

Product Data Short Form

Resistors



TT Electronics plc is a global electronics company.

Within its resistors business unit are multiple manufacturing facilities and dedicated engineering teams providing custom solutions.

BI Technologies, IRC and Welwyn are market leading brands within this group, with a 80-year track record of resistive component innovation.

TT Electronics offers the full spectrum of resistor technologies and a broad standard product range, in addition to providing custom engineered solutions.

Medical Application

A manufacturer of portable automatic external defibrillators (AEDs) needed a compact high voltage resistor for use in the charge regulation circuit. Standard products from other sources were proving unreliable under conditions of sustained high humidity and high voltage loading. The precision and stability with time and temperature were critical as they directly impact the tight error budget for delivered energy dosage. TT Electronics engineers solved this problem with a planar resistor with optimised thick-film element design and a high integrity epoxy coating and supported the customer through their rigorous approval process.

Other innovations in this area include pulse withstanding chip resistors for monitor circuit protection and a 200J energy dump resistor based on reinforced wirewound technology to enable daily self-test diagnostic cycles.



Aerospace Application

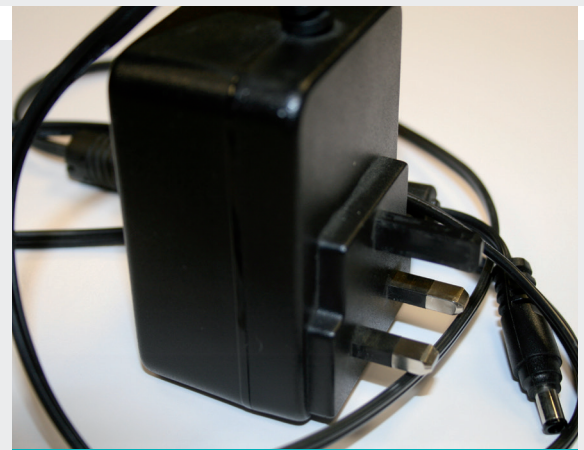
A designer working on an anti-ice aircraft surface heating system had to meet stringent safety requirements in the event of failure of a heating circuit. The failure mode to be mitigated was an "always on" condition, and this called for a single shot disconnection switch. TT Electronics engineers were contacted to help identify a solution, but nothing was available off the shelf. A set of potential solutions was proposed and the preferred option was a combination of self-switching resistive heater and thermal fuse. This was developed from concept into a fully qualified component within the required timescale. The compact format of the design also contributed significantly to the customer's mass reduction target.



Consumer Application

Safety is becoming increasingly important in consumer products and a key aspect is protection against fire by the use of fusing line input resistors. With one component it is possible to reduce inrush current, protect against power line surges and give flameproof circuit opening under fault conditions. One company working in this area had a further need for fusing to be inaudible and invisible to the consumer.

TT Electronics devised a solution using a wirewound resistor with impact absorbing coating which contains the fused element without fragmenting. Other innovations include the offer of UL1412 recognised fusing resistors.



Industrial Application

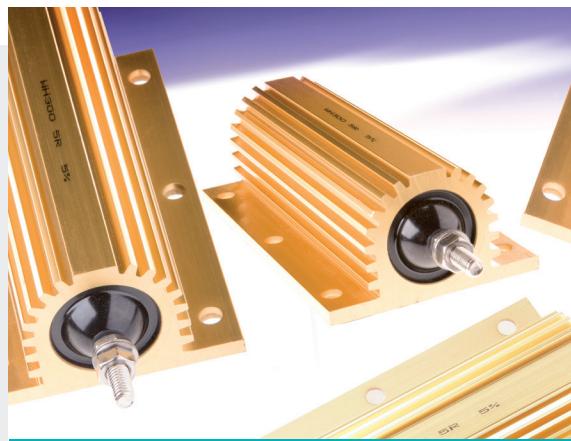
High-end industrial circuit breakers need to give reliable long-term performance under harsh conditions. In particular, transient surges caused by switching of inductive loads present a challenge. When a designer of industrial circuit breakers needed to modernise a design to SMT format, a through-hole wirewound protection resistor was proving hard to replace without filling a very large area with chip resistors. TT Electronics developed a solution whereby an axial part is leadformed and packed in blister tape. The resulting “ZI-form” component can be picked, placed and reflowed as an SMT part.



Using the Short Form

1. Choose the right technology - page 3
Find the best resistor technology for the set of features your design needs
2. Choose the right product series - pages 3 & 4
Use the SMT and Through Hole selector guides to identify a series which has the required ratings, precision and value range
3. Choose the right product type - pages 5 to 16
Refer to product tables to select the correct size and link to further data

Or, if you know the product series, use the Quick Find index.



Quick Find

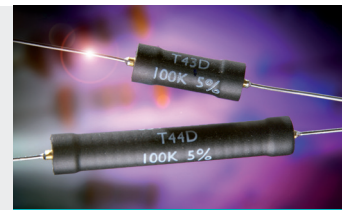
Series	Page	Series	Page	Series	Page	Series	Page
1600/1900	9	HVP	7	PLO	6	WCR	16
3810	6	LCS	5	PR	13	WDBR	11
4500	6	LHVC	7	PTS	15	WDBR-UL	11 (see WDBR)
4530	7	LOB	5	PWC	8	WSHR	11 (see WDBR)
4800	12	LRCS/LVC	5	PWP	9	WSMHP	12
ASC	16	LR(F)	5	PWRL	6	WH	11
BCN	16	LRF3W	5	RC	13	WHPC	11
BPC	9	LRMA	5	RCP	13	WHS	9
BPR	10	LRZ	16	RHVD	7	WIN	14
CAR	12	MAR	13	SC3	10	WL4	16
CC	8	MFC	5	SOT143	14	WMHP	11
CR	15	MFP	10	SP20F	14	WMO-S	11
DIV23	12	MFR	15	SPP	15	WPRT	12
DSC	8	MF-S	10	SQM	10	WP-S	9
EBW	5	OAR	6	SQP	10	WP-SZI	12
EMC	14	OARS	6	T	8	WPYP	8
GCR	16	PCA	13	ULR	6	WRM	14
GHVC	7	PCF	13	ULW	15	WRM-HP	14
HDSC	8 (see DSC)	PCFH	13	UPCA	14	WRM-HV	14
HPWC	8 (see PWC)	PCFP	13	VRW	8	WSM	12
HR	7	PCR	13	W20	11	WSMHP	12
HTCR	10	PFC	15	W30	9		
HVC	7	PFC-D	13	WA84F	15		
HVD	7	PFC-HT	15	WBC	14		

Technology and Product Selector Guides

Technology	Thick Film	Thick Film on Steel	Metal Film	Metal Oxide	WIN Film	Carbon Composition	Wirewound	Metal Alloy	Metal Foil
Low values	Good	Poor	Fair	Poor	Fair	Poor	Excellent	Excellent	Poor
High values	Excellent	Poor	Good	Fair	Good	Poor	Poor	Poor	Poor
Tolerance	Good	Poor	Excellent	Poor	Excellent	Poor	Fair	Fair	Excellent
TCR	Fair	Poor	Excellent	Fair	Excellent	Poor	Good	Fair	Excellent
Power rating	Good	Excellent	Fair	Good	Fair	Fair	Excellent	Fair	Poor
Voltage rating	Excellent	Fair	Fair	Good	Fair	Poor	Poor	Poor	Fair
Load Stability	Fair	Fair	Good	Fair	Excellent	Poor	Fair	Fair	Excellent
Damp Stability	Good	Good	Poor	Fair	Excellent	Poor	Good	Good	Fair
Overload	Good	Excellent	Fair	Good	Fair	Fair	Good	Fair	Poor
Surge	Good	Good	Poor	Good	Fair	Excellent	Good	Good	Fair
High Temp.	Good	Excellent	Fair	Good	Good	Poor	Good	Good	Fair

