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Automotive & Transportation





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The Specialist in Electronic Component Distribution

Why Choose TTI?

Why Buy from TTI?

Founded in 1971, TTI has steadily grown to become a world leading specialist distributor of electronic components. The company was founded on the premise that passive component purchasing could be made more efficient by offering product specialisation, customer-driven service and proprietary supply chain solutions.

Product Knowledgeable Experts

Our unique specialisation enables us to provide significantly better product knowledge to support manufacturing from design chain to supply chain. TTI's commitment to this specialty and our customers is as dedicated today as always.

Broader and Deeper Inventories

TTI maintains extensive inventories, stocking more than 2M part numbers globally – that's more connector, passive, electromechanical, discrete, sensor and power supply inventory available than from any other source.

Leading Edge Technology Products

TTI partners with manufacturers that lead the industry in new component technologies and can help solve any design challenge. We ensure the very latest and most technologically-advanced products are readily available from stock.

Supply Chain Excellence

From technical application advice to customised logistical solutions; TTI can add value throughout the supply chain by reducing acquisition costs, improving material flow through forecast analysis, provide safety stock and reduce receipt handling through consolidated shipments. We provide the BOM coverage necessary to deploy comprehensive supply chain solutions that reduce total cost of ownership and mitigate line down risk.

Global Distribution Centres

Our European headquarters is located just outside of Munich, Germany in Maisach-Gernlinden. In total, we have more than 35,000m² of dedicated warehouse space and local sales and technical support in over 40 locations across Europe.

TTI has more than 120,000m² of automated warehousing in North America, Europe and Asia. All are linked into a global warehouse management system that provides superior customer service and overall business efficiencies. Wherever you are in the world, TTI can support you.

Quality and Reliability

TTI is the first distributor to have all global warehouse locations ISO registered and certified to ISO 9001 and ISO 14001 Standards. TTI Europe is also certified to EN9120/EN9100, IECQ-CECC and ISO/IEC 27001 Standards. Additionally, all of our European sales branches are ISO 9001 certified. TTI has one global documentation system that ensures that every TTI branch and warehouse in the world follows the same processes.

Year after year, customers rate our inventory availability, on-time delivery and accuracy among the very best in the industry – contact us today to find out what a true specialist has to offer.



Global Distribution Centres with more than **120,000m²** of automated warehousing in North America, Europe and Asia.





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Broadest and Deepest Inventory



Connectors

Automotive & Transportation Connectors

By Product Type

	3M	Amphenol	AVX	Aptiv	Harwin	HellermannTyton	ITT Cannon	JAE	JST	Kyocera	Molex	Panduit	Phoenix Contact	PKC Group	Radiall	Smiths Interconnect	SOURIAU	TE Connectivity	Weidmüller	
Board-to-Board																				
Circular – Metal																				
Circular – Sealed																				
Circular – Unsealed																				
Contacts																				
EV/HEV – High Power																				
EV/HEV – 48V Connectors																				
EV/HEV – Charging Couplers																				
Fibre Optic Products																				
FFC/FPC Connectors																				
Fuse/Lamp Holders																				
Input/Output																				
ISO – Agricultural/Trailer Connectors																				
Multimedia / Convenience Port																				
Memory Card																				
Modular Blocks																				
Rail - High Reliability Power																				
Rail - Signal Connectors																				
Relay Holders																				
RF - Coax / Microwave																				
RF - FAKRA / HSD																				
Rectangular - Heavy-Duty																				
Rectangular - Sealed																				
Rectangular - Unsealed																				
Automotive Sensor Interconnects																				
Solderless Terminals																				
Terminal Blocks																				
Tooling																				
Wire & Cable																				
Wire Management - Fixing & Identification																				
Wire-to-Board																				
Wire-to-Wire																				

By Market Segment

	3M	Amphenol	AVX	Aptiv	Harwin	HellermannTyton	ITT Cannon	JAE	JST	Kyocera	Molex	Panduit	Phoenix Contact	PKC Group	Radiall	Smiths Interconnect	SOURIAU	TE Connectivity	Weidmüller	
Agriculture																				
Automotive																				
Commercial Vehicles																				
Construction & Mining																				
Electric / Hybrid Vehicles																				
Rail / Mass Transit																				
Marine																				
Military / Aerospace																				
Recreational Vehicles																				

Backplane, Board-To-Board & Device-To-Board Backplane

	3M	Amphenol	AVX	Harwin	ITT Cannon	JAE	JST	Molex	Preci-Dip	Radiall	Smiths Interconnect	SOURIAU	TE Connectivity
10 Gb/s+ Solutions													
2.00mm Assemblies (Backplane)													
ATCA/MicroTCA													
Cable Assemblies													
Card Edge													
Compact PCI													
DIN 41612 (Eurocard)													
Fiber Optic													
Future Bus													
Hard Metric													
PCI Express													
Power													
RF / Ganged RF													
SCA-2													
Board-To-Board													
Ball Grid Array (BGA)													
Battery Connectors													
Board Stacking													
Breakaway Headers													
Compression													
Headers & Receptacles													
Mezzanine / FPC													
Power													
SCSI													
Shunts													
Stacking													
Device-To-Board													
DIMM													
DIP													
PCMCIA													
PGA													
PLCC													
RIMM / DIMM / SIMM													
SIP													
SO DIMM & RIMM													
Test / Burn-In Sockets													
Transistor													

Cable & Wire/ Management

	3M	Amphenol	AVX	HellermannTyton	JAE	JST	Kyocera	Nexans	Panduit	Phoenix Contact	Radiall	Smiths Interconnect	SOURIAU	TE Connectivity	Weidmüller
Cable & Wire															
Cable Assemblies															
Coaxial (RF)															
EV/HEV - High Power															
Fiber Optic															
Flat Flex (FFC, FPC)															
Flat Ribbon															
Modular - Flat															
Multiple Conductor															
Single Conductor (Wire)															
Cable & Wire Management															
Accessories															
Bushings, Grommets															
Cable and Cord Grips															
Cable Braids															
Cable Ties															
Clamps and Clips															
Cold Shrink Tape, Tubing															
Heat Shrink Boots and Tubing															
Identification - Labels and Markers															
Solid Tubing and Sleeving															
Spiral Wrap and Expandable Sleeving															
Splice Enclosures and Protection															

Connectors

Input/Output	3M	Amphenol	API (Spectrum Control)	AVX	Carlisle / Tri-Star	Aptiv	Glennair	ITT Cannon	Harwin	JAE	JST	Molex	Phoenix Contact	Pulse	Radiall	Smiths Interconnect	SOURIAU	TE Connectivity	Weidmüller	
1394 & 1394b																				
Audio																				
Audio ¼" Phone																				
Audio 3.5mm PCB																				
Audio BNC 75ohm																				
Audio XLR																				
Audio MP Multipin																				
Camera Link/Mini Camera Link																				
Circular																				
Combo I/O																				
Display Port																				
D-Subminiature																				
DVI																				
Fiber Channel																				
Fiber Optic																				
Filtered I/O																				
HDMI / Micro HDMI																				
Ipass (Mini SAS)																				
InfiniBand®																				
M12 / M12D / M8																				
Micro D																				
Mini DIN / Circular DIN																				
Mini D-Subminiature																				
Mobile Systems																				
Modular Plugs & Jacks																				
PCI Express																				
Power																				
Push / Pull																				
Rectangular																				
RF / Coax / Microwave																				
RJ / Industrial Ethernet																				
SATA / SAS / Mini SATA																				
SCSI																				
SFP / XFP																				
TDP																				
USB / Mini USB / USB OTG																				

Memory Card Connectors	3M	Amphenol	AVX	C&K Components	JAE	JST	Molex	Panasonic Industry	TE Connectivity
CompactFlash™									
DDR/DDR2/Mini DDR2/DDR3									
Express Card									
Memory Stick / Duo									
Micro SD									
Mini SD									
MMC									
PC Card / CardBus									
PCMCIA									
SD (Secure Digital)									
Smart Card (SIM)									
xD									

Military & Avionics Specifications	Amphenol	Glennair	ITT Cannon	Smiths Interconnect	SOURIAU	TE Connectivity
EN2997 / ESC						
EN3645						
EN4165						
HE301						
HE308						
MIL-22992						
MIL-DTL-26482 Series 1 Crimp						
MIL-DTL-26482 Series 1 Solder						
MIL-DTL-26482 Series 2						
MIL-DTL-27599 Solder						
MIL-DTL-28840 Shipboard						
MIL-DTL-38999 Series I & II						
MIL-DTL-38999 Series III						
AS50151						
MIL-DTL-55302						
MIL-C-81511						
MIL-DTL-83723						
Hermetics						
VG95234						
VG95328						
VG96912						
VG96929						

Military Connectors & Accessories	Amphenol	Carlisle / Tri-Star	Glennair	ITT Cannon	HellermannTyton	Molex	Pendut	Preci-Dip	Radiall	Smiths Interconnect	SOURIAU	TE Connectivity
Backshells & Accessories												
Coax/RF												
Contacts												
D-Subminiature												
Discrete Sockets												
Filtered Audio Connector												
Micro D												
Rack & Panel												
Sealed Plugs												
Microwave												
Terminal Blocks												
Terminals												
Tools												

Connectors

RF/Coaxial/ Microwave

	3M	Amphenol	Carlisle / Tri-Star	ITT Cannon	JAE	JST	Molex	Radiall	Smiths Interconnect	SOURIAU	TE Connectivity
1.0 / 2.3											
1.6 / 5.6											
7/16											
BMA											
BNC (50/75Ω)											
BNC (Miniature)											
B to B Blindmate/Compression											
BSA											
FAKRA											
MCX / MMCX											
MHV / SHV											
Precision1											
QMA											
Reverse Polarity2											
Shielded Terminators											
SMA											
SMB (50/75Ω)											
SMB (Miniature)											
SMC											
SMP											
SMT											
SSMA											
TNC											
Triax											
Twinax											
Type F/G											
Type N											
UHF / MiniUHF											

Speciality Connectors

	3M	Amphenol	API (Spectrum Control)	AVX	Carlisle / Tri-Star	Aptiv	Glenair	ITT Cannon	Harwin	HellermannTyton	JAE	JST	Molex	Phoenix Contact	Smiths Interconnect	SOURIAU	Swisher	TE Connectivity	Weidmüller	
Automotive																				
Battery																				
COTS																				
EMI Shielded																				
Filtered																				
Harsh Environment																				
Hermetic																				
High Voltage																				
Industrial																				
LED Connector																				
Micro Miniature / Nano																				
Motor Connectors																				

Terminal Blocks

	Amphenol	API (Spectrum Control)	Molex	Phoenix Contact	SOURIAU	TE Connectivity	Weidmüller
Barrier Strips							
Europa							
Eurostyle – Fixed / Pluggable							
2.54mm							
3.50mm							
3.81mm							
5.00mm							
5.08mm							
Filtered							
Interface Modules							
Phenolic							
Rail Mounted							
Screw Terminal							
Spring Clamp							

Wire & Board Management/ Accessories

	3M	Amphenol	Carlisle / Tri-Star	Glenair	ITT Cannon	Harwin	HellermannTyton	JAE	JST	Molex	Panduit	Phoenix Contact	Preci-Dip	SOURIAU	TE Connectivity	Weidmüller
Backshells					*											
Cable Clips																
Cable Management																
Cable Marker Ties																
Cable Mounts																
Cable Spacers																
Cable Terminals																
Cable Ties																
Heat Shrink Products																
Jumper Links																
Labelling Systems																
Labels																
PCB Spacers																
PCB Terminals																
Printers/Software and Ribbons																
RFI Clips & Spring Fingers																
Shorting Links																
Solderless Terminals																
Splices																
Stainless Steel Accessories																
Test Points																
Tooling																
Wire & Cable																
Wire Ducting																

Wire-To-Board/ Wire-To-Wire

	3M	Amphenol	AVX	Aptiv	Glenair	Harwin	JAE	JST	KYOCERA	Molex	Phoenix Contact	Smiths Interconnect	SOURIAU	TE Connectivity	Weidmüller
1.25mm															
1.27mm															
2.00mm															
2.50mm															
2.54mm															
3.00mm															
3.96mm															
4.00mm															
4.20mm															
5.00mm															
5.03mm															
5.08mm															
6.35mm															
7.50mm															
9.00mm															
10.00mm															
Bus Bar															
Cable Assemblies															
Discrete Wire															
FFC / FPC															
IDC Discrete Wire															
IDC / Mass Termination															
Mini D Ribbon / Champ															
Power															
SATA / SAS / Mini SATA															
SCSI I, II, III															

Diodes	AVX	Bourns	Littelfuse	Panasonic	Toshiba	TT Electronics	Vishay
Protection							
Arrays		■	■		■	■	■
ESD Protection		■	■		■	■	■
TVS	■	■	■		■	■	■
TVS Diodes Arrays		■	■		■	■	■
Zener		■	■		■	■	■
Standard							
Arrays		■	■		■	■	■
PIN Diodes		■	■		■	■	■
Schottky	■	■	■		■	■	■
Small Signal		■	■		■	■	■
Switching		■	■		■	■	■
Rectifiers							
Bridge		■	■		■	■	■
Standard		■	■		■	■	■
Fast		■	■		■	■	■
Ultrafast		■	■		■	■	■
Schottky	■	■	■		■	■	■
Silicon Carbide		■	■		■	■	■
Modules							
Bridge							■
Diode							■
IGBT			■				■
Thyristor			■				■
MOSFET							■
Dice Solutions							
Rectifiers							■
High Voltage Diodes							■
Schottky Diodes			■				■
TVS Diodes			■				■
Thyristors							■

IC's	Bourns	Kingbright	Littelfuse	Toshiba	TT Electronics	Vishay
IC's						
LED Driver						■
Logic IC's				■		
Analog Switch						■
DC/DC Converter						■
Non-Isolated DC-DC Switching Regulators						■
Voltage Regulator						■
Power Stage Integrated Driver plus MOSFETs						■
Smart Load Switches						■
Slew Rate Control						■
Current Limit						■
True Bi-Directional						■
Evaluation and Demo Tools						
Buck Converter						■
Simulation Software						■
BOM Crossing						■
Samples ex stock TTI NPIs	■	■	■	■	■	■

Design Support	Bourns	Kingbright	Littelfuse	Toshiba	TT Electronics	Vishay
Evaluation and Demo Tools						
LED Demo Boards			■			
Ambient Light Sensor Evaluation Board						■
Mid Range Ambient Light & Proximity Sensor Board					■	■
Short Range Ambient Light & Proximity Sensor Board					■	■
UV-A+B Sensor Evaluation Board					■	■
RGBW Sensor Evaluation Board					■	■
Buck Converter	■					
Simulation Software	■					
BOM Crossing	■					
Samples ex stock TTI NPIs	■	■	■	■	■	■

Opto Electronics	Kingbright	Panasonic	TT-Electronics	Toshiba	Vishay
Visible LEDs					
High Power LEDs		■			■
Standard LEDs – SMD		■	■		■
Standard LEDs – SideView SMD		■			■
Standard LEDs – Through Hole 1.8/3/5mm		■			■
LEDs – Bicolour		■			■
LEDs – RGB		■			■
LEDs – Ultra Violet		■			■
Infrared Emitter					
Infrared Emitters		■	■		■
Infrared Emitters – High Power			■		■
Optical Detectors and Sensors					
Ambient Light Sensors					■
Proximity Sensors					■
Ambient Light and Proximity Sensors				■	■
Photo IC					■
Photo Diodes		■		■	■
Photo Transistors		■		■	■
RGBW Sensors					■
UV-A+B Sensor					■
UV-C Sensor					■
Transmissive Sensor				■	■
Biometrical Sensor					■
Reflective Sensor					■
Fibre Optic				■	■
Infrared/Human Presence Detection				■	■
Infrared Communication					
Infrared Receiver Modules					■
IRDC Components					■
Evaluation and Demo Tools					
LED Demo Boards		■			
Ambient Light Sensor Evaluation Board					■
Mid Range Ambient Light and Proximity Sensor Board					■
Short Range Ambient Light and Proximity Sensor Board					■
UV-A+B Sensor Evaluation Board					■
RGBW Sensor Evaluation Board					■
Dice Solutions					
IR Emitters					■
Photo Detectors					■
Optocoupler Solutions					
Opto Couplers/Isolators		■			■
Phototransistor Output					■
Photodarlington Output					■
Optocoupler with AC Input					■
Linear					■
Phototriac Output					■
High Speed					■
IGBT Driver					■
MOSFET Driver					■
Isolated IPM Driver					■
Solid State Relays					■
Analog Switches					■
IC's					
LED Driver					■
Modules and Displays					
Display Modules					■
LCD Displays					■
LED Displays					■
OLED Displays					■
Plasma Displays					■
7-Segment Displays					■
LED Dot Matrix Displays		■			■
LED Modules					■

Electromechanical

Relays & Circuit Breakers

	IDEC	KEMET	Littelfuse	Omron	Parasonic Industry	Radiall	Standex Meder	Sensata - Crydom	TE Connectivity
Relays									
Automotive									
Communication									
Contactors									
Control									
Counters									
Crystal Can									
Definite Purpose Contactors									
DIN Rail Mounted									
Force Guided Contact									
General Purpose									
High Frequency Relays									
High Voltage									
Industrial DC & AC									
Input / Output Modules									
Magnetic Latching									
Microwave									
Military / Space									
Miniature PCB									
MOSFET									
Panel/Plug-In									
Power									
Reed									
Safety									
Signal									
Sockets									
Solid State Relays									
Time Delay									
Circuit Breakers									
Magnetic Circuit Breakers									
Thermal Circuit Breakers									

Switches

	Alps Alpine	APEM/ IDEC	Bourns	C&K	Honeywell	Littelfuse	Omron	Parasonic Industry	Standex Meder	TE Connectivity
Analog										
Counters / Hour Meters										
Detection										
DIP										
Emergency Stop										
Encoder										
Fader										
Industrial										
Joystick										
Keylock / Switchlock										
Key Switch										
Knob Switch										
Limit										
Mil / Aero / Space Grade Level										
Navigation Switches										
Pushbutton										
Pushwheel / Thumbwheel										
Rocker										
Rotary										
Safety										
Selector										
Slide										
Snap Action										
Special Purpose										
Tactile										
Toggle / Paddle										
Wireless Limit										

Passives – Capacitors

Aluminium

	AVX	Cornell Dubilier	Eaton (Cooper Bussmann)	KEMET	Lelon	Murata	Nichicon	Panasonic Industry	TDK	Vishay (ECCcomponents)
AC Motor Start		●								■
Axial Electrolytic		●			■					●
EDLC / Supercapacitor				■						■
FlatPack Electrolytics		▲								■
High Rel		●								●
Polymer		■			■					■
Radial Miniature		●			■					●
Screw Terminal		■			■					■
Snap-In		■			■					■
Surface Mount		■			■					■

Ceramic

	API Technologies	AVX	ATC	Cornell Dubilier	KEMET	Knowles (Syfer)	Murata	Samsung	TDK	Tusonix	Vishay	BCcomponents	Ceramate	Vitamon	Yageo
Arrays	■	●			■	■	■	■	■	■					■
Dip 2-Pin		■													
Disc				■	■	■	■	■	■	●	■	■			■
High Cap		●			●	■	■	■	■		●			●	■
High Q	■	■	■		■	■	■	■	■						■
High Rel	●	●	●		●	●	■	■	■	●	●				■
High Temperature		●			●	■	■	■	■		■				■
High Voltage	■	■		■	■	■	■	■	■		■				■
Low Inductance		■			■	■	■	■	■		■				■
Multi-Layer	■	●			●	●	■	■	■		■			●	■
RF / Microwave		■	■												■
Safety		■			■	■	■	■	■		■				■
Single Layer			■			■	■	■	■		■				■
Switch Mode	■	■			■	■	■	■	■		■				■
Tip 'n' Ring		■			■	■	■	■	■		■				■
Trimmer					■	■	■	■	■	■					■

Film & Mica

	API Technologies	AVX	Cornell Dubilier	KEMET	Nichicon	Panasonic Industry	TDK	Vishay	BCcomponents	Draloric	Roederstein	WIMA
High Rel	●	●	●	●				●				
Film												
Motor Run			■	■	■	■	■	■				
Polyester		■	■	■	■	■	■	■	■	■	■	■
Polypropylene		■	■	■	■	■	■	■	■	■	■	■
Power Film			■	■	■	■	■	■	■	■	■	■
Snubber			■	■	■	■	■	■	■	■	■	■
Suppression X-Y (Safety Cap)	■		■	■	■	■	■	■	■	■	■	■
Surface Mount		■	■	■	■	■	■	■	■	■	■	■
Mica												
Metal Clad			●									
Mica			●									
Surface Mount			●									

Tantalum

	AVX	Cornell Dubilier	KEMET	Panasonic Industry	Vishay	Sprague	Transitor
Micro-Chip	■	■	■	■	■	■	■
Conformal Coated Chip	■	■	■	■	■	■	■
Dipped Radial		■	■	■	■	■	■
Fail Safe / Fused Chip		■	■	■	■	■	■
Hermetic Through Hole		■	■	■	■	■	■
High Rel		●	●	●	●	●	●
High Temperature Chip		●	●	●	●	●	●
Low ESR Chip		●	●	●	●	●	●
Low Profile Chip		●	●	●	●	●	●
Moulded Chip		●	●	●	●	●	●
Moulded Through Hole		■	■	■	■	■	■
Niobium Chip		■	■	■	■	■	■
Polymer Chip		●	●	●	●	●	●
Solid Metal Case Through Hole		■	■	■	■	■	■
Supertan					■	■	■
Wet Through Hole	●				●	●	●

- Lead-free only parts available
- Lead & Lead-free compliant parts available
- ▲ Lead-only compliant parts available

Passives – Electromagnetics

Protection Devices

	AVX	Bourns	Eaton	KOA	Litel/fuse	Murata	Panasonic Industry	TDK	EPCOS	Vishay	BC-Components	Dale
Overcurrent												
Axial (PICO) Fuses												
Automotive (Blade) Fuses												
Cartridge Fuses												
NTC Thermistors												
Power (Electrical) Fuses												
PTC Thermistors												
Radial Leaded Resettable Fuses (PPTC)												
Radial Subminiature Fuses												
SMT Resettable Fuses (PPTC)												
Surface Mount (125V+) Fuses												
Telecom Resettable Fuses (PPTC)												
Thermal Cutoffs (TCO)												
Thin Film (Chip) Fuses												
Over Voltage												
Gas Discharge Tube (GDT)												
Line Protection Networks												
Polymer ESD Suppression												
Protection Thyristors												
Surface Mount Varistors (MLV)												
Thermal (MOV)												
Through-Hole Varistors (MOV)												
TVS Diodes												
TVS Diodes Arrays												

EMI/RFI & RF

	Amphenol	API Technologies (Spectrum Control)	AVX	KEMET	Molex	Murata	Panasonic Industry	Pulse	TDK	EPCOS	TE Connectivity	Tusonix (CTS)	Yageo
EMI / RFI Filters													
Feed-Thru Filters													
RF / Microwave Filters													
SAW Filters													
Surface Mount Filters													
RF / Wireless Antennas													

Ferrites / Inductors / Transformers

	API Delevan	ATC	AVX	Bourns	Eaton (Coiltronics)	KEMET	KOA	Murata	Panasonic Industry	Pulse	Samsung	TDK	EPCOS	TT Electronics (BI Tech)	Vishay	Yageo
Air Coil Inductors																
Common Mode Chokes																
Custom Inductors																
Ferrite Beads																
Ferrite Cores / Clamp Filters																
High Current Inductors																
Leaded Inductors																
Military Inductors																
Multilayer Inductors																
Power Inductors																
RF Inductors																
Thin Film Inductors																
Toroid Inductors																
Transformers																
Wirewound / Coil Inductors																

Sound Devices

	KYOCERA	Murata	Panasonic Industry	TDK
Buzzer				
Microphone				
Receiver				
Ringer				
Sensor				
Sounder				
Speaker				

Frequency Control

	KYOCERA	Murata	Panasonic Industry	Samsung	TDK	Vishay (Dale)
Crystals						
Oscillators						
Piezo Sound Devices						
Resonators						
Tuning Forks						

- Lead-free only parts available
- Lead & Lead-free compliant parts available
- ▲ Lead-only compliant parts available

Passives – Resistors

Film	Bourns	KOA	OHMITE	Panasonic Industry	TE Connectivity	TT Electronics	BI Technologies	IRC	Welwyn	Vishay	Angstrom	BC-components	Dale	Electro-Films	Huntington/Milwaukee	Sternice/MB	Techno	Thin Film	Vishay Precision Group	Yageo	
Chip Array	■																				
Discrete Chip			●																	●	
Flame Proof	■	■	●																		
Fusible			■																		
High Rel	●		●																		
High Temp	■	■	●																		
High Voltage		■	●																		
Matched Sets			■																		
Melf/Cylindrical		■	■																		
Metal Film	■	■	●																		
Metal Glaze		■	■																		
Metal Oxide		■	●																		
Precision	■	■	●																		
Thick Film Chip	■	■	●																		
Thin Film Chip	■	■	●																		
Trimmable			■																		
Voltage Divider	■	■	■																		

Network	Bourns	KOA	Panasonic Industry	TE Connectivity	TT Electronics	BI Technologies	IRC	Welwyn	Vishay	Dale	Electro-Films	Huntington/Milwaukee	Techno	Thin Film	Vishay Precision Group	Yageo
Array	■															
Conformal Coated	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Custom			■	■	■	■	■	■	■	■	■	■	■	■	■	■
High Rel	●		■	■	■	■	■	■	■	■	■	■	■	■	■	■
Integrated Passive	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Ladder	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Line Protection	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Moulded	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Resistor/Capacitor	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SMT	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Surge	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Thick Film DIP	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Thick Film SIP	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Thin Film DIP	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Thin Film SIP	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Potentiometers/ Trimmers	Bourns	Honeywell	Knowles (Syfer)	Murata	OHMITE	Panasonic Industry	TE Connectivity	TT Electronics (BI Tech)	Tusonix	Vishay	BC-components	Dale	Sternice/MB	Spectrol	Vishay Precision Group
High Rel	●		●		●			●	●	●					●
Trimming Potentiometers															
Adjustment Tools	■														
Carbon	●			■			■	■							
Cermet	●	●		■		■	■	■	■	■			■		
Counters															
Dials / Knobs	■														
Multi-Turn	●			■			■	■			■				
Open Frame	●			■			■	■							
Open Frame Slide															
Sealed Frame	●			■			■	■							
Single-Turn	■			■			■	■							
Wirewound	▲														
Precision Panel Control															
Carbon	■														
Cermet	■	■													
Conductive Plastic	■	■													
Knobs	■				■										
Hybrid	■				■										
Linear	■														
Metal Foil															■
Modular															
Motor Pot															
Multi-Turn	■				■										
Non-Linear	■														
Rheostat	■				■										
Rotary	■	■			■										
Sealed Frame	■														
Single-Turn	■				■										
Wirewound	■	■			■										
High Rel	●				●										●
Sensor / Encoder															
Attenuator															
Encoders		■	●												
Linear Motion															
Rotary			●		■										

Power / Wirewound / Carbon & Foil	ATC	AVX	Bourns	KOA	OHMITE	Panasonic Industry	TE Connectivity	TT Electronics	BI Technologies	IRC	Welwyn	Vishay	Dale	Huntington/Milwaukee	Sternice/Mob	Thin Film	Vishay Precision Group	Yageo
High Rel		●	●	■	●			●					●					●
Power / Wirewound																		
Brackets / Hardware					●		■											
Ceramic Composition					■		■											
Commercial					●		■		■									
Current Sense / Low Resistance			■		■		■		■									
Industrial					■		■		■									
Precision					■		■		■									
Rheostat			■		■		■		■									
Special Purpose	■				■		■		■									
Tubular					■		■		■									
Vitreous Enamel					■		■		■									
Carbon																		
Carbon Composition					●		■		■									
Carbon Film					■		■		■									
Foil																		
Bulk Metal Foil																		●

- Lead-free only parts available
- Lead & Lead-free compliant parts available
- ▲ Lead-only compliant parts available



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Connectors

3M™

3M

Product	Series & Description	Features & Benefits	Applications
3M™ D-Sub I/O Connectors (Delta Sub)			
	8200 (Plug) 8300 (Socket) Robust and approved input/output connectors	<ul style="list-style-type: none"> • Available in either open or closed end cover • Available with dimples to aid in EMI/ESD protection • Improved metal strain relief hooks directly to metal shell • Low profile • Four mounting options as protection for shock and vibrations • Diverse shell options for flat and round cables 	<ul style="list-style-type: none"> • Industrial process measurement and control • I/O connections of cabinets and devices • Board-to-board and wire-to-board applications • Traffic control and information system • Connections in harsh environment • Automobile service terminals
3M™ Mini Delat Ribbon Connectors			
	101 and 102 High density I/O connector	<ul style="list-style-type: none"> • Wiper-on-wiper contact for reliable repetitive plugging • MDR digital LCD interface as a 20 or 26 contact connector • Accepts a wide variety of cable constructions e.g. flat, round, twisted pair and twinax cables • Accepts a wide variety of shielded junction shells • Contacts: 14, 20, 26, 36, 40, 50, 68, 80 and 100 • Much smaller shape than D-Dub connectors 	<ul style="list-style-type: none"> • Automobile diagnostic systems • Automobile service terminals • I/O connections of cabinets and devices • High Speed transmission systems (e.g. LVDS, Camera Link®) • Traffic control and information systems • Connections in harsh environments
3M™ SD-Card and MicroSD-Card Connectors			
	SD and MicroSD Memory Card Connectors Top mount, push-push type card connector	<ul style="list-style-type: none"> • Compatibility with both SD card and multi media card format • Card polarisation against wrong card insertion • Card locks after it is mated • Prevents the wrong card/incorrect insertion • Easy manual operation of insertion and extraction of card • Metal shielded case 	<ul style="list-style-type: none"> • Mobile or fixed storage applications • Storage of telemetry data • Updating of board computer software • Applications where software has to be updated
3M™ Mini Clamp II Connectors			
	Mini Clamp II, Plug and Socket Connectors Simply connected solution	<ul style="list-style-type: none"> • Designed to accommodate typical wiring specifications • Easy, quick and reliable IDC termination • Integrated cable retention • No special tooling needed • Compact design saves board space • Latch helps enable rugged field termination 	<ul style="list-style-type: none"> • I/O applications in sensor control systems, factory automation, industrial controls, transportation • Interconnection in lighting systems • Automobile service terminals • Traffic control and information system
3M™ Twin Axial Cable with CiS-Twinfix-Connector			
	Twinfix plus Twinax cable Truly flexible: connect – clamp – complete	<ul style="list-style-type: none"> • Thin profile and flexibility improves airflow and reduces cost of energy • Cost-effective alternative vs soldering • Flexible cable solutions = reduction of inventory • Potential cost savings by elimination of FR4 and redriver • Reliable high speed performance • Clamping interlock is closed and the ZIF connection is established 	<ul style="list-style-type: none"> • Dashboard application • Entertainment systems • Navigation systems • Air conditioning • Diagnostic equipment • Control units
3M™ Halogen Free Cable			
	HF017 Human and environment safety	<ul style="list-style-type: none"> • Low Smoke Zero Halogen (LSZH) Insulation • LSZH insulation reduce the risk to firefighters • Reduce the soot and corrosion damage to nearby equipment • 360° expanded copper shielding • Primary cable is zippable for branching or discrete terminations • 28 AWG stranded wire on .050inch centres permits mass termination to broad line of IDC connectors 	<ul style="list-style-type: none"> • Public service vehicles like railway, tramway, bus • Traffic engineering • Traffic control and information system • Car-park routing • Automobile service terminals




Product	Series & Description	Features & Benefits	Applications
Netbridge™ Connector System			
	Compliant with Us-car-2 specifications for automotive applications	<ul style="list-style-type: none"> • 0.5mm x 0.4mm terminal system • Temperature range +105°C in sealed and unsealed • Sealing class IP68/IP69K • Optional ESD shielding and CPA for secondary lock • Able to crimp both UTP and STP cables 	<ul style="list-style-type: none"> • Body control, safety, security and comfort • Advanced driver assistance Systems (ADAS) • Telematics, multi-media, infotainment, GPS and camera
HSbridge Connector System			
	Compliant with USCAR EWCAP & USCAR-2 specifications for automotive applications	<ul style="list-style-type: none"> • USCAR EWCAP & USCAR-2 compliant • Supports LVDS, USB 2.0, HDMI, VGA and display port • Patent protected assembly design • Resistance to reflow soldering temperatures • Compatible with other competing products 	<ul style="list-style-type: none"> • Body control, safety, security and comfort • Advanced driver assistance systems (ADAS) • Telematics, multi-media, infotainment, GPS & camera
HSD (High Speed Data) Connector System			
	Compliant with USCAR-2 specifications for automotive applications	<ul style="list-style-type: none"> • USCAR-2 compliant • 2.5x enhanced retention force • Patent protected assembly design • Resistance to reflow soldering temperatures • Compatible with other competing products 	<ul style="list-style-type: none"> • Body control, safety, security and comfort • Advanced driver assistance systems (ADAS) • Telematics, multi-media, infotainment, GPS & camera
Autolock FPC Connector			
	Single action auto-locking FPC	<ul style="list-style-type: none"> • 0.5mm pitch reliable and robust solution • Auto-locking mechanism • Poka Yoke insertion mechanism • High speed data rate up to 5Gb/s 	<ul style="list-style-type: none"> • Advanced driver assistance systems (ADAS) • Telematics, multi-media, infotainment, GPS & camera
Bergstak® 0.40mm Floating Board-To-Board Connector			
	3-Axis floating feature, shielded design	<ul style="list-style-type: none"> • Fine pitch design at 0.4mm • Supports speed performance up to 3Gb/s • Floating range of ±0.40mm in the X, Y and Z directions • Shielded design for superior EMI performance • Polarised key for Poke Yoke mating 	<ul style="list-style-type: none"> • Body control, safety, security and comfort • Advanced driver assistance systems (ADAS) • Telematics, multi-media, infotainment, GPS & camera
Minitek Microspace™ Crimp-To-Wire Connector			
	Compact, robust and versatile connector system	<ul style="list-style-type: none"> • Available in 1.8, 1.5 and 1.27mm pitch sizes • LV214 severity-2 compatible • Terminal positioning assurance (TPA) • Primary and secondary contact retention • Connector positioning assurance (CPA) • Keying to prevent visual mismatching 	<ul style="list-style-type: none"> • Body control, safety, security and comfort • Battery management systems • EV charging stations • Advanced driver assistance systems (ADAS) • Head and interior LED lighting • Telematics, multi-media, infotainment, GPS & camera

Product	Series & Description	Features & Benefits	Applications
ATV Series™			
	A-Series™ 18 position heavy duty connectors	<ul style="list-style-type: none"> • 18pole version in the well-established A-Series connector system • Cable-to-Cable solution as flange mount or In-line connection • Up to 13A per contact • Contact Size 16 with wire range of 14–22 AWG • Compatible with other industry standard mating connectors 	<ul style="list-style-type: none"> • Construction equipment • Agricultural machines • Utility vehicles
Armor IPX™			
	A-Series™ Sealed circuit board enclosures	<ul style="list-style-type: none"> • Plastic enclosure boxes and PCB headers • Easy click-in solution • PCB headers with AT and ATM 12 pole interfaces • Optional venting available • IP67 and IP69K rated • Compatible with other industry standard mating connectors 	<ul style="list-style-type: none"> • Electronic controls and calculators • Agricultural machines • Construction equipment • Utility vehicles
HyperBuss™			
	A-Series™ Heavy duty busbed receptacles	<ul style="list-style-type: none"> • Available in 2, 4, 6, 8 and 12 position in-line receptacles • Sealed integrated busbed feedback assembly • Different buss versions available • Mate with standard AT series plugs • Busbed feedback receptacles used as a splice block or tap block • Compatible with other industry standard mating connectors 	<ul style="list-style-type: none"> • Construction equipment • Agricultural machines • Utility vehicles
BoardLock™			
	A-Series™ PCB header family	<ul style="list-style-type: none"> • Flanged or flangeless • 180° straight or 90° right angle pin orientation • Snap-lock or screw-lock mounting • Potted or unpotted • IP67 rated • Compatible with other industry standard mating connectors 	<ul style="list-style-type: none"> • Electronic controls and calculators • Agricultural machines • Construction equipment • Utility vehicles
Isobus Implement Connector			
	A-Series™ Isobus implement connector for agriculture	<ul style="list-style-type: none"> • Compatible to ISO 11783-2 • #8 power contacts for 6/10/16mm² wire gauge • Machined and stamped contacts #12 & #16 available • Rapid and secure assembly • Field installable cable connectors as well as overmolded cable assemblies available • Compatible with other industry standard mating connectors 	<ul style="list-style-type: none"> • Agriculture • Standardized connection between tractor and implement according to ISO 11783-2
Duramate™ AHDM			
	A-Series™ Metal circular connectors for heavy duty applications	<ul style="list-style-type: none"> • Circular multi-pole hybrid connector • Economical quick-connect bayonet locking system • Robust metal shell, Size 18 and 24 • 15 different contact arrangements for signal/mixed power • IP67 and IP69K rated • Compatible with other industry standard mating connectors 	<ul style="list-style-type: none"> • Construction equipment • Agricultural machines • Utility vehicles

Product	Series & Description	Features & Benefits	Applications
Excel Mate			
	<p>HVSL High power rectangular plastic connector for high voltage electric vehicles</p>	<ul style="list-style-type: none"> • Available for 23A up to 350A • Rated voltage up to 1.000V • IP67 mated • HVIL contacts included • Multiple coding options 	<ul style="list-style-type: none"> • High voltage battery • Inverter • Motor • Power distribution boxes • Auxiliary devices
Excel Mate PT			
	<p>HVPT High voltage shielded pass trough</p>	<ul style="list-style-type: none"> • Available in 1, 2 and 3 pole • Wire gauge range from 25–70mm² • 360° shielding • IP67, IP6K9K • Mechanical coding options 	<ul style="list-style-type: none"> • Power distribution unit • Inverter • Electric motors
Excel Mate Metal			
	<p>HVSLS Metal rectangular connector for high voltage</p>	<ul style="list-style-type: none"> • For up to 180A • Wire gauge range from 16–50mm² • IP67 mated • 360° shielding • HVIL included • Multiple coding options 	<ul style="list-style-type: none"> • Battery packs • Inverter • Power distribution box
Excel Mate Mono			
	<p>HVBI Circular push-pull connector for high voltage</p>	<ul style="list-style-type: none"> • For up to 250A • Wire gauge range from 16–70mm² • Push pull locking system with audible click • IP67 mated • HVIL contacts included • Multiple coding options 	<ul style="list-style-type: none"> • HVAC • Power distribution box • Inverters • Battery packs
Excel Mate MSD			
	<p>MSD Manual service disconnect for high voltage electric vehicles</p>	<ul style="list-style-type: none"> • 3 different types – MSD, MINIMSD and MSDXL • Fuses for up to 630A • Rated voltage max with Fuse 1.000V • Rated voltage max without Fuse 1.500V • IP67; IP6K9K mated • HVIL contacts included 	<ul style="list-style-type: none"> • High voltage battery • Power distribution units
Excel Mate CC			
	<p>HVCO IEC CCS2 charging connectors for electric vehicles</p>	<ul style="list-style-type: none"> • Current ranges 65, 125 and 200A • 10.000 mating cycles • IP44 mated • Equipped with temperature sensor • LED on vehicle inlet 	<ul style="list-style-type: none"> • Electric vehicles • Charging stations




Amphenol Industrial

Amphenol Industrial

Product	Series & Description	Features & Benefits	Applications
UPC			
	9.1mm (2 way, 3 way), 14mm (3 way) 2~3 poles high voltage (150~450A)	<ul style="list-style-type: none"> • Secondary locking feature • Touch proof • Waterproof IP67 & IP6K9K • Compact design for space considerations with EVS • Plastic shell, lightweight, flammability: UL 94V-0 • Touch proof, EMI version available 	<ul style="list-style-type: none"> • EV (Battery pack, motor, PDU/MCU) • Energy storage system • E-Motorcycle • Inverter DC/DC • Hybrid and electric vehicles
Surlok plus			
	5.7mm, 8.0mm, 10.3mm, 8.0mm EMI Single pole, high current (100~350A) application	<ul style="list-style-type: none"> • Quick lock and press-to-release design • 360° rotating plug • Compact robust design • Waterproof IP67 & IP6K9K • UL 1977 & TUV SAE J1742 • Touch proof, EMI version available 	<ul style="list-style-type: none"> • Home energy storage systems • Commercial ESS • Battery • Inverter DC/DC • EV (Battery pack, motor, PDU/MCU)
ePower-lite			
	3.6mm (2 way, 3 way, 4 way), 5.7mm (2 way) 2~4 poles, 70~120A rated current	<ul style="list-style-type: none"> • Secondary locking feature • Plastic shell, light weight, flammability: UL 94V-0 • Touch proof • Waterproof IP67 & IP6K9K • Compact design for space considerations with EVS • Touch proof, EMI version available 	<ul style="list-style-type: none"> • EV (Battery pack, motor, PDU/MCU) • On-board charger • E-Motorcycle • Inverter DC/DC • Hybrid and electric vehicles

Amphenol RF







Amphenol® RF

Product	Series & Description	Features & Benefits	Applications
FAKRA Series (general)			
	FAKRA	<ul style="list-style-type: none"> • Range Gen 1.0/2.0/2.5/3.0/4.0 • Plug keying options • Dual housings • Mechanical and colour coding • Available for a wide range of cables • Wide range for PCB / SMT, vertical and angled mount 	<ul style="list-style-type: none"> • Camera vision systems • Video • Satellite radio • DSRC/vehicle to vehicle communication • GPS • Antenna connections
Sealed FAKRA			
	FAKRA IP67 Rated Automotive Interconnect Solution	<ul style="list-style-type: none"> • IP67 Rated to prevent dust and water ingress • Rugged, impact resistant body and housing • Color coded and mechanically keyed housings to prevent mis-mating • Available in straight, right angle, and low profile configurations 	<ul style="list-style-type: none"> • Advanced driver assistance systems (ADAS) • 360° surround view cameras • GPS • Wi-Fi • Asset tracking • Ideal for harsh environments
AUTOMate High-Speed Automotive Connector System			
	High-Speed Mini-FAKRA New compact 20 Gb/s Automotive Connector System	<ul style="list-style-type: none"> • Reduced package size ideal for compact spaces • Rugged, impact resistant body and housing • Installation proof design with colour coded and mechanically keyed housings • Low mating forces suitable for ganged solutions • High-density multi port interconnect • Suitable for high bandwidth applications up to 20 Gbps 	<ul style="list-style-type: none"> • Autonomous driving • Driver assistance systems • Navigation • Infotainment • 360° surround view camera • V2x communication

Product	Series & Description	Features & Benefits	Applications
CTCS			
	<p>Unsealed, SP, & XP A complete portfolio of connectors, accessories, covers, terminals, seals, and hand crimp tools suitable for harsh environments.</p>	<ul style="list-style-type: none"> • Interchangeable with other industry terminals and housings • Mounting flexibility: panel, strap/clip, and bracket • Improved vibration resistance: up to 30G sine, 20Grms random 330hrs./axis and robust back shells • High temperature ratings: up to -40°C to +140°C • Additional connector shielding for protection against debris • Tin, silver, and gold plating options for terminals 	<ul style="list-style-type: none"> • Commercial • Construction • Military • Marine • Agriculture vehicles
OCS			
	<p>In-line sealed and unsealed connectors and terminals: 0.64, 1.2, 1.5 and 2.8mm</p>	<ul style="list-style-type: none"> • Robust design features for enhanced warranty performance and designed-in durability • Clear and consistent audible click • Enhanced strain relief for blocked cavity configurations • Thumb grip incorporated to aid connector unmating • Validated to USCAR-2 Class III and other OEMs' specifications 	<ul style="list-style-type: none"> • Body • Engine compartment • Cockpit
CMC (Computer Modular Connector)			
	<p>32, 48, 64, 86, 112, & 154 ways Full interconnect sealed solutions for engine management solutions using 0.64 and 1.5 GTS terminals</p>	<ul style="list-style-type: none"> • TPA front holder latch for lock & unlock • Smooth guided terminal insertion & polarised terminals • Clean body terminals friendly to block/mat seal • High terminal retention force • Standard footprint interface interchangeable with multiple suppliers 	<ul style="list-style-type: none"> • Electrical parking brake system • Engine management systems • Engine management with feedback to anti-lock brake system • Electronic control unit • Liquefied petroleum gas (LPG) converter • HEV/EV battery control unit • Body control management
APEX			
	<p>In-line Sealed Connectors</p> <ul style="list-style-type: none"> • APEX 150 (1.5mm) housings: 10, 14, 16 way; 24 and 55 way ErgoMate™ housings • APEX 2.8mm housings 	<ul style="list-style-type: none"> • Fulfill USCAR and other OEMs' performance specifications • 2-piece APEX terminal technology • Clean Body Terminal design friendly to mat seal • No polarisation needed • Tin, silver and gold plated versions available • Temperature range: -40°C to 120°C and up to 155°C for some selective connectors 	<ul style="list-style-type: none"> • Harsh environment applications • Automotive • Commercial • Construction • Marine vehicles • Agriculture vehicles
SICMA			
	<p>Mini-Sealed Connection Systems Gen.4 4, 5, & 6 ways in-line connectors using SICMA 1.5mm terminals</p>	<ul style="list-style-type: none"> • High sealing performance ensured by rear mat-seal and circumferential interface seal • Temp Range -40°C to +155°C • Easy and quick connection system with Go-No-Go locking principle • TPA and CPA • High vibration 40g • Validated by several OEMs and the Euro7 	<ul style="list-style-type: none"> • Harsh environment applications • Automotive • Commercial • Construction • Agricultural
Sensor Housings (CTS, HDK, APEX, GTS, DCS)			
	<p>2-5 way female housing availability depending on the selected family. Terminal size offering: 0.5, 1.2, 1.5, & 2.8mm</p>	<ul style="list-style-type: none"> • High vibration resistance • Mat and single wire sealing • Special connector types for heavy duty diesel engine applications • Terminal position assurance (TPA) • HDK and APEX 1.2 complies with AK 1.2 / USCAR 120 • High temperature: GTS up to T4=150°C 	<ul style="list-style-type: none"> • Fuel injector • Actuator • Pressure sensor • Distance sensor • Radar sensor

APTIV

• APTIV •


Product	Series & Description	Features & Benefits	Applications
High Voltage AK Class 4			
	2 Way Connection System with HVIL 250A at 1000V DC	<ul style="list-style-type: none"> • High robustness against vibrations and higher operating temperatures • Individual shielded cables • Header compatible with both straight & right angle female connectors • Connector and header design according to AK interface specifications and LV215 latest revision • Fully interchangeable with other AK supplier sources 	High voltage / high current modules: <ul style="list-style-type: none"> • Inverter • Battery • Junction box • Power electric box
High Voltage AK Class 1			
	2 & 3 way header and female connector 35A at 1000V DC	<ul style="list-style-type: none"> • Multiple layouts & HVIL options in the same interface • Connector according to AK interface specifications and LV215 latest revision • Finger proof/touch safe • Multicore shielded cable for wiring simplification • Fully interchangeable with other AK supplier sources 	High voltage auxiliary modules: <ul style="list-style-type: none"> • PTC heaters • Invert • On-board-chargers • Air conditioning
High Voltage AK Pass-through			
	1, 2 & 3 way Panel Mount System 250A at 1000V DC	<ul style="list-style-type: none"> • Very compact dimensions • High robustness against vibrations • Higher operating temperatures • Ring terminal is bolted to bus bar • 360° individually shielded • Fully interchangeable with other AK supplier sources 	High voltage / high current modules: <ul style="list-style-type: none"> • E-motors • Battery • Junction box • Power electric box • Inverter
High Voltage Shield-Pack™ HV280			
	2 Piece Header with Pluggable Inner Connector 35A at 1000V DC	<ul style="list-style-type: none"> • Inner Connector with TPA can be plugged into header during device assembly • Panel mount to device with face seal • Internal HVIL (shunt in harness connector) • Two options available: Two-stage locking system for HVIL time delay and tool-less mating systems • Cable range: 2mm² to 5mm² power circuit; 0.5mm² HVILcircuit • Electrical protection: finger-proof IP2XB 	High voltage auxiliary modules: <ul style="list-style-type: none"> • PTC heaters • Invert • On-board-chargers • Air conditioning
High Voltage RCS 800 and RCS 890 Product Range			
	2 Way Connection System with HVIL 210A at 1000V DC	<ul style="list-style-type: none"> • Dual sealing, header sealed mated and unmated • Bundle shielding with external braid • HVIL shunted in harness connector • ErgoMate™ Axial Mating Assist System on harness connector • Panel mount to device with face seal to module • Two power circuits (8.0mm round terminal) 	High voltage / high current modules: <ul style="list-style-type: none"> • Inverter • Battery • Junction box • Power electric box
High Voltage Charge Plugs			
	Pigtails, Mode 2 EVSE, Mode 3 Jumpers High quality, field-proven automotive charge plugs	<ul style="list-style-type: none"> • Fully compliant with IEC 62196-2 • Higher robustness in extreme conditions • Superior durability for mating cycles • CE marking • Charging capabilities from 8A 1-phase to 32A 3-phase 	<ul style="list-style-type: none"> • Electric vehicle charging stations • Cable assemblies for plugging from charging stations to vehicle • Portable electric vehicle supply equipment (EVSE) for grid-to-vehicle charging

Product	Series & Description	Features & Benefits	Applications
Custom Automotive Connectors			
	Custom Connectors for automotive	<ul style="list-style-type: none"> In-house stamping, plating, molding, stitching Plating capabilities: Sn, SnPb, Ni, Au, Ag PressFit / IDC contacts Overmolding (2K) Silicon sealing Potting 	<ul style="list-style-type: none"> Engine control unit Hybrid power control E-mobility Advanced driver assistance systems Active/passive safety Comfort electronics
Wire-to-Board – IDC			
	Series 9175 (up to 1A) 9176 (up to 10A) 9177 (up to 15A)	<ul style="list-style-type: none"> Cold welded wire termination High reliability IDC connection Solid/stranded wires 12-28AWG Low Profile versions Strip™ contacts Can be potted/overmolded 	<ul style="list-style-type: none"> Electric motors/sensors/pumps Door handles Tail lights Infotainment / navigation Emergency vehicle lighting
Wire-to-Board – IDC / Press-Fit			
	Series 53-8702	<ul style="list-style-type: none"> Dual cold welded “gas-tight” connection Solid/stranded wires 18-24AWG Dual row up to 8p Single row up to 6p Replaces hand soldering, costly 2pc connectors 	<ul style="list-style-type: none"> Gear shifter Multi-media Pumps/actuators
Wire-to-Board – RF IDC Coax			
	Series 00-6791	<ul style="list-style-type: none"> Low component cost Low assembly time Good RF quality solution Very small footprint Replaces costly 2pc connectors 	<ul style="list-style-type: none"> Shark fin antenna Wi-Fi/bluetooth module Security/card access systems Smart meter antenna
Board-to-Board – Compression			
	Series – Stackers 00-9148 00-9158 00-9188 00-9258 Series – Battery 00-9155	<ul style="list-style-type: none"> 1 piece solution reducing assembly time Gold plated BeCu contacts Extremely robust to shock and vibration Parallel or right angle connection of PCB's Many options for customised versions 	<ul style="list-style-type: none"> Entertainment systems Dashboards, navigation systems Light switch modules Devices requiring pluggable or programming modules Battery back-up
Board-to-Board – Linking Contact System			
	Series 70-9159-300	<ul style="list-style-type: none"> 3-Piece STRIPT™ design 20A current rating Large tolerance absorption Extreme shock & vibration 	<ul style="list-style-type: none"> Linear led board-to-board connections Co-planar PCB mating Off-road vehicle lighting


Product	Series & Description	Features & Benefits	Applications
EdgeClips			
	Mounts with cable ties for routing wires, harnesses and hoses along or across edges	<ul style="list-style-type: none"> • Edge clips allow for secure fastening without holes, screws, or adhesives • Easily applied by hand without tools • Built-in, chrome-free, galvanised spring steel clamp delivers high pull-off force • Part range covers three edge thickness's 0.5–2.5mm; 1.0–3.0mm; 3.0–6.0mm 	<ul style="list-style-type: none"> • Cable harness making • Automotive • Mass transit
OS Series Cable Ties			
	Outside serrated cable tie with smooth surface to the bundle made from polyamide 6.6 (PA66)	<ul style="list-style-type: none"> • Tie sits snugly on the cable bundle • Curved head design takes up less space • Easy to apply manually or with tie gun • Delivers high tensile strength • Also available made from PA46 and PA66V0 	<ul style="list-style-type: none"> • Automotive • Mass transit • Defence applications
EVO7 / EVO9 Cable Tie Guns			
	Manual tensioning tools for plastic cable ties	<ul style="list-style-type: none"> • EVO7 up to 4.8mm strap width; EVO9 up to 13.5mm strap width • Unique mechanism eliminates recoil and significantly increases blade-life • Simple tension adjustment, high operator comfort • Lightweight, robust housing 	<ul style="list-style-type: none"> • Cable harness making • High-volume tying with repeatable quality • All industrial applications
HEGEMIP-HY (IEC CISPR25 Compliant)			
	Electromagnetic protection braided sleeving for hybrid vehicles	<ul style="list-style-type: none"> • Excellent electromagnetic protection • Extremely flexible and expandable • Does not kink or rupture at sharp angles • Superior abrasion protection • Copper alloy protects against salt spray • Inner tube makes cable insertion easy 	<ul style="list-style-type: none"> • Automotive • Rail • Marine electronics
MBT SS316 (Coated/Uncoated)			
	Heavy duty stainless steel band cable ties with ball-lock	<ul style="list-style-type: none"> • Made from stainless steel 316 • Available with durable polyester coating • Non-releasable locking feature • Corrosion and chemical resistant • Highly temperature resistant • Non-burning 	<ul style="list-style-type: none"> • Mass transit • Ship building • Heavy duty vehicles • Offshore
SA47-LA Heat Shrink Tubing (POX)			
	Standard wall, adhesive-lined heat shrinkable tubing with a shrink ratio of 4:1	<ul style="list-style-type: none"> • Clear tubing lined with black hot melt adhesive for easy visual control of sealing • Reliable moisture seal • Maximum corrosion protection for splices/connections of different materials • Excellent tensile strength and strain relief • Halogen free • Listed by leading vehicle manufacturers 	<ul style="list-style-type: none"> • Automotive • Mass transit • Cable harness making • Battery cables

Product	Series & Description	Features & Benefits	Applications
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Trident Neptune & Neptune Metal Connectors

	<p>TN/TNM Series Robust range of reliable shielded metal or plastic body bayonet connectors.</p>	<ul style="list-style-type: none"> Mixed power (30A) and signal (13A up to 16A) layouts High sealing, high vibration resistant with shielded variants Up to IP65/IP67 & RoHS compliant Integrally molded latches or bayonet coupling Wide range of stamped and machined contacts 500V Trident High Voltage (THV) available 	<ul style="list-style-type: none"> Engine control unit Cabins chassis interconnects Batteries and power distribution Gear box and switch cabinets Control panels and boxes Cooling and heating systems
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Trident Snap Together Interconnects

	<p>TST Series RoHS compliant rectangular and space-saving low profile circuit board and internal wiring interconnects.</p>	<ul style="list-style-type: none"> Cable connecting plug, PCB receptacle, panel mount receptacle Rated up to 13A and 250V AC RMS Support 2 to 36-ways variants Integrally moulded latching for quick connect/disconnect RoHS Compliant and UL-listed 	<ul style="list-style-type: none"> Cabin electronics Lighting systems Control boxes Gear box/switch cabinets Control panels/boxes
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Cable-to-Cable Interconnect Solutions

	<p>CTC Series Environmental sealed, high performance cable-to-cable interconnects for reliable signal circuits.</p>	<ul style="list-style-type: none"> Snap together latch with audible feedback when mating Small in size, light weight, space saving interconnect Available in 8,12,16, 24 way Up to IP69 sealing level Hand insertable 13A & 16A contacts Wire range: 24-16 awg (0.20mm² - 1.5mm²) RoHS compliant and UL-listed 	<ul style="list-style-type: none"> LCD displays and cabin accessories Engine harnesses Lighting systems Seat and window controls Wipers and underhood electronics Signal interface
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Reliable Plastic Circular Interconnects

	<p>APD Series Full-plastic, bayonet solution with IP69K sealing and colour and mechanical coding.</p>	<ul style="list-style-type: none"> Sealing up to IP67 & IP69K Bayonet locking with secondary locking feature Power up to 245A and voltage up to 500VDC/VAC Mounting styles: plug, flange, snap-in and jam nut Wire range: 0.35 – 50mm² (AWG 22 – AWG 0) Configurations: 1, 2, 4, 6/7, 19, 37, 51-way 	<ul style="list-style-type: none"> Gear box Control panels/box Sensor applications Dashboard harnesses Cooling and heating systems Engine control unit
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Reverse Bayonet Connectors


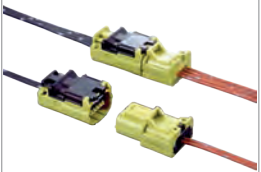
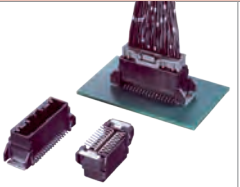



	<p>CA Bayonet Series High performance VG95234 certified reverse bayonet connector with exceptional shock and vibration resistances.</p>	<ul style="list-style-type: none"> Box mount, wall mount, jam nut, right angle thru-bulkhead, straight, cable-to-cable Customisable with over 140 configurations and up to 65-way variants Sealing up to IP67/IP68/IP69K Full range of salt spray resistant or highly conductive and RoHS compliant plating 	<ul style="list-style-type: none"> Ground defense vehicles/systems Heavy industrial equipment Power and signal control boxes Control and sensor systems Construction/off-road vehicles Rail and highway infrastructure
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EVSE & EV Charging Solutions

	<p>IEC 62196 EV Connectors, Plugs, Cables & Outlets Customisable AC charging connectors, outlets, harness assemblies and accessories.</p>	<ul style="list-style-type: none"> Up to 80A AC charging option Single and triple phase variants Low contact resistance Customised cables, end terminals and handles Built in accordance with all key regional standards 	<ul style="list-style-type: none"> Public charging stations Charging/jumper cables Public charging Home charging Mode 3 charging cables Capability to be used in mode 2 assemblies
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Product	Series & Description	Features & Benefits	Applications
Safety / SRS System Connectors			
	MX72 Self-rejecting Squib connector for airbags	<ul style="list-style-type: none"> • Self-rejection function • Compliance with the AK2 standard specification • 3 kinds of key codes • The contact part has 3 contact points with high reliability • Angled and straight types 	<ul style="list-style-type: none"> • Developed for car air bags applications
Safety / SRS System Connectors			
	MX36 Complete mating connectors for air bags, waterproof, cable-to-cable(relay)	<ul style="list-style-type: none"> • Small size, highly reliable • Waterproof: grommet type • Mechanical complete mating method: if retainer is not completely inserted in housing, the connector is not engaged, and incomplete contact insertion is detected • The conductivity will be cut by pushing back the socket connector with a coil spring, which is built into the socket housing • Type with short-circuit contacts, which prevents erroneous function due to static electricity • Contacts pos.: 2, 4; operating temperature: -40°C - +105°C 	<ul style="list-style-type: none"> • Developed for car air bags applications
Unsealed Board-to-Cable Connectors			
	MX34 Compact and high density connector	<ul style="list-style-type: none"> • USCAR tested, low profile and high density • Big range of pin counts: 4 – 40 circuits • Mechanical lock system ensures reliable mating • Preset type retainer surely detects incomplete insertion of the terminals • ISO/JASO standard middle tab size 0.64mm is used for pin terminals 	<ul style="list-style-type: none"> • Various applications where compact construction is required, e.g. body-chassis ECU, switches and sensors
Unsealed Board-to-Cable Connectors			
	MX77A Ultra low profile connector	<ul style="list-style-type: none"> • Compact low-profile automotive ECU connector • Compatible with vehicle-mounted specifications • Terminal area for signal: 1.8mm pitch, terminal for power: 2.1mm pitch • Compact right angle SMT type connector with 9.7mm mounting height • Ultra-compact, terminal size 0.4mm (width of pin) 	<ul style="list-style-type: none"> • Automotive body-based ECU/BMS (battery management system), etc.
Unsealed Board-to-Cable Connectors			
	MX84B PHEV, EV Connector with low flammability	<ul style="list-style-type: none"> • Insulator materials compliant with the flame retardant standard UL94 V-0 • Same compactness and high density as MX34 range • Operating temperature range: -40°C - +85°C • No. of contacts: 20, 28 pos. • Terminal size: 0.64mm (pin side width) 	<ul style="list-style-type: none"> • For in-vehicle ECUs use
Sealed In-line Connectors			
	MX19 Compact, waterproof and vibration resistant cable connection	<ul style="list-style-type: none"> • Compliant with JIS D0203 S1, compact 2-4 positions • Sealing ring prevents against water, grease, dust, etc. • Mechanical lock system to withstand vibration and tension • Mechanical lock system enables mating with a perfect 'click' feeling • With rear cover protecting grommet against termination damages • Rated current: 5A; dielectric withstanding voltage: 1000V AC 	<ul style="list-style-type: none"> • Automotive door and mirror applications

Product	Series & Description	Features & Benefits	Applications
Sealed In-line Connectors			
	<p>MX60A Multipolar waterproof connectors for powertrain with lever</p>	<ul style="list-style-type: none"> Waterproof, IP69K equivalent High pin count lever with optimum pin count 94 to 177, divided into 2 blocks Socket terminal retention strength over 100N Signal and power supply socket terminals able to support a wide range of cable sizes Durable pin terminal by low height, with 1mm width and 0.5mm thickness Operating temperature -40°C – +105°C 	<ul style="list-style-type: none"> High pin count waterproof applications in engine compartments Automotive engine ECUs and PCUs
Camera systems, High Frequency & Multimedia Connectors			
	<p>MX55J Digital camera compatible connector</p>	<ul style="list-style-type: none"> Transmission characteristic compatible with LVDS high-speed differential signals Superior waterproof performance: IP69K when mated and rear case 100kPa as an individual product Rear case connector size correspond to camera size (23 x 23mm) Mechanical lock and structure to resist twist force when mated Ground shell and EMI control Compatible with STQ (shielded twisted quad wire) 	<ul style="list-style-type: none"> Automotive camera applications
Camera systems, High Frequency & Multimedia Connectors			
	<p>MX65 HSD-Compatible connector for LVDS, USB 2.0 signals</p>	<ul style="list-style-type: none"> Compatible with various types of differential signals such as vehicle LVDS, and USB 2.0 Compatible with European de-fact standard STQ (shielded twisted quad) cables Line-up of signal 4 pos. (STQ cable) + two discrete cables e.g. two differential signal channels or one differential signal channel + two power supply lines 	<ul style="list-style-type: none"> High-speed transmission for in-vehicle information and communication devices Camera applications
Camera systems, High Frequency & Multimedia Connectors			
	<p>MX66 Waterproof FAKRA coaxial connector</p>	<ul style="list-style-type: none"> Water-proof FAKRA coaxial connector For frequency band up to 3GHz (USCAR17) Superior waterproof performance (USCAR2) 	<ul style="list-style-type: none"> High-speed interfaces
Camera systems, High Frequency & Multimedia Connectors			
	<p>MX68 High Speed Connectors for Infotainment System</p>	<ul style="list-style-type: none"> Vehicle-mounted LVDS / GVIF (GVIF is a trademark of Sony Corporation) and can be used for differential signals (MX68A) Supports signals of USB2.0 (MX68B) Impedance designs compatible with high-speed transmission Supplied as complete harness to ensure transmission performance and reliability Compatible with STP cables Pin count 2-8 pos.; rated current 2.2 A (power / GND line) 	<ul style="list-style-type: none"> Automotive infotainment system
Camera systems, High Frequency & Multimedia Connectors			
	<p>MX79A LVDS / GVIF Transmission Compatible Connector</p>	<ul style="list-style-type: none"> LVDS / GVIF transmission 2 rows, 4 positions (2 signal lines, power, ground) 4 positions right angle type Key-coding: 4 kinds Dielectric withstanding voltage: 1000VAC (mated) Operating temperature -40°C – + 85°C 	<ul style="list-style-type: none"> Digital camera applications