Surface Mount Products	Power (W)					LEV (V)					TCR (ppm/°C)					Tol. (%)					Value (Ω)															Category	Series
	0.01	0.1	1	10	100	10	100	1000	10K	100K	≤5	10 - 15	25	50	≥100	≤0.1	0.25-0.5	1 - 2	≥5	R001	R01	R1	1R	10R	100R	1K	10K	100K	1M	10M	100M	1G	10G	100G			
Thick Film																																					
Anti Sulphur																																			Gp	ASC	
Professional chip																																			Hr	CR	
Double-sided chip																																			Sg	DSC	
Adhesive Attach																																			Gp	GCR	
Green HV chip																																			Hv	GHVC	
High value chip																																			Hv	HR	
High temperature																																			Hp	HTCR	
High voltage chip																																			Hv	HVC	
Lower range HVC																																			Hv	LHVC	
Current sense sm.																																			Cs	LRCS	
Current sense																																			Cs	LR(F)	
Current sense 3W																																			Cs	LRF3W	
High current link																																			Zo	LRZ	
Semi-precision																																			Pr	PCR	
Pulse chip																																			Sg	PWC	
Power chip 3W																																			Hp	SC3	
General chip																																			Gp	WCR	
Power chip																																			Hp	WHPC	
T0263 power																																			Hp	WSMHF	
Thin Film																																					
Current Sense																																			Cs	LCS	
Precision chip																																			Pr	PCF	
High temp. PCF																																			Pr	PCFH	
Passivated PCF																																			Hr	PCFP	
Platinum sensor																																			Ts	PTS	
MELF																																			Pr	WRM	
Hi Power MELF																																			Pr	WRM-HI	
HV MELF																																			Pr	WRM-HV	
TaN Thin Film																																					
Divider / array																																			Pr	DIV23	
Precision chip																																			Hr	PFC	
Divider chip																																			Pr	PFC-D	
High temp. PFC																																			Pr	PFCHT	
Wirebond chip																																			Pr	WBC	
Hi-rel precision																																			Pr	WIN	
Metal Alloy																																					
Flat chip																																			Cs	LRMA	
Open air J-lead																																			Cs	OARS	
Metal Foil																																			Cs	MFC	
Flat chip																																			Cs	ULR	
Wirewound																																					
Moulded w/w																																			Hp	WSM	
ZI-form w/w																																			Hp	WP-SZ	

Cs: Current Sense	Fu: Fusible	Gp: General Purpose	Hp: High Power	Hr: High Reliability
Hv: High Value / Voltage	Pr: Precision	Sg: Surge / Pulse	Ts: Temperature Sensor	Zo: Zero-ohm Jumper



Through-hole & Off-PCB Products	Power (W)					LEV (V)					TCR (ppm/°C)					Tol. (%)					Value (Ω)																	Category	Series
	0.01	0.1	1	10	100	10	100	1000	10K	100K	≤5	10 - 15	25	50	≥100	≤0.1	0.25- 0.5	1 - 2	≥5	R001	R01	R1	1R	10R	100R	1K	10K	100K	1M	10M	100M	1G	10G	100G					
Thick Film																																							
Ultra-high ohmic																																	100T→	Hv	3810				
HV SIL resistor																																		Hv	4500				
HV SIL divider																																		Hv	4530				
Power SIL																																		Hp	BPC				
HV divider																																		Hv	HVD				
Compact HV SIL																																		Hv	HVP				
Pulse planar																																		Sg	PWP				
Robust HV divider																																		Hv	RHVD				
Ultra-HV axial																																		Hv	T				
¼ – 1W HV axial																																		Hv	VRW				
Steel power res.																																		Hp	WDBR				
T0220/247 power																																		Hp	WMHP				
Metal Film																																							
High precision																																		Pr	CAR				
UL1412 inrush																																		Fu	EMC				
Ultra precision																																		Pr	MAR				
Small flameproof																																		Hp	MFP				
Professional film																																		Hr	MFR				
Flameproof film																																		Hp	MF-S				
Semi-precision																																		Pr	PR				
Precision																																		Pr	RC				
Power precision																																		Pr	RCP				
Metal Oxide																																							
Ceramic box vert.																																		Hp	SQM 1of2				
Ceramic box hor.																																		Hp	SQP 1of2				
Flameproof coat																																		Hp	WMO-S				
Carbon Comp																																							
Moulded axial																																		Sg	CC				
Wirewound																																							
Vitreous tubular																																		Hp	1600				
Low val. hor. box																																		Cs	PL0				
Low val. vert. box																																		Cs	PWRL				
UL1412 fibre core																																		Fu	SPP				
UL1412 molded																																		Fu	SP20F				
Ceramic box vert.																																		Hp	SQM 2of2				
Ceramic box hor.																																		Hp	SQP 2of2				
UL1412 inrush																																							

Cs: Current Sense

Fu: Fusible

Gp: General Purpose

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Sq: Surge / Pulse

Ts: Temperature Sensor

Zo: Zero-ohm Jumper

Current Sense

EBW Series						E-Beam Welded Shunt
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l,w,t
EBW8518	36	L050 – L250	1, 2, 3, 5	-	100	85, 18, 3

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/EBW8518.pdf>



LCS Series						Low Value Current Sense Thin Film Chip Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l,w, h
0603	0.1	0R2 – 1R	0.5, 1, 5	-	50, 100	1.6, 0.8, 0.55
0805	0.125	0R2 – 1R	0.5, 1, 5	-	50, 100	2.0, 1.25, 0.65
1206	0.25	0R1 – 1R	0.5, 1, 5	-	50, 100	3.05, 1.55, 0.65
2010	0.5	0R1 – 1R	0.5, 1, 5	-	50, 100	4.9, 2.4, 0.65
2512	1.0	0R1 – 1R	0.5, 1, 5	-	50, 100	6.3, 3.1, 0.65

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LCS.pdf>



LOB Series						Low Resistance Metal Element Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, Dia
LOB-1	1	0.005 - 0.1	1 - 5	-	-	9.9, 3.6
LOB-3	3	0.005 - 0.12	1 - 5	-	-	14.2, 5.3
LOB-5	5	0.005 - 0.1	1 - 5	-	-	23.4, 8.4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LOB.pdf>



LRCS/LVC Series						Small Size Low Value Chip Resistor
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
0402	0.063	R05 – 1R0	1, 5	-	200 – 400	1, 0.5, 0.32
0603	0.1	R02 – 1R0	1, 5	-	200 – 600	1.6, 0.8, 0.45
0805	0.125, 0.25	R02 – 1R0	1, 5	-	200 – 600	2, 1.25, 0.55

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LRCS.pdf>



LR(F) Series						Low Value Flat Chip Resistor
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
1206	0.5	0R003 - 1R	1, 2, 5	-	±100	3.2, 1.63, .8
2010	1.0	0R003 - 1R	1, 2, 5	-	±100	5.23, 2.64, .8
2512	1.5/2.0	0R003 - 1R	1, 2, 5	-	±100	6.5, 3.25, .8

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LR.pdf>



LRF3W Series						Low Range 3 Watt SMT Chip Resistor
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
LRF3W	3	0R003 - 1R	to ±1%	50	±100	3.25, 6.5, 0.9

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LRF3W.pdf>



LRMA Series						Low Resistance Metal Alloy Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
M 0805	0.5	R005 – R025	1, 5	-	100	2, 1.25, 0.4
N 0612	1	R001 – R003	1, 5	-	100	1.7, 3.2, 0.6
N 0815	1	R003 – R03	1, 5	-	100	2.1, 3.75, 0.5
M 1206	1	R001 – R05	1, 5	-	50	3.2, 1.6, 0.5
T 2010	1.5	R005 – R1	1, 5	-	75, 100, 275	5, 2.5, 0.6
N 1225	3	R002 – R04	1, 5	-	100	3.2, 6.4, 0.9
M 2512	1 – 2	R0005 – R06	1, 5	-	75, 100, 275	6.4, 3.2, 0.9-2.6
T 2512	1 – 2	R001 – R1	1, 5	-	75, 100, 275	6.4, 3.2, 0.9-2.0
P 2512	3	R0005 – R3	1, 5	-	50	6.4, 3.2, 0.9-2.0
P 3920	5	R0002 – R003	1	-	50 - 200	10, 5.2, 2
P 5930	10	R0001 – R002	1	-	50 - 100	15, 7.8, 2

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LRMA.pdf>
 & <https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LRMAP3920.pdf>
 & <https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LRMAP5930.pdf>

AEC-Q200



MFC Series						Metal Foil on Ceramic Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l,w, h
0603	0.5	R005 – R02	1, 5	-	50	1.6, 0.8, 0.6
2817	5	R003 – R15	1, 5	-	30	7.1, 4.2, 0.7