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Product	Series & Description	Features & Benefits	Applications
CHAdeMO Car Charging Connector			
	KW1 Quick charging of electric and hybrid vehicle connector	<ul style="list-style-type: none"> Compliant with CHAdeMO electric vehicle charging and discharging protocol (JEVS G 105, 1993) World-wide certification: UL recognised and CE compliant Superior operability and safety: mated/unmated Lightweight class (approx. 1kg) Rated current / voltage: 125 A / 500V DC 	<ul style="list-style-type: none"> Quick charger for electric vehicles (CHAdeMO Protocol) Quick charging of electric vehicles used on the road for long and short driving distances
CHAdeMO Car Charging Connector			
	KW02 Low-speed protocol compliant V2H (Vehicle to Home) system connector	<ul style="list-style-type: none"> Compliant with the electric vehicle charging and discharging system guidelines V2H (EVPS-002) Ver.2.1 Ease of operation: convenient single action insertion and removal procedure with ergonomic grip design for easy handling Rated current / voltage: 25 A / 450V DC 	<ul style="list-style-type: none"> Electric vehicle charging and discharging system (CHAdeMO Protocol) V2H (vehicle to home), V2G (vehicle to grid), and others
CHAdeMO Car Charging Connector			
	KW03 Medium-speed charger for hybrid and electric vehicles	<ul style="list-style-type: none"> Compliant CHAdeMO system guidelines V2H (EVPS-002) Ver.2.1 electrical vehicle charging and discharging connector World-wide certification: UL recognised and CE compliant All internally active components, such as switches are water and dustproof Rated current / voltage: 80 A / 500V DC 	<ul style="list-style-type: none"> Connector for electric vehicle charging and discharging system (V2H guidelines Ver.2.1 compliant) Charging of vehicles with medium-speed
CCS Type 2 Car Charging Connector			
	KW04 New quick charger for hybrid and electric vehicles with replaceable mating part	<ul style="list-style-type: none"> Compliant with standards: IEC62196-1 and IEC62196-3 CCS Type 2, CE compliant product Replaceable mating part for easy, fast and safe maintenance reduces life time costs Double insulation (internally active components are all waterproof and dustproof) Rated current / voltage: 125A and 200A / 1000 V DC 	<ul style="list-style-type: none"> Electric vehicle charging and discharging system (IEC62196-1 and IEC62196-3)
Railway Connectors			
	JK06 High reliable harsh-environment interconnection	<ul style="list-style-type: none"> Compliant with EN50467 (railway applications for rolling stock electrical connectors) and VG95234 standard for electro-mechanical & environmental compliance Halogen-free resin parts acc. to NFF61-030, NFF16-101 & 102 standards Compatible with MIL-DTL-5015 contact insert arrangement Protection degree IP67, mated condition (1m /24h) Housing with bayonet quick locking, pin count 10-48 	<ul style="list-style-type: none"> Developed for railway electronic equipment Train control, passenger information & safety, rail vehicles sub-systems
Railway Connectors			
	QE6 High robust and reliable EMI compatible Control Cabinets Connector	<ul style="list-style-type: none"> Flammability resistant material compliant with EN45545-2 (2016) Superior EMI performance compliant with IEC 62236-3-2 Robust design through metal outer shell Compatible with 3U4HP size cards for 19-inch sub-rack Satisfies ISO/IEC 11801 standard: Cat 5 Ethernet transmission (up to 100Mbps) 2 types of connection: crimp and board-through-hole terminals 	<ul style="list-style-type: none"> Railway control cabinets, VME systems

Product	Series & Description	Features & Benefits	Applications
JIA			
	Board-to-wire/ Sealed connector	<ul style="list-style-type: none"> Waterproof Hybrid 5A to 15A; -40° + 120°C Number of circuits 74-132 Mechanical assist lever Various key code High vibration level supported 	<ul style="list-style-type: none"> Automotive Marine Refrigerated transport Agricultural equipment Truck/bus Construction
FAH			
	Wire-to-wire High current	<ul style="list-style-type: none"> 50A 600V AC/DC Finger protection, high reliability Hermaphrodite contacts Prevention of false mating Insulation resistance 100MΩ 	<ul style="list-style-type: none"> Automotive / batteries Truck/bus Escalator, elevator Power supply Construction Agriculture
JFA			
	Connector for harsh environment	<ul style="list-style-type: none"> Temperature range: -55° to +105°C Double spring construction Number of circuits: 1 to 20 Current rating: 1A to 50A AC/DC Voltage rating 125V to 600V AC/DC Strong mechanical structure 	<ul style="list-style-type: none"> Railway systems Access control Electrical vehicle Agriculture Automation Truck/bus
WPJ			
	WPJ (W TO B) Glow Wire and Waterproof	<ul style="list-style-type: none"> Waterproof Glow wire Low profile Current & voltage rating 7A 300V Harsh environment 	<ul style="list-style-type: none"> Automotive lighting Electric bike Garden equipment Pleasure craft Traffic light
PA			
	Solution for complex harness	<ul style="list-style-type: none"> Available in TH and SMD Strong locking secure Current 3A AC/DC Automotive homologation Harsh environment (vibration) 	<ul style="list-style-type: none"> Lighting Power supply Boat navigation system Traffic light
JMC			
	Small board-to-board connector	<ul style="list-style-type: none"> Space saving Secure mating Versatile number of circuit and height Current 0.5A AC/DC Voltage 50V AC/DC Absorbing misalignment when mating connector 	<ul style="list-style-type: none"> Sat nav Screen panel Measurement system

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Product	Series Description	Features & Benefits	Applications
In-Vehicle Media Modules			
	Access high-speed audio and video connections through integrated active and passive Media Modules	<ul style="list-style-type: none"> • Full turn-key testing and product validation provided • Complete manufacturing solution • Extensive Molex automotive I/O connector offering • Power supply and media-bus architecture • Global manufacturing and logistics solutions • Design simulation and measurement capabilities 	<ul style="list-style-type: none"> • Audio, navigation, infotainment • Bluetooth • Headphone inputs • Navigation systems • Video games • Cellular phone directory
HSAutoLink Interconnect Systems			
	Robust, sealed and cost-competitive system with data rates up to 13.5Gbps	<ul style="list-style-type: none"> • Standard Molex automotive and USB connector components used • Flexible, expandable product family with data rates up to 5 Gbps • Shrouds and latches standard • System uses proven Molex LFH terminal interface designed for high pin-count signal applications • Plugs designed with fully protected shield case • Full-length cable shielding 	<ul style="list-style-type: none"> • ATVs • Trucks • Infotainment • Telematics • Navigation Systems • Connected Vehicle Services • Diagnostics and Data Upload • Camera to Controller • Controller to Display
FAKRA Connector Systems			
	High-performing and cost-effective system for automotive telematics applications	<ul style="list-style-type: none"> • Colour coded and keyed shrouds • Mates with original FAKRA PCB jacks and plugs • Frequency DC to 6 GHz • Machined contact versions available • IP69K rating for sealed versions • Primary latch and ISL 	<ul style="list-style-type: none"> • Audio, navigation, infotainment • Bluetooth • GPS
DuraClik Connector System			
	Provides superior electrical contact reliability, mating retention and space savings	<ul style="list-style-type: none"> • 2 to 15 circuits in vertical and horizontal configurations • Wide solder tabs designed and tested to SAE automotive vibration standards • Audible click sound on mating • Inertia lock on TPA (2 to 8 circuits) • Enclosed contact design • Terminal Position Assurance (TPA) and Independent Secondary Lock (ISL) 	<ul style="list-style-type: none"> • Air-conditioning • Exterior lighting • Heads-up display • Steering • Wiper/blinker lever • Cranes, tractors trucks
Mini50 Connector Systems			
	Achieve 50% space savings over traditional USCAR 0.64mm connectors with sealed or unsealed Mini50	<ul style="list-style-type: none"> • High-performing sealed receptacle using matte-seal design • High-temperature thermoplastic housings • Industry's only interface that meets USCAR 050 standards • Orientation features are molded into the header • Independent secondary lock (ISL) terminal-retention feature • Connector position assurance (CPA) latch optional 	<ul style="list-style-type: none"> • Cameras/sensors • Clusters/navigation • Interior and exterior lighting • Sensors and switches • Radios • Mirrors • Power steering
Stac64 Single, Multi-Pocket and Hybrid Header System			
	Stackable connection system provides single and multi-pocket PCB solutions	<ul style="list-style-type: none"> • Stackable PCB headers readily available • Pre-assembled, linear Mylar PC tail alignment strip for right angle headers • Housings molded in standard USCAR colour schemes for additional polarisations • High temperature thermoplastic housing • PCB standoffs molded into housings • Modular-housing design with standard dovetail features molded into the housings 	<ul style="list-style-type: none"> • Clusters/navigation • Battery management system • Power seat modules • Interior lighting • Door zone modules

Product	Series & Description	Features & Benefits	Applications
Squba Sealed Wire-to-Wire Connectors			
	<p>Offering an IP67 NEMA rating and reliably delivering 6.0A in space-constrained applications</p>	<ul style="list-style-type: none"> Protected, low-profile positive latch Miniature size – 1.80mm pitch Sealed components with proven performance 2 to 10 circuits available Primary lock enables 30N terminal retention Wraparound insulation crimp Clean-body terminal 	<ul style="list-style-type: none"> ATVs Aviations Forklifts Marine: under-dash wiring, lighting Trucks Recreational vehicles
ValuSeal Wire-to-Wire Connector System			
	<p>Achieve cost efficiencies and IP65 sealing protection in an innovative design</p>	<ul style="list-style-type: none"> Integrated wire strain-relief in the connector body IP65-rated, integrated wire-and-ring seal One-piece housing design Compact 4.00mm pitch Crimp-and-poke insertion 2 and 4-circuit versions available 	<ul style="list-style-type: none"> Golf carts ATVs Buses Trucks Forklift trucks Lawn and garden tractors
Mizu-P25 Miniature Waterproof Connectors			
	<p>Superior protection for applications requiring space savings</p>	<ul style="list-style-type: none"> Certified for IP67 rating Positive locks Spring-beam terminal design Compact size Integral seal stopper feature Raised-body male terminal design 	<ul style="list-style-type: none"> Door electronics Commercial vehicles Mirror motor harnesses Powered rear view mirrors Parking sensors Lamp mirrors
MXP120 Sealed Connector System			
	<p>Up to 13.0A power in a compact package that meets USCAR specifications</p>	<ul style="list-style-type: none"> Versatile sealed system using space-saving 1.20mm terminals Reduced package size when compared to existing 1.50mm system Compatible with AK or USCAR interface Single wire seal (SWS) connection system with robust perimeter seal Accommodates wire gauges up to 1.00mm² Female receptacles with Independent Secondary Locking (ISL), Male blade connectors with primary lock reinforcement (PLR) 	<ul style="list-style-type: none"> Door-lock mechanisms Emission controls Fuel injection Safety Restraint Systems (SRS) Seat-belt pretensioners Supplemental Inflatable Restraints (SIR) Airbags Turn signal lamps Exterior lighting
MX150 and MX150L Connector Systems			
	<p>High-performance connector system for a broad range of transportation applications</p>	<ul style="list-style-type: none"> 1.50mm low insertion force terminal system Pre-assembled connector housings and TPA components MX150L exceeds IP67 requirements Sealed and unsealed systems available (MX150) MX150 Sealed conforms to USCAR requirements MX150L system provides audible clicks on insertion, extraction and mating 	<ul style="list-style-type: none"> Construction equipment Off-road vehicles Marine equipment ATVs Air bag sensors Heavy equipment systems
ML-XT Sealed Connector System			
	<p>High performing, sealed connection system to ensure superior reliability</p>	<ul style="list-style-type: none"> Covalently interlocked one-piece plug housing and inter-facial seal Utilises Molex proven XRC terminals Heatshrink tubing cover Wedglock/TPA loaded after terminals 9 colour-coded housings available High terminal retention force; exceeds 111N 	<ul style="list-style-type: none"> Cars and motorcycles Generator sets Commercial and military vehicles Construction and mining equipment Forest and garden equipment Marine equipment




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Product	Series & Description	Features & Benefits	Applications
MX123 Sealed Connector System			
	Rugged, fully-sealed interface with the smallest packaging size in the industry	<ul style="list-style-type: none"> • GMW3191 specifications • Centre-wall feature • Matte-seal technology • Colour coding and mechanical polarisation options • Integrated TPA and CPA components • PCB tail customisation: solder-tail or compliant-pin technology 	<ul style="list-style-type: none"> • Audio, navigation, infotainment • Body electronics • Construction equipment • Industrial vehicles and equipment • Power-train • Heavy equipment systems
CMC and CMX Connectors			
	IP6K9k sealed, modular, high-density and hybrid connection system	<ul style="list-style-type: none"> • Color coding options and mechanical polarisation • Wide range of standard headers • CMX features lever-actuated movable seal protector • High-performing CMX system uses matte-seal technology • Moveable interfacial-seal protector surrounding the CMX connector • CP female terminals (tin or gold) work with a variety of wire sizes 	<ul style="list-style-type: none"> • Body electronics • Gear boxes • Power-train • Suspension controller • Commercial vehicles
XRC – Extra Rugged Circular Connectors			
	Sealed, plastic-circular connectors IP67-rated to ensure integrity	<ul style="list-style-type: none"> • Environmentally sealed to IP67 standard • Backshells easily snap onto the XRC housing • Low-insertion-force stamped terminals • Wire seals are imprinted instead of embossed or engraved (24 shell size, 31-circuit connectors only) • Tactile and audible mating feedback • Simple crimp-and-poke technology 	<ul style="list-style-type: none"> • Heavy equipment systems • Air bag sensors • Recreational and speciality vehicles • Construction, farming and marine equipment • ATVs
SRC – Sealed Rectangular Connectors			
	Hybrid, high power and signal circuit-count system for harsh applications	<ul style="list-style-type: none"> • Simple crimp, poke and plug application • Integral, two-way matte seal plus interface seal • Pre-assembled connector housing, seals, rear cover and TPA ship in one-piece • Superior electrical and mechanical performance capabilities • Unused circuits can be blocked using plastic seal plugs • Connector system retention greater than 200N 	<ul style="list-style-type: none"> • Agricultural machines • Generator sets (Gensets) • Construction and mining equipment • Search, detection and navigation equipment • Trains and rail equipment
MAX-LOC Plus Shielded Cord Grip Assemblies			
	Robust assemblies that reduce disruptive EMI and RFI	<ul style="list-style-type: none"> • Sealed O-ring, IP67 and IP69K rated • Tapered shielding ring • Nickel-plated aluminium housing and shielding ring • Aluminium die-cast, electroless nickel-plated threaded assembly • Two external mounting holes • Grip assembly accommodates 1 AWG, 1/0, 2/0 shielded cables 	<ul style="list-style-type: none"> • Agricultural machines • Buses • Construction equipment • Hybrid electric vehicles • Mining machinery
Imperium High Voltage/High Current (HVHC) Connector System			
	Delivering superior shielding and current density	<ul style="list-style-type: none"> • Capable of handling up to 1000V and 250.0A per contact • Closed-loop 360° shield design with grounding tabs • Rugged integrated shield design • Robust solid, one-piece contacts • Protective, insulated plug and receptacle contact caps • Fully sealed to IP6K9K while mated 	<ul style="list-style-type: none"> • DC-to-DC converters • High-current batteries • Electric motors • Hybrid electric vehicles • Inverters • Military ground vehicles



PHOENIX CONTACT









Product	Series & Description	Features & Benefits	Applications
Charging Interfaces For Electric Vehicles			
	Vehicle inlets for AC and DC charging	<ul style="list-style-type: none"> • Complete portfolio for CCS type 1, CCS type 2 and GB/T • Silver-plated contacts for high efficiency and durability • CCS inlets allow DC and AC charging with a single mating face • Fast and accurate temperature measurement on all contacts • AC charging powers up to 26 kW (uncooled) • DC charging powers up to 250 kW (uncooled) 	<ul style="list-style-type: none"> • For installation in all types of electric vehicles (automobiles and utility vehicles)
Cables And Sockets For Charging Stations			
	AC charging cables, AC charging sockets, DC charging cables	<ul style="list-style-type: none"> • Complete portfolio for CCS type 1, CCS type 2 and GB/T • Silver-plated contacts for high efficiency and durability • Award-winning ergonomic, robust and high quality design • AC charging powers up to 26 kW (uncooled) • DC charging powers up to 250 kW (uncooled) • DC charging powers up to 500 kW (cooled) 	<ul style="list-style-type: none"> • AC sockets for installation at charging points • AC cables with open end for installation at charging points • AC mobile cables for the car trunk • AC mobile adapter cables for charging imported vehicles • DC cables with open end for installation at charging points
Controllers For Charging Stations			
	AC and DC charging controllers	<ul style="list-style-type: none"> • Safe and reliable monitoring and control of the charging process • According to IEC 61851-1, SAE J1772 and GB/T 20234 • High flexibility thanks to configuration and programming options • Build up intelligent charging infrastructures with load management • Easy integration into management systems 	<ul style="list-style-type: none"> • Simple wallboxes in carports and garages • Networked charging stations in the commercial and public sector • Complex fast charging stations with backend integration

PRECI-DIP



Product	Series & Description	Features & Benefits	Applications
Heavy Duty Spring Loaded Connectors			
	Elastic Clip Coaxial and Elastic Clip In Line Design PRECI-DIP has developed a unique patented technology which ensures reliable connectivity from piston to barrel using an elastic clip.	<ul style="list-style-type: none"> • Elastic joint between piston & barrel • Shock resistance • Vibration resistance • High number of matings (5000 mating cycles minimum) • Up to 25A continuous with a rising temperature lower than 30°C • Low contact resistance 20mΩ 	<ul style="list-style-type: none"> • Automotive applications • Aeronautical connectors • Medical devices • Smartphone battery connections • Heavy industrial applications
	Custom Series PRECI-DIP offers various designs of heavy duty spring loaded contacts technology within a large range according required performances to meet your needs.	<ul style="list-style-type: none"> • Elastic joint between piston & barrel • Shock resistance • Vibration resistance • High number of matings (5000 mating cycles minimum) • Up to 25A continuous with a rising temperature lower than 30°C • Low contact resistance 20mΩ 	<ul style="list-style-type: none"> • Automotive applications • Aeronautical connectors • Medical devices • Smartphone battery connections • Heavy industrial applications







Product	Series & Description	Features & Benefits	Applications
Mini Modular, High Density Connector System			
	Mini modular High density rectangular modular solution offering a combination of signal, power and coaxial contacts	<ul style="list-style-type: none"> • High density up to 1000 signal 0.60mm contacts • Metallic shell with cable clamp from 12mm to 25mm • 5000 mating cycles with threaded jackscrew, 15000 with 1/2 turn jackscrew • High resistance to shock and vibration 	<ul style="list-style-type: none"> • Cable to chassis, cable-to-cable and rack and panel applications
Heavy Power Series			
	High power, heavy duty, modular connectors for on-board power applications In compliance with French railway standards	<ul style="list-style-type: none"> • Suitable for applications requiring the transmission of very high currents • From 1 to 4 poles, cross section from 25mm² to 70mm² • Up to 300A thanks to Tortac® contact technology • Straight, angled and shunt termination styles • Easy assembly with no special tooling • Reduced stock and kitting/logistics management 	<ul style="list-style-type: none"> • Any applications requiring the transmission of very high currents such as power distribution, intercoaches and bogies
Rack and Panel Blind Mating Modular Connectors			
	LHS/LHZ High reliability flat floating connector ideal for blind mating	<ul style="list-style-type: none"> • Mixed power, signal, coaxial and quadrx contacts • Compliant with NF F 61-032 standards • Modular system: signal, power, coax and data contacts • High contact density, up to 70 signal contacts • Gold plating contacts with a large crimp section 	<ul style="list-style-type: none"> • Rack and panel applications (norm XPF61-005) • Suitable for EN railway cables • Cab radio system applications
High Density Modular Connector			
	L Series High density, modular, rack & panel connectors compliant to EN45545 standards	<ul style="list-style-type: none"> • Mixed signal, power, and coaxial modules • Provides up to 200 amp power • Cable to chassis and rack & panel; plastic backshell with strain relief and half turn quick disconnect jackscrew • Float mountable for blind mating • Configurations compliant to EN45545 standards • Low insertion – extraction forces 	<ul style="list-style-type: none"> • Rack and panel rail applications • High demanding rail applications
Robust and Reliable M12 Connector System			
	Circular metal M12 Series High reliable metric interconnect solution for Ethernet data transmission applications	<ul style="list-style-type: none"> • Designed for applications where space and weight are critical • Common housing for inserts from 3 to 8 ways • Compact IP67 metal shell • 360° EMI shielding • Hyperboloid contact technology • Compliant with fire and smoke standards 	<ul style="list-style-type: none"> • Ideal for communication applications • Factory automation, drive motors and machine tools
REP Series			
	Environmentally-sealed plastic connector, optimised for use in rail and embedded applications	<ul style="list-style-type: none"> • 2, 6 and 12 way standard insulators • Crimp, straight or bent termination options • Smart design with integrated functions • Conforms to main rail standards • Allows wire sections from 0.5mm² to 2.52mm² (24-12AWG) • Excellent resistance to shock according to EN 61-373 	<ul style="list-style-type: none"> • High temperature monitoring sensor application • Train doors application • Bogies application • Toilets application: system control unit, hand dryer • Air conditioning and floor heating • Seats connection

Product	Series & Description	Features & Benefits	Applications
High Speed Interconnect Solutions			
	<p>VGE1 Elio – MSG 3U – UTS LC & MPO</p> <p>One shell, multiple solutions: signal, quadrax or fibre optic</p>	<ul style="list-style-type: none"> Ethernet solutions: Quadrax layouts for VGE1 & MSG 3U Elio solutions: fiber optic technology in VGE1 and 38999 connectors (>300 Gbit/s) MPO & LC solutions: UTS with MPO & LC fiber optic 	<ul style="list-style-type: none"> Passenger information Wi-Fi systems Signalling applications
Trim Trio Connectors			
	<p>UTS & UTO</p> <p>Versatile interconnect solution</p>	<ul style="list-style-type: none"> Trim Trio contact: one qualified contact design interchangeable with SMS, MSG 3U, VGE1 Cost saving: plastic and metal versions Time saving: quick bayonet mating Waterproof: IP68/69K in mated and unmated conditions (only Hi-seal version for unmated conditions) Fire smoked qualified: HL3/R23 & HL2/R22 following the EN 45545-2 	<ul style="list-style-type: none"> Cabin applications Pantograph system Passenger information
High Density Bayonet Connectors			
	<p>851 & 8525 MIL-DTL-26482 1 & 2</p>	<ul style="list-style-type: none"> High density: up to 61 contacts Time saving: quick bayonet mating Reliable: proven technology in railway and military applications High sealing performance: hermetic versions available 	<ul style="list-style-type: none"> Signalling applications Cabin applications
Quick Mating Connector			
	<p>SMS</p> <p>Rectangular and plastic connector</p>	<ul style="list-style-type: none"> Easy to use: quick mating/unmating mechanism Fire and smoke qualified: HL3/R23 & HL3/R22 following the EN 45545-2 High voltage & IP68 solutions: SMS IP versions for sealed versions and high current Safe: Pin protection and positive polarisation keys Cost saving: Integrated strain relief hood versions Trim Trio contact: one qualified contact design interchangeable with VGE1, MSG 3U, UTS & UTO 	<ul style="list-style-type: none"> Interior & Cabin applications Signalling applications Passenger information
Easy & Secure Connectors for Rack System			
	<p>MSG 3U</p> <p>Front I/O solutions for railway</p>	<ul style="list-style-type: none"> Easy and secure mating: quick lever with safe locking Space saving: high density solution compatible with 3U rack Signal integrity: shielding with 360° metal housing Flexible grounding: different grounding structures by each port for the 5 Quadrax layout Fire and smoke certified: HL3/R23 & HL3/R22 according to EN 45545-2 Trim Trio contact: one qualified contact design interchangeable with SMS, VGE1, UTS & UTO 	<ul style="list-style-type: none"> Signalling room Cabin systems CBTC systems TRU systems ERTMS systems
Rail Circular Connectors			
	<p>VGE1 / FER1</p> <p>Bayonet or screw connector with hard thermoplastic insert (Fire and smoke qualified)</p>	<ul style="list-style-type: none"> Fire and smoke: HL3/R23 & HL3/R22 according EN45545-2 Safe: ruggedised connector to withstand vibration Time saving: quick bayonet mating High speed data transmissions: signal, quadrax and fibre optic layouts Trim Trio contact: one qualified contact design interchangeable with SMS, MSG 3U, UTS & UTO 	<ul style="list-style-type: none"> Bogie applications Pantograph systems Passenger information applications

TE – Industrial & Commercial Transportation



Product	Series & Description	Features & Benefits	Applications
DEUTSCH DRC Connectors			
	<p>DEUTSCH DRC Series Designed for high-pin count, harsh environment applications.</p>	<ul style="list-style-type: none"> • Accepts contact sizes 16 (13 amps), and 20 (7.5 amps) • 14-22 AWG (2.50-0.35mm²) • 24, 40, 50, 60, 64, and 70 cavity arrangements • In-line, flange, or PCB mount • Rectangular, thermoplastic housing • Jackscrew for mating 	<ul style="list-style-type: none"> • Truck & bus • Off-highway, construction & mining • Agriculture & forestry • Emergency vehicles • Recreational & marine • Motorcycle
DEUTSCH DTHD Connectors			
	<p>DEUTSCH DTHD Series Easy to install, field serviceable single terminal connectors for heavy-duty applications.</p>	<ul style="list-style-type: none"> • Accepts contact sizes 4 (100 amps), 8 (60 amps), and 12 (25 amps) • 6-14 AWG (16.00-2.00mm²) • 1 cavity arrangement • In-line or flange mount • Circular, thermoplastic housing with integrated latch for mating • Available accessories: mounting clips 	<ul style="list-style-type: none"> • Truck & bus • Off-highway, construction & mining • Agriculture & forestry • Emergency vehicles • Recreational & marine • Motorcycle
DEUTSCH HD10 Connectors			
	<p>DEUTSCH HD10 Series Environmentally sealed connectors heavily used for diagnostic connections.</p>	<ul style="list-style-type: none"> • Accepts contact sizes 4 (100 amps), 12 (25 amps), and 16 (13 amps) • 6-20 AWG (16.00-0.50mm²) • 3, 4, 5, 6, and 9 cavity arrangements • In-line, flange, or PCB mount • Circular, thermoplastic housing with coupling ring for mating • Available accessories: backshells, boots, dust caps, gaskets, lanyards, mounting clips, strain relief 	<ul style="list-style-type: none"> • Truck & bus • Off-highway, construction & mining • Agriculture & forestry • Emergency vehicles • Recreational & marine • Motorcycle
DEUTSCH DRB Connectors			
	<p>DEUTSCH DRB Series Heavy-duty connectors designed for bulkhead applications.</p>	<ul style="list-style-type: none"> • Accepts contact sizes 4 (100 amps), 8 (60 amps), 12 (25 amps), 16 (13 amps), and 20 (7.5 amps) • 6-22 AWG (16.00-0.35mm²) • 48, 60, 102, and 128 cavity arrangements • Flange mount • Rectangular, thermoplastic housing with jackscrew for mating • Wedgelocks confirm contact alignment and retention 	<ul style="list-style-type: none"> • Truck & bus • Off-highway, construction & mining • Agriculture & forestry • Emergency vehicles • Recreational & marine • Motorcycle
DEUTSCH HDP20 & HD30 Connectors			
	<p>DEUTSCH HDP20 & HD30 Series IP68 environmentally sealed, heavy duty, multi-pin circular connectors.</p>	<ul style="list-style-type: none"> • Accepts contact sizes 4 (100 amps), 8 (60 amps), 12 (25 amps), 16 (13 amps), and 20 (7.5 amps) • Up to 4-22 AWG (25.00-0.35mm²) • 2, 6, 7, 8, 9, 14, 16, 18, 19, 20, 21, 23, 29, 31, 33, 35, and 47 cavity arrangements • In-line or flange mount • Circular, aluminium (HD30) or thermoplastic (HDP20) housing with coupling ring for mating • Available accessories: backshells, boots, dust caps, gaskets, mounting hardware, strain relief 	<ul style="list-style-type: none"> • Truck & bus • Off-highway, construction & mining • Agriculture & forestry • Emergency vehicles • Recreational & marine • Motorcycle
DEUTSCH DT Connectors			
	<p>DEUTSCH DT Series Rugged small snap-latch IP68 sealed housings for power and signal needs. Additional products available. DTHD, DTM, DTP and DTV Series.</p>	<ul style="list-style-type: none"> • Accepts contact size 16 (13 amps) • 14-20 AWG • 2, 3, 4, 6, 8, and 12 cavity arrangements • In-line, flange, or PCB mount • Rectangular, thermoplastic housing • Integrated latch for mating • Wedgelocks assure contact alignment and retention 	<ul style="list-style-type: none"> • Truck & bus • Off-highway & construction & mining • Agriculture & forestry • Emergency vehicles • Recreational & marine • Motorcycle

Product	Series & Description	Features & Benefits	Applications
AMP+ Auxiliary Power Terminal			
	Accessory to the Interconnect. TE's AMP+ auxiliary power terminal is a high voltage accessory/ device interconnect for hybrid and electric vehicles.	<ul style="list-style-type: none"> Individually shielded cable TE's AMP+ auxiliary power terminal is a high voltage accessory The terminal offers sealed, individually shielded cable and a touch-safe wire-to-device The accessory meets USCAR-2 specifications 	<ul style="list-style-type: none"> Hybrid and electric vehicles and infrastructure
AMP+ IPT Shielded Ring Tongue			
	TE's AMP+ IPT shielded ring tongue provides 360° EMC shielding and wire-to-device capabilities.	<ul style="list-style-type: none"> Easy and flexible adaption of the Internal Power Terminal The IPT is available in 1-, 2-, or 3-pole housings The power accessory provides 360° EMC shielding and wire-to-device capabilities The screwed ring tongue can be applied on different length cables 	<ul style="list-style-type: none"> Various applications
AMP+ HVP 1100 High Voltage Connector System			
	TE's AMP+ HVP 1100 high voltage connector system is designed for flexibility with a wide range of options for hybrid and electric vehicle device applications.	<ul style="list-style-type: none"> Finger proof, touch safe Two stage unlatching for effective HVIL functionality Finger actuated No tool required to unmate Wide cable range (35 to 95mm²) Tested to 50 mating cycles 	<ul style="list-style-type: none"> Battery pack Inverter High voltage power distribution unit
AMP+ HVP 800 High Voltage Connector System			
	TE's AMP+ HVP 800 high voltage connector system safely transports high currents and voltages through hybrid and electric vehicles. The robust design supports multiple wire harness assembly routing options.	<ul style="list-style-type: none"> AK 4.3.3, LV215-1, RoHS compliant Wide wire range 90° and 180° plugs Touch-proof No tool required to unmate Sealed 	<ul style="list-style-type: none"> Battery E-motor Inverter
Smart HV Terminal & Connector Systems			
	TE's broad connector portfolio helps enable our customers to flourish in the fast changing e-mobility market while continuing the industry momentum to electrify the powertrain.	<ul style="list-style-type: none"> Touch-safe technology Available in several positions No tool required to unmate Wide cable ranges Sealed Multiple coding options 	<ul style="list-style-type: none"> Hybrid & electric mobility solutions Battery technologies Charging solutions In-vehicle technologies
AMP+ HVA 280 High Voltage Connector System			
	TE's AMP+ HVA 280 high voltage connector system offers thousands of design possibilities, routing flexibility and manufacturing efficiencies.	<ul style="list-style-type: none"> Unique design improves manufacturability and packaging Finger-proof, touch-safe two- or three-position low-medium current plugs Provides multiple latching options and an integrated internal HVIL 	<ul style="list-style-type: none"> Battery pack DC/DC converter On-board charger Electric heater Electric air conditioning Electric power steering