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/MFC.pdf>



OAR Series Open Air Sense Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
OAR-1	1	R003 – R1	1, 5	-	to ±20	11.43, 1.65, 8.26
OAR-3	3	R002 – R1	1, 5	-	to ±20	15.24, 1.65, 28.58
OAR-5	5	R003 – R05	1, 5	-	to ±20	20.32, 1.65, 28.58

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/OAR.pdf>



OARS / OARS-XP Series Surface Mount Sense Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
OARS1	2	OR003 to OR050	1	-	±20	11.18, 3.175, 3.05
OARSXP	5	OR001 to OR025	1, 5	-	±20	12, 6.4, 4.6

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/OARS.pdf>

AEC-Q200



PLO Series Low Resistance Power Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
PLO-3	3	R005 - R18	1, 2, 3, 5, 10	-	30 - 500	22.4, 7.87, 7.87
PLO-5	5	R005 - R18	1, 2, 3, 5, 10	-	30 - 500	22.4, 9.65, 8.89
PLO-7	7	R01 - R18	1, 2, 3, 5, 10	-	30 - 500	35.3, 9.65, 8.89
PLO-10	10	R01 - R18	1, 2, 3, 5, 10	-	30 - 500	47.8, 9.65, 8.89

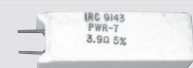
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PLO.pdf>



PWRL Series Low Resistance Stand-up Power Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
PWRL	3, 5, 7, 10	OR01 - OR18	1, 2, 3, 5, 10	-	50 - 500	25.4, 12 (3W)

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PWRL.pdf>

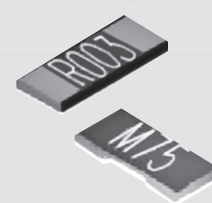


ULR Series Metal Strip Current Sense Resistors Surface Mount

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
ULR1S	1	R0002 - R01	1, 5	-	50	3.2, 1.6, 0.6
ULR1	1.0	R0005 - R01	1, 5	-	50, 75, 100, 150	6.4, 3.2, 1.4
ULR15S	1.5	R0002 - R01	1, 5	-	50	5.1, 2.5, 0.6
ULR2	2.0	R0005 - R01	1, 5	-	50	6.4, 3.2, 1.4
ULR25	2.5	R0035 - R006	1, 5	-	50	6.4, 3.2, 1.4
ULR3	3.0	R00015 - R003	1, 5	-	50, 75, 100	6.4, 3.2, 1.4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/ULR.pdf>

AEC-Q200



High Value / Voltage

3810 Series Ultra-High Value Precision Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
3810	-	100M - 1T	10, 20	500	-500 to -3500	25, 6
3811	-	100M - 1T	1, 2, 5, 10	1000	-500 to -3500	42.9, 6
3812	-	1T - 100T	2, 5, 10	1000	-500 to -3500	48, 6

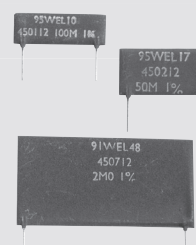
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/3810.pdf>



4500 Series High Voltage Planar Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
4501	1	20K - 500M	1, 2, 5	10000	100, 150	25.7, 2, 9
4502	1.7	36K - 750M	1, 2, 5	10000	100, 150	25.7, 2, 13
4503	2	36K - 750M	1, 2, 5	15000	100, 150	38.7, 2, 9
4504	3	62K - 1G	1, 2, 5	15000	100, 150	38.7, 2, 13
4505	2.8	51K - 1G	1, 2, 5	20000	100, 150	51.2, 2, 9
4506	3.6	82K - 1G	1, 2, 5	20000	100, 150	51.2, 2, 13
4507	4.5	180K - 1.5G	1, 2, 5	20000	100, 150	51.2, 2, 25.7

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/4500.pdf>



4530 Series

High Voltage Planar Dividers

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
4531	1.0	20K - 130M	1, 2, 5	6500	100	25.7, 2, 9
4532	1.7	36K - 250M	1, 2, 5	6500	100	25.7, 2, 13
4533	2.0	36K - 250M	1, 2, 5	10000	100	38.7, 2, 9
4534	3.0	62K - 450M	1, 2, 5	10000	100	38.7, 2, 13
4535	2.8	51K - 370M	1, 2, 5	15000	100	51.2, 2, 9
4536	3.6	82K - 660M	1, 2, 5	15000	100	51.2, 2, 13
4537	4.5	180K - 1.4G	1, 2, 5	15000	100	51.2, 2, 25.7

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/4530.pdf>

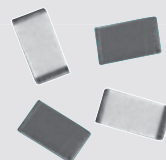


GHVC Series

Green High Voltage Chip

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, t
GHVC1206	0.3	25K - 100M	1, 2, 5, 10	1000	±100	3.2, 1.6, 0.6
GHVC2010	0.5	25K - 100M	1, 2, 5, 10	2000	±100	5.1, 2.5, 0.7
GHVC2512	1	25K - 100M	1, 2, 5, 10	3000	±100	6.5, 3.2, 0.7

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/GHVC.pdf>

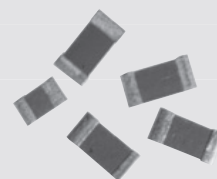


HR Series

High Value Surface Mount Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0503	-	10M - 20G	10	50	0 to -2500	1.25, .63, .5
0603	-	10M - 20G	5	75	0 to -2000	1.6, .8, .55
0805	-	100M - 50G	10	100	0 to -2000	2, 1.25, .6
1005	-	100M - 50G	10	150	0 to -1500	2.5, 1.25, .7
1206	-	100M - 50G	10	200	0 to -1000	3.2, 1.6, .7

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/HR.pdf>



HVC Series

High Voltage Chip Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
1206	0.3	10K - 1G0	10, 5, 2, 1, 0.5	1000	50, 100	3.2±0.4, 1.6±0.2, 0.7
2010	0.5	10K - 1G0	10, 5, 2, 1, 0.5	2000	50, 100	5.1±0.3, 2.5±0.2, 0.8
2512	1	10K - 1G0	10, 5, 2, 1, 0.5	3000	50, 100	6.5±0.3, 3.2±0.2, 0.8

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/HVC.pdf>

Anti-Sulphur Option

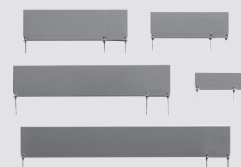


HVD Series

High Voltage Divider Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
HVD08	0.75	10K - 1G0	0.25, 0.5, 1	7,500	25, 50	25.4, 2.5, 9.4
HVD12	1.5	50K - 2G0	0.25, 0.5, 1	10,000	25, 50	38.1, 2.5, 13.6
HVD15	2.5	100K - 2G0	0.25, 0.5, 1	15,000	25, 50	50.8, 2.5, 16.1
HVD20	3.5	100K - 5G0	0.25, 0.5, 1	20,000	25, 50	76.2, 2.5, 16.1
HVD30	4.5	100K - 5G0	0.25, 0.5, 1	30,000	25, 50	101.6, 2.5, 16.1

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/HVD.pdf>



HVP Series

High Voltage Planar resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
HVP04	0.4	1K - 250M	0.25, 0.5, 1, 5	2000	25, 50, 100	10.2, 7.4, 2
HVP06	0.6	1K5 - 1G0	0.25, 0.5, 1, 5	5000	25, 50, 100	12.7, 7.4, 2
HVP08	0.8	2K - 1G0	0.25, 0.5, 1, 5	7500	25, 50, 100	19.1, 7.4, 2
HVP10	1	3K - 2G0	0.25, 0.5, 1, 5	10,000	25, 50, 100	25.4, 7.4, 2
HVP15	1.5	4K - 5G0	0.25, 0.5, 1, 5	15,000	25, 50, 100	38.1, 7.4, 2
HVP20	2	5K - 10G	0.25, 0.5, 1, 5	20,000	25, 50, 100	50.8, 7.4, 2

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/HVP.pdf>



LHVC Series

Lower Range High Voltage Chip

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
0603	0.1	100K - 10M	1, 5	200	200	1.6, 0.8, 0.45
0805	0.125	100K - 10M	1, 5	400	200	2, 1.3, 0.55
1206	0.25	100K - 10M	1, 5	500	200	3.1, 1.6, 0.55
2010	0.5	50K - 10M	1, 5	1600	200	5, 2.5, 0.55
2512	1	50K - 10M	1, 5	2000	200	6.4, 3.2, 0.55