TE



Product	Series & Description	Features & Benefits	Applications
Industrial Ethernet Switches with M12 Connectivity			
	<p>Our robust, unmanaged Industrial Ethernet switches, featuring M12 connectivity, are designed to enable faster and more reliable Ethernet networks.</p>	<ul style="list-style-type: none"> • Managed and unmanaged EN50155 compliant ethernet switches • PoE, bypass, intelligent management • Advanced security functions 	<ul style="list-style-type: none"> • Public transportation • Railway • Tram • Metro
Omni Directional Antenna Family			
	<p>A wide range of indoor and outdoor wireless connections that can be used for on-board and trackside applications.</p>	<ul style="list-style-type: none"> • EN50155 compliant on-board antennas • Trackside antennas • Multi-function antennas reduce the cost of installation 	<ul style="list-style-type: none"> • Data communications
Rail D-Subminiature Backshells			
	<p>A comprehensive range of ruggedised metal backshells for D-Subminiature connectors.</p>	<ul style="list-style-type: none"> • Metal shell ruggedised D-Sub Hood • Comprehensive quick lock system • Including D-Sub connectors and crimp contacts • EN50155 compliant 	<ul style="list-style-type: none"> • Data communications
M12 Rail Cable Assemblies			
	<p>Meet the demand for increasing digitalisation in applications such as rail data communication systems and heavy industrial applications.</p>	<ul style="list-style-type: none"> • Full assembled cable • Standard lengths from 0.5 to 20m • Several coding combinations • EN45545 compliant 	<ul style="list-style-type: none"> • Public transportation • Railway • Tram • Metro
M12 Rail Cable Connectors			
	<p>TE Connectivity's M12 Railway Connectors for field assembly, designed for railway (EN45545) and automation industry applications, provide a solution that safely and reliably supports communication in harsh environments.</p>	<ul style="list-style-type: none"> • A, D, X-coding • Straight and right angled • PCB and panel mount versions • EN50155 / EN45545 compliant 	<ul style="list-style-type: none"> • Ethernet network • Audio-visual communication • Passenger information • Video surveillance • Passenger entertainment and Wi-Fi • Passenger information displays

Product	Series & Description	Features & Benefits	Applications
UIC552 Series			
	<p>The UIC552 Series is a railway standard power connector used for international service.</p>	<ul style="list-style-type: none"> • Compliant to UIC552 standard • Rail network approved • Low maintenance costs • Field proven • Full UIC package available 	<ul style="list-style-type: none"> • Inter-vehicle connection
EKO Series			
	<p>Composite and shielded connectors for power application.</p>	<ul style="list-style-type: none"> • Compact and weight saving • Straight and 90° connection • Shielded and unshielded version • 3 or 4 pole configurations • Cable from 10 to 240mm² • Halogen-free 	<ul style="list-style-type: none"> • Traction power • Inter-vehicle connection
NGC - Compact Plastic Wire-to-Wire Connectors			
	<p>Compact plastic connector compliant with railway standards.</p>	<ul style="list-style-type: none"> • Compact and cost-effective solutions • High level of performance • Halogen-free • Field-proven 	<ul style="list-style-type: none"> • Train control • PIS and safety • Sub systems
MU27P Series			
	<p>Trainline wire connections for control and communications</p>	<ul style="list-style-type: none"> • Compliant to AAR-S-512 and APTA PR-E-RP-017-099 standard • Aluminium shell with automatic push pull coupling system • Arrangement: 27 poles • 10, 12 or 14 AWG wire • Mechanical coding • 5 colour codes to prevent intermating of any other 27 pole jumpers 	<ul style="list-style-type: none"> • Inter-vehicle

TE



Product	Series & Description	Features & Benefits	Applications
Low Fire Hazard Wire 100E Wire and Cable			
	To complement its existing 100G product line TE is launching 100E 300 volt signal wire.	<ul style="list-style-type: none"> • Lightweight, thin walled leading to reduce bundle volume and weight • Approximately 30% lighter than conventional thick walled wire, giving significant energy savings to the end use 	<ul style="list-style-type: none"> • Rail market rolling stock • Underground metro tunnels • All signal and power applications for rolling stock and tunnels
Light Power and Instrumentation Wire			
	100G	<ul style="list-style-type: none"> • Small size, lightweight • Zero-halogen • 19/37/56 strand conductors depending on size • Excellent handling and flexibility • Outstanding resistance to oils • Excellent scrape abrasion and cut through 	
Rail Cat 7 Data Cables			
	Rail approved zero halogen, high speed data cables	<ul style="list-style-type: none"> • Obtain data rates of 1 Gbps • Expand design capabilities for broader bandwidth • Ethernet connections with increased speed • Stranded conductors for flexible cable application use • Zero-halogen jacket • High performance rail approved to EN45545-2 	<ul style="list-style-type: none"> • Railway CCTV/passenger information • Trackside control cabinets • Entertainment systems • Sensor systems • Video link
Multicore Railway Cables			
		<ul style="list-style-type: none"> • Small size, lightweight • Limited fire hazard • Custom designed to application requirements • Greater flexibility in the choice of routings • Mixed sizes, component types and functionality • Excellent handling and flexibility 	
ZHPCG Power Cable			
	Power Cable	<ul style="list-style-type: none"> • Radiation cross-linked insulation system • Zero-halogen • Low smoke • Flame retardant • Fluid resistant jacket • Excellent handling and flexibility 	

Product	Series & Description	Features & Benefits	Applications
HLX-NEL Narrow Edge Leading Low Fire Hazard Tie-On Printable Cable Marker Tags			
	<p>HLX-NEL Cable Markers are designed to offer flexibility when it comes to wire and cable identification.</p>	<ul style="list-style-type: none"> • Excellent resistance to burning – typical LOI 39% • Zero-halogen • Low toxic fumes • Low smoke • Self-extinguishing • Recommended for use where combustion of products may endanger personnel or delicate electronics at risk • Low fire hazard characteristics (low smoke, low toxicity and low flammability) 	
D-SCE Fluid Resistant Heat-shrinkable Wire Identification Sleeves			
	<p>D-SCE markers are used to identify wires and cables where exposure to organic fluids, especially oils, is required.</p>	<ul style="list-style-type: none"> • Supplied with side scoring • Resistance to organic fluids, common fuels, lubricants and solvents • 3:1 shrink ratio • Wide range of sizes for several wire and bundle diameters • Formulated for use in harsh environments • Dot matrix and thermal printable - both print technologies meet all specifications and approvals list 	<ul style="list-style-type: none"> • Rail • Military • Aerospace
HX-SCE Low Fire Hazard Heat-shrinkable Wire Identification Sleeves			
	<p>HX-SCE is a thin walled, zero-halogen, low smoke, low toxicity, radiation crosslinked, polyolefin heat-shrinkable tubing, assembled as cut sleeves organised in a ladder format.</p>	<ul style="list-style-type: none"> • Zero-halogen • Low toxic fumes • Low smoke • Self-extinguishing, non-flame propagating • Low heat release rate • Resistant to key industrial and rail fluids (defined by RW2072) • Pre-termination cable identification • Particularly suitable for locations with a fire risk to human life or equipment 	<ul style="list-style-type: none"> • Mass transit – rail, aerospace, marine
ZHD-SCE Heat-shrinkable Wire Identification Sleeves			
	<p>ZHD-SCE Low Fire Hazard, fluid resistant heat shrinkable wire identification sleeves.</p>	<ul style="list-style-type: none"> • Meets industry standards, including EN45545-2 • Zero-halogen • Diesel resistant • Resistant to key rail and industrial fluids including diesel (defined by RW-2536) • Low toxic fumes • Non-flame propagating 	<ul style="list-style-type: none"> • Rail • Military • Aerospace
TMS-SCE Military Grade Heat-shrinkable Wire Identification Sleeves			
	<p>TMS-SCE marker sleeves are designed to meet the wire and cable marking needs of manufacturers with high performance requirements.</p>	<ul style="list-style-type: none"> • Permanent identification sleeves • Computer-printable • Lightweight for aerospace applications • Military specification material and print performance • 2:1 shrink ratio • CSA certified 	<ul style="list-style-type: none"> • Rail • Military • Aerospace



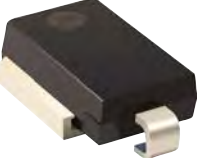


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Discretes



Bourns

BOURNS®

Product	Series & Description	Features & Benefits	Applications
AEC-Q101 Compliant TBU® High-Speed Protectors			
	Model TBU-DB-Q TBU® High-Speed Protectors	<ul style="list-style-type: none"> • Superior circuit protection • Overcurrent protection • Blocks surges up to rated voltage limit • High-speed performance • Small SMT package • RoHS compliant/AEC-Q101 compliant 	<ul style="list-style-type: none"> • Exposed sense and data lines • Battery sensing/balancing • Protection modules and dongles
AEC-Q101 Compliant TVS Diodes			
	SMAJ-Q, SMBJ-Q, SMCJ-Q, SMLJ-Q and SMDJ-Q	<ul style="list-style-type: none"> • Surface mount package • Standoff Voltage: 12V to 58V • AEC-Q101 compliant • Industry standard DO-214AC (SMA), DO-214AA (SMB) and DO-214AB (SMC) package 	<ul style="list-style-type: none"> • DC power bus protection • I/O interface protection • LED overvoltage protection
AEC-Q101 Compliant Load Dump Diodes			
	Model SM8S-Q and SM8SF-Q New Load Dump Diodes	<ul style="list-style-type: none"> • Standoff Voltage: 24V to 36V • Power Dissipation: 7000 watts (10/1000 us) • Maximum Peak Pulse Current: 132A (10/1000µs) • Meets ISO7637-2 / ISO16750-2 surge specification 	<ul style="list-style-type: none"> • Battery protection in BMS • Electronic control units • Sensors • Entertainment systems • Portable devices that require high reliability


Littelfuse

Littelfuse®

Product	Series & Description	Features & Benefits	Applications
Automotive Grade TVS			
	TPSM and SLD (load dump) AEC-Q101 qualified components TVS Diodes Meets ISO7637-2 & ISO 16750-2	<ul style="list-style-type: none"> • Wide standoff voltage range for automotive • Ensures max reliability in harsh environments • Range 600W to 3000W & 2200W for load dump • High current available: 1kA to 15kA • Surface mount & radial leaded • AEC-Q101 qualified and PPAP capable 	<ul style="list-style-type: none"> • Inductive load switching • Alternator load dump • New energy car • Communications and infotainment • Electronic control units • Safety & powertrain systems
Automotive Grade Diode Arrays			
		<ul style="list-style-type: none"> • Low capacitance (11.5 pF typ.) • Enhanced ESD (21kV) and surge (3A) protection • Ensures max. reliability in harsh environments • Helps preserve signal & minimise data loss • Uni & bidirectional • AEC-Q101 qualified and PPAP capable 	<ul style="list-style-type: none"> • CAN & LIN BUS • ETHERNET • Keyless entry • Bluetooth • Communications & infotainment • Touch screens

Vishay



Product	Series & Description	Features & Benefits	Applications
AEC-Q100 Qualified Analog Switch			
	DGQ2788ADN Improves signal integrity and bandwidth for automotive applications	<ul style="list-style-type: none"> • Over-voltage tolerant switch • Wide supply voltage range • Suitable for audio, video and bus switching • Compact package mQFN16: 1.8 x 2.6 x 0.55mm • Power down and signal over rail • Latch up current: 300mA (JESD78) 	<ul style="list-style-type: none"> • Audio, video and bus switching • Infotainment • Power windows, power locks • Power mirror control • Advanced diagnostics and engine control modules • Traction and stability control modules
Automotive TrenchFETs			
	SQ-Series Power MOSFETs, AECQ101 Qual to +175°C	<ul style="list-style-type: none"> • Wide Range of N- and p-Channel MOSFETs • N-ch VDS = 12 V to 300 V • P-ch VDS = -12 V to -200 V • Single, dual, asymmetric configurations • High efficient innovative space saving packages • RDSon down to 1mOhm 	<ul style="list-style-type: none"> • General automotive • Car batteries • Infotainment • Lighting • Electric vehicles • Power train
VCNL Series - Light to Digital			
	Proximity and ambient light sensors with object detection up to 1.5 meters	<ul style="list-style-type: none"> • High resolution (16-bit for proximity & ambient light sensor) • Low profile of 0.75mm • Interrupt: upper and lower thresholds • Automotive-qualified options (-X01) • I²C bus communication interface • Options with four Different Slave Addresses 	<ul style="list-style-type: none"> • Presence detection in automotive • Rear view mirror dimming • Display wake up and touch screen locking • Backlight & contrast control for automotive displays • Gesture recognition with two or three external emitters
AEC-Q101 Qualified Optocoupler			
	VOMA617A Automotive grade Optocoupler with Phototransistor Output	<ul style="list-style-type: none"> • High CTR with low input current • Flat SOP-4 package saves board space • High collector emitter voltage, VCEO = 80V • Isolation test voltage = 3750 VRMS • Low coupling capacitance • AEC-Q101 qualification 	<ul style="list-style-type: none"> • Galvanic and noise isolation • Hybrid/electric vehicle applications • Battery management • On-board chargers • System control • 48 V board net
400W TVS Diode in SMF Package			
	VTVSxxSMF with Industry first 2% VBR Tolerance	<ul style="list-style-type: none"> • Breakdown voltage tolerance down to 2% • SMF package (DO219AB) with low profile of 1mm • High surge capability of 400W at 10/1000μs • Peak pulse current from 2.9A to 20.3A • AEC-Q101-qualified • Line transient voltage protection 	<ul style="list-style-type: none"> • Automotive
Fred Pt[®] Ultrafast Diodes			
	New eSMP low profile Packages & Power Packs	<ul style="list-style-type: none"> • Current range from 1A to 150A • Reverse voltage 100V to 1200V • Fast and soft recovery characteristics • Low leakage currents • Low forward voltage drop • Space reduction using eSMP Packages 	<ul style="list-style-type: none"> • Automotive ECU and on-board chargers • DC/DC converters • Telecom • Power factor correction • Output rectification • Charging stations










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Electromechanical


Switches | Relays

Product	Series & Description	Features & Benefits	Applications
TACT Switches			
	SKST Middle Travel/ SMD type	<ul style="list-style-type: none"> • High operation force meets the automotive market needs and helps to prevent malfunction • Rubber stem helps to provide pre-stroke and over-stroke for excellent operability • Good & clear click feeling based on tactile feedback characteristic • Operation sound is small compared with the conventional model kind • Operation force of 4N/7N/10N • Operating life 100K - 500k 	<ul style="list-style-type: none"> • HVAC • Car audio and navigation • Steering switch
TACT Switches			
	SKSU Middle travel/dust & water drop proof/ SMD type	<ul style="list-style-type: none"> • High operation force, middle travel meets the automotive market needs and helps to prevent malfunction • Rubber stem helps to provide pre-stroke • 30% smaller size than our conventional type • Small operation sound achieved • IP54 equivalent protection against dust & water drop 	<ul style="list-style-type: none"> • HVAC • Car audio and navigation • Steering switch
TACT Switches			
	SKRA Middle travel/ SMD type	<ul style="list-style-type: none"> • Rubber stem helps to provide pre-travel and over-travel for excellent operability • Package size of 6.2x6.2mm is ideal for high-density mounting • Good & clear click feeling based on tactile feedback characteristic • Operation force of 1,96N/2,45N/3,43N/3,92N available • Operating life of 100.000 cycles 	<ul style="list-style-type: none"> • HVAC • Car audio • Car navigation
Ring type Encoders			
	EC50A Large ring shaft type that can be combined with small LCD	<ul style="list-style-type: none"> • Various devices can be mounted in a large centre space • Centre hole diameter of 37mm • Operating life of 40.000 cycles • Good rotation operational feel • Small shaft wobble 	<ul style="list-style-type: none"> • Car audio • HVAC • General human machine interface
Ring type Encoders			
	EC35A Ring shaft type suitable for multifunctional controller	<ul style="list-style-type: none"> • 2 phase output type and 3 phase output (ABC) type avoids errors caused by chattering • Good rotation operational feel • Available long shaft type to minimise wobble of customer knob • Broad variety of different pulse/detent, detent torque, shaft length 	<ul style="list-style-type: none"> • Car audio • HVAC • General human machine interface
Detector Switch			
	SPVQ8 Industry's smallest waterproof detector switch with broad variety	<ul style="list-style-type: none"> • High contact reliability (shock/vibration) due to double-sided sliding contact • Wire harness variety – side wire, downward wire • Solderless fork terminal variety - press fit connection • NO/NC versions available • Secured 2mm over stroke contributes to design flexibility • Max. 40° inclined push possible 	<ul style="list-style-type: none"> • Open/close detection • Position detection for door, back door, hood, etc.

Product	Series & Description	Features & Benefits	Applications
Emergency Stop Switches			
	<p>ES Heavy duty safety switch</p>	<ul style="list-style-type: none"> • Rugged version: 100.000 cycle mechanical life • Locked/unlocked status indicator • Lower behind-panel depth • Sealed to IP65, IP67 and IP69K • Complies with EN 60947-5-1 • Operating temperature: -40°C to +85°C 	<ul style="list-style-type: none"> • Heavy duty equipment • Harsh environments • Safety • Remote controls • Industrial applications
	<p>X6 Third-generation E-stop switch with Reverse Energy Structure</p>	<ul style="list-style-type: none"> • 3rd generation E-stop with IDEC's original "Reverse energy control" • Smooth and dust-proof design • Two ways of resetting - pulling and turning • Very compact product up to 2 contacts • Fully qualified and certified 	<ul style="list-style-type: none"> • Transportation • Heavy duty equipment • Material handling • Safety
	<p>XA Compact E-Stop with Safe break action</p>	<ul style="list-style-type: none"> • 3rd generation E-stop with IDEC's original "Reverse energy structure" and "Safe break action" • Numerous options: Button size and colour, terminals, illumination • Two ways of resetting - pulling and turning • Very compact product, up to 4 contacts • Fully qualified and certified 	<ul style="list-style-type: none"> • Transportation • Machinery • Heavy duty equipment • Material handling • Safety
	<p>XN1E-XN5E Robust construction E-Stop</p>	<ul style="list-style-type: none"> • 3rd generation E-Stop with IDEC's original "Reverse energy structure" and "Safe break action" • Plastic and flush metal bezels available • Push-on illuminated button possible • Two ways of resetting - pulling and turning • Fully qualified and certified 	<ul style="list-style-type: none"> • Transportation • Machinery • Heavy duty equipment • Material handling • Safety
	<p>XW Ø22mm E-Stop with Safe Break Action</p>	<ul style="list-style-type: none"> • 3rd generation E-stop with IDEC's original "reverse energy control" • Unique "Safe Break action": the contacts are held open, if the button is not correctly fixed or damaged • Two ways of resetting: pulling and turning • Very compact product (37.1mm deep behind panel with 4 contacts) • Numerous options, including illumination linked to operation 	<ul style="list-style-type: none"> • Transportation • Machinery • Heavy duty equipment • Material handling • Safety
	<p>YW YW is part of a range full of pushbuttons, pilot lights, selectors and key selector switches</p>	<ul style="list-style-type: none"> • Modular construction • Efficient easy to assemble • Low maintenance • 3 different designs including a mushroom head, illuminated or not • Certified to UL, CSA & CCC 	<ul style="list-style-type: none"> • Heavy duty equipment • Material handling • Security • Harsh environments
	<p>YW E-Stop Ergonomic E-Stop certified to the highest safety standards</p>	<ul style="list-style-type: none"> • Industrial range • Push to lock, pull or twist to release • Current/voltage rating: AC-12, 6A 240VAC/ DC-12, 8A 24VDC • Panel sealed to IP65 • Mechanical life: 250.000 cycles (with one contact block) • Available in single, double or three pole version 	<ul style="list-style-type: none"> • Transportation • Machinery • Heavy duty equipment • Material handling • Safety

APEM



Product	Series & Description	Features & Benefits	Applications
Indicators			
	Q-Series Panel mount LED indicators	<ul style="list-style-type: none"> Bright chrome, black or satin grey bezel finish Prominent and flush bezel styles Voltage: 2 VDC – 220 VAC Terminals: 2.8 x 0.8 solder lug/fastons, pins or 200mm long wires IP67 sealing option (EN 60529) Supplied with fixing nut and spring washer 	<ul style="list-style-type: none"> Professional electrical appliances Civil engineering vehicles, trucks, diggers, cranes Automotive Machine tools
Pushbuttons			
	13000 High reliability single pole and double pole momentary pushbuttons	<ul style="list-style-type: none"> For panel or PCB UL and CECC approved Designed to European MIL specs. Bushing Ø6,35 and Ø 11,9 Operating temperature: -40°C to +85°C Silver contacts, 4A 30VDC; gold contacts 100mA 30V 	<ul style="list-style-type: none"> Transportation Material handling Defense
	AV Anti-vandal pushbutton switches	<ul style="list-style-type: none"> Security pushbutton switches Actuator and bushing: nickel plated, chrome plated, varnished polished or stainless steel Flat or curved actuator available Marking and illumination available Front panel sealing: IP65 	<ul style="list-style-type: none"> Transportation Heavy duty equipment Harsh environments
	CW CW is a full range offflush switches, pilot-lights and selectors for aesthetic applications.	<ul style="list-style-type: none"> Separable contact blocks Up to 6 contacts, rated 10Amps max 2 different shapes, 7 different colours and 2 different bezels Flush silhouette: only 2,5mm above the panel Fully qualified and certified 	<ul style="list-style-type: none"> Transportation Control panels Heavy duty equipment Material handling Safety
	FD Double icon illuminated pushbutton switches	<ul style="list-style-type: none"> Operating temperature: -40°C to +75°C Quality of screen printed legends Large size, snap-in and threaded bushing versions Sealing up to IP69K 	<ul style="list-style-type: none"> Transportation Security
	FP Fully illuminated pushbutton switches	<ul style="list-style-type: none"> Snap-in mounting Full actuator or symbol illumination Large but lightweight Pad printed or laser etched symbols Operating temperature: -40°C to +75°C Bushing Ø26mm 	<ul style="list-style-type: none"> Transportation




Product	Series & Description	Features & Benefits	Applications
Pushbutton Switches			
	<p>IA Pushbutton for harsh environments</p>	<ul style="list-style-type: none"> • Max. current/voltage rating with resistive load: 2A/24VDC • Electrical life at full load: 1.000.000 cycles • Resistant to frost, sand and hydrocarbons • Tactile feedback • Front panel sealed up to IP67 	<ul style="list-style-type: none"> • Transportation • Harsh environments • Heavy duty equipment
	<p>IHL Hall effect pushbutton switches</p>	<ul style="list-style-type: none"> • Linear output pushbutton • 0.5V to 4.5V output • Different operating forces • 5 million cycles • Sealed to IP67 • Operating temperature: -40°C to +85°C 	<ul style="list-style-type: none"> • Material handling • Heavy duty equipment • Transportation • Marine • Remote controls
	<p>IHS Hall effect pushbutton</p>	<ul style="list-style-type: none"> • Operating temperature: -40°C to +85°C • Eight actuator colours • Operating force: 6N ± 2N • Hall effect sensors for long life • IP67 sealing • Low behind-the-panel depth 	<ul style="list-style-type: none"> • Automotive • Heavy duty equipment • Material handling • Harsh environments
	<p>IX Pushbutton switches for harsh environments</p>	<ul style="list-style-type: none"> • Backlight marking in a compact case • Strong tactile feedback • NO or NC/NO • High sealing level • No space between actuator and bushing (IP67/IP69K) 	<ul style="list-style-type: none"> • Heavy duty equipment • Transportation • Harsh environments
	<p>LB/LBW LB/LBW series is a full range of switches, pilot-lights, selectors, and buzzers</p>	<ul style="list-style-type: none"> • Projects only 2mm from the panel surface for sleek and refined style • Separable contact blocks, up to 3 contacts • 3 different shapes and 8 different colours • Accessories for customisation • Fully qualified and certified 	<ul style="list-style-type: none"> • Transportation • Control panels • Heavy duty equipment • Material handling
Rocker Switch			
	<p>KR Power rocker switches</p>	<ul style="list-style-type: none"> • Unique rocker design • Wide choice of colours • Laser etched symbols • Illuminated or non-illuminated • Optionally sealed to IP68 or IP69K • Operating temperature: -40°C to +85°C 	<ul style="list-style-type: none"> • Transportation • Heavy duty equipment

Product	Series & Description	Features & Benefits	Applications
Toggle Switches			
	600H-600NH Industrial toggle switches with high amperage and metal or insulated lever	<ul style="list-style-type: none"> • Construction: terminal and contact support are manufactured from a single piece of metal • The contacts are resistance-welded to the terminal for increased mechanical strength • Rating: these switches are suitable for motor loads and power applications up to 15A 250 VAC or 10A 400 VAC • Metal or insulated lever • UL, CSA and NF-VDE (EN 61058-1) approved 	<ul style="list-style-type: none"> • Transportation • Boats/marine • Hydraulic crane controls • Control panels • Heavy duty equipment • Material handling
	3500 High performance toggle switches	<ul style="list-style-type: none"> • Completely sealed switches withstanding 0.1 bar pressure • Approved to European standards CECC 96000 • Three types of terminals • Many lever styles available • Operating temperature: -40°C to +85°C • Mechanical life: 40.000 cycles 	<ul style="list-style-type: none"> • Transportation • Boats/marine • Hydraulic crane controls • Control panels • Heavy duty equipment • Material handling
	3600NF Sealed toggle switches for outdoor applications	<ul style="list-style-type: none"> • Sealed to IP67 • 12 amp rating • UL approved on select models • O-ring seal, molded-in terminals • Numerous electrical configurations • Solder lug, quick connect or screw terminals 	<ul style="list-style-type: none"> • Control panels • Construction site • Heavy duty equipment • Marine • Transportation • Material handling
	5000 Miniature toggle switches; threaded bushing Ø6.35mm	<ul style="list-style-type: none"> • 17 actuators including toggles, paddle levers and locking levers in different lengths • Various contact materials for low and high currents • 8 functions including maintained and momentary versions • 1 to 4 pole configurations • Several bushing styles • 3 approvals (UL - CSA - CECC) 	<ul style="list-style-type: none"> • Electronic systems • Lab equipment • Control modules • Transportation • Heavy duty equipment • Material handling
	12000 Robust switches for high specification environments	<ul style="list-style-type: none"> • Operating temperature: -40°C to +85°C • Approvals: CECC 96201-005, CECC 96201-008, MIL 3950 • Toggle action on 2-position models giving smooth mechanical operation • Plastic material with high insulation resistance • Several locking lever and front panel sealing options • Bright chrome, satin chrome or matt black finish 	<ul style="list-style-type: none"> • Transportation • Telecommunication • Defense • Industrial automation • Heavy duty equipment • Material handling

Product	Series & Description	Features & Benefits	Applications
Subminiature Detect Switches			
	SSW Electronic park brake SMT switch	<ul style="list-style-type: none"> • Changeover function with time <15ms • Vertical detect • IP67 sealed • Redundant contacts • Low acoustics 	<ul style="list-style-type: none"> • Automotive, ASIL related applications (electrical parking brake, by-wire functions) • Safety applications
Double Contact Tact Switches			
	KSC DCT Sealed Tact Switch for SMT with SPDT function	<ul style="list-style-type: none"> • Positive tactile feeling • IP67 • SPDT NC-NO • Soft actuator 5.2mm high 	<ul style="list-style-type: none"> • Automotive openings • Any safety function with double contact switch
Backlit Pushbutton Switch			
	APB Panel switch with IP67 and illumination	<ul style="list-style-type: none"> • IP67 sealed • 1,000,000 life cycle • Illumination • Threaded or snap-in mounting • Customisable symbols 	<ul style="list-style-type: none"> • Harsh environments • Multi function grip for heavy vehicles • Control panel • Construction equipment controls
Power Toggle			
	PT Single & Double pole power toggle in IP68 case	<ul style="list-style-type: none"> • IP66 / IP68 • Integrated panel seal for extra protection • Superior oil and fuel resistance • Heat resistant housing for applications subjected to vibration and harsh conditions 	<ul style="list-style-type: none"> • Off-road, construction/agricultural vehicles • Material handling equipment • Articulating, scissor and bucket lift controls • Lift gate controls
High Performance SMT Key Switch			
	K12S Robust single & double stroke switch	<ul style="list-style-type: none"> • Harsh environment applications – IP67 • Excellent tactile feel • Compatible with SMT lead free soldering process • Illuminated • High reliability / long life 	<ul style="list-style-type: none"> • Motorcycles handle bar • Gear shift • Steering wheel controls • Joystick for heavy vehicles and off road machinery
Seat Adjustment Module			
	SAM Multiway Switches	<ul style="list-style-type: none"> • Multi-directional power switches 2-way & 4-way • Actuation force 5.3N or 6N • Footprint 20.7x18.0mm (2-way) & 26.2x26.2mm (4-way) • Momentary action – SPDT • Power contact with low voltage 	<ul style="list-style-type: none"> • Joystick switch • Seat adjustment • Avionics

C&K




C&K




Product	Series & Description	Features & Benefits	Applications
Subminiature Snap-acting Switch			
	ZMSM Reliable snap-acting IP65	<ul style="list-style-type: none"> • IP65 & IP67 with potted wires only • Various PCB terminals and actuators • Reliable snap-acting mechanism • Long electrical and mechanical life 	<ul style="list-style-type: none"> • Latching closure system • Seat belt application • Position detection
Microminiature SMT Top Actuated IP67			
	KMR6 Tact switch with ultra-low current capabilities	<ul style="list-style-type: none"> • Excellent tactile feeling • Long Life version • Watertight IP67 • Ultra low current capabilities 	<ul style="list-style-type: none"> • Door handle switch • Steering wheel & column switches • Keyfobs
Sealed Pushbutton Switch			
	PNP IP68 sealed to endure harsh environments	<ul style="list-style-type: none"> • 1,000,000 life cycle • Snap-action provide positive tactile feedback • Multiple housing styles • Available with separate caps 	<ul style="list-style-type: none"> • Control grips • Off-road panels • Heavy equipment • Lifts/platform

Honeywell




Honeywell




Product	Series & Description	Features & Benefits	Applications
Toggle Switches (Commercial)			
	NT and MT Series Sealed, Rugged, Panel Mounted Toggle Switches	<ul style="list-style-type: none"> • Designed for demanding, harsh environment applications • Sealed to IP 67/68 • Standard (NT) and Miniature (MT) switches • 1, 2, 4-Pole, 2 or 3 position, maintained and momentary action • UL recognised, CSA certified and CE certified • Highly reliable and cost-effective 	<ul style="list-style-type: none"> • Control panels • Construction equipment • Material handlers • Aerial work platforms • Agricultural equipment • Mining machines
Toggle Switches (Military Spec)			
	TL and TW Series Sealed, Rugged, Panel Mounted Mil Spec Toggle Switches	<ul style="list-style-type: none"> • Designed for the most demanding conditions of mechanical shock, vibration, dust, splashing or hose-directed water and temperature extremes • Qualified to MIL-DTL-83731 (TW Series), MIL-DTL-3950 (TL Series) • Standard (TL) and Miniature (TW) switches • 1 or 2-Pole, 2 or 3 position, maintained and momentary action • UL recognised, CSA certified and CE approved 	<ul style="list-style-type: none"> • Military and commercial aircraft and helicopters • Construction equipment • Aviation ground equipment • Military land vehicles
Pressure Switches			
	HP, HE, MH, ME, LP, LE Series Durable, Reliable Pressure Switches	<ul style="list-style-type: none"> • Pressure switching set point range: 3.5psi to 4500psi • IP67 sealing rating • More than 15 pressure port options and over 30 electrical terminations • Plated steel, brass or stainless steel options • Life cycle rating up to 2 million • Switching point accuracy up to $\pm 2\%$ 	<ul style="list-style-type: none"> • Agricultural, mining • Construction equipment • Material handling • Marine and rail • Industrial machines • Pumps/pneumatic equipment