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LHVC.pdf>

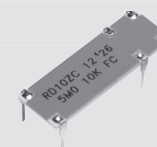


RHVD Series

Robust High Voltage Divider Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, h, w
RHVD08	0.5	10K - 1G0	0.25, 0.5, 1	7,500	25, 50	25.4, 9.2, 5
RHVD10	0.75	50K - 1G0	0.25, 0.5, 1	10,000	25, 50	38.1, 9.2, 5
RHVD10A	1	100K - 1G0	0.25, 0.5, 1	10,000	25, 50	38.1, 13.4, 5
RHVD15	1.5	100K - 1G0	0.25, 0.5, 1	15,000	25, 50	50.8, 9.2, 5
RHVD15A	2	100K - 1G0	0.25, 0.5, 1	15,000	25, 50	50.8, 15.9, 5

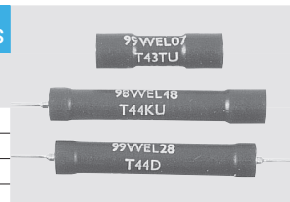
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/RHVD.pdf>



T Series High Voltage Precision Thick Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
T43	1.5	10K - 10G	1, 2, 5	4000	25, 50, 100	25.4, 8.4
T44	3.5	10K - 50G	1, 2, 5	14000	25, 50, 100	50.8, 8.4
T48	10	33K - 50G	1, 2, 5	50000	25, 50, 100	150, 8.4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/T40.pdf>



VRW Series High Voltage Thick Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) L, D
VRW25	0.25	100K to 30M	1, 2, 5	1600	200	6.2, 2.5
VRW37	0.5	100K to 10M	1, 2, 5	3500	200	9.0, 3.7
VRW68	1	100K - 68M	1, 2, 5	10000	200	15.5, 5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/VRW.pdf>



WPYP Series Capacitor Mount Balance/ Bleed Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) Pitch
WPYP8	10	1R0 - 82K	1, 2, 5	685	100	22
WPYP10	13	1R0 - 120K	1, 2, 5	940	100	31.8

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WPYP.pdf>

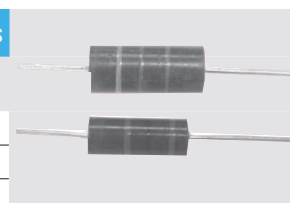


Surge / Pulse

CC Series Carbon Composition Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, dia
CC1	1	100R - 50K	10, 20	-	1000	15, 6
CC2	2	100R - 10K	10, 20	-	1000	18, 8

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/CC.pdf>



DSC Series Double Sided Chip

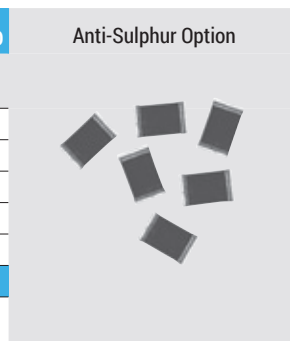
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0603	0.125	1R - 1M0	0.5, 1, 5	75	100 - 200	1.5, 0.8, 0.6
0805	0.25	1R0 - 1M0	0.5, 1, 5	150	100 - 200	2.0, 1.25, 0.7
1206	0.33	1R0 - 4M7	0.5, 1, 5	200	100 - 200	3.2, 1.6, 0.7
2010	0.75	1R0 - 4M7	0.5, 1, 5	400	100 - 200	5.1, 2.5, 0.8
2512	1.5	1R0 - 4M7	0.5, 1, 5	500	100 - 200	6.5, 3.2, 0.8

Higher Pulse Double Sided (HDSC) version available

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/DSC.pdf>

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/HDSC.pdf>

Anti-Sulphur Option



PWC Series Pulse Withstanding Chip Resistors

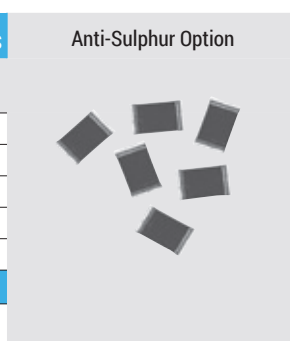
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0603	0.125	1R - 10M	0.5, 1, 5	75	100 - 200	1.5, 0.8, 0.6
0805	0.25	1R0 - 10M	0.5, 1, 5	150	100 - 200	2.0, 1.25, 0.7
1206	0.33	1R0 - 10M	0.5, 1, 5	200	100 - 200	3.2, 1.6, 0.7
2010	0.75	1R0 - 10M	0.5, 1, 5	400	100 - 200	5.1, 2.5, 0.8
2512	1.5	1R0 - 10M	0.5, 1, 5	500	100 - 200	6.5, 3.2, 0.8

Higher Pulse Withstanding (HPWC) version available

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PWC.pdf>

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/HPWC.pdf>

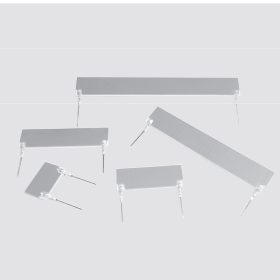
Anti-Sulphur Option



PWP Series Pulse Withstanding Planar Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
PWP04	0.4	100R – 200K	1, 5	-	±100	10.16, 2, 6.35
PWP06	0.6	100R – 200K	1, 5	-	±100	12.7, 2, 6.35
PWP08	0.8	100R – 200K	1, 5	-	±100	17.78, 2, 6.35
PWP10	1	100R – 200K	1, 5	-	±100	24.4, 2, 6.35
PWP15	1.5	100R – 200K	1, 5	-	±100	38.1, 2, 6.35
PWP20	2	100R – 200K	1, 5	-	±100	50.8, 2, 6.35

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PWP.pdf>



W30 Series Flameproof Wirewound Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
W31	3	R01 – 10K	<R1: 5 ≥R1: 1, 2, 5	500	100 - 1000	13, 5.6

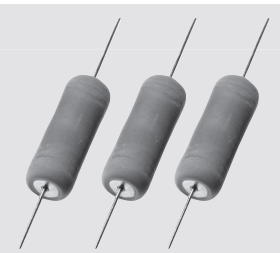
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WHS Series Wirewound High Surge Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim(mm) l, dia
WHS2	2	1R0 – 330R	1, 2, 5	-	±200	9, 3.6
WHS3	3	1R0 – 330R	1, 2, 5	-	±200	14.5, 5.2
WHS5	5	1R0 – 330R	1, 2, 5	-	±200	16.5, 7
WHS7	7	1R0 – 330R	1, 2, 5	-	±200	25, 8.8
WHS10	10	2R2 – 330R	1, 2, 5	-	±200	51, 10.5

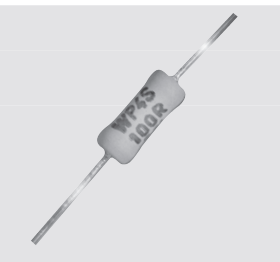
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WHS.pdf>



WP-S Series Compact Flameproof Power Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WP1S	1	R068 to 430R	<20r: 5 ≥20R: 1,2,5	50	<1R: 350 ≥1R: 200	6.2, 2.8
WP2S	2	R05 to 900R	<20r: 5 ≥20R: 1,2,5	50	<1R: 350 ≥1R: 200	9.0, 3.6
WP25S	2.5	R05 to 900R	<20r: 5 ≥20R: 1,2,5	75	<1R: 350 ≥1R: 200	12.5, 4.5
WP3S	3	R01 to 2K2	<20r: 5 ≥20R: 1,2,5	100	<1R: 350 ≥1R: 200	14.5, 5.2
WP4S	4	R01 to 10K	<R10:5 ≥R10: 1,2,5	100	<1R: 350 ≥1R: 200	13, 5.6
WP5S	5	R015 to 6K8	<20r:5 ≥20R: 1,2,5	150	<1R: 350 ≥1R: 200	16.5, 7.0

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WP-S.pdf>

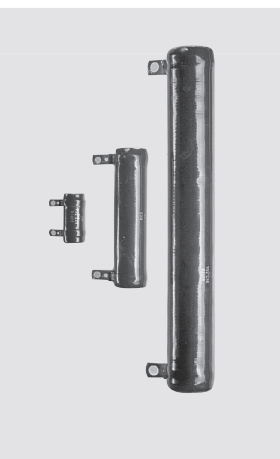


High Power

1600/1900 Series Tubular Vitreous Enamelled Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
1601	11	1 - 15K	1, 2, 5, 10	250	75 - 200	33, 17.5
1905	16	1 - 30K	1, 2, 5, 10	450	75 - 200	56.1, 14.5
1600	16.5	1 - 56K	1, 2, 5, 10	600	75 - 200	61.5, 14.5
1602	17	1 - 43K	1, 2, 5, 10	500	75 - 200	51, 17.5
1906	22	1 - 50K	1, 2, 5, 10	700	75 - 200	64.3, 17.5
1603	25	1 - 83K	1, 2, 5, 10	850	75 - 200	74.5, 17.5
1604	35	1 - 100K	1, 2, 5, 10	1300	75 - 200	102, 17.5
1605	47	1 - 100K	1, 2, 5, 10	1100	75 - 150	89.5, 24
1908	54	1 - 100K	1, 2, 5, 10	1200	75 - 150	102, 24
1607	76	1 - 100K	1, 2, 5, 10	1300	75 - 150	102, 32
1606	91	1 - 160K	1, 2, 5, 10	2100	75 - 150	166, 24
1608	115	1 - 180K	1, 2, 5, 10	2100	75 - 150	152, 32
1609	165	1 - 250K	1, 2, 5, 10	3000	75 - 150	216, 32

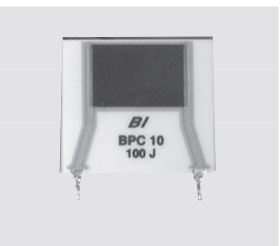
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/1600-1900.pdf>



BPC Series Planar Power Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, h, t
BPC3	3	0R1 - 200K	1, 2, 5, 10	500	100	10.2, 27.7, 2.5
BPC5	5	0R1 - 200K	1, 2, 5, 10	500	100	12.7, 27.7, 2.5
BPC7	7.5	0R1 - 200K	1, 2, 5, 10	500	100	19.1, 27.7, 2.5
BPC10	10	0R1 - 200K	1, 2, 5, 10	500	100	25.4, 27.7, 2.5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/BPC.pdf>

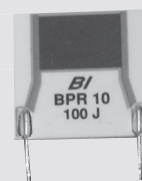


BPR Series

Vibration-proof Planar Power Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, h, t
BPR3	3	0R1 - 200K	1, 2, 5	500	100	12.7, 17, 6.1
BPR5	5	0R1 - 200K	1, 2, 5	500	100	12.7, 27.2, 6.1
BPR7	7	0R1 - 200K	1, 2, 5	500	100	25.4, 20.8, 6.1
BPR10	10	0R1 - 200K	1, 2, 5	500	100	25.4, 27.2, 6.1
BPR30	30	0R1 - 200K	1, 2, 5	500	100	53.3, 37.3, 6.1
BPR50	50	1R0 - 1K0	1, 2, 5	500	100	53.3, 52.8, 6.1

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/BPR.pdf>

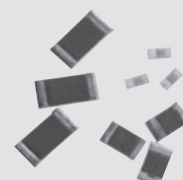


HTCR Series

High Temperature Chip Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, h, t
0805	0.125	1R0 - 10M	1, 5	150	100 - 200	2, 1.3, 0.5
1206	0.25	1R0 - 10M	1, 5	200	100 - 200	3.2, 1.6, 0.5
2010	0.625	1R0 - 10M	1, 5	400	100 - 200	5, 2.5, 0.65
2512	1	1R0 - 10M	1, 5	500	100 - 200	6.3, 3.2, 0.65

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/HTCR.pdf>

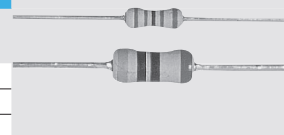


MFP Series

Flameproof Power Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MFP1	1	0R1 - 1M	1, 2, 5	350	100, 200, 300	6.2, 2.5
MFP2	2	1R0 - 1M	1, 2, 5	350	100	10, 4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/MFP.pdf>

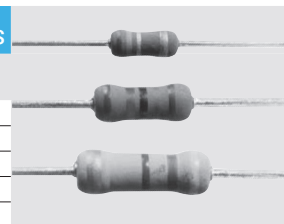


MF-S Series

Power Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MF1/2S	0.5	0R1 - 1M	1, 2, 5, 10	350	150 - 350	6.2, 2.5
MF1S	1.0	0R1 - 1M	1, 2, 5, 10	350	150 - 350	9, 3.6
MF2S	2.0	0R1 - 1M0	1, 2, 5, 10	350	150 - 350	12.5, 4.2
MF3S	3.0	0R1 - 1M0	1, 2, 5, 10	350	150 - 350	14.5, 5.3

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/MF-S.pdf>

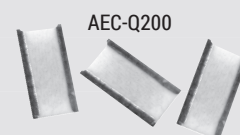


SC3 Series

High Power Chip Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SC3	3	1R0 - 10K	1, 2, 5	50	100	3.25, 6.5,

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SC3.pdf>

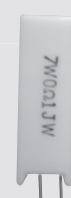


SQM Series

Ceramic Case Pluggable Resistor

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) h, w, d
SQM2	2	0R1 - 33K	5	150	350, 400	20, 11.5, 7.5
SQM3	3	0R1 - 56K	5	300	350, 400	25, 12.5, 8.5
SQM5	5	0R1 - 100K	5	350	350, 400	25, 12.5, 9
SQM7	7	0R1 - 200K	5	500	350, 400	38, 12.5, 9
SQM10	10	0R1 - 200K	5	750	350, 400	50, 12.5, 9
SQM10A	10	0R1 - 560R	5	750	350, 400	35, 16, 12

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SQM.pdf>



SQP Series

Ceramic Case Resistors - Wirewound / Metal Oxide

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SQP2	2	0R1-120K	5	-	350	18, 7, 7
SQP3	3	0R1-150K	5	-		22, 8, 9
SQP5	5	0R1 - 150K	5	-		22, 10, 9
SQP7	7	0R1 - 200K	5	-		35, 10, 9
SQP10	10	0R1 - 200K	5	-		49, 10, 9
SQP15	15	1R0- 200K	5	-		49, 12.5, 11.5
SQP20	20	2R0-200K	5	-		60, 14.5, 13.5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SQP.pdf>

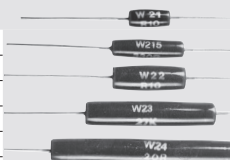


W20 Series Vitreous Enamelled Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
W21	3.0	0R1 - 10K	1, 2, 5	100	+75 to 200	12.7, 5.6
W215	5.0	0R1 - 15K	1, 2, 5	160	+75 to 200	22, 7
W22	7.0	0R1 - 22K	1, 2, 5	200	+75 to 200	22, 8
W23	10.5	0R15 - 60K	1, 2, 5	500	+75 to 200	38, 8
W24	14.0	0R2 - 100K	1, 2, 5	750	+75 to 200	53.5, 8

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/W20.pdf>

SnPb Option
CECC 40201-002



WDBR Series Ultra Low Profile Dynamic Braking Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w
WDBR1/2	300	22R - 100R	10	-	+500 - +600	31.9, 28.1
WDBR1	700	12R - 150R	10	-	+500 - +600	49.3, 35.9
WDBR2	780	12R - 150R	10	-	+500 - +600	61, 40.6
WDBR3	900	12R - 150R	10	-	+500 - +600	102, 70
WDBR5	1000	12R - 150R	10	-	+500 - +600	122, 70
WDBR7	1490	47R - 150R	10	-	+500 - +600	152, 102

UL Recognised (WDBR-UL) version also available and Steel Heater (WSHR) version also available

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WDBR.pdf>

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WDBR-UL.pdf>

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WSHR.pdf>

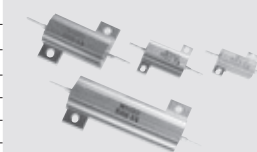


WH Series Aluminium Housed Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WH5	10	0R01 - 10K	1, 2, 5, 10	150	50, 100	30, 17, 9
WH10	15	0R01 - 20K	1, 2, 5, 10	250	50, 100	36.5, 21, 11
WH25	25	0R01 - 44K	1, 2, 5, 10	500	50, 100	51, 28, 15
WH50	50	0R015 - 120K	1, 2, 5, 10	1250	50, 100	72.5, 30, 16
WH100	100	0R01 - 70K	1, 2, 5, 10	1900	25, 100	88, 47.5, 24.1
WH200	200	0R01 - 50K	1, 2, 5, 10	1900	25, 100	146, 72.5, 41.8
WH300	300	0R01 - 68K	1, 2, 5, 10	2500	25, 100	184, 72.5, 41.8