Omron			OMRON
Product	Series & Description	Features & Benefits	Applications
Sealed Microswitch			
	D2AW D2AW Sealed Ultra Subminiature Basic Switch	<ul style="list-style-type: none"> • Small size and long stroke (OT reference value: 1.4mm) • Sliding contact structure enables smooth and quiet operation • Double reliability with the help of twin contacts • Sliding contact aid in cleaning up the foreign materials 	<ul style="list-style-type: none"> • Energy • Automotive
Detection Switch			
	D2HW Sealed Ultra Subminiature Basic Switch	<ul style="list-style-type: none"> • Smallest sealed snap-action switch • Extra-long stroke even without levers • Made of environment-friendly materials • Best water tightness 	<ul style="list-style-type: none"> • HVAC • Electronic door lock
Tactile Switch			
	B3AL B3AL Long Stroke Tactile Switch	<ul style="list-style-type: none"> • High operating force • Long life (up to 1,000K operations) • Dust-proof • No flux penetration by serrations • Long stroke achieved by using rubber plunger 	<ul style="list-style-type: none"> • Automotive

Sensata			Sensata Technologies
Product	Series & Description	Features & Benefits	Applications
Pressure Switches			
	PS80 Automatic Reset Pressure Switch	<ul style="list-style-type: none"> • Custom engineered solutions • Historically proven reliability • Hermetically sealed sensor • Environmentally sealed leads • Flexible set point range • Fixed set point 	<ul style="list-style-type: none"> • Air Conditioning • Compressors & pumps • Hydraulic Systems • Vehicle controls • Oil pressure monitoring
Temperature Switches			
	1NT; 3NT; 5003, 5011, 5100 series. Single throw, snap-action, fixed temperature thermostat suitable for a variety of industrial and commercial applications.	<ul style="list-style-type: none"> • High temperature capability • High impact strength • Many termination and mounting configurations • UL and CSA certified 	<ul style="list-style-type: none"> • Heating systems (Automotive) • Heavy vehicles and offroad equipment • Electric motors • Refrigeration units
Encoder solutions			
	DSO5H; HHM3 SIL3 Ple and Magnetic Incremental Encoders	<ul style="list-style-type: none"> • Suitable for safe motor feedback • Robustness and excellent resistance to shock and vibration • Extended temperature range • Compact industrial encoder with solid shaft 	<ul style="list-style-type: none"> • Automated guided vehicles • Agriculture equipment • Forestry vehicles • Construction vehicles




Product	Series & Description	Features & Benefits	Applications
6mm Square Middle Travel 2 terminals SMD Light Touch Switch			
	EVPBD New mid travel LSW with 0.75mm stroke	<ul style="list-style-type: none"> External dimensions 6.0mm x 6.0mm x 4.0mm Sharp feeling (high click ratio) Silent click sound High reliability and endurance (100k life cycle, 3.5N) 	<ul style="list-style-type: none"> Center stack applications HVAC and RNS applications
6mm Square Long Travel 2 terminals SMD Light Touch Switch			
	EVPAS EVPAS Series is a new "rubber dome type"	<ul style="list-style-type: none"> Common size of 6.0mm square x 5.0mm (with push plate) Travel 1.0mm or 1.3mm Excellent solderability with 2 terminals Reflow soldering available Excellent light-touch operation feeling Usage temperature range: -40°C – +90°C 	<ul style="list-style-type: none"> Operating switches for car electronic equipment Input on operating switches for telephones, electronic musical instruments, etc.
6mm Square Thin Type SMD Light Touch Switch			
	EVQQ2 New height available: 4.3mm (from April 19 in MP)	<ul style="list-style-type: none"> External dimensions 6.5mm x 6.0mm x 1.8mm Sharp short stroke feeling (0.25mm & 0.2mm) High reliability and endurance (up to 2Mio. life cycle, 0.5N) Best price performance ratio 	<ul style="list-style-type: none"> Steering applications HVAC and RNS applications Window lifter application Interior lighting applications
35A High Power Relay			
	HE-S relay High-capacity and long life 35A 277V AC electromechanical relay	<ul style="list-style-type: none"> Switching capacity 35A 277V AC Meet the requirements of IEC 61851-1 2 NO or 2 NO 1 NC Mirror contact according to EN60947-4-1 Contact gap >3.2mm Low holding power 170mW 	<ul style="list-style-type: none"> Wall box (EV charging) Charging cable
6A Safety Relay			
	SFY relay Electromechanical relays with forcibly guided contacts according to EN 61810-3	<ul style="list-style-type: none"> Suitable for applications requiring EN 50155 4pole and 6pole types available High shock & vibration resistance Degree of protection RTIII Reinforced insulation according to EN 50178 Gold clad contacts on request 	<ul style="list-style-type: none"> Railway signalling Railway axle counting Emergency stop Cable car control Elevator & escalator control Safety control
Up to 1,500V Load Voltage PhotoMOS			
	AQV PhotoMOS relay DIP6-pin type with low on-resistance and reinforced insulation	<ul style="list-style-type: none"> Infinite number of switching cycles Very high switching frequency Reinforced insulation up to 5,000V available Ambient temperature -40°C to +85°C No operation sound 	<ul style="list-style-type: none"> Railway signalling systems Measuring systems Insulation monitoring Data communication systems Automatic meter reading device

Product	Series & Description	Features & Benefits	Applications
Panel Mount DC Solid State Relays			
	Series 1-DC Reliable DC output SSRs in a hockey puck package style	<ul style="list-style-type: none"> • Ratings from 7 up to 100 Amps • Low on-resistance MOSFET output • Improved SEMS screw connections • C-UL-US approved 	<ul style="list-style-type: none"> • Vehicle heating system • Battery management system
PCB Mount DC Solid State Relays			
	CMX series Compact design	<ul style="list-style-type: none"> • SIP style package • Ratings from 3 up to 20 Amps • Low on-resistance MOSFET output • C-UL-US approved 	<ul style="list-style-type: none"> • Aircraft power supplies • Vehicle heating system • Battery management system
DIN Rail Mount DC Solid State Relays			
	DR22 Series Compact and powerful 22.5mm design	<ul style="list-style-type: none"> • Output ratings up to 30 Amps at 200 VDC • Ready to use with integral heatsink • IP20 touch-safe housing • C-UL-US approved 	<ul style="list-style-type: none"> • Battery management system • Refrigerated vehicles • Aircraft power supplies

Product	Series & Description	Features & Benefits	Applications
Reed Relays			
	KT Reed Relays	<ul style="list-style-type: none"> • High isolation characteristic • High isolation voltage • Tape and reel packaging • Hermetically sealed thermoset • SMT and THT available • Dynamically tested contacts 	<ul style="list-style-type: none"> • Automotive • Battery management systems • Alternative energy • Cable and in-circuit tester • E-cars
Reed Relays			
	SHV Reed Relays Single in-line and high voltage relay	<ul style="list-style-type: none"> • Small high voltage relay • Dielectric strength up to 4 kVDC • Internal magnetic shield • Hermetically sealed • UL-listed instrumentation grade reed relay 	<ul style="list-style-type: none"> • High density assembly • Battery management systems (BMS) • Cable and in-circuit tester • Test and measurement • Battery control • E-cars
Reed Switches			
	SMD Reed Sensors Surface mount design	<ul style="list-style-type: none"> • Ideal for on/off control switch, proximity, motion and position detection • Different lead designs • Bare glass or rugged thermoset overmolded versions • Overmolded version for harsh environment, shock protected • No power consumption • Ideal for automatic pick and place 	<ul style="list-style-type: none"> • Automotive • Gear shift position • On/off position • Door lock • Seat belt sensor • Brake pedal position




TDK



Product	Series & Description	Features & Benefits	Applications
High-Voltage Contactors (HVC)			
	B88269X* / HVC200* Operating current 200A Operating voltage up to 1200V	<ul style="list-style-type: none"> Gas-filled and hermetically sealed No polarity of contact terminals Temperature and voltage sensor (optional) Auxiliary contact (optional) UL 60947-4-1 RoHS compatible 	<ul style="list-style-type: none"> Battery charging/discharging systems Renewable energy storage systems DC high-voltage/high-current applications DC fast-charging stations
	B88269X*** / HVC300* Operating current 300A Operating voltage up to 1200V	<ul style="list-style-type: none"> Dual coil (optional) Increased make and break capability Temperature and Voltage sensor (option) Auxiliary contact (option) Low holding power Coil termination integrated 	<ul style="list-style-type: none"> Battery charge/discharge systems Renewable energy storage systems DC high-voltage/high-current applications DC fast charging stations
	B88269X*** / HVC500* Operating current 500A Operating voltage up to 1200V	<ul style="list-style-type: none"> Gas-filled and hermetically sealed No polarity of contact terminals Temperature and voltage sensor (option) Auxiliary contact (option) UL 60947-4-1 RoHS compatible 	<ul style="list-style-type: none"> Gas-filled and hermetically sealed No polarity of contact terminals Temperature and voltage sensor (option) Auxiliary contact (option) UL 60947-4-1 RoHS compatible

TE



Product	Series & Description	Features & Benefits	Applications
KILOVAC High Voltage Relays and Contactors			
	EV100, EV200, LEV100, LEV200 These 12-900V contactors support 100A/500A LEV & EV100 = 20KW, 50K cyc. LEV & EV200 = 60KW, 10K cyc. LEV = single coil (no economizer) EV = dual coil economiser	<ul style="list-style-type: none"> Hermetically sealed for harsh environments Excellent size to power ratio Ability to interrupt DC loads High shock and vibration performance Wide temperature range Voltage ratings to 70 KVDC 	<ul style="list-style-type: none"> Electric & hybrid vehicles Power distribution units Battery packs
	KSC01, KSC03 The KSC01, KSC03 Current Sensing contactors support 12-600V and 100A/500A. KCS01 = 24KW, 10K cyc. KCS03 = 60KW, 10K cyc. Mechanical or electronic two-coil economiser with internal suppression	<ul style="list-style-type: none"> Hermetically sealed for harsh environments Excellent size to power ratio Ability to interrupt DC loads High shock and vibration performance Wide temperature range Voltage ratings to 70 KVDC 	<ul style="list-style-type: none"> Electric & hybrid vehicles Power distribution units Battery packs
	KHR500, K1K06X The KHR500, K1K06X contactors support 28-1000V and 600A/1000A KHR500 = 80KW, 4K cyc. K1K = 130KW, 10K cyc. Integrated dual-coil electronic "Cut throat" economiser	<ul style="list-style-type: none"> Hermetically sealed for harsh environments Excellent size to power ratio Ability to interrupt DC loads High shock and vibration performance Wide temperature range Voltage ratings to 70 KVDC 	<ul style="list-style-type: none"> Electric & hybrid vehicles Power distribution units Battery packs



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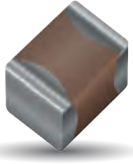
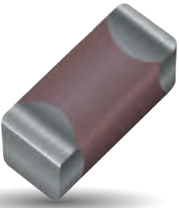
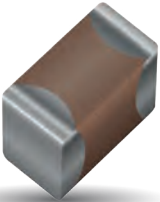
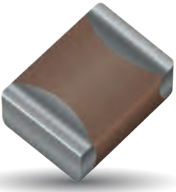
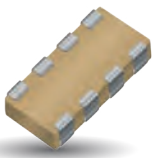

Passives

Antennas | Capacitors | Circuit Protection | Electromagnetic | Resistors

AVX



Product	Series & Description	Features & Benefits	Applications
Low Profile PCB Antennas			
	LTE	<ul style="list-style-type: none"> • Full LTE coverage • SMT • Small PCB footprint • High efficiency • Tuning capabilities • Mechanical robustness 	<ul style="list-style-type: none"> • Telematics • Ecall • On-board diagnostic • Tracking
Low Profile Stamped Metal Antennas			
	Wi-Fi / BT	<ul style="list-style-type: none"> • Dual band: 2.4 / 5 GHz • SMT • Tuning capabilities • High efficiency 	<ul style="list-style-type: none"> • Infotainment • Telematics • Ecall • On-board diagnostic • Tire pressure monitor sensor
Miniature Ceramic Antennas			
	BT	<ul style="list-style-type: none"> • 2.4 GHz • Extra-small form factor • SMT • Tuning capabilities 	<ul style="list-style-type: none"> • Infotainment • Telematics • Ecall • On-board diagnostic • Tire pressure monitor sensor
Vertical Polarised Stamped Metal Antennas			
	V2X / DSRC	<ul style="list-style-type: none"> • 2.4 GHz • Extra-small form factor • SMT • Tuning capabilities 	<ul style="list-style-type: none"> • Telematics • Ecall • Infrastructure
Vertical Polarised Stamped Metal Antennas			
	GNSS	<ul style="list-style-type: none"> • Wideband coverage: GPS/GLONASS/BEIDOU/Galileo • Circular polarisation • Single or dual feed • Pin-through or SMT 	<ul style="list-style-type: none"> • GPS/navigation • Telematics • Ecall • Tracking • On-board diagnostic
Vertical Polarised Stamped Metal Antennas			
	GNSS Combo	<ul style="list-style-type: none"> • Wideband coverage: GPS/GLONASS/BEIDOU Galileo • Circular polarisation • Single or dual feed • Pin-through or SMT 	<ul style="list-style-type: none"> • GPS/navigation • Telematics • Ecall • Tracking • On-board diagnostic

Product	Series & Description	Features & Benefits	Applications
TIN TERMINATION			
	NP0 Low ESR, NP0, X7R, High Temp X8R, X8L High Voltage X7R	<ul style="list-style-type: none"> • Excellent EMI filtering • Low ESR • Wide range of values • High temp +150°C series • High voltage up to 3000V 	<ul style="list-style-type: none"> • Telematics • DC motors • Pumps • Infotainment • Hybrid and electric vehicles
FLEXITERM™			
	X7R High Temp X8R, X8L High Voltage X7R	<ul style="list-style-type: none"> • Excellent EMI filtering • Low ESR • Flexible termination system • Up to 5mm flexure • Excellent mechanical and thermo-mechanical performance 	<ul style="list-style-type: none"> • Hybrid and electric vehicles
FLEXISAFE			
	X7R	<ul style="list-style-type: none"> • Excellent EMI filtering • Low ESR • Combines Flexiterm™ with cascade design for safety critical applications • Excellent reliability 	<ul style="list-style-type: none"> • Airbag • Crash avoidance • Power steering • Transmission control • Parking assistant • Hybrid and electric vehicles
ESD-SAFE™			
	X7R	<ul style="list-style-type: none"> • Excellent EMI filtering • Low ESR • ESD qualified per HBM of AEC Q200-002 • ISO 10605 • ESD rating 18 - 30kV 	<ul style="list-style-type: none"> • Transponders • Power steering • Turbo charger • Alarm • Hybrid and electric vehicles
ARRAY			
	NP0, X7R High Temp X8R	<ul style="list-style-type: none"> • Excellent EMI filtering • Low ESR • 4-element arrays • Reduced space and placement costs • High temp +150°C series 	<ul style="list-style-type: none"> • GPS • Infotainment • Abs • Ecu
LEADED			
	NP0, X7R High Temp X8R High Voltage X7R	<ul style="list-style-type: none"> • Excellent EMI filtering • Low ESR • Excellent mechanism shock and vibration resistance • Exceptional thermal resistance • High temp +150°C series • Axial and radial configuration 	<ul style="list-style-type: none"> • DC motors • Pumps • Turbo charger • Engine cooling fan

AVX






Product	Series & Description	Features & Benefits	Applications
Medium Power Film Capacitors			
	DC Filtering AC Filtering Protection Tuning	<ul style="list-style-type: none"> Reliability & soft end of lifetime due to controlled self-healing Custom Designs (mechanical/electrical) 	<ul style="list-style-type: none"> Traction drives Spare parts Battery charger Hybrid/electric
High Power Film Capacitors			
	DC Filtering DC link Discharge	<ul style="list-style-type: none"> Reliability & soft end of lifetime due to controlled self-healing Custom Designs (mechanical/electrical) 	<ul style="list-style-type: none"> DC/DC converters Electric drive DC link Traction drives
DC Link Capacitors			
	DC Filtering	<ul style="list-style-type: none"> Reliability & soft end of lifetime due to controlled self-healing Custom designs (mechanical/electrical) 	<ul style="list-style-type: none"> EV/HEV traction converters EV/HEV auxiliary converters
SCC Supercapacitor Cylindrical Cells			
	ACN based supercapacitors	<ul style="list-style-type: none"> Internal standards to withstand automotive environment Excellent lifetime performance 1F to 3000F range 2,7 and 3V cells available Extra Low ESR versions also available Customised modifications on demand 	<ul style="list-style-type: none"> Energy harvesting (regenerative braking) Pulse power handling (telematics) Power hold up (door opening, battery chatter) Primary battery lifetime enhancement
SCM Supercapacitor Cylindrical Modules			
	ACN based supercapacitors	<ul style="list-style-type: none"> Internal standards to withstand automotive environment Shrink wrap/molded encapsulation possibilities Catalogue range up to 9V Various balancing methods available Customised solutions available on request 	<ul style="list-style-type: none"> Energy harvesting (regenerative braking) Pulse power handling (telematics) Power hold up (door opening, battery chatter) Primary battery lifetime enhancement
SCM Supercapacitor Cylindrical Modules			
	Water based supercapacitors BZ and BW series	<ul style="list-style-type: none"> Lowest ESR per farad in the industry Low leakage current options available 4,7mF to 1F range 3,5V to 20V range Low profile robust design Not reflow solderable 	<ul style="list-style-type: none"> Energy harvesting (RF harvesting) Pulse power handling (telematics, keyless entry) Power hold up (battery chatter) Primary battery lifetime enhancement

Product	Series & Description	Features & Benefits	Applications
Conductive Polymer			
	TCJ TCQ TCM TCN F38	<ul style="list-style-type: none"> • AEC-Q200 at TCQ • Benign failure mode • Low ESR - higher ripple rating • Rated voltage up to 125V • RoHS reflow compatible • Mechanically robust 	<ul style="list-style-type: none"> • Cabin electronics • Body electronics • DC/DC converters • Wireless systems • Surround monitoring
OxiCap®			
	NOJ NOS NOM	<ul style="list-style-type: none"> • AEC-Q200 • Very high reliability • Stable parameters over lifetime • No piezo effect 	<ul style="list-style-type: none"> • Safety applications • Navigation • Sensors • DC/DC converters • Control units • Cameras
MnO2 - Tantalum			
	TAJ TPS TRJ F-series	<ul style="list-style-type: none"> • High reliability • Stable parameters over lifetime • Unlimited life time operation • Mechanically robust • Low ESR and DCL • RoHS 	<ul style="list-style-type: none"> • Cameras • DC/DC converters • Energy harvesting • ECU • Tire pressure • Drive train
Multianode			
	TMJ TCM NOM TRM	<ul style="list-style-type: none"> • Very low ESR • High ripple rating • Stable life parameters • Mechanically robust • Conductive Polymer, OxiCap®, MnO2 Tantalum 	<ul style="list-style-type: none"> • Power control units • ECU • DC/DC converters • LED lighting • Sensors • Energy harvesting
High Temperature			
	THJ F9H F97-HT3	<ul style="list-style-type: none"> • Temperature range up to 200°C • Stable parameter over lifetime • Improved reliability • Increased performance at high temp • High temperature / mechanical shock robustness 	<ul style="list-style-type: none"> • Engine applications • ECU • High temperature sensors • Steering systems • Braking systems • Lighting
Low Profile and High CV			
	TLN (Pulse Cap) TCN (J-Cap)	<ul style="list-style-type: none"> • High capacitance • High energy per volume • TLN MnO2 – low DCL • TCN Polymer – Low ESR • Low profile case • Stable parameters 	<ul style="list-style-type: none"> • Communication • Hold up capacitor • Energy harvesting • Tracking

Cornell Dubilier




Product	Series & Description	Features & Benefits	Applications
High Temperature Aluminium Electrolytic Capacitors			
	<p>HHT Ruggedised, Long Life at +175°C</p>	<ul style="list-style-type: none"> • Glass-to-metal seal ensures long life at high operating temperature. • 2000 hours at +175°C • 5000 hours at 150°C • 10 year shelf life • Withstands 20g vibration • High ripple current capability at high temperature 	<ul style="list-style-type: none"> • High temperature power conversion • Electronic systems for agricultural and mining equipment • Extreme under-the-hood applications
High Vibration, Hybrid Aluminium Polymer Capacitors			
	<p>HZC_V High Vibration, High Temperature, SMT, Hybrid Aluminium Polymer Capacitors for Automotive Applications</p>	<ul style="list-style-type: none"> • +125°C, Up to 4,000 hours load life • Low leakage current • Very low ESR and high ripple current • 260°C reflow soldering • AEC-Q200 compliant 	<ul style="list-style-type: none"> • Filtering • Bypassing • Power supply decoupling with long life requirements
DGH, Low ESR Supercapacitor			
	<p>DGH DGH, High Pulse Power Supercapacitors Extend Battery Life</p>	<ul style="list-style-type: none"> • Very fast charge/discharge • 0.5 to 470 Farads • 2.7 and 5.5 WVDC • -40°C to +65°C (-40°C to +85°C at 2.3V (2.7V parts) and 4.6V (5.5V parts)) • Exceeds 500,000 charge/discharge cycles • Low ESR 	<ul style="list-style-type: none"> • Battery backup/alternative • Pulse power GPS tracking • Energy harvesting • Utility meters • Led displays • Mechanical actuators




Product	Series & Description	Features & Benefits	Applications
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XLR-48 Module

	<p>High reliability, long life and maintenance free supercapacitor energy module for rugged environments</p>	<ul style="list-style-type: none"> • Ultra low ESR provides high efficiency, high power • No heavy metals, non-hazardous energy storage • High power density for low operating costs • Millions of charge/discharge cycles • UN ECE R100 certified • Meets IP65 environmental rating 	<ul style="list-style-type: none"> • Hybrid or electric vehicles • Commercial vehicles: trucks, mining, construction • Trolley, subway • Vehicles and buses
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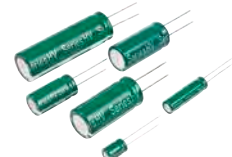
XVM Module

	<p>Supercapacitor module provides peak power for 12 V systems.</p>	<ul style="list-style-type: none"> • Compact size for easy mounting • Series or parallel connections for easy integration • High reliability, green solution for pulse or backup power • Maintenance free 	<ul style="list-style-type: none"> • Engine starting for marine, automotive, light vehicle • Battery assist to extend life, increase power
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XV Supercapacitor

	<p>Supercapacitors for high power applications</p>	<ul style="list-style-type: none"> • Low ESR provides high efficiency, high power • High capacitance high peak current capability • Operating Temperature Range (-40°C to +85°C) • Long operating life, achievable over 20 years 	<ul style="list-style-type: none"> • Energy regeneration and motor start in fork lift trucks and HEVs • Active suspension • Electric power steering • Boardnet stabilisation
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HV Cylindrical Cells

	<p>Low ESR supercapacitors ideal for providing peak current demand</p>	<ul style="list-style-type: none"> • Ultra low ESR for high power density • UL recognised 	<ul style="list-style-type: none"> • Door locks • Emergency backup energy • E-call • Asset tracking/fleet management
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TV Cylindrical Cells

	<p>3-volt supercapacitor for 20% energy increase and >20% power increase</p>	<ul style="list-style-type: none"> • Ultra low ESR for high power density • UL recognised • Maintenance free, no replacement needed 	<ul style="list-style-type: none"> • Door locks • Emergency backup energy • E-call/RF radio transmissions • Asset tracking/fleet management
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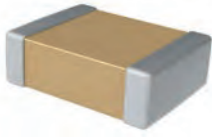
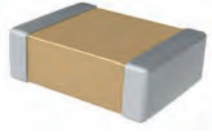
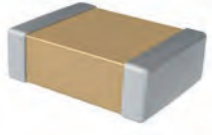

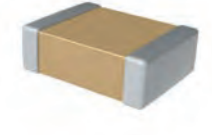
Supercapacitors

	Capacitance (F)	Maximum Working Voltage (V)	Surge Voltage (V)	Operating Temperature
TV Cylindrical Cells	6.0 – 100	3.0	3.3	-40°C to +65°C
HV Cylindrical Cells	1.0 – 100	2.7	3	-40°C to +65°C with linear voltage derating to 2.3V at +85°C
XVM Module	65	16.2	17	-40°C to +65°C
XV Module	300 – 600	2.7	3	-40°C to +65°C
XLR Module	166	48.6	51.3	-40°C to +65°C extended to +85°C at 41V

Kemet



Electronic Components
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CHARGED®

Product	Series & Description	Features & Benefits	Applications
Automotive Grade SMD Capacitors in Polyester Dielectric			
	F161	<ul style="list-style-type: none"> Rated voltage: 50 – 400VDC Capacitance range: 0.01 – 12μF EIA size: 2220 – 6560 Operating temperature range of -55°C to +125°C Automotive grade options available No piezo effect 	<ul style="list-style-type: none"> Input filtering Decoupling and coupling circuits BULK in low power DC applications
Automotive Grade SMD Capacitors in Polyethylene Naphthalate (PEN) Dielectric			
	LDE is a general purpose series designed for the highest reliability and high temperature service	<ul style="list-style-type: none"> Rated voltage: 50 to 1,000VDC Capacitance range: 0.001 to 4.7μF EIA size: 1206 to 6054 Operating temperature range of -55°C to +125°C Automotive (AEC-Q200) grades available 	<ul style="list-style-type: none"> Bypassing and signal coupling Not suitable for across-the-line application Driver convenience (remote keyless entry, climate control, lighting)
Automotive Grade Metallized Polyester Film Capacitors			
	R60 & RSB	<ul style="list-style-type: none"> Voltage range: 50VDC to 1000VDC AEC-Q200 available up to pitch 22.5mm Operating temperature range of -55°C to +105°C Capacitance range: 0.001μF to 150.0μF Self-healing Typical failure mode open 	<ul style="list-style-type: none"> Ignition systems Fan, wiper, window lifts applications Electrical steering Alternators Filtering
Automotive Grade Boxed Power Film Capacitors			
	C4AQ	<ul style="list-style-type: none"> Automotive grades (AEC-Q200) Suitable for high frequency applications High contact reliability High ripple current Self-healing Low losses 	<ul style="list-style-type: none"> On-board chargers Pump drives Power steering Electric vehicle charger stations
Snap-In Electrolytic Capacitors for High Voltage			
	ALA Series AEC-Q200 qualified Snap In Aluminium Electrolytic Capacitors	<ul style="list-style-type: none"> Vibration proof Long life, up to 15K hours (+85°C)/8K hours (+105°C) High ripple current Excellent surge voltage capability High voltage up to 500V 	<ul style="list-style-type: none"> On-board chargers Inverters or wall boxes E-mobility
Radial Crown and Axial Electrolytic Capacitors			
	PEG Series PEH Series	<ul style="list-style-type: none"> Very high ripple current up to 28A Ripple (RMS, continuous load) High vibration resistance Rated temperature up to 150°C Designed for long life applications Capacitance range 470μF to 6300μF Radial Mounting Options Available 	<ul style="list-style-type: none"> Fans Water pumps Power steering Start-stop systems Super chargers Energy recuperation

Product	Series & Description	Features & Benefits	Applications
ESD Rated Automotive Grade Surface Mount Capacitors			
	MLCC X7R & COG ESD Protected	<ul style="list-style-type: none"> • ESD qualified per HBM AEC-Q200-002 • DC Voltage ratings 16 – 250 VDC • Available in package size EIA 0402, 0603, 0805, 1206 • Capacitance range from 1 nF to 2.2µF • Flexible termination option available 	<ul style="list-style-type: none"> • Electrostatic discharge • Integrated circuit (IC) protection • RF filtering • Input and output automotive applications such as controllers, navigation systems, airbags and keyless entry systems
X7R Dielectric Ceramic SMD High Capacitance Values			
	LDE KEMET's Automotive Grade Series surface mount capacitors in X7R performance in harsh environments.	<ul style="list-style-type: none"> • AEC Q200 automotive qualified • Temperature stable dielectric • Non-polar device, minimising installation concerns • EIA 0402, 0603, 0805, 1206, 1210, 1812, and 2220 case size available sizes • Extremely low ESR and ESL • DC voltage ratings of 6.3V, 10V, 16V, 25V, 50V, 100V, 200V and 250V 	<ul style="list-style-type: none"> • Bypassing, signal coupling, filtering and transient voltage suppression in engine, body, and transmission control modules. • DC-to-DC converters • Multimedia (radio, DVD, GPS) • Electronic engine control • Driver convenience (remote keyless entry, climate control, lighting)
High Voltage X7R and COG Dielectric, 500 – 3,000 VDC MLCC's			
	MLCC X7R / COG Automotive High Voltage	<ul style="list-style-type: none"> • AEC Q200 automotive qualified • High Voltage X7R & COG Dielectric, 500 – 3,000VDC • Superior flex performance (up to 5mm) optional • EIA 0402, 0603, 0805, 1206, 1210, 1812, and 2220 case size as well as up to 4540 (COG) available sizes • Low ESR and ESL • Exceptional performance at high frequencies 	<ul style="list-style-type: none"> • Hybrid automotive motor control circuits • DC/DC converters • High voltage power supply • High voltage DC blocking & coupling • Electric drive system • Input filter
Flex Crack Mitigation Solutions			
	COG, X7R & U2J Kemet MLCC FT-Cap, Open Mode & Floating Electrode	<ul style="list-style-type: none"> • Superior flex performance (up to 5mm) optional from 10pF to 22µF • Open Mode automotive design available 1,000pF – 6.8µF • Floating Electrode (FE-CAP) design available 150pF – 0.22µF • EIA 0402, 0603, 0805, 1206, 1210, 1812, and 2220 case size available • Provides protection against a low IR or short circuit condition 	<ul style="list-style-type: none"> • Hybrid automotive motor control circuits • DC/DC converters • Multimedia (radio, DVD, GPS) • Electronic engine control • Driver convenience (remote keyless entry, climate control, lighting) • Input filter
Power Solutions (KPS) High Voltage stacked capacitors			
	KPS, KPS High Voltage, KPS High Temperature Stacked MLCC Solutions for Automotive Applications	<ul style="list-style-type: none"> • Higher capacitance in the same footprint • Reliable and robust termination system • Provides up to 10mm of board flex capability • Reduces audible, microphonic noise • Extremely low ESR and ESL 	<ul style="list-style-type: none"> • Noise reduction (piezoelectric/mechanical) • DC/DC converters • Circuits with a direct battery or power source connection • Critical and safety relevant circuits without (integrated) current limitation • Driver convenience (remote keyless entry, climate control, lighting)
KC-LINK Surface Mount Capacitors			
	KC-LINK for Fast Switching Semiconductor Applications DC Link, Snubber, Resonator Capacitor, 150°C	<ul style="list-style-type: none"> • Very high ripple current capability • Operating temperature range of –55°C to +150°C • High frequency operation (> 10 MHz) • No capacitance shift with voltage • Extremely low ESR and ESL • No piezoelectric noise 	<ul style="list-style-type: none"> • EV/HEV (drive systems, charging) • Wireless charging • DC link • Battery or power source connection • Wide bandgap (WBG), silicon carbide (SiC) and gallium nitride (GaN) systems




Kemet







Electronic Components
KEMET
CHARGED®

Product	Series & Description	Features & Benefits	Applications
Tantalum Surface Mount Capacitors – Automotive Grade			
	T498 Automotive Grade MnO2 150°C & T499 Automotive Grade MnO2 175°C Robust for high temperature applications	<ul style="list-style-type: none"> Complies with AEC-Q200 Voltage rating of 4 – 50 VDC Capacitance values of 0.15 to 220µF 100% steady-state accelerated aging T498 Temperature/voltage de-rating is 2/3 at 150°C T499 temperature/voltage de-rating is 1/2 at 175°C 	<ul style="list-style-type: none"> High temperature sensors Pump ECU's Power train control modules Throttle control modules DC/DC converters Control units operating -55°C to +175°C
Organic Capacitor (KO-CAP®) – High Humidity/High Temperature Automotive Grade			
	T591 125°C, T598 125°C, T599 150°C Unmatched capacity by case size	<ul style="list-style-type: none"> Ultra-low ESR Non-ignition failure mode High reliability up to 1,000 hours with 85°C / 85% RH load Qualification package compliant with AEC-Q200 Rated capacitance Range: 4.7 – 330µF at 120 Hz/25°C Rated Voltage Range: 2.5 – 50V 	<ul style="list-style-type: none"> Autonomous driving Infotainment Automotive cluster Advanced driver assist systems (ADAS) DC/DC converters Ultra extended mission profiles



















Lelon













Product	Series & Description	Features & Benefits	Applications
Axial Aluminium Electronic Capacitors			
	TUR/TSR/TUK/TSK/TUP/TSP New launched, for 48V Mild Sys. up to 150dC 2Khrs	<ul style="list-style-type: none"> Wide operating temperature range -55 ~ +150°C High reliability and long useful life: 100~ 500K hrs Vibration resistance up to 40G Low ESR and high ripple current capability 	<ul style="list-style-type: none"> 48V mild hybrid of iBSG & DC-DC applications ECU for battery/motor/steering/gearbox Heavy electromechanical tools & PV inverter
V-Chip (SMD) Lines			
	VEU/VUK/VZH/VZS/VZT/VUJ/VUP Global top three supplier on quality/quantity	<ul style="list-style-type: none"> Up to 150DC & long life of full range Extreme high reliability & large capacitance Ultra LESR with high CVs, up to 18x21 size 	<ul style="list-style-type: none"> Infotainment/telematics/HVAC/lighting Window lifting/micro control system Powertrain/BCS/ECU/safety system Fuel injection system Aviation/military system applications
Snap-In Power Capacitors			
	LSR/LSM/LSK/LSP/LSH New innovation W-Wing for high RC App.	<ul style="list-style-type: none"> ESR >30% Less, Ripple >30% Higher, ΔT 0.5dC Less Note: 85°C/105°C, 3K /5 K/7 K hrs are all available 	<ul style="list-style-type: none"> DC power bank High power inverter HVAC OBC/charging station All kinds of inverter applications

Product	Series & Description	Features & Benefits	Applications
Standard and High Voltage MLCCs – AEC-Q200 Qualified			
	<p>X7R and C0G material, Case size 0603 to 3640, up to 12kV (up to 4kV with AEC-Q200 qualification)</p> <p>Highest voltage offering in the industry</p>	<ul style="list-style-type: none"> Up to 12kV (up to 4kV with AEC-Q200 qualification) working voltage Smallest case sizes for highest voltage/capacitance combinations FlexiCap™ termination option, and AEC-Q200 qualification Safety capacitors/250Vac and 500Vac non-safety For DC-DC converters, in vehicles or charging stations Radial leaded options for space savings and isolation from the board 	<ul style="list-style-type: none"> Battery management system (BMS) On-board charger (OBC) DC-DC converter AC-DC inverter PTC heater controller E-Compressor Inverter
StackiCap™ MLCCs – AEC-Q200 Qualified			
	<p>High Voltage Monolithic Capacitors</p> <p>Highest cap density high voltage monolithic MLCC</p>	<ul style="list-style-type: none"> Ground breaking product designed to provide high CV in compact packages Offers the greatest volumetric efficiency and CV per unit mass of any high voltage X7R ceramic capacitor Suitable replacement for film and tantalum capacitors Suitable for application in power supplies, filtering, DC-DC converters Available in 1812, 2220 and 3640 case sizes FlexiCap™ termination, and AEC-Q200 qualification 	<ul style="list-style-type: none"> Battery management system (BMS) On-board charger (OBC) DC-DC converter AC-DC inverter PTC heater controller E-Compressor inverter
Safety Capacitors – AEC-Q200 Qualified			
	<p>Case Sizes 1808, 1812, 2211, 2215 and 2220</p> <p>High voltage AC MLCCs</p>	<ul style="list-style-type: none"> Safety certified capacitors are certified to international UL and TÜV specifications Reduces board area and height restrictions FlexiCap™ termination option, and AEC-Q200 qualification 	<ul style="list-style-type: none"> Battery management system (BMS) On-board charger (OBC) DC-DC converter AC-DC inverter PTC heater controller E-Compressor Inverter
SMD EMI Chip Filters and X2Y EMI Filters – AEC-Q200 Qualified			
	<p>Case sizes from 0805 to 1812</p> <p>Surface mount filters are designed to be directly to printed circuit boards using conventional mounting techniques</p>	<ul style="list-style-type: none"> Surface mount EMI Filters from 0805 to 1812 Feedthrough filter capacitors with capacitance up to 1.8µF Efficient low pass SMD EMI filter, for balanced or unbalanced lines Suppresses EMI on dc motors - e.g. car seat, windows, HVAC, movable grilles AEC-Q200 qualified 	<ul style="list-style-type: none"> Power control unit DC Motor
Open Mode & Tandem Capacitors – AEC-Q200 Qualified			
	<p>Modified internal structure with FlexiCap Termination 0603 to 2225</p> <p>Provides robust and reliable component</p>	<ul style="list-style-type: none"> Open Mode & Tandem capacitors are designed to dramatically reduce the chance of short circuit FlexiCap terminations to enhance reliability Case sizes from 0603 to 2225 Qualified to AEC-Q200 	<ul style="list-style-type: none"> Battery management system (BMS) On-board charger (OBC) DC-DC converter AC-DC inverter Steering system
High Q Ultra Low ESR Capacitors – AEC-Q200 Qualified			
	<p>Capacitance Range 0.1pF to 5.1nF</p> <p>Where economical high performance is required</p>	<ul style="list-style-type: none"> 0402, 0603, 0805 and 1111 case sizes, NP0 dielectric Excellent low loss performance, optimized for lowest possible ESR Up to 10GHz self-resonance frequency An extended operating temperature range of -55°C to +150°C 	<ul style="list-style-type: none"> V2X communication Car infotainment Safety systems (e.g. radar)

Chip Monolithic Ceramic Capacitors/Lead Type Ceramic Capacitors – Powertrain/Safety

Series	Series name	Characteristics	Rated voltage		Capacitance							
			V	kV	pF	μF						
			1	10	100	10	1	0.1	1	10	100	1000
GCM	 • General purpose products for automotive	• AEC-Q200 compliant product	4Vdc – 100Vdc		0.1pF – 47μF							
GCB	 • Ni Plating + Pd Plating termination conductive glue mounting	• AEC-Q200 compliant product • Operations up to 200°C	10Vdc – 100Vdc		1000pF – 0.47μF							
GCD	 • Specially designed product to reduce shorts	• AEC-Q200 compliant product • Fail safe product • Product resistant to deflection cracking	16Vdc – 100Vdc		1000pF – 0.47μF							
GCE	 • Specially designed product to reduce shorts and resin electrode products	• AEC-Q200 compliant product • Fail safe product • Product resistant to deflection cracking	25Vdc – 100Vdc		1000pF – 0.10μF							
GCG	 • Ag/Pd termination conductivity adhesive compatible type	• AEC-Q200 compliant product • Product resistant to deflection cracking • Product with solder cracking suppression	6.3Vdc – 100Vdc		1.0pF – 47μF							
GCJ	 • Soft termination products	• AEC-Q200 compliant product • Fail safe product • Product resistant to deflection cracking	6.3Vdc – 100Vdc		1000pF – 47μF							
GCQ	 • High Q type capacitors	• AEC-Q200 compliant product • Low dissipation for high frequency	50Vdc		0.1pF – 47μF							
GC3	 • High effective capacitance and high allowable ripple current	• AEC-Q200 compliant product • Product suitable for acoustic noise reduction and low distortion	250Vdc – 630Vdc		10000pF – 1.0μF							
GGD	 • Water repellent MLSC design	• AEC-Q200 compliant product • Water repellent	25Vdc – 100Vdc		1000pF – 1.0μF							
GGM	 • Water repellent chip multilayer ceramic capacitors for automotive	• AEC-Q200 compliant product • Water repellent	6.3Vdc – 100Vdc		0.1pF – 47μF							
KCM	 • Metal terminal type for automotive	• AEC-Q200 compliant product • Product suitable for acoustic noise reduction and low distortion • Product resistant to deflection cracking • Product with solder cracking suppression	25Vdc – 100Vdc		100μF – 68μF							
KCA	 • Safety standard certified metal terminal type	• AEC-Q200 compliant product • Product suitable for acoustic noise reduction and low distortion • Product resistant to deflection cracking • Product with solder cracking suppression • Certified by safety standard	250Vdc		100pF – 10000pF							
KC3	 • Metal terminal type/high effective capacitance and high allowable ripple current for automotive	• AEC-Q200 compliant product • Product suitable for acoustic noise reduction and low distortion • Product resistant to deflection cracking • Product with solder cracking suppression	250Vdc – 630Vdc		0.10μF – 2.2μF							
DE6	 • Safety standard certified (IEC60384- 14 Class X1/Y2 for automotive)	• AEC-Q200 compliant product • Certified by safety standard	300Vac (r.m.s.)		100pF – 4700pF							
NFM	 • 3 terminals low ESL	• AEC-Q200 compliant product • Low ESL • Noise reduction • Reduction of the number of components	10Vdc – 100Vdc		220pF – 1.0μF							
RCE	 • 125°C compatible type for automotive	• AEC-Q200 compliant product	25Vdc – 100Vdc		1.0pF – 22μF							
RHE	 • 150°C compatible type for automotive	• AEC-Q200 compliant product	25Vdc – 100Vdc		100pF – 22μF							
RHS	 • 175/200 operation leaded MLCC for automotive	• AEC-Q200 compliant product	100Vdc – 500Vdc		100pF – 1000μF							

Chip Monolithic Ceramic Capacitors/Lead Type Ceramic Capacitors – Infotainment/Comfort

Series	Series name	Characteristics	Rated voltage		Capacitance			
			V	kV	pF		μF	
			1 10 100 10 1	0.1 1 10 100 1000 10000 0.1 1 10 100 1000				
GRM	 • For general purpose (infotainment/comfort)		2.5Vdc – 3150Vdc		0.10pF – 330μF			
GRT	 • AEC-Q200 compliant chip multilayer ceramic capacitors for infotainment	• AEC-Q200 compliant	2.5Vdc – 100Vdc		0.10pF – 100μF			
GXM	 • Water repellent chip multilayer ceramic capacitors for general purpose	• Water repellent	2.5Vdc – 100Vdc		1000pF – 47μF			
GXT	 • AEC-Q200 compliant water repellent chip multilayer ceramic capacitors for infotainment	• AEC-Q200 compliant • Water repellent	6.3Vdc – 100Vdc		1.0pF – 47μF			
GR3	 • High effective capacitance and high allowable ripple current	• Product suitable for acoustic noise reduction and low distortion	250Vdc – 630Vdc		0.1μF – 1.0μF			
GRJ	 • Soft termination products	• Product resistant to deflection cracking	6.3Vdc – 1000Vdc		68000pF – 47μF			
GJM	 • High frequency high Q type • 1005 (in mm)/0402 (in inch) size max.	• Low dissipation for high frequency	6.3Vdc – 100Vdc		0.10pF – 47pF			
KR3	 • Metal terminal type, high effective capacitance and high allowable ripple current for general purpose	• Low dissipation for high frequency • Product resistant to deflection cracking • Product with solder cracking suppression	250Vdc – 630Vdc		0.10μF – 2.2μF			
KRM	 • Metal terminal type for general purpose (Infotainment/comfort)	• Low dissipation for high frequency • Product resistant to deflection cracking • Product with solder cracking suppression	16Vdc – 1000Vdc		68000pF – 100μF			
Polymer Aluminium Electrolytic Capacitors – Infotainment/Comfort								
ECAS	 • 7.3×4.3mm	• Over 220μF • No DC bias characteristics • No acoustic noise	2Vdc-25Vdc		6.8μF-560μF			

Nichicon



nichicon

Product	Series & Description	Features & Benefits	Applications
Hybrid-SMT			
	GYA <ul style="list-style-type: none"> Chip type 125°C High reliability 	<ul style="list-style-type: none"> High reliability Low ESR High ripple current Long life of 4000 hours at 125°C AEC-Q200 compliant 	<ul style="list-style-type: none"> ECU – engine control unit
Hybrid-SMT			
	GYB <ul style="list-style-type: none"> Chip Type 105°C High Reliability 	<ul style="list-style-type: none"> High reliability Low ESR, low impedance High ripple current Long life of 10000 hours at 105°C AEC-Q200 compliant 	<ul style="list-style-type: none"> Automotive and transportation
Al-snap in			
	LGN <ul style="list-style-type: none"> Snap in terminal 105°C Smaller sized 	<ul style="list-style-type: none"> Withstanding 3000 hours application of rated ripple current at 105°C Smaller case size Addition of 600V rated voltage Highest voltage in the industry 	<ul style="list-style-type: none"> Electric vehicles
Al-snap in			
	LGX <ul style="list-style-type: none"> Snap in terminal Long life Smaller sized 	<ul style="list-style-type: none"> 105°C long life assurance withstanding 5000 hours Small size Addition of 500V rated voltage 	<ul style="list-style-type: none"> Suited for rectifier circuit of general inverter switching power supply
Conductive Polymer SMT			
	PCJ series <ul style="list-style-type: none"> Low ESR - higher capacitance High ripple current 	<ul style="list-style-type: none"> Low ESR, low impedance higher capacitance High ripple current Load life of 2000 hrs at 105°C AEC-Q200 compliant 	<ul style="list-style-type: none"> For high frequency application Automotive and transportation
Polymer-SMT			
	PCL <ul style="list-style-type: none"> Chip type Long life 	<ul style="list-style-type: none"> Long life assurance (105°C 20000hours) Withstand voltage improving oxidizer New separator and new anode foil 	<ul style="list-style-type: none"> Infotainment

Product	Series & Description	Features & Benefits	Applications
Conductive Polymer SMT			
	PCV <ul style="list-style-type: none"> • Chip type • High voltage • Long life 	<ul style="list-style-type: none"> • High voltage (up to 125V) • Low ESR, low impedance • High ripple current • Load life of 3000 hours at 105°C • Lead free reflow soldering condition at 260°C peak correspondence 	<ul style="list-style-type: none"> • For high frequency application • Automotive and transportation
Al-lytic Capacitor, High Temperature Range			
	UBY <ul style="list-style-type: none"> • THT type • High temperature range, for +125°C or 135°C use • (125°C / 135°C 3000hour) 	<ul style="list-style-type: none"> • Higher capacitance • Higher ripple current • High temperature range • Low ESR, low impedance • AEC-Q200 compliant 	<ul style="list-style-type: none"> • High temperature environments (engine area) • ECUs, power steering • Automotive and transportation
Al-lytic SMT			
	UCH <ul style="list-style-type: none"> • Chip type • High reliability • Low temperature ESR specification 	<ul style="list-style-type: none"> • High reliability • Low temperature • Added ESR specification after the test at -40°C • Endurance guaranteed up to 2,000 hours at 125°C • AEC-Q200 compliant 	<ul style="list-style-type: none"> • Applicable to automatic mounting machine fed with carrier tape • Automotive and transportation
Al-lytic, SMT			
	UCM series <ul style="list-style-type: none"> • 105°C Al-lytic • Chip type • Low Impedance 	<ul style="list-style-type: none"> • Wide range of case sizes from 4Dx5.8L to 18Dx21.5L • Low ESR, low impedance • Temperature range up to +105°C • AEC-Q200 compliant • High capacitance 	<ul style="list-style-type: none"> • Automotive and transportation • EMC filter/input buffer
Al-lytic, SMT			
	UCZ series <ul style="list-style-type: none"> • Chip type • High reliability, • Low temperature ESR specification 	<ul style="list-style-type: none"> • Chip type, high temperature range, for +125°C use • Added ESR specification after the test at -40°C • High Reliability • Optionally available with anti-vibration feature • Wide range of case sizes from 6.3Dx5.8L to 18Dx21.5L 	<ul style="list-style-type: none"> • Automotive and transportation
Al-lytic Capacitor, Miniature Sized, Vibration Resistance			
	UXY <ul style="list-style-type: none"> • Anti-vibration structuring than UBY • For +125° C or +135° C use (endurance 3000hrs) 	<ul style="list-style-type: none"> • Anti-vibration • Miniature sized • 125° C / 135° C 3000hrs • AEC-Q200 compliant • Optionally available with anti-vibration feature 	<ul style="list-style-type: none"> • Automotive ECU's • Especially suitable for automotive ECU's where heavy duty services are indispensable

Panasonic Industry

Panasonic INDUSTRY

Product	Series & Description	Features & Benefits	Applications
Hybrid Capacitors			
	<p>ZS series Using best of two worlds combining the low leakage of aluminium electrolytic and low ESR of the polymer technology</p>	<ul style="list-style-type: none"> • AEC-Q200 compliant • Voltage range: 25 to 63V • Capacitance range: 150 to 560 μF • Endurance: 4000 h at 125°C • Ripple current: up to 4Arms • ESR: as low as 11mΩ • Size: ϕ10x12.5, ϕ10x16.5 	<ul style="list-style-type: none"> • Automotive ECU • Motor drivers • DC/DC converter
Film Capacitors			
	<p>ECQUA & ECWFG Film capacitors for high safety & high reliability applications including automotive, industrial, renewable energy</p>	<ul style="list-style-type: none"> • High safety (fuse function technology) • High humidity resistance • High thermal shock resistance • AEC-Q200 compliant • RoHS & REACH compliant 	<ul style="list-style-type: none"> • Input & output filtering for charging station • Input filter for on-board charger • The range of EV/PHEV applications • DC/DC, AC/DC Converters • Input & output filtering/snubber for industrial power supply • Inverter for renewable energy



Product	Series & Description	Features & Benefits	Applications
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CeraLink® Capacitors for Fast-Switching Semiconductors

	<p>FA Series - B58035U* LP Series - B58031* SP Series - B58033* CeraLink as DC Link. Filter or snubber capacitors.</p>	<ul style="list-style-type: none"> • Compact design • Ultra low ESL • Ripple current • Robust construction • Automotive qualification • Supports high voltage 	<ul style="list-style-type: none"> • Electrical vehicles and PHEVs • On-board chargers (OBC) • Powertrain converters • Traction • Charging systems
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Low-Resistance MEGACAP Type MLCCs

	<p>CAA* Supreme reliability in harsh environments</p>	<ul style="list-style-type: none"> • Excellent vibration performance • Low ESR & ESL by new lead frame material • Low height by vertically stacking structure • High ripple current capability • Superior board flex performance • Excellent performance for thermal shock 	<ul style="list-style-type: none"> • EV DC-DC converters • Inverters • OBC & wireless charging • Electrical turbochargers • 48V systems • Electrical pumps
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Low-Resistance Soft-Termination MLCCs

	<p>CNA* Superior ESR & ESL performance</p>	<ul style="list-style-type: none"> • 70% reduction of soft resin material • Low ESR & ESL by soft resin material reduction • Excellent performance for thermal shock • Superior board flex performance • Temperature characteristics: X7R, X7S, X7T • Prevention of ceramic body cracks by board bending 	<ul style="list-style-type: none"> • Safety/critical applications such as: <ul style="list-style-type: none"> - battery lines - power trains - suspensions - airbags
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MKP High Density THB Series of DC Link Capacitors

	<p>B3277*H* Ideally suited for harsh environments</p>	<ul style="list-style-type: none"> • Biased humidity: 500 hours with 85°C / 85% r.h. / Vr • THB 1000 h with 60 °C / 95% r.h. / Vr on request • SiC ready • Rated voltage up to 1600V DC • Low losses with high current capability • Long useful life, high reliability 	<ul style="list-style-type: none"> • DC link for: <ul style="list-style-type: none"> - automotive DC/DC converters - automotive compressors - on-board chargers
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EMI MKP X2 Humidity Capacitors

	<p>B3292*H* B3292*J* DC and AC application</p>	<ul style="list-style-type: none"> • THB 85 °C / 85% r.h. / 1000 h / 240 Vac, 50 Hz • AEC-Q 200D compliant • High stability of capacitance value • Self-healing properties • High robustness under high humidity • X2 class for interference suppression 	<ul style="list-style-type: none"> • Energy meters, RFI suppression • Capacitive power supplies • In-series with mains • Across the line
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New Compact & Ultra Compact High-Voltage Large-Size Capacitors


	<p>B43649* B43268* Large size aluminium electrolytic capacitor for automotive application</p>	<ul style="list-style-type: none"> • Extremely high CV product, ultra compact • High reliability • High ripple current capability • Up to 500V 	<ul style="list-style-type: none"> • On-board chargers
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Vishay




Product	Series & Description	Features & Benefits	Applications
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Automotive Grade AC Line Rated Ceramic Capacitor

	<p>AY1 / AY2 Class X1, 760 VAC, Class Y1, 500 VAC Class X1, 440 VAC, Class Y2, 300 VAC</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified • Withstands 85 / 85 / 1000 h test • Can pass 1000 temperature cycles • Complying with IEC 60384-14 4th edition • High reliability • PPAP (AIAG version) is available 	<ul style="list-style-type: none"> • X1, Y1 / X1, Y2 according to IEC 60384-14.4 • Application as Y capacitors for AC line filter • Primary-secondary coupling on battery chargers • Application as filter capacitors on DC/DC
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Aluminium Electrolytic Capacitors

	<p>299 PHL-4TSI High Ripple Current and Long Life 4-Terminal Snap-In</p>	<ul style="list-style-type: none"> • Four terminals for stable mounting and keyed polarity • Large case sizes: 35mm x 50mm up to 45mm x 100mm • Allows replacement of bus bars and screw terminals by lower cost PC board and solder process • Long lifetime: 15 years at 65 °C • High ripple current capability 	<ul style="list-style-type: none"> • High power motor inverters • Energy storage in pulse systems • Uninterruptable power supply (UPS) systems • Auxiliary power supplies
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High Temperature Molded Tantalum Capacitors


	<p>TH3 and TH4 High Temperature 150°C and 175°C, Automotive Grade</p>	<ul style="list-style-type: none"> • Operating temperature up to +150°C and 175°C with 50% voltage derating • AEC-Q200 qualified • TH3: Capacitance up to 220µF, VR up to 50V DC • TH4: Capacitance up to 100µF, VR up to 35V DC 	<ul style="list-style-type: none"> • Automotive devices and controllers • Off-road vehicles and trucks • Transportation systems • Forklifts • Trains
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Yageo

YAGEO

Product	Series & Description	Features & Benefits	Applications
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MLCC

	<p>AC Series Automotive Grade MLCC</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified and PPAP ready • Board flex ≥ 2mm • 100% AOI • IATF16949 certified • TC: X7R, NPO (-55°C ~ +125°C) 	<ul style="list-style-type: none"> • All general purpose applications • Entertainment applications • Comfort/security applications • Information applications
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MLCC

	<p>AS Series Automotive Grade Soft Termination</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified and PPAP ready • Board flex ≥ 5mm • 100% AOI & SPC monitor • IATF16949 certified • TC: X7R (-55°C ~ +125°C) • Enhanced thermal and mechanical robustness 	<ul style="list-style-type: none"> • Power train & safety • Comfort & infotainment • Body electronics • E-Mobility (HEV/PHEV/EV)
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MLCC

	<p>AQ Series Automotive Grade High Frequency</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified and PPAP ready • Improved thermal and mechanical robustness • High Q and low ESR in VHF, UHF and microwave • Low dielectric loss, low power dissipation • TC: NPO (-55°C ~ +125°C) • Soldering is compliant with J-STD-020D 	<ul style="list-style-type: none"> • All general purpose applications • Entertainment applications • Comfort/security applications • Information applications
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Product	Series & Description	Features & Benefits	Applications
SMT Varistors			
	<ul style="list-style-type: none"> • High energy • Load dump • Low capacitance • Arrays • FeedThru varistor 	<ul style="list-style-type: none"> • TVS protection and EMI filtering • No derating over operating temp • Small size • High reliability 	<ul style="list-style-type: none"> • Safety systems • ECU • Lighting • Sensors • Communication • Hybrid/electric
150°C and 175°C High Temperature Varistors			
	<p>Varistors for high temperature requirements</p>	<ul style="list-style-type: none"> • TVS protection and EMI filtering • Leading temperature rating in the industry • Small size • High reliability 	<ul style="list-style-type: none"> • Powertrain • Engine • Transmission • Sensors • Hybrid/electric
Radial and Axial Leaded Varistors			
	<p>Radial and axial varistors for leaded mounting requirements</p>	<ul style="list-style-type: none"> • TVS protection and EMI filtering • Excellent mechanical shock and vibration resistance • High Temp +150°C series 	<ul style="list-style-type: none"> • DC motors • Pumps • Turbo chargers • Engine cooling fans • Wire harness • Hybrid/electric
Radial Leaded CapGuard™			
	<p>Combines Varistor with MLC Capacitor for enhanced filtering</p>	<ul style="list-style-type: none"> • TVS protection and enhanced EMI filtering • Excellent mechanical shock and vibration resistance • High reliability 	<ul style="list-style-type: none"> • Seat motors • Door motors • Wipers • Fuel pumps • Water pumps • Oil pump
SMT NTC Thermistors			
	<p>NTC thermistors with 100% tin termination NTC thermistors with hybrid PdPtAg termination</p>	<ul style="list-style-type: none"> • Wide resistance range • Fast thermal response • Operating temp to +150°C • High reliability 	<ul style="list-style-type: none"> • Dashboard • Lamp/LED drivers • ECU • TCU • Dash boards • Hybrid/electric
Leaded NTC Thermistors			
	<p>Disc and high accuracy NTC thermistors</p>	<ul style="list-style-type: none"> • Multiple temperature stability options • Tolerance from ±1% • Operating temp to +150°C • Product customisation 	<ul style="list-style-type: none"> • Oil temperature • Air intake • Water temperature • Heating systems • Fluid level detectors • Hybrid/electric

Bourns





BOURNS®

Product	Series & Description	Features & Benefits	Applications
Multifuse® PPTC Resettable Fuses			
	Model MF-MSMF, MF-LSMF, MF-PSHT, MF-NSMF and MF-NSHT Series	<ul style="list-style-type: none"> • Ultra-low resistance • Surface mount packaging for automated assembly • Symmetrical design • Small footprint size and low profile 	<ul style="list-style-type: none"> • Thermal protection for Li-ion and polymer battery packs • USB port protection - USB 2.0, 3.0 and OTG • Digital cameras

Eaton

EATON
Powering Business Worldwide

Product	Series & Description	Features & Benefits	Applications
Fast Acting Fuse			
	3216FF Fuse High current, fast-acting, surface mount fuses in a compact size	<ul style="list-style-type: none"> • AEC-Q200 qualified • Highest available current rating in a traditional SMD fuse • RoHS compliant, lead free and halogen free construction 	<ul style="list-style-type: none"> • Li-Ion BMS protection • LED lighting • Back-up camera modules • Infotainment • Instrumentation • Ignition coils
ESD Suppressor			
	0402ESDA-AEC1 ESD Suppressor 30VDC operation and ultra low capacitance ESD suppressor in 0402 format for automotive Ethernet and connected car (3G, 4G) antenna protection	<ul style="list-style-type: none"> • AEC-Q200 qualified • Ultra-low capacitance (0.05pF) ideal for high speed data applications • Provides Electro Static Discharge (ESD) protection with fast response time • Low leakage current (<0.1nA typ.) reduces power consumption • Single-line, bi-directional device • Rated for use on circuits up to 30V 	<ul style="list-style-type: none"> • Infotainment and telematics • High speed data ports and interface • Automotive body electronics • Advanced driver assistance systems
ESD Suppressor			
	PS04LTV1 ESD Suppressor Ultra-low capacitance and low clamping voltage in 0402 format for automotive infotainment and other sensitive circuits	<ul style="list-style-type: none"> • AEC-Q200 qualified • Ultra-low capacitance (0.05pF) ideal for high speed data applications • Provides Electro Static Discharge (ESD) protection with fast response time • Low leakage current (<0.1nA typ.) reduces power consumption • Single-line, bi-directional device • Low trigger voltage 	<ul style="list-style-type: none"> • Infotainment and telematics • High speed data ports and interface • Satellite navigation systems
Surface Mount Fuse			
	CC12H Surface mount fuse High I2t Chip fuse withstands high inrush currents in a 1206 (3216 metric) package	<ul style="list-style-type: none"> • AEC-Q200 qualified • High inrush withstand capability • Excellent temperature and cycling characteristics 	<ul style="list-style-type: none"> • Back-up camera modules • Infotainment • Instrumentation • Ignition coils • Li-Ion BMS protection • LED lighting

Product	Series & Description	Features & Benefits	Applications
XTREME-GUARD™ ESD Suppressors			
	AXGD1 Series SMT Polymeric Electrostatic Discharge Suppressors	<ul style="list-style-type: none"> • High ESD Rating up to 30kV contact/air • Discharge • Ultra-low capacitance • Low leakage current • High rated voltage up to 32V maximum • Helps preserve signal & minimise data loss • AEC-Q200 Qualified 	<ul style="list-style-type: none"> • High frequency like RF, antenna, ethernet • Communications & Infotainment • GPS tracker • Car TV • High speed interface • Advanced driver assistance systems
AEC-Q200 Compliant Multi-layer Varistors			
	AUML & MLA series Transient voltage surge suppression devices	<ul style="list-style-type: none"> • AEC - Q200 compliant • Leadless 0603, 0805, 1206 and 1210 chip sizes • Variety of energy ratings available • Load dump energy rated per SAE Specification J1113 • No temperature derating up to 125°C ambient • High peak surge current capability 	<ul style="list-style-type: none"> • ESD protection meeting to IEC 61000-4-2 (Level 4) • Provides on-board transient voltage protection • Replaces larger smt TVS Zeners • Telematics • Radio & infotainment • Power audio
AEC-Q200 Varistors			
	AUMOV® Varistor Series Durable & reliable Auto qualified Varistors	<ul style="list-style-type: none"> • Five disc sizes available: 5, 7, 10, 14, and 20mm • Peak surge current rating up to 5kA (8/20 µs pulse) • High energy absorption (load dump & jump start) • Optional phenolic coating for operating temps up to 125°C • VMAX DC (V): 16, 20, 28, 34, 50, 65, 85, 100, 125, 170 • Suitable for harsh automotive environments 	<ul style="list-style-type: none"> • Body electronics systems • Powertrain systems • Infotainment system • Automotive control module protection • Motor or inductive load transient suppression
AEC-Q200 PPTC Overcurrent Protection Devices			
	Mini SMD & SMD PPTC Resettable Devices Automotive Devices	<ul style="list-style-type: none"> • Resettable and single-use overcurrent devices • Products meet automotive AEC-Q200 • Range from 0.05A to 2A & 12V to 60V • High temp surface mount available -40°C to 125°C • Helps reducing weight of wire harnesses • High performance transient voltage protection 	<ul style="list-style-type: none"> • Actuators and medium motors • Trace protection • Electronic control modules • Telematics/infotainment • Led overtemperature • Powered outputs