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WH.pdf>

SnPb Option
CECC 40203-006



WHPC Series High Power Chip

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, w, h
1206	0.5	1R - 10M	1, 5	200	100 - 200	3.1, 1.6, 0.55
0612	0.5	1R - 1M	1, 5	200	100 - 400	1.6, 3.2, 0.55
2010	1	1R - 10M	1, 5	200	100 - 200	5, 2.5, 0.55
1020	1	1R - 1M	1, 5	200	100 - 400	2.5, 5, 0.55
1218	1	1R - 1M	1, 5	200	100 - 400	3.1, 4.6, 0.55
1225	1.5	1R - 1M	1, 5	200	100 - 400	3.1, 6.3, 0.55

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WHPC.pdf>



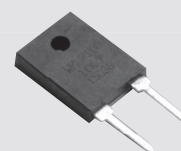
WMHP Series Heatsink Mount High Power Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WMHP20	20	R05 - 10K	1, 5	350	50	14.8, 10.1, 4.4
WMHP35	35	R05 - 10K	1, 5	350	50	14.8, 10.1, 4.4
WMHP50	50	R05 - 10K	1, 5	350	50	14.8, 10.1, 4.4
WMHP100	100	R05 - 10K	1, 5	700	50	20.7, 15.8, 5.0

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WMHP.pdf>

Heatsink available: <https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WMHP-HS.pdf>

AEC-Q200



WMO-S Series Flameproof Metal Oxide Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WMO1/2S	0.5	10R - 100K	5	250	350	7.5, 3
WMO1S	1.0	10R - 120K	5	350	350	10, 4.5
WMO2S	2.0	10R - 150K	5	350	350	12, 5
WMO3S	3.0	10R - 150K	5	350	350	16, 5.5
WMO5S	5.0	10R - 180K	5	500	350	26, 8.5
WMO7S	7	20R - 150K	5	750	350	32, 8.5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WMO-S.pdf>

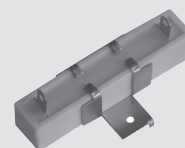


WPRT Series Wirewound Power Radial Terminal Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WPRT10	10	1R0 – 820R	5	-	±350	48, 10, 9
WPRT15	15	1R0 – 1K0	5	-	±350	48, 12.5, 11.5
WPRT20	20	2R0 – 1K2	5	-	±350	63, 12.5, 13.5
WPRT30	30	3R0 – 1K5	5	-	±350	75, 19, 19
WPRT40	40	6R0 – 1K5	5	-	±350	90, 19, 19
WPRT50	50	6R0 – 1K5	5	-	±350	90, 19, 19

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WPRT.pdf>

AEC-Q200



WP-SZI Series Cement Coated Surface Mount Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WP2SZI	2	0.05 - 900R	<0R1:5,10	50	<1R: 350 1R: 200	14.8, 3.6, 6.5
WP3SZI	3	0.01 - 2K2	≥0R1:1,2,5,10	100	<1R: 350 1R: 200	21, 5.2, 8.2
WP5SZI	5	0.015 - 6K8	1, 2, 5, 10	150	<1R: 350 1R: 200	21, 7.0, 8.2

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/ZI-FORM.pdf>



WSM Series Moulded Surface Mount Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WSM1	1	0R01 - 400R	1, 2, 5, 10	100	20 - 100	7.9, 7, 3.94
WSM2	2	0R01 - 1K	1, 2, 5, 10	100	20 - 100	12, 10.5, 5.5
WSM3	3	0R05 - 3K	1, 2, 5, 10	100	20 - 200	18, 16, 6.5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WSM.pdf>

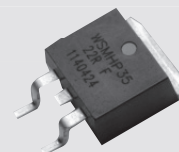


WSMHP Series Surface Mount T0-263 Power Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
WSMHP20	20	0R5 – 100K	1, 5	500	50	10.1, 10.1, 4.6
WSMHP25	25	0R5 – 100K	1, 5	500	50	10.1, 10.1, 4.6
WSMHP35	35	0R5 – 100K	1, 5	500	50	10.1, 10.1, 4.6

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WSMHP.pdf>

AEC-Q200



Precision

4800 Series Ultra Precision Bulk Metal Foil Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
4802/12/32	0.5	1R0 to 100K	0.005, 0.01	200	5	8.9, 10.2, 3.8, 7.5, 8, 2.5
4804	1	0R5 to 200k	0.02, 0.05	350	5	9.7 5.4 9.7
4805	1.5	33R0 to 300K	0.01, 0.25, 0.5, 1	500	5	15.2, 13.2, 3.8
						22.6, 13.2, 3.8

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/4800.pdf>



CAR Series Ultra Precision Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
CAR5	0.25	10R0 - 3M	0.01, 0.02,	250	5, 10,	7.2, 2.5
CAR6	0.33	10R0 - 5M	0.05, 0.1,	350	15, 25,	10, 3.7
CAR7	0.5	10R0 - 10M	1.0	500	50	15.5, 5.5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/CAR.pdf>



DIV23 Series Surface Mount Divider Network

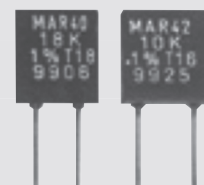
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
DIV23	0.25	10R - 200K	0.05	100	Track ±5	2.9, 1.3, 1

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/DIV23.pdf>



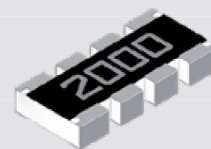
MAR 40/42 Series					Ultra Precision Metal Film Resistors	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
MAR 40	0.3	20R0 - 400K	0.005, 0.01	250	2, 5	7.75, 3.3, 8.64
MAR 42			0.02, 0.05 0.01, 0.25, 0.5,			8.25, 3.3, 8.64

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/MAR.pdf>



PCA Series					Precision Chip Array				
Type	Package Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	# Res	Circuit	Size	Dim.(mm) l, w, h
PCA164	0.25	24R9 – 100K	0.1, 0.25, 0.5, 1	50	10, 15, 25, 50	4	Isolated	1206	3.2, 1.6, 0.55

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PCA.pdf>



PCF Series					Precision Surface Mount Resistor	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0201	0.031	50R - 33K	0.5, 1	15	25, 50	0.6, 0.3, 0.26
0402	0.063	10R-205K	0.01 - 1	25	2 - 50	1, 0.5, 0.4
0603	0.063	2R - 1M	0.01 - 1	50	2 - 50	1.6, 0.8, 0.55
0805	0.1	1R - 2M	0.01 - 1	100	2 - 50	2, 1.3, 0.65
1206	0.125	1R - 2M5	0.01 - 1	150	2 - 50	3.2, 1.6, 0.65
1210	0.2	1R - 2M5	0.01 - 1	150	2 - 50	3.2, 2.6, 0.5
2010	0.25	1R - 3M	0.01 - 1	150	2 - 50	4.9, 2.4, 0.65
2512	0.5	1R - 3M	0.01 - 1	150	2 - 50	6.3, 3.1, 0.65

High Power (PCFH), and Passivated (PCFP) versions available

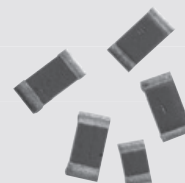
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PCF.pdf>

AEC-Q200



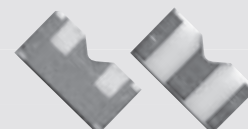
PCR Series					Precision Thick Film Surface Mount Resistors	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0805	0.1	10R - 1M	0.1 - 1	100	50	2, 1.25, .6
1005	0.125	10R - 1M	0.1 - 1	150	50	2.5, 1.25, .7
1206	0.25	10R - 1M	0.1 - 1	200	50	3.2, 1.6, .7

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PCR.pdf>



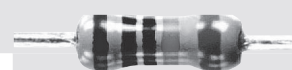
PFC-D Series					Precision 1206 Resistive Dividers	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, t
PFC-D	0.25	10R - 200K	0.05, 0.1, 0.5, 1	100	25, 50, 100	3.2, 1.6, 0.6

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC-D.pdf>



PR Series					Precision Metal Film Resistors	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
PR4	0.25	100R - 1M	0.1, 0.25,	250	15, 25, 50	6.2, 2.5
PR5	0.5	100R - 1M	0.5, 1	350	15, 25, 50	9, 3.6