TDK



Product	Series & Description	Features & Benefits	Applications
Automotive SMD NTC Thermistors			
	B57***V5* Complete portfolio in chip coating technology	<ul style="list-style-type: none"> • Qualification based on AEC-Q200, Rev. D with extended stress level • Superior performance in high-stability applications • Accurate temperature sensing up to +150°C • Excellent long-term aging stability in high temperature and high humidity environment • Short response time, RoHS, UL compliant, lead-free • Alternative ratings available on request 	<ul style="list-style-type: none"> • Battery packs in vehicles • LED temperature control • Engine control units • Electronic control units (ECU) • Air-conditioning • Displays • Gearbox control
New Automotive G Series			
	B72***G* New automotive G series for battery line protection	<ul style="list-style-type: none"> • Qualification based on AEC-Q200, Rev. D • Complies with automotive pulses acc. ISO 7637-2 & ISO 16750-2 • Reliable protection against automotive transient (load dump, jump-start) • High energy absorption capability, high ESD & surge robustness • Bidirectional protection • High temperature stability up to 150°C 	<ul style="list-style-type: none"> • Transient overvoltage protection such as <ul style="list-style-type: none"> – battery lines – body control units – ABS / ESP – EPS – DC motors
Automotive SMD Varistors			
	B72650M* B72660M* Chip encapsulated disk varistors	<ul style="list-style-type: none"> • 12 V and 24 V supply systems • High energy absorption capability • Jump-start and load-dump protection • SMD plastic package • No temperature derating up to 85°C • Suitable for lead-free soldering 	<ul style="list-style-type: none"> • Dashboard systems • Airbag control units • Braking control units (ABS/ESP) • Cruise control systems • Car alarm systems • Railway control units
Automotive Disk Varistors for High Surge & High Temperature Requirements			
	B722**X* Leaded Varistors for Automotive and high operating temperatures	<ul style="list-style-type: none"> • High surge current ratings up to 12kA • IEC 60695-11-5 (needle flame test) • Qualified according to AEC Q200 • Operating temperature up to +125°C • Enhanced heat and humidity resistance • Alternative ratings available on request 	<ul style="list-style-type: none"> • On-board chargers
PTC - SMD Limit Temperature Sensors			
	B59721A* B59641A* B59421A* "Superior Series" - Automotive Qualified	<ul style="list-style-type: none"> • Qualification based on AEC-Q200 rev. D • UL approval to UL1434 • Fast and reliable response • Size (EIA) 0402 – 0805 • Over-temperature protection of power components 	<ul style="list-style-type: none"> • DC/DC converters • SMPS • Automotive electronics • Secondary protection of battery packs
Automotive Varistors			
	B722**S1* (AUTO D1 Version) Leaded Varistors for Automotive grade ratings	<ul style="list-style-type: none"> • Automotive grade ratings (load-dump, jump-start) • Stable protection level • Minimum leakage current • Operating temperature up to +125°C • High resistance to cyclic temperature stress • Qualified acc. to AEC-Q200 	<ul style="list-style-type: none"> • Dashboard systems • Airbag control units • Braking control units (ABS/ESP) • Cruise control systems • Small motor drives (mirrors, seats, windows) • Car alarm systems

Bourns






BOURNS®

Product	Series & Description	Features & Benefits	Applications
AEC-Q200 Compliant Inductor Series			
	Model SRF1010DA Series Dual-Shielded Inductor Series for Class-D Amplifiers	<ul style="list-style-type: none"> Shielded construction Metal alloy powder core High saturation current Dual inductors AEC-Q200 compliant RoHS compliant and halogen free 	<ul style="list-style-type: none"> Class-D amplifier systems Class-D output filters
AEC-Q200 Compliant High Current Shielded Power Inductor Series			
	Model SRPxxxxA Series Bourns® AEC-Q200 Compliant High Current, Shielded Power Inductor Series	<ul style="list-style-type: none"> High saturation current Magnetically shielded construction AEC-Q200 compliant 	<ul style="list-style-type: none"> AEC-Q200 applications DC/DC converters Power supplies

Eaton


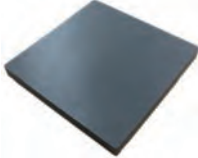


EATON

Powering Business Worldwide

Product	Series & Description	Features & Benefits	Applications
MPIAV2 Inductor Family			
	High current, low profile, pressed powder inductors	<ul style="list-style-type: none"> AEC-Q200 qualified, Grade 3 Handles high transient inrush current spikes Magnetically shielded, low EMI 2.7 x 2.2mm and 4.7 x 4.31mm footprint SMD in 1.05 to 2.0mm heights Rugged pressed magnetic powder construction Halogen free, lead free, RoHS compliant 	<ul style="list-style-type: none"> Advanced driver assistant systems (ADAS) LED lighting Infotainment Engine control modules Wireless chargers
HCM1A Inductor Family			
	High current pressed powder inductors	<ul style="list-style-type: none"> AEC-Q200 qualified, Grade 1 155°C max operating temperature Pressed magnetic powder construction PCB footprint sizes 7 size options available 	<ul style="list-style-type: none"> LED lighting DC/DC converters Powertrain Engine control modules Active/passive/predictive safety Electric steering On-board chargers
HCMA Inductor Family			
	High current pressed powder inductors	<ul style="list-style-type: none"> AEC-Q200 qualified 125°C max operating temperature Iron powder core material 5 size options available 	<ul style="list-style-type: none"> LED lighting DC/DC converters Powertrain Engine control modules Active/passive/predictive safety Electric steering On-board chargers
DRAQ Inductor Family			
	Dual winding (coupled), high power density shielded drum core power inductors	<ul style="list-style-type: none"> AEC-Q200 qualified 165°C max operating temperature Dual winding inductors that can be used as single inductor or coupled inductor/transformers Ferrite core material 	<ul style="list-style-type: none"> LED lighting Single-ended primary inductor converter Powertrain Active/passive/predictive safety SEPIC applications
DRA Inductor Family			
	High power density, high efficiency, shielded drum core power inductors	<ul style="list-style-type: none"> AEC-Q200 qualified, Grade 1 165°C max operating temperature Ferrite core material 5 size options available Magnetically Shielded, Low EMI 	<ul style="list-style-type: none"> LED lighting DC/DC converters Powertrain Engine control modules Active/passive/predictive safety Electric steering On-board chargers

Kemet

Electronic Components
KEMET
CHARGED®

Product	Series & Description	Features & Benefits	Applications
Large-Current Power Inductors			
	MPLCV & MPCV Metal composite SMD inductors with flat or round wire technology	<ul style="list-style-type: none"> • Proprietary metal composite powder • Operating temperature up to +155°C • High current, low DCR, low acoustic noise, high magnetic saturation • AEC-Q200 qualified 	<ul style="list-style-type: none"> • ECU applications, LED headlights & cluster applications • Pump drives for water and oil systems in high temperature environment • DC to DC switching power supplies • Noise filtering with high performance processors and electric fans
Wireless Charging Ferrite Plates			
	FPL Automotive wireless power transfer for 3 to 11kW	<ul style="list-style-type: none"> • Ferrite tiles are used in wireless power charging systems to increase system efficiency • Tiles, Plates, Pads in wireless charging system (standard 100x100mm or customised shapes) • High operating frequency range up to 1MHz. • Low temperature rise with high magnetic flux density -40°C to 125°C operating temperature • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive wireless power transfer
EMICores For Automotive Applications			
	ESD-SR-H/HL Automotive grade Snap-on Cores for Round Cables with High Heat Resistance	<ul style="list-style-type: none"> • Proprietary core material for high performance in high frequency range • Easy to install through its snap-on mechanism • Wider operating temperature range from -40°C to +100°C for H type and -40°C to +125°C for HL type • UL94 V-0 flame retardant rated case / AEC-Q200 (HL type) 	<ul style="list-style-type: none"> • Automotive inverters, chargers & DC/DC converter • Information and communication devices • Audio-visual equipment / automotive camera systems
Noise Suppression Sheets			
	Flex Suppressor® (FF1 & EFF4) AEC-Q200 grade high frequency noise suppression for EMC or to avoid digital crosstalk	<ul style="list-style-type: none"> • The flexible sheet is a polymer base, blended with micron-sized magnetic powders dispersed throughout the material • Electromagnetic wave suppression • Resonance suppression – controls the high frequency current and suppresses unwanted electromagnetic resonance • Thin, flexible material used in automotive equipment • RoHS compliant and halogen-free/AEC-Q200 (for FF1 and EFF4 series) 	<ul style="list-style-type: none"> • EMC noise suppression for automotive electronic equipment like display, ADAS camera (POE), car infotainment applications

EMI Suppression Filters – Powertrain/Safety/Infotainment/Comfort

BLM Inductor Type		Series	Size code in inch (in mm)	Impedance (Ω) at 100MHz	Effective frequency range (Applicable frequency ranges are only for reference)						
					10kHz	100kHz	1MHz	10MHz	100MHz	1GHz	10GHz
For General Band Noise	For General Signal Lines	BLM_AG	0201-0805 (0603-2012)	10-1000							
	For High Speed Signal Lines	BLM_B	0402-0805 (1005-2012)	5-2700							
	Power Lines Type	BLM_P/EG/K/S*	0201-1806 (0603-4516)	22(6A)-1000(1.5A)							
For GHz Band Noise	Universal Type [Power Lines/Signal Lines]	BLM18EG*	0603 (1608)	100(2A)-600(0.5A)							
	Signal Lines Type	BLM_HG+HD	0201-0603 (0603-1608)	470-1800							

NFE LC Combined Type		Series	Size code in inch (in mm)	Capacitance (F)	Effective frequency range (Applicable frequency ranges are only for reference)						
					10kHz	100kHz	1MHz	10MHz	100MHz	1GHz	10GHz
Universal Type [Power Lines/Signal Lines]		NFE61HT	2706 (6816)	33p-3300p							

DLW Common Mode Choke Coils		Series	Size code in inch (in mm)	Impedance (Ω) at 100MHz	Effective frequency range (Applicable frequency ranges are only for reference)						
					100kHz	1MHz	10GHz	10MHz	100MHz	1GHz	10GHz
Signal Lines Type	For Differential Signal Lines	DLW21S* DLW31S	0805 (2012) 1206 (3216)	67-490 2200							

DLW Common Mode Choke Coils		Series	Size code in inch (in mm)	Impedance (Ω) at 100MHz	Effective frequency range (Applicable frequency ranges are only for reference)						
					100kHz	1MHz	10MHz	100MHz	1GHz	10GHz	
Signal Lines Type	For Differential Signal Lines	DLW43S DLW43M DLW32S DLW32M	1210-1812 (3225-4532)	11-200							

PLT Large Current Common Mode Choke Coils for Automotive Available		Series	Size code in inch (in mm)	Impedance (Ω) at 100MHz	Effective frequency range (Applicable frequency ranges are only for reference)						
					100kHz	1MHz	10MHz	100MHz	1GHz	10GHz	
Power Lines Type		PLT10H**	-	45-1000							

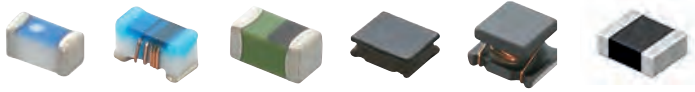
BNX Block EMIFIL®		Series	Height (mm)	Rated voltage (Vdc)	Rated current (A)	Effective frequency range (Applicable frequency ranges are only for reference)						
						10kHz	100kHz	1MHz	10MHz	100MHz	1GHz	10GHz
Power Lines Type	SMD Type	BNX024H01*	3.5	50	15							
		BNX025H01*	3.5	25	15							
		BNX026H01*	3.5	50	15							
		BNX027H01*	3.5	16	15							
	Lead Type	BNX012H01*	8.5 max.	50	15							

VFC Lead Type Capacitors with Varistor Function		Series	Height (mm)	Capacitance (F)	Varistor voltage (V)
Power Lines Type		VFC2	6.0 max.	1.0μ	27

* DLW21S series is for infotainment and Comfort only

** The derating of rated current is required for some items according to the operating temperature.

Powertrain/Safety/Infotainment/Comfort



Application Matrix

Product name	Series	Powertrain	Safety	Comfort	Infotainment
RF inductors film type	LQP			■	■
RF inductors multilayer type	LQG	■	■	■	■
RF inductors/power lines wire wound type	LQW			■	■
Power lines/general circuit multilayer type	LQM	■	■	■	■
Power lines/general circuit wire wound type	LQH	■	■	■	■
Power lines/general circuit metal alloy type	DFE			■	■


Powertrain/Safety






Series	Type	Size code in inch (in mm)	Thickness (mm/max.)	Inductance range (H)						Rated current	
				1n	10n	100n	1μ	10μ	100μ		1m
LQG	RF Inductors Multilayer Type	0402 (1005)	–	1.0nH-270nH						110mA – 300mA	
		0603 (1608)	–	1.2nH-270nH						200mA – 500mA	
LQM	Power Lines/General Circuit Multilayer Type	0805 (2012)	1.2 ≥ Size T ≥ 1				2.2μH				800mA
LQH	Power Lines/General Circuit Wire Wound Type	1210 (3225)	0.95 – 2.2				0.15μH-22μH				250mA – 1450mA
		1212 (3030)	1.2 – 1.5				1.0μH-100μH				260mA – 1600mA
		1812 (4532)	2.8				1.0μH-47μH				220mA – 1410mA
		2020 (5050)	2.2				0.47μH-47μH				1050mA – 4000mA
DFE	Power Lines/General Circuit Metal Alloy Type	1008 (2520)	1.2				0.33μH-2.2μH				1900mA – 4900mA

Infotainment/Comfort

Series	Type	Size code in inch (in mm)	Thickness (mm/max.)	Inductance range (H)						Rated current	
				1n	10n	100n	1μ	10μ	100μ		1m
LQP	RF Inductors Film Type	0201 (0603)	–	0.6nH-120nH						80mA – 850mA	
LQG	RF Inductors Multilayer Type	0402 (1005)	–	1.0nH-270nH						110mA – 300mA	
LQW	RF Inductors/Power Lines Wire Wound Type	0402 (1005)	–	1.3nH-120nH						110mA – 1200mA	
		0603 (1608)	–	2.2nH-470nH						75mA – 1400mA	
LQM	Power Lines/General Circuit Multilayer Type	0603(1608)	0.55 – 0.95				1.0μH-2.5μH				250mA – 600mA
		0805(2012)	0.55 – 1.0				0.47μH-4.7μH				600mA – 1300mA
		0806(2016)	1.0				0.47μH-4.7μH				1100mA – 4000mA
		1008(2520)	0.8 – 1.2				0.47μH-4.7μH				800mA – 1800mA
LQH	Power Lines/General Circuit Wire Wound Type	0806(2016)	0.95				0.33μH-68μH				150mA – 1130mA
		1008(2520)	0.6 – 1.2				0.47μH-22μH				260mA – 2750mA
		1210(3225)	1.7 – 2.2				0.47μH-470μH				170mA – 1900mA
		1212(3030)	1.0 – 1.5				0.68μH-100μH				260mA – 2700mA
		1812(4532)	2.8				1.0μH-220μH				220mA – 3300mA
		1616(4040)	1.0				0.68μH-47μH				360mA – 2400mA
		2020(5050)	2.2				0.47μH-22μH				1050mA – 4000mA
DFE	Power Lines/General Circuit Metal Alloy Type	0806(2016)	1.2				0.15μH-2.2μH				1200mA – 5200mA
		1008(2520)	1.2				0.33μH-10μH				800mA – 4600mA

Product	Series & Description	Features & Benefits	Applications
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Power Choke Coil			
	<p>ETQP Series In order to achieve the high requirements for the environment and low fuel consumption, the number of functions implemented in ECUs is growing while at the same time mounting space becomes smaller and smaller.</p>	<ul style="list-style-type: none"> • Solution for downsizing (30-50% less mounting space) • No-Hard magnetic saturation by high peak current • Low DC-resistance, low AC-resistance • Super high reliability and high stability for the requirements of the automotive and industrial market • Excellent inductance stability over broad temperature range • Low loss, improving the efficiency of the power supply and enabling an increase of the ECU functionality • Excellent vibration resistance properties, suitable for high vibration up to 50G • Heat-resistance: 155°C/2000h (Short term: 180°C) 	<ul style="list-style-type: none"> • Engine ECUs for HEVs • Gasoline cars • Power supply circuits of a variety of ECUs • LED lighting • Radar • Lidar


Product	Series	Features & Benefits	Part number	Size (mm)	Height (mm)	Inductance (uH)	Rated Current (A)
	High Performance	<ul style="list-style-type: none"> • Compact size • High efficiency • High bias current • High reliability • Low audible buzz noise 	ETQP3M__YFP	5.5x5.0	3.0	2.2/3.3	5.8/5.0
			ETQP4M__YFP	5.5x5.0	4.0	4.7/22	2.3 – 4.8
			ETQP3M__YFN	6.5x6.0	3.0	0.68/1	12.0/10.7
			ETQP4M__YFN	6.5x6.0	4.5	3.3 - 47	2.2 – 6.6
			ETQP5M__YFM	7.5x7.0	5.4	4.7 – 48	2.9 – 8.0
			ETQP5M__YGM	7.5x7.0	5.0	95	1.9
			ETQP5M__YFK	8.5x8.0	5.4	2.5 – 48	3.4 – 14.0
			ETQP5M__YGK	8.5x8.0	5.0	100	2.1
			ETQP5M__YFC	10.7x10.0	5.4	1.45 – 66	3.6 – 21.4
			ETQP5M__YGC	10.7x10.0	5.0	97	2.7
			ETQP5M__YLC	10.9x10.0	5.0	0.33 – 2.0	19.4 – 39.7
ETQP6M__YLC	10.9x10.0	6.0	1.5 – 4.7	14.1 – 23.3			
	MC-Large Current	<ul style="list-style-type: none"> • Large current power • High vibration resistance(30G) 	ETQP8M__JFA	12.6x13.2	8.0	0.33 – 4.7	20.2 – 53.5
	MC-High Vibration resistant	<ul style="list-style-type: none"> • High vibration resistance (50G) 	ETQP5M2R2YSK	8.5x8.0	5.4	2.2	12.0
	MC-5Mhz	<ul style="list-style-type: none"> • High frequency • Less power loss 	ETQP3M__HFP	5.5x5.0	3.0	2.2	6.3
			ETQP3M__HFN	6.5x6.0	3.0	10/22	3.7/2.5
	LP	<ul style="list-style-type: none"> • IHLP pin-compatible • Less power loss 	ETQP3M__KVP	5.5x5.0	3.0	0.68 – 10	2.9 – 10.2
			ETQP3M__KVN	6.5x6.0	3.0	0.68 – 33	2.1 – 13.2
			ETQP4M__KVK	8.5x8.0	4.0	0.68 – 33	3.1 – 19.5
			ETQP4M__KVC	10.7x10.0	4.0	1 – 47	3.4 – 23.9
	LE	<ul style="list-style-type: none"> • Less power loss (low DC resistance) • Ferrite type pin compatible 	ETQP4M__KFN	6.4x6.0	4.8	3.3 – 15	4.2 – 9.2
			ETQP4M__KFM	7.4x7.0	4.8	4.7 – 47	2.9 – 8.8

Product	Series & Description	Features & Benefits	Applications
High Insulation Transformer/Choke module for today's BMS solutions			
	HM2102/3NL, HM2106/8NL, HM2112/3ZNL, HM2136NL/7NL and HMU1205/2129NL Approved BMS Modules for xEV and Energy Storage	<ul style="list-style-type: none"> Designed for BMS Chipsets: LTC6804/6 & LTC6820, MC33771 & MC33664, MAX11068 & MAX11080/1 and BQ76PL455A & BQ79606-Q1 AEC-Q200 qualified/IATF16949 factory Single/Dual channel modules 250VAC – 6000Vdc insulation breakdown 250V – 1600Vdc working voltages Wide temperature range -40 to +150°C Approvals - ADI (LTC), NXP, MAXIM and TI 	<ul style="list-style-type: none"> BMS for EV battery packs Off grid battery management Alternative custom options by request
Automotive Ethernet Chip Chokes			
	AE2002/AE300x/ AE5002 NEW Chokes for Automotive 2 wire Ethernet	<ul style="list-style-type: none"> AEC-Q200 qualified/IATF16949 factory Automated production with high reliability 100Mbps – OABR/IEEE802.3bw/100BASE-T1 1000Mbps – IEEE802.3bp/1000BASE-T1 Approvals – Broadcom, NXP, Intel, Infineon, Marvell (100BT1 and 1000BT1) Approvals – Aquantia (2.5/5/10G) Approvals – Valens for Automotive HDBaseT 	<ul style="list-style-type: none"> ADAS systems Automotive gateways Imaging networks Lidar/radar sensory systems Infotainment systems Body Electronics systems and sensors
CAN/CAN-FD and Automotive EMI			
	PE-1812/1210ACC High performance Chip Chokes for CAN and CAN-FD Networks with wide Temperature range	<ul style="list-style-type: none"> AEC-Q200 qualified Wide temperature range Industrial size and footprint Shielded for superior EMC Supports high current lvs Approved by VW Group Companies inc. Audi, VW, Skoda, SEAT Detailed Test report by FTZ Germany for CAN/CAN-FD compatibility 	<ul style="list-style-type: none"> CAN BUS links CAN-FD links Battery Management Systems
Automotive DC/DC Converter			
	PM2223NL, PM2224NL, PM2225NL 1.8kW Full-Bridge DC/DC Converter	<ul style="list-style-type: none"> PM2223NL: 18uH/20Apk PM2224NL: 3000Vrms Isolation, 8.0mm UL creepage distance PM2225NL: 2.1uH/170Apk 	<ul style="list-style-type: none"> DC/DC converter
High Isolation SMD Transformers			
	PH9085NLT, PH9385NLT, PH9185NLT, PH9384NLT, PH9084NL, PH9184NL High Efficiency Transformers for Multi-cell Battery Monitoring and Gate Drive	<ul style="list-style-type: none"> Designed for LTC6804 and LTC6811 Basic and reinforced insulation AEC-Q200 qualified Up to 5kVrms isolation voltage Up to 12mm creepage Up to 1000Vrms working voltage Approvals - Analog Devices, MAXIM and Texas Instruments Approved by Porsche and BMW 	<ul style="list-style-type: none"> Automotive BMS High isolation transformers Gate drive transformers
Flyback Transformers for Battery Management System			
	PA5178NLT, PA5179NLT, PA5180NLT, PA5181NLT High Efficiency Transformers for Bidirectional Multi-cell Battery Balancing	<ul style="list-style-type: none"> Designed for LT8584 and LTC3300 Designed for Texas instruments LM5072 1500Vrms isolation voltage Compact EP10 and EP13 platforms Optimised for high efficiency Approvals – Analog Devices 	<ul style="list-style-type: none"> Automotive BMS Energy storage Off grid battery management Energy harvesting


Product	Series & Description	Features & Benefits	Applications
Compact SMD High-Current Chokes			
	<p>B82559*A* (ERU13 to ERU25) High current inductor with rectangular wire</p>	<ul style="list-style-type: none"> • Extreme low resistance by flat wire helical winding • Low switching losses • High saturation ferrite core material • Very high rated currents up to 71A • SMT technology • Magnetically shielded • ERU16, EUR19 and ERU20 are AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive • Non-isolated DC/DC converters • Suitable for high frequency/high ripple current applications • For buck, boost, buck-boost topologies
Common-Mode Chokes for Signal Lines			
	<p>B82787* (ACT45B) ACT45R, ACT45L ACT1210 Available in case sizes 1210 & 1812</p>	<ul style="list-style-type: none"> • High temperature - up to 150°C • Cost optimised I-core solution • Very compact product • Leadframe construction with laser welded terminals for high mechanical strength • Highly automated production 	<ul style="list-style-type: none"> • CAN bus • FlexRay bus
SIMID High-Frequency SMD Inductors			
	<p>B82496C* (SIMID 0603-C) B82498F3*1* (SIMID 0805-F) Laser-cut technology & wire-wound technology</p>	<ul style="list-style-type: none"> • High temperature range up to 150°C / 125°C • Close tolerance up to 2% • No polarisation effect • Winding ends welded to terminals for better stability • Epoxy-molded flat top for vacuum pick up • Optimised materials and high-precision winding technology features high Q factor and very high resonance frequencies 	<ul style="list-style-type: none"> • Car access systems • TPMS • ADAS (advanced driver assistance systems) • LPF: 100 base T1 (Ethernet) in automotive applications
SMD Power Inductors with Dual Coils			
	<p>B82477D* Replaces two components by one</p>	<ul style="list-style-type: none"> • High temperature range up to 150°C • High coupling factor • High rated inductance up to 100µH • Low DC resistance • 12x12mm case size 	<ul style="list-style-type: none"> • SEPIC (single-ended primary inductor converters) • DC/DC converters • Power supplies • Multiple applications: parallel, series, dual inductor and 1:1 transformer • Automotive systems
Low-Profile SMD Power Inductors			
	<p>TFM-ALMA Metal composite core technology</p>	<ul style="list-style-type: none"> • Low profile down to 1.0mm • Minimised leakage flux • Excellent DC Bias characteristics • High temperature -40 to +150°C • Withstand voltage 20V • Withstand voltage 40V under development 	<ul style="list-style-type: none"> • ADAS ECU • In-vehicle cameras (view & sensing) • Radar • Communication modules
SMD Power Inductors for Automotive General Use			
	<p>CLF-NI-D Magnetic shield wound inductor technology</p>	<ul style="list-style-type: none"> • Wide temperature range -55 to +150°C • High rated current up to 8.5A • High reliability with welding connections • High temperature -55 to +150°C 	<ul style="list-style-type: none"> • DC/DC converters • Engine control modules • Power steering

Product	Series & Description	Features & Benefits	Applications
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Molded Inductor

	<p>HA72L Compact surface mount component that operates in demanding environments, mechanically robust and magnetically shielded</p>	<ul style="list-style-type: none"> • 155°C operation • AEC-Q200 certified • 80 Amps max. current • 3 MHz frequency performance • Low core loss • Magnetically shielded 	<ul style="list-style-type: none"> • Transportation <ul style="list-style-type: none"> - Lighting - Engine control - Transmission control - Powertrain - Braking - Electrical power steering
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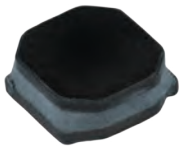
Common Mode Choke

	<p>HA19 Electrical power steering common mode choke</p>	<ul style="list-style-type: none"> • Operating temperature range -40°C to +125°C • Rated current up to 44 amps • Low loss ferrite core • Reduces line conducted interference • Excellent performance in rugged environments • AEC-Q200 certified • Ideal for high frequency noise suppression applications 	<ul style="list-style-type: none"> • Transportation <ul style="list-style-type: none"> - Engine control - Transmission control - Electronic control unit - Electrical power steering
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Gate Drive Transformer

	<p>HA42A-20 Mechanically robust with low profile for demanding battery management system applications</p>	<ul style="list-style-type: none"> • -55°C to +125°C Operation • Ambient temperature, maximum to +85°C • Temperature rise, maximum 40°C • RoHS compliant • AEC-Q200 certified 	<ul style="list-style-type: none"> • Automotive <ul style="list-style-type: none"> - HV/EV battery management system
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Low Profile Surface Mount Inductor

	<p>HA74 Miniature power inductor for high reliability automotive application, mechanically robust</p>	<ul style="list-style-type: none"> • Inductance value from 4.7µH to 33µH • High energy capability • Suitable for high power density board • Ideal for high temperature • High saturation current capability • AEC-Q200 certified 	<ul style="list-style-type: none"> • Transportation <ul style="list-style-type: none"> - Powertrain - ADAS - Engine control - Transmission control
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Gate Drive Transformer

	<p>HA86A Miniature surface mount design, mechanical robust with lower leakage inductance</p>	<ul style="list-style-type: none"> • -40°C to 125°C Operation • Ambient temperature, maximum to +85°C • Temperature rise, maximum 40°C • RoHS Compliant • AEC-Q200 Certified • Designed for freescale HV/EV battery Management system 	<ul style="list-style-type: none"> • Automotive <ul style="list-style-type: none"> - HV/EV battery management system
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SMD Power Inductor

	<p>HA66 Low profile, low loss, ferrite-based inductor, very compact and magnetically shielded</p>	<ul style="list-style-type: none"> • 155°C operation • AEC-Q200 certified • Operating frequency up to 3MHz • Low DC resistance • High saturation and magnetically shielded • Low profile, low loss 	<ul style="list-style-type: none"> • Transportation <ul style="list-style-type: none"> - Radar system - Camera control system - Transmission control • LED driver
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Product	Series & Description	Features & Benefits	Applications
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Power Inductors

	IHLP High current, low profile metal composite inductors	<ul style="list-style-type: none"> • Shielded construction • Excellent saturation behaviour • Different operating temperatures (from -55°C to +125/+155/+180°C) • Broad variety of foot prints and inductance values • All series tested acc. AECQ200 	<ul style="list-style-type: none"> • DC/DC conversion • Filter applications • Automotive
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Inductors




Series	Product image	Description	Inductance range (µH)	Size class	Rating current (A)
IHLE-4040DC-5A		Low profile, high current inductors with e-field shield	0.47 to 47	4040	2.5 to 30
IHLD-3232HB-5A		Low profile, high current dual inductors	10 to 33	3232	3.1 to 5.6
IHLD-4032KB-5A				4032	
IHLP-8787MZ-5A		Low profile IHLP® power inductors – high temperature, automotive, 22.0 x 22.1 x 13.0	0.47 to 100	8787	9.1 to 80
IHLP-6767 Series		Low profile IHLP® power inductors – automotive, 17.9 x 17.1 x 7.0	0.22 to 100	6767	5 to 80
IHLP-5050 Series		Low profile IHLP® power inductors – high temperature (+155 °C/+180 °C), automotive, 13.6 x 12.9 x 3.5 /13.6 x 12.9 x 5.0/13.6 x 12.9 x 6.5	0.1 to 22	5050	7.0 to 66
IHLP-4040 Series		Low profile IHLP® power inductors – high temperature (+155 °C/+180 °C), automotive, 11.5 x 10.3 x 4.0	0.19 to 47	4040	2.5 to 40
IHLP-3232 Series		Low profile IHLP® power inductors – automotive, 8.0 x 8.0 x 3.0/8.0 x 8.0 x 4.0	0.22 to 33	3232	3.1 to 36
IHLP-2525 Series		Low profile IHLP® power inductors – low DCR, high temperature (+155 °C/+180 °C), automotive, 7.2 x 6.7 x 1.8/7.2 x 6.7 x 2.4 /7.2 x 6.7 x 3.0	0.1 to 22	2525	2.5 to 32.5
IHLP-2020 Series		Low profile IHLP® power inductors – low DCR, high temperature (+155 °C), automotive, 5.7 x 5.4 x 2.0/5.7 x 5.4 x 3.0	0.1 to 15	2020	2.4 to 23
IHLP-1616 Series		Low profile IHLP® power inductors – automotive, 4.7 x 4.3 x 1.2	0.047 to 4.7	1616	1.7 to 13

KOA



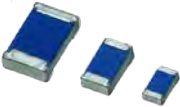
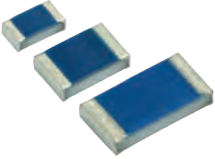
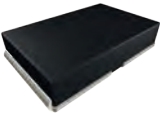
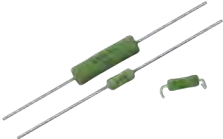

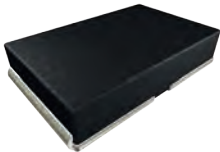
Product	Series & Description	Features & Benefits	Applications
High Current Metal Plate Shunts			
	PSL2, PSJ2, PSF4, PSG4 2 or 4 terminal construction	<ul style="list-style-type: none"> • Current ratings up to 244A • Ultra-low resistance • Excellent long-term stability and pulse withstand performance • Low inductance • Robust construction • AEC-Q200 qualified 	<ul style="list-style-type: none"> • High current sensing automotive applications (e.g. ECU, EPS, Motor control, EV/HEV) • DC/DC converter • Inverter power supplies • Frequency converter • Intelligent power modules
Precision Metal Plate Shunts			
	TLR Filletless SMD product	<ul style="list-style-type: none"> • Special 'no hotspot' trimming for higher reliability • Low parasitic inductance • 0.5mΩ to 20mΩ • 1W (0805 inch) to 3W (2512 inch) • T.C.R.: ±50 or ±75 ppm/K • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive electronics • Motor control units • Power steering (EPS) • Power supplies • AC/DC-DC power converters • CPU current sensing
Wide Terminal Thick Film			
	WK73R, WK73S 90° rotated termination design	<ul style="list-style-type: none"> • Excellent heat dissipation • Superior temperature and power cycling performance • Low thermal expansion stress • Higher rated power - less board space • 10mΩ to 1MΩ • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive electronics • ECU • Power supplies • Motor control units • Battery packs
Pulse Proof Thick Film			
	SG73P Standard SMD packaging	<ul style="list-style-type: none"> • Outstanding pulse load capability up to 550W • Higher rated power up to 1W • ±0.5% to ±5% • 1Ω to 10MΩ • 0402 to 1210 • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive electronics (e.g. ECU) • Power supplies • Motor control circuits • Power conditioner/inverter
Ultra High Precision Thick Film			
	RS73 Thick film alternative to metal film	<ul style="list-style-type: none"> • ±0.2% ~ Long term stability • ±0.1%, ±0.25%, ±0.5% or ±1% • T.C.R.: ±25 or ±50 ppm/K • ESD stability of thick film resistors • Ideal for applications where thin film is not suitable • AEC-Q200 qualified 	<ul style="list-style-type: none"> • High precision circuits for automotive • Motor controls • AC adapters • A/D signal conversion • Switching boards
Ultra High Precision Metal Thin Film			
	RN73H Highest reliability	<ul style="list-style-type: none"> • ±0.1% ~ Long term stability • Tol. ±0.05% and T.C.R. ±5 ppm/K is possible • High rated power at +85°C • Advanced moisture & high heat resistance • Additional inorganic passivation • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive electronics (ECU, HEV/BMS, EPB, EPS) • Converter • High precision voltage divider circuits

Product	Series & Description	Features & Benefits	Applications
High Wattage Chassis Mount Resistor			
	ARG Series Aluminium housed wire-wound	<ul style="list-style-type: none"> • Wired connection points • Insulated connectors • Finned extrusion provides more power dissipation • Available thermal cut-off • Great overload and pulse handling 	<ul style="list-style-type: none"> • Motor control • Dynamic braking • Frequency converters
Thick Film Planar Resistor			
	TAP600/800 Series High power heatshrinkable package	<ul style="list-style-type: none"> • Low inductance and capacitance • Pulse loading capable • High alumina ceramic bottom • High insulation resistance • Up to 800 Watts of power dissipation 	<ul style="list-style-type: none"> • Variable speed drives • Power supplies • Robotics • Motor control
Aluminium Housed Power Resistor			
	HS/89 Series Wire-wound molded into aluminium extrusion	<ul style="list-style-type: none"> • Chassis mounting for higher wattage • Insulated resistor for environmental protection • Customisation available • High stability 	<ul style="list-style-type: none"> • Motor control • Discharge circuit • Small motor braking
High Wattage Tubular Resistors			
	270/280 Series Low value wire-wound construction	<ul style="list-style-type: none"> • Welded design for sturdy connection points • Up to 1000 Watts of power dissipation • Great overload ratings • Flame resistant coating 	<ul style="list-style-type: none"> • Resistive load banks • Heaters • Motor starting • Dynamic braking • Inrush limiting
Edge Wound High Current Resistor			
	PFE/PFR Series Ceramic on plated metal frame	<ul style="list-style-type: none"> • Plated frame to prevent oxidation • Up to 1000 Watts of power dissipation • Slotted mounting bar • Overload rating of 10x 	<ul style="list-style-type: none"> • Load banks • Dynamic braking • Current limiting • Motor starting
Steel Encased Wirewound Resistor			
	Metal Ohm Series Heatshrinkable with multiple terminal options	<ul style="list-style-type: none"> • Non inductive versions available • Flame-proof, inorganic potting material • Multiple tap options • Dielectric ratings up to 4250V 	<ul style="list-style-type: none"> • Motor controls • Dynamic braking • Power supplies

Product	Series & Description	Features & Benefits	Applications
High Precision Chip Resistors / Thin Film Chip Resistor			
	<p>ERAxA High reliability thin film resistors low tolerance, low TCR provide high voltage measurement accuracy</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified • Stable at high reliability by using original resistance material • Tolerance: $\pm 0.10\%$ • Stable T.C.R.: $\pm 25\text{ppm/K}$ • Low current noise, excellent linearity • High solder-joint reliability by using original terminal material 	<ul style="list-style-type: none"> • Automotive electronics • Electronic control units • Electronic power steering
Small & High Power Chip Resistors			
	<p>ERJP Solution for automotive trend - high power in small size for increased solder joint reliability</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified • Size 0402 to 1210 • Achieved low T.C.R. ($\pm 100\text{ppm/K}$) by original material • High power (0402:0.2W / 0603:0.25W / 0805:0.50 W) is suitable for small size • High solder-joint reliability by using original terminal material • ESD surge characteristics superior to standard resistors 	<ul style="list-style-type: none"> • Automotive electronics • Electronic control units
Low TCR High Power Chip Resistors / Wide Terminal Type			
	<p>ERJD1 and D2 For automotive and high reliability applications</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified • R-range from 10 mΩ to 200 mΩ • Size 0612 and 1020 • Achieved low T.C.R. ($\pm 100\text{ppm/K}$) by using wide terminal electrode structure and original material • High power (0612: 1W) is suitable for small size/high power current detection • High solder-joint reliability by wide terminal construction and original terminal material 	<ul style="list-style-type: none"> • Automotive electronics • Electronic control units • Motor controls • DC-DC converters • Battery monitoring




Product	Series & Description	Features & Benefits	Applications
Current Sense Power Resistors			
	LRMA3920/5930 Low resistance metal alloy power resistors	<ul style="list-style-type: none"> • Up to 10W rating on FR4 PCB • Up to 15W rating on thermal substrate • AEC-Q200 qualified • Values 200$\mu\Omega$ to 3mΩ • High surge tolerance gives reliable product performance under inrush and momentary short circuit conditions • Low thermal impedance minimises the temperature rise and enhances the reliability of the assembly 	<ul style="list-style-type: none"> • DC-DC conversion • Steering control • Motor drives • Battery monitoring
Current Sense Open Air Resistors			
	OARS Surface mount shunt with flexible structure	<ul style="list-style-type: none"> • Flexible leads for thermal expansion • Open air design reduces PCB heating • Values down to 1mΩ • Accuracy to 1%, 40ppm/$^{\circ}\text{C}$ • Mounts over components to save space • Bulk metal gives high surge performance 	<ul style="list-style-type: none"> • Motor control • Automotive body control • Power supply • DC-DC converter
High Overload Wirewound Resistors			
	WPRT Wirewound power radial terminal resistors	<ul style="list-style-type: none"> • Overload up to 250W for 5s • 10 to 50W power range • Quick connect or solder tags • AEC-Q200 • Rugged mounting bracket • Flameproof construction 	<ul style="list-style-type: none"> • HEV pre-charge • HEV BDU discharge • Motor drive inrush limiting • Switched rapid bleed
MELF Resistors			
	WRM & WRM-HP Precision & high power MELF resistors	<ul style="list-style-type: none"> • Precision to 0.1%, 5ppm/$^{\circ}\text{C}$ • Ratings up to 1W, 350V • AEC-Q200 • Surge withstanding up to 6kV 1.2/50μs 	<ul style="list-style-type: none"> • Body control system • Engine control system
Power Resistors			
	WMHP & WSMHP TO-263, TO147 & TO220 power resistors	<ul style="list-style-type: none"> • TO-263 SMD to 35W • TO220 / TO147 through hole to 100W • Very low thermal resistance • Non-inductive • Thick film with good surge performance • WSMHP is AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive actuator drive • Rapid capacitor bleed • DC-DC converter • Current sense • Current surge limiting
Pulse Withstanding Chip Resistors			
	DSC & HPWC Double sided & high pulse withstanding chip resistors	<ul style="list-style-type: none"> • High surge performance for size • DSC has 2 parallel resistance elements • DSC offers tolerance to 0.5% • HPWC has one untrimmed element • HPWC offers tolerance to 5% 	<ul style="list-style-type: none"> • Surge protection • Motor control • Actuator control • DC-DC converter


Product	Series & Description	Features & Benefits	Applications
High Power Thin Film Chip Resistors			
	<p>MC HP Excellent stability in high power applications.</p>	<ul style="list-style-type: none"> • 175 °C operating temperature • 200 mW for case size 0402 • Reduce case size: replace one 0805 by 0402 • Excellent long term stability: $\leq 0.2\%$ (for 1000 h) • AEC-Q200 qualified • Case sizes 0402 to 0805 	<ul style="list-style-type: none"> • Automotive engine control unit • Automotive DC/DC converters • Automotive safety (e.g. ABS, airbag) • Electronic transmission control • Circuits with board space limitations
Platinum RTDs for Precise Temperature Measurement			
	<p>PTS AT Ultra stable platinum sensors for precise temperature measurement qualified for automotive</p>	<ul style="list-style-type: none"> • Operating temperature up to +175°C • High accuracy with tolerance classes of F0.3 (1B) and F0.6 (2B) • Outstanding stability ensuring reliable operation • Short reaction time • Industry first AEC-Q200 compliant 	<ul style="list-style-type: none"> • AdBlue sensors • Dual clutch transmission • DC/DC converter • Transmission controls (ultrasonic oil sensor) • Engine controls (NOx reducing exhaust systems) • Chassis electronics (active stabilisers)
NTC Temperature Sensing for Surface Applications			
	<p>NTCALUG NTC temperature sensing. Ideal for surface applications in automotive</p>	<ul style="list-style-type: none"> • Fast time response for surface applications • High variety of solutions possible • Temperature range up to 150°C long term • Up to 2.6 kV insulation voltage • RoHS compliant without exemption available • AEC-Q200 qualified / UL approved 	<ul style="list-style-type: none"> • Battery temperature management • PV-power inverters • Heat-sink temperature control • On-Board chargers/charging plugs • DC/DC converters
Automotive Cemented Leaded Wirewound Resistors			
	<p>AC-AT High power dissipation in small design with excellent pulse load capability</p>	<ul style="list-style-type: none"> • 1 W to 10 W power rating • AEC-Q200 qualified • 1000 times of rated power for 1 ms • WSZ-form lead bending available for SMD mounting • Non-flammable coating conforming to UL 94 V-0 	<ul style="list-style-type: none"> • Precharge and discharge for EV/HEV • HV DC-DC converters • Power inverters • Battery management systems
Precision High Voltage Thin Film Chip Resistors			
	<p>TNPV e3 Significant component count reduction by increased operating voltage.</p>	<ul style="list-style-type: none"> • High operating voltage U_{max}. up to 1000V • TCR down to ± 10 ppm/K at tolerance $\pm 0.1\%$ • Long term stability: $\leq 0.05\%$ (P70 for 1000 h) • Very low voltage coefficient < 1 ppm/V • AEC-Q200 qualified • Case sizes 1206 and 1210 	<ul style="list-style-type: none"> • Automotive inverters • Battery management systems • High voltage dividers • Circuits with board space limitations.
Power Metal Strip® Resistors			
	<p>WSHP Series High Power (10W), Low Value (down to 0.001Ω), Surface Mount</p>	<ul style="list-style-type: none"> • Improved thermal management incorporated into design • All welded construction of the power metal strip resistors are ideal for all types of current sensing, voltage division, and pulse applications • Proprietary processing technique produces extremely low resistance values • Sulfur resistance by construction that is unaffected by high sulfur environments • Very low inductance (< 5 nH) and low thermal EMF (< 3 μV/°C) • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive: electronic controls <ul style="list-style-type: none"> – engine controls, climate controls, anti-lock brakes • Automotive: brushless DC motor controls <ul style="list-style-type: none"> – electric power steering, electric – water pump, oil pump, air conditioning • Automotive: electric and hybrid controls <ul style="list-style-type: none"> – battery management

Product	Series & Description	Features & Benefits	Applications
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Power Metal Strip® Resistors

	<p>WSLF Low value (down to 0.0003 Ohm), surface-mount</p>	<ul style="list-style-type: none"> • Power Metal Strip® all-welded construction is ideal for all types of current sensing, voltage division, and pulse applications • Solid metal nickel-chrome, manganese-copper, or manganese-copper-tin alloy resistive element with low TCR (< 20 ppm/°C) • Proprietary processing technique produces extremely low resistance values, down to 0.0003 Ohm • Sulfur resistance by construction that is unaffected by high sulfur environments • Very low inductance (< 2 nH) and low thermal EMF (< 3 µV/°C) • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive: electronic controls (engine controls, climate controls, anti-lock brakes) • Automotive: brushless DC motor controls (electric power steering, water pumps, oil pumps, air conditioning) • Electric and hybrid controls (battery management)
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Automotive Power Thick Film Resistors

	<p>LTO100 & LTO150 AEC-Q200 Resistors Low profile thick film TO-247 resistors 100W & 150W</p>	<ul style="list-style-type: none"> • AEC-Q200 fully qualified • Up to 150W power dissipation • Screw or clip mounting • High dielectric strength up to 3kVRms • High energy capable up to 57J for 0,1s • Special terminations bending available 	<ul style="list-style-type: none"> • Automotive • DC/DC converters • Power supplies • OBC • Precharge, active and passive discharge • Snubber
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Product	Series & Description	Features & Benefits	Applications
	<p>AT Series Automotive grade thin film</p>	<ul style="list-style-type: none"> • Superior resistance against sulfur-containing environments • High precision and stability • Low TCR, low electrical noise • Advanced sputtering technology • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive electronics • Power system
	<p>PA Series Low TCR metal plate current sensor</p>	<ul style="list-style-type: none"> • Excellent current sensing performance • AEC-Q200 qualified • Reduced power consumption • Low thermal EMF (<0.3 $\mu\text{V}/^\circ\text{C}$) • Low TCR • Operation temperature from -55°C to $+170^\circ\text{C}$ 	<ul style="list-style-type: none"> • Alternative energy • Automotive electronics • Power supply
	<p>AC Series Automotive grade thick film</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified • Soldering is compliant with J-STD-020D • PPAP ready • Highly reliable electrode construction • 100% performed by AOI prior to taping 	<ul style="list-style-type: none"> • Automotive electronics • Power supply
	<p>SR Series Anti-surge</p>	<ul style="list-style-type: none"> • Excellent performance at pulse loading • AEC-Q200 qualified • High stability & reliability • Narrow tolerance down to $\pm 0.5\%$ • Excellent ESD withstand performance 	<ul style="list-style-type: none"> • Power supply • Automotive electronics • Inverter
	<p>PU Series Automotive grade shunt resistor</p>	<ul style="list-style-type: none"> • AEC-Q200 qualified • Withstand high temperature & high humidity • Excellent heat dissipation • Low thermal EMF • Operation temperature from -65°C to $+275^\circ\text{C}$ • High rated power 3 ~ 10W, low TCR 	<ul style="list-style-type: none"> • Power system • Automotive
	<p>PE Series Low TCR metal foil current sensor</p>	<ul style="list-style-type: none"> • Excellent current sensing performance • High power rating for large current detection • Reduce power consumption • Low thermal EMF (<0.3 $\mu\text{V}/^\circ\text{C}$) • Low TCR • Operation temperature from -55°C to $+170^\circ\text{C}$ 	<ul style="list-style-type: none"> • Power supply • Alternative energy • Automotive consumer goods






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Power & Specialties

Murata



 INNOVATOR IN ELECTRONICS

Product	Series & Description	Features & Benefits	Applications
Railway DC-DC Converters			
	IRH150, IRQ100 High power density DC-DC modules	<ul style="list-style-type: none"> Covers 110v DC railway batteries -40°C +100°C operating baseplate temp Fully isolated single o/p 150w half brick 100w quarter brick 	<ul style="list-style-type: none"> Railway on-board and trackside
12v/24v Battery Systems			
	IRE / IRS 9v – 36v DC/ DC converters for transportation systems	<ul style="list-style-type: none"> 9v - 36v I/P (& 18v - 75vDC I/P - IRS series) 120w single o/p in eighth brick package 50w Single o/p in sixteenth brick package -40°C - +100°C baseplate temp Rugged package design 	
SMD Piezoelectric Sounders			
	PKLCS/PKMCS SMD piezo sounder for automotive application	<ul style="list-style-type: none"> Small size and low profile High sound pressure Low current consumption Easy assembly RoHS/REACH 	<ul style="list-style-type: none"> Cluster Power tail gate Power slide door Warning and confirmation sound
Crystal Units			
	XRCGB / XRCGE 2016 sized crystal in new package technology	<ul style="list-style-type: none"> Good temperature characteristics Good visibility of solder fillet Stable supply IC-matching service available AEC-Q200 RoHS/REACH 	<ul style="list-style-type: none"> ADAS (camera, radar, lidar) RKE/TPMS CAN-FD/FlexRay/Ethernet NFC/wireless charger
Ceramic Resonators (CERALOCK®)			
	CSTNR/CSTNE New ceramic resonator in base metal technology	<ul style="list-style-type: none"> Built-in Load capacitance Quick Start-up time IC-matching service available AEC-Q200 RoHS/REACH 	<ul style="list-style-type: none"> Microcontroller LIN/CAN/CAN-FD All automotive applications (ECUs, xEV)
Chip NTC Thermistor			
	NCP	<ul style="list-style-type: none"> High accuracy in resistance and B-Constant Recognized by UL/cUL. (UL1434, File No.E137188) Excellent solderability and high stability in the application's environment Same B-constant in the same resistance in the three sizes (0805 size/0603 size/0402 size) Downsize is easy for design 	<ul style="list-style-type: none"> Temperature compensation for transistors, ICs, and crystal oscillators in communications Temperature detection in general use of electric circuits (e.g. LCD, rechargeable battery)






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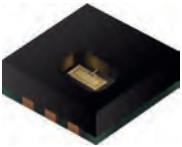

Sensors

Amphenol Advanced Sensors

Amphenol
Advanced Sensors




Product	Series & Description	Features & Benefits	Applications
JS8741 Pipe Clip Surface Temperature Sensor			
	From thermometrics, an integrated clip-on sensor that monitors the temperature of a fluid or gas that passes through a pipe or tubing circulation system.	<ul style="list-style-type: none"> • Compact design and quick mount spring-loaded clip • High sensitivity • Integrated connector with locking mechanism • VW75174 approved connector system • IP57 ingress protection rating 	<ul style="list-style-type: none"> • Engine coolant temperature • Battery pack coolant line temperature • HVAC water and refrigeration
WTF083B001 Coolant Temperature Sensor (CTS)			
	From thermometrics, monitors the temperature of battery coolant in EV/PHEVs and relays a signal in the event of overheating.	<ul style="list-style-type: none"> • Compact IP67 design with integrated connector • -40°C to +100°C range • Fast response • Proven design 	<ul style="list-style-type: none"> • EV/PHEV battery coolant system temperature management • HVAC refrigerant lines
GE-1935/GE-2102/GE-2103 Inline Flow-Through Fluid Temperature Sensor			
	From thermometrics, monitors the temperature of the fluid that passes through it.	<ul style="list-style-type: none"> • High sensitivity • Wide application range • Compact design • SAE J-1231 interface • USCAR sealed connection system • Available in three standard hose sizes 	<ul style="list-style-type: none"> • Battery pack coolant line temperature • Engine coolant temperature • HVAC water management
NTC Type CR1 Harsh Environment Chip Thermistors			
	From thermometrics, an NTC chip thermistor on Sn-coated alloy 52 leads with high performance acid and moisture resistant coating, making them ideal for harsh environment applications.	<ul style="list-style-type: none"> • Operation up to 190°C with excellent stability • High thermal shock resistance • AEC Q200 Rev D qualified • Small body diameter • Fast response 	<ul style="list-style-type: none"> • Automotive • Exhaust gas recirculation (EGR) systems • Urea storage and delivery systems (SCR)
NTC Type NK Epoxy Chip Thermistors			
	From Thermometrics, epoxy-coated chip thermistors with tin-coated steel wires and epoxy resin coating.	<ul style="list-style-type: none"> • Operation up to 155°C with excellent stability • Fast response • Tight tolerances on resistance and B values • Small body diameter 	<ul style="list-style-type: none"> • Engine management • Fluid/air/battery temperature
FMA Series – Filtration Air Restriction (FAR) Sensor			
	From NovaSensor, accurately measures pressure loss across a variety of air filtration devices utilising high accuracy NPA piezoresistive technology.	<ul style="list-style-type: none"> • 5VDC supply voltage • Linear output 0.5V to 4.5V (ratiometric) • Diagnostic features • Sealed AMP electrical connector • Temperature compensated • Multiple pressure ranges available (vacuum and pressure) • Fast response time 	<ul style="list-style-type: none"> • Engine air filtration systems • Cabin pressure • HVAC pressure • Exhaust pressure

Product	Series & Description	Features & Benefits	Applications
Magnetic Sensors			
	HGPRDT005A Magnetic encoder output sensor	<ul style="list-style-type: none"> • Rotation detection that uses two-phase output from one sensor only • Pitch free design, giving large flexibility on gap tolerance • High sensitivity and resolution with GMR Technology • highly suitable for high performance rotation control & measurement • SOT23 package (size: 2.9x2.8x1.1mm) 	<ul style="list-style-type: none"> • Rotation control • Motor control (anti-pinch control) • Power window, power slide door, power tail gate, sunroof
	HGAR Magnetic analog angle sensor	<ul style="list-style-type: none"> • single output type and SIN/COS dual phase output types available • Dual phase output & 2 full-bridges (+sin,-sin,+cos,-cos) • MSOP-8 or DFN1810 package • Low current consumption, 5kΩ bridge resistance 	<ul style="list-style-type: none"> • Position detection, stroke, angle • Steering angle sensor • Shifter • Motor control • Input device
Resistive Sensor			
	RDC50 Resistive rotary position sensor	<ul style="list-style-type: none"> • Available horizontal mount, vertical mount and reflow soldering • Hollow shaft type suitable for the connection with the actuator • Long-life type • Supports wide operating temperature range (-40°C to +120°C) • Compact size, horizontal type 11.0 x 12.0 x Tmm, Vertical type 11.0 x 3.8 x 13.5mm • High precision 	<ul style="list-style-type: none"> • Rotational angle detection of actuators for car air conditioner • Angle detection for motor actuator unit

Product	Series & Description	Features & Benefits	Applications
Rotary Position Sensors			
	Model 3382 For applications that typically require frequent adjustment	<ul style="list-style-type: none"> • Surface mount and through-hole versions • 12mm Square/dustproof • One million rotational cycles • Thin profile • RoHS compliant • AEC-Q200 compliant 	<ul style="list-style-type: none"> • Volume control on audio equipment • Motion controllers
Environmental Sensors			
	BPS230 Humidity sensors	<ul style="list-style-type: none"> • High reliability and stable performance over the life of the sensor • High sensitivity for relative humidity sensing • Low voltage operation capability • Low current consumption for battery supported application 	<ul style="list-style-type: none"> • HVAC system - RH & temperature monitoring • Agriculture field and silo sensors
Environmental Sensors			
	BPS110, BPS120 and BPS130 Pressure sensors	<ul style="list-style-type: none"> • Superior performance in harsh media/ultra-low pressure sensing applications • Compensated plug and play reduces development time • World-class technical support • Global supply chain 	<ul style="list-style-type: none"> • HVAC system - RH & temperature monitoring • Agriculture field and silo sensors



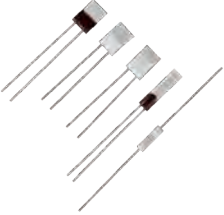
Honeywell

Honeywell

Product	Series & Description	Features & Benefits	Applications
Inertial Measurement Unit (IMU)			
	Transportation Attitude Reference System (TARS Series) Ruggedised high performance IMU	<ul style="list-style-type: none"> • Reports vehicle angular rate, acceleration and inclination • Advanced filtering of raw sensor data to minimize unwanted noise and vibrations, improves positioning accuracy • Improve machine safety, productivity and ease of use • Industry standard CAN J1939 connectivity 	<ul style="list-style-type: none"> • Mining machines • Material handlers • Aerial platforms • Crop harvesters • Logging machines • Dumpers
Smart Position Sensors			
	SPS Durable/accurate linear and arc sensors	<ul style="list-style-type: none"> • High resolution • Sealed to IP67K • Non-contact design for long life and reliability • Analog or digital outputs available 	<ul style="list-style-type: none"> • Precise position control • Hydraulic cylinders • Construction equipment • Material handling • Machine control • Elevator position detection
Speed Sensors			
	SNG, SNDH, LCZ Non-contact speed and speed/direction detection	<ul style="list-style-type: none"> • No moving parts for high reliability • Sealed to IP69K • High frequency switching capability: 3 Hz to 20 kHz • Robust electrical noise immunity • Electrical noise radiated immunity (EMC) rated to 100V/m 	<ul style="list-style-type: none"> • Engine and transmission speed detection • Electric vehicles • Construction equipment • Material handlers • Agricultural and mining machines

KOA




KOA

Product	Series & Description	Features & Benefits	Applications
Linear Thin Film PTC Resistors			
	LT73V SMD flat chip style	<ul style="list-style-type: none"> • Various T.C.R.'s from 150 to 4500 ppm/K available • Nickel based PTC thin film element • 0805 and 1206 chip sizes • Temperature range: -55°C to +155°C • Rated ambient temperature: +85°C • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Automotive temperature control • Temperature compensation of current sensor, FET and semiconductor • Temperature compensation of various kinds of electrical circuits and sensors • Sensor using LED, LED modules • Power supplies
Platinum Film Thermal Chip Sensors			
	SDT73V2B SMD flat chip style 1206	<ul style="list-style-type: none"> • Stable platinum T.C.R. of 3850 ppm/K • T.C.R. in accordance with JIS - IEC standards • 100Ω or 500Ω • Resistance tolerance down to ±0.2% • Operating temperature up to +155°C • AEC-Q200 qualified 	<ul style="list-style-type: none"> • Temperature compensation of electronic components for automotive • Temperature compensation for various kinds of sensor drive circuits
Platinum Film RTD Temperature Sensors			
	SDT310 Axial and radial formats	<ul style="list-style-type: none"> • Stable platinum T.C.R. of 3850 ppm/K • High long term stability • Excellent temperature shock resistance • Excellent precision over a wide temperature range • T.C.R. in accordance with IEC standards (Class A, B) • Various shapes in radial and axial formats 	<ul style="list-style-type: none"> • Cold point compensation for thermocouples • Temperature compensation for RF circuits • Heater element for thermal flowmeters • Temperature compensation of air flow meters • Automotive (e.g. SDT310VASP)

Murata






 INNOVATOR IN ELECTRONICS

Product	Series & Description	Features & Benefits	Applications
Combined Gyro Sensor and Accelerometer			
	SCC2000 Combined X-axis or Z-axis gyroscope & 3-axis accelerometer	<ul style="list-style-type: none"> • Single axis X or Z-axis gyroscope with $\pm 125^\circ/\text{s}$ or $\pm 300^\circ/\text{s}$ measurement range • 3-axis accelerometer with $\pm 2\text{g}$ or $\pm 6\text{g}$ measurement range • Extensive self diagnostics features • SPI digital interface • User selectable low pass filter via SPI • $-40^\circ\text{C} - +125^\circ\text{C}$ operating range 	<ul style="list-style-type: none"> • Inertial measurement units (IMUs) for highly demanding environments • Platform stabilisation and control • Machine control systems • Electronic stability control (ESC) • Hill start assist (HSA) • Roll over detection
High Performance 3-axis Inclinometer			
	SCL3300 3-axis MEMS sensor offering best-in-class characteristics for inclination measurements.	<ul style="list-style-type: none"> • Size $7.6 \times 8.6 \times 3.3\text{mm}^3$ (w x l x h) • SPI digital interface • Unique mechanical over damping • $-40^\circ\text{C} - +125^\circ\text{C}$ operating range • 3.0V – 3.6V supply voltage with 1.2mA current consumption • Proven capacitive 3D-MEMS technology • (Direct) Inclination angle output in degrees 	<ul style="list-style-type: none"> • Leveling • Tilt sensing • Machine control • Structural health monitoring • Inertial measurement units (IMUs) • Robotics
3-axis Accelerometer			
	SCA3300 Industry proven technology with significantly improved performance	<ul style="list-style-type: none"> • Size $7.6 \times 8.6 \times 3.3\text{mm}^3$ (w x l x h) • SPI digital interface • 3-axis high performance accelerometer with ± 1.5 to $\pm 6\text{g}$ user selectable measurement range • $-40^\circ\text{C} - +125^\circ\text{C}$ operating range • 3.0V – 3.6V supply voltage with 1mA current consumption • Excellent bias stability, low noise level and linearity • Robust MEMS designs and high performance in harsh environment 	<ul style="list-style-type: none"> • Inertial measurement units (IMUS) for heavy machine and automotive (ADAS) • Motion analysis and control • Navigation system • Professional leveling • Angle measurement and control • Tilt compensation

Sensata



Product	Series & Description	Features & Benefits	Applications
Pressure Sensors			
	2CP5; 35CP; 81CP; 82CP; 87CP; 116CP; 112CP; 2HMP; PTE7000; P1A; P1J/K; P992 Ceramic capacitive pressure sensors	<ul style="list-style-type: none"> • Durable and compact design • Accurate performance over wide temperatures • Outstanding long term stability and performance • Small size and simple installation • Various pressure & electrical connections 	<ul style="list-style-type: none"> • Refrigeration pressure monitoring • Compressor oil pressure monitoring • Hydraulic systems • Pneumatic systems
Temperature Sensors			
	3000 and 5024 series Temperature sensor probes	<ul style="list-style-type: none"> • Stainless steel probe assemblies • Ideal for immersion, surface and air sensing • Long term reliability • Robust • Flexible leads applicable for welding or soldering • High absolute accuracy 	<ul style="list-style-type: none"> • Surface, liquid or air temperature sensing • Industrial exhaust gas
Hall Effect Sensors			
	ACW4-IO Link; TCW4-IO Link IO-LINK absolute single and multi-turn modular sensor	<ul style="list-style-type: none"> • Maximum flexibility due to its two-part design • IO-Link with COM3 transmission rate • Easy commissioning and configuration with IO-Link • Simple device replacement with data storage capability • Robust and excellent resistance to shock and vibration • Universal power supply by IO-Link Master 	<ul style="list-style-type: none"> • Steering and pedal positioning for construction, agriculture and mining vehicles • Wheel and throttle position for material handling equipment

Standex Meder



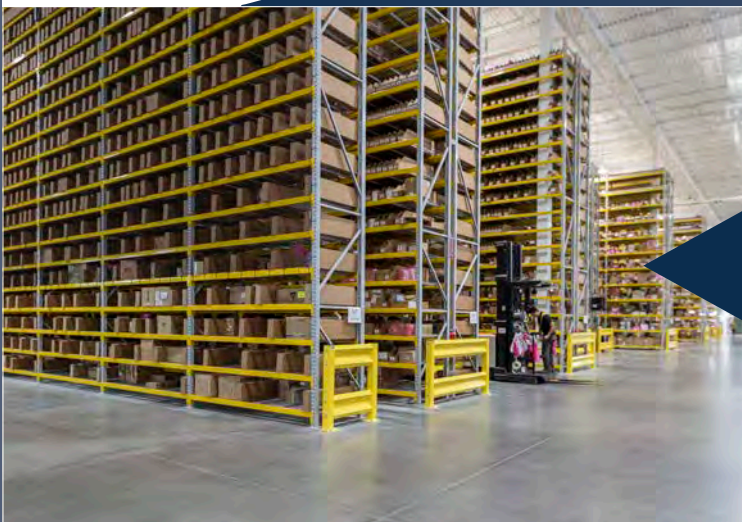
Product	Series & Description	Features & Benefits	Applications
Reed Sensors			
	MK23 Series Reed Sensor	<ul style="list-style-type: none"> • Flat or round bent leads • Surface mounted • Tape and reel packaging • Hermetically sealed • No power consumption • Designed for ease in pick and place machine 	<ul style="list-style-type: none"> • Automotive • Brake pedal position • Seat belt sensor • Gear shift position
Reed Sensors			
	MK24 Series Reed Sensor Ultra miniature surface mount (SMD) reed sensor	<ul style="list-style-type: none"> • No power consumption • Surface mounted • Tape and reel packaging • Hermetically sealed • J-Lead • Designed for ease in pick and place machines 	<ul style="list-style-type: none"> • Metering • End position • Transportation • Wake up function
Reed Level Sensors			
	LS04 Level Sensor Versatile liquid level sensor for single, multi and continuous level control, detection and monitoring.	<ul style="list-style-type: none"> • Up to 6 floats • 1 – 100W rated power • Various cables & connectors • Hermetically sealed • No power consumption • Various configurations 	<ul style="list-style-type: none"> • Automotive • Transportation • Brake fluid sensing • Marine • Fuel level





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