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PR.pdf>



RC Series					Precision Metal Film Resistors	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
RC55	0.25	1R - 4M	0.05, 0.1, 0.25, 0.5	350	5, 10, 15,	7.2, 2.5
RC65	0.5	1R - 4M		350	25, 50, 100	10, 3.7
RC70	1.0	1R - 10M		500		15.5, 5.5

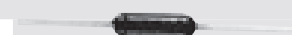
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/RC.pdf>

SnPb Option
CECC 40101-004/804



RCP Series					Precision Metal Film Resistors	
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
RC55P	0.5	1R - 4M	0.05, 0.1, 0.25, 0.5	350	5, 10, 15,	7.2, 2.5
RC65P	1.0	1R - 4M		500	25, 50, 100	10, 3.7
RC70P	1.5	1R - 10M		500		15.5, 5.5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/RCP.pdf>



SOT143 Series

4 Pin SMT Package

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
SOT	0.25	10R - 100K	0.05	100	Track ±5	2.9, 1.3, 1

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SOT143.pdf>

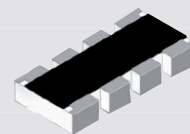


UPCA Series

Ultra-Precision Chip Array

Type	Package Power (watts)	Res. Range (ohms)	Matching Tolerance %	Max Volts	Tracking TCR (ppm/°C)	Array Description # Res Circuit Size	Dim.(mm) l, w, h
UPCA164	0.4	20R - 200K	0.05	75	5	4 Isolated 1206	3.2, 1.5, 0.4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/UPCA.pdf>

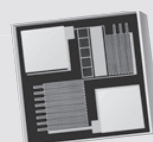


WBC Series

TaNSil® Wire Bondable Silicon Chip Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0202	0.25	10R - 400K	to 0.05	100	±25	0.51, 0.51
0303	0.25	21R - 800K	to 0.05	100	Track 2	0.76, 0.76

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WBC.pdf>



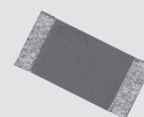
WIN Series

Water Insoluble Nitride Thin Film Precision Chip Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
T0402	0.05	7R5 - 30K	0.1	75	25	1.02, 0.53, 0.3
T0603	0.1	4R7 - 100K	0.05	75	10	1.58, 0.8, 0.45
T0805	0.25	4R7 - 267K	0.05	100	10	2.02, 1.28, 0.45
T1206	0.33	4R7 - 1M0	0.05	200	10	3.15, 1.57, 0.5

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WIN.pdf>

Anti-sulfur



WRM Series

Melf Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
0102	0.2	8R2 - 1M	1, 0.1, 0.25, 0.5, 1, 2, 5	200	15, 25, 50, 100	2.3, 1.35
0204	0.25	R22 - 5M1		200	5, 15, 25, 50, 100	3.7, 1.55
0207	0.4	R22 - 4M7		250	25, 50, 100	6.1, 2.4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WRM.pdf>

AEC-Q200



WRM-HP Series

High Power MELF Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
0204	0.4	0R1 - 1M0	0.1, 0.25, 0.5, 1, 5	200	15, 25, 50, 100	3.7, 1.55
0207	1	0R1 - 1M0	0.1, 0.25, 0.5, 1, 5	350	15, 25, 50, 100	6.1, 2.4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WRM-HP.pdf>

AEC-Q200



WRM-HV Series

High Voltage MELF Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
0204	0.4	340K - 3M4	0.1, 0.25, 0.5, 1	500	25, 50	3.7, 1.55
0207	1	340K - 3M4	0.1, 0.25, 0.5, 1	1000	25, 50	6.1, 2.4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WRM-HV.pdf>



Fusible

EMC Series

Pulse Withstanding Fusible Flameproof Metal Film Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
EMC2	2	4R7 - 68R	10, 20	-	100	10, 4

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/EMC.pdf>



SP20F Series

Failsafe Molded Wirewound Resistors

Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
SP20F	1	0R1 - 1K0	5, 10	-	±150	9.91, 3.56

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SP20-SP20F.pdf>



SPP Series Fibre Core Conformal Coated Wirewound Resistors						
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
SPP-1	1	0R1 – 1K2	5, 10	-	±300	10.2, 3.8
SPP-2	2	0R1 – 2K4	5, 10	-	±300	14.5, 4.3
SPP-3	3	0R1 – 2K4	5, 10	-	±300	14.5, 4.3
https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/SPP.pdf						

UL1412



ULW Series UL1412 Wirewound Mains Input Resistor						
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim. (mm) l, dia
ULW2	2	1R - 100R	5	-	200	9, 3.6
ULW3	3	1R - 100R	5	-	200	14.5, 5.2
ULW4	4	1R - 100R	5	-	200	13, 5.6
ULW5	5	1R - 100R	5	-	200	16.5, 7.2
https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/ULW.pdf						

UL1412

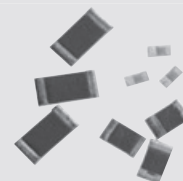


WA84F Series Fusible Wirewound Resistors						
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WA84F	1.6	0R2 - 30R	5	100	100 - 350	14.5, 5.2
https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WA84F.pdf						

High Reliability

CR Series Surface Mount Resistors						
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0503	0.063	1R - 10M	0.1 - 5	50	100	1.25, .63, .5
0603	0.1	1R - 10M	0.1	75	100	1.6, .8, .55
0805	0.125	1R - 100M	0.1 - 5	100	100	2, 1.25, .6
1005	0.125	1R - 100M	0.1 - 5	150	100	2.5, 1.25, .7
1206	0.25	1R - 100M	0.1 - 5	200	100	3.2, 1.6, .7
2010	0.5	1 - 1M	0.1 - 5	400	100	5.1, 2.5, .7
2512	1.0	1 - 1M	0.1 - 5	500	100	6.5, 3.2, .7
https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/CR.pdf						

SnPb Option
CECC 40401-003/004/008



MFR Series Metal Film Resistors						
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
MFR3	0.4	1R0 - 1M	1	200	50	3.5, 1.8
MFR4	0.5	1R0 - 1M	0.5, 1	350	50	6.2, 2.5
MFR5	0.75	1R0 - 1M	0.5,	350	100 - 150	9, 3.6
https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/MFR.pdf						

SnPb Option
CECC 40101-019/803



PFC Series TaNFilm® Precision Chip Resistors						
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0402	0.05	50R – 30K	0.1 - 5	75	25 - 100	1, 0.5, 0.3
0603	0.1	5R – 100K	0.02 - 5	75	10 - 100	1.6, 0.8, 0.5
0805	0.25	5R – 267K	0.02 - 5	100	10 - 100	2.1, 1.3, 0.5
1206	0.33	5R – 1M	0.02 - 5	200	10 - 100	3.2, 1.6, 0.6

High Temperature (PFC-HT) version available

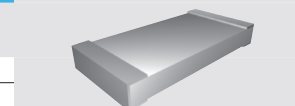
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<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PFC-HT.pdf>

SnPb Option
Anti – Sulphur Option
MIL-PRF-55342



Temperature Sense

PTS Series Platinum Film Temperature Sensors						
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, t
0603	-	1K0	0.12, 0.24	-	+3850	1.6, 0.8, 0.5
0805	-	100R & 1K0	0.12, 0.24	-	+3850	2.1, 1.3, 0.5
1206	-	100R & 1K0	0.12, 0.24	-	+3850	3.2, 1.6, 0.6
https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/PTS.pdf						



Zero-Ohm Jumper

LRZ Series						High Current Jumper Chip
Type	Current (amps)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, t
0603	6	0.003 max	-	-	-	1.6, 0.8, 0.5
0805	15	0.003 max	-	-	-	2.0, 1.25, 0.61
1206	20	0.003 max	-	-	-	3.2, 1.25, 0.61
2010	30	0.003 max	-	-	-	5.23, 2.64, 0.74
2512	35	0.003 max	-	-	-	6.5, 3.25, 0.74

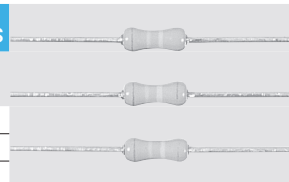
<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/LRZ.pdf>

AEC-Q200



WL4 Series						Jumper Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, dia
WL4	-	0.012 max	-	-	-	6.2, 2.3
WLT	Wire link taped, 0.6 / 0.7 / 0.8mm dia x 52mm					

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WL4.pdf>

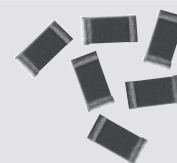


The following series also have zero ohm versions: ASC, BCN, CR, GCR, WCR, WRM

General Purpose

ASC Series						Anti Sulphur Chip Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0402	0.063	1R0 - 10M	1	50	100 - 200	1, 0.5, 0.35
0603	0.1	1R0 - 10M	1	50	100 - 200	1.6, 0.8, 0.45
0805	0.125	1R0 - 10M	1	150	100 - 200	2, 1.25, 0.5
1206	0.25	1R0 - 10M	1	200	100 - 200	3.1, 1.55, 0.55
1210	0.33	1R0 - 10M	1	200	100 - 200	3.2, 2.6, 0.55
2010	0.625	1R0 - 10M	1	200	100 - 200	5, 2.5, 0.55
2512	1	1R0 - 10M	1	250	100 - 200	6.35, 3.2, 0.55

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/ASC.pdf>

Anti - Sulphur
AEC-Q200

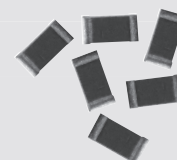
BCN Series						Thick Film Chip Resistor Arrays
Type	Package Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	Array Description # Res. Circuit Size	Dim. (mm) l, w, h
BCN10	0.25	10R - 1M0	1, 5	25	4 Isolated	0804 2, 1, 0.36
BCN164A/AB(I)	0.25	10R - 1M0	1, 2, 5	50	4 Isolated	1206 3.2, 1.6, 0.5-0.6
BCN168RB/SB	0.25	100R - 1M0	5	25	8 Bussed	1206 3.2, 1.6, 0.5
BCN21	0.5	68R - 220K	5	25	8 Bussed	1608 4, 2.1, 0.55
BCN4D(BI)	0.5	10R - 1M0	1, 5	75	4 Isolated	2112 5.34, 3.1, 0.55
BCN318RB(I)/SB(I)	0.5	22R - 1M0	1, 2, 5	50	8 Bussed	2512 6.4, 3.1, 0.55-0.6

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/BCN.pdf>

Anti - Sulphur Option
AEC-Q200 (BCN164AB)

GCR Series						Glueable Chip Resistors
Type	Current (amps)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0805	0.125	1R0 - 10M	1, 5	150	100 - 200	2, 1.3, 0.5
1206	0.25	1R0 - 10M	1, 5	200	100 - 200	3.2, 1.6, 0.5
2010	0.625	1R0 - 10M	1, 5	400	100 - 200	5, 2.5, 0.65
2512	1	1R0 - 10M	1, 5	500	100 - 200	6.3, 3.2, 0.65

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/GCR.pdf>



WCR Series						General Purpose Surface Mounted Resistors
Type	Power (watts)	Res. Range (ohms)	Tolerance %	Max Volts	TCR (ppm/°C)	Dim.(mm) l, w, h
0201	0.05	10R - 1M	1	25	250	0.6, 0.3, 0.23
0402	0.1	1R - 1M	1	50	100	1, .5, .35
0603	0.063	1R - 10M	1	75	100	1.6, .8, .5
0805	0.125	1R - 10M	1	150	100	2, 1.25, .5
1206	0.25	1R - 10M	1	200	100	3.2, 1.6, .55
1210	0.25	1R - 10M	1	200	100	3.2, 2.6, 0.55
2010	0.5	1R - 10M	1	200	200	5, 2.5, .56
2512	1.0	1R - 10M	1	200	200	6.3, 3.2, .56

<https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Datasheets/WCR.pdf>

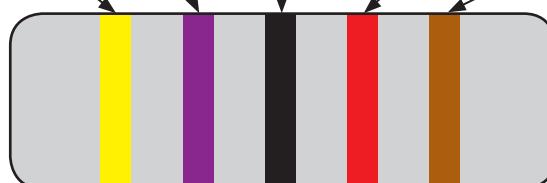
AEC-Q200 option



Colour Code for Band-marked Resistors

		Value 1	Value 2	Value 3	Multiplier	Tolerance	
Silver					x 0.01	10%	K
Gold					x 0.1	5%	J
Black		0	0	0	x 1		
Brown		1	1	1	x 10	1%	F
Red		2	2	2	x 100	2%	G
Orange		3	3	3	x 1K		
Yellow		4	4	4	x 10K		
Green		5	5	5	x 100K	0.5%	D
Blue		6	6	6	x 1M	0.25%	C
Violet		7	7	7	x 10M	0.1%	B
Grey		8	8	8	x 100M	0.05%	A
White		9	9	9	x 1G		
Blank						20%	M

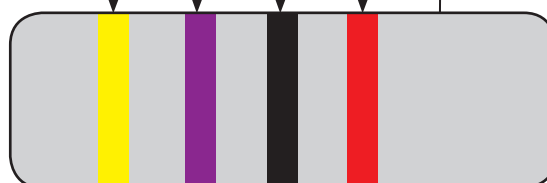
Example 1
5-Band Marking
E24/E96 values



4 7 0 x100 1% = 47K 1%

E.g. MFR4 E96

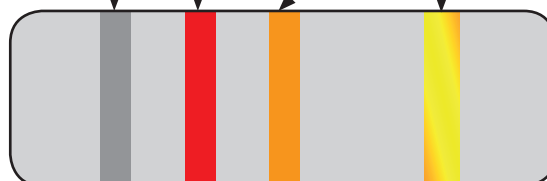
Example 2
4-Band Marking
E24/E96 values
without tolerance



4 7 0 x100 = 47K

E.g. WRM0204 E96

Example 3
4-Band Marking
E24 values



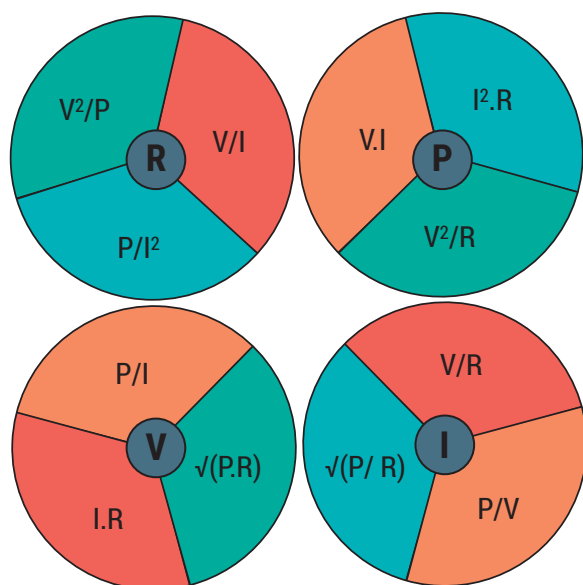
8 2 x1K 5% = 82K 5%

E.g. WM03S E24

Further Technical Information

Application Notes for current sense, circuit protection, pulse and overload ratings, energy metering, lighting, medical, automotive, high voltage design and more	http://www.ttelectronics.com/resistors
Parametric Search for selection of products by parameters, package, technology and application	http://www.ttelectronics.com/resistors/parts-search ,
Calculation Tools for pulse loading, temperature derating, critical resistance, capacitor bleed and more	Tools tab at http://www.ttelectronics.com/resistors
Product Compliance for RoHS and REACH SVHC status, termination finish, obsolescence data, SnPb availability and more	See compliance and lifecycle tabs of relevant product information page.
Tin Whisker Report test report on tin whisker qualification of Pb-free finishes	https://www.ttelectronics.com/TTElectronics/media/ProductFiles/Resistors/Compliance/Tin-Whisker-Test-Report.pdf

Common Formulae



R is resistance value (ohms) **P** is power dissipated (watts)
V is voltage dropped (volts) **I** is current flowing (amps)
 E.g. $R = V / I$

Preferred Values

E192	E96	E24	E12	E6		
1	3.16	1	1	1	1	97
1.01	3.2	1.02	1.1	1.2	1.5	2
1.02	3.24	1.05	1.2	1.5	2.2	3
1.04	3.28	1.07	1.3	1.8	3.3	4
1.05	3.32	1.1	1.5	2.2	4.7	5
1.06	3.36	1.13	1.6	2.7	6.8	6
1.07	3.4	1.15	1.8	3.3	10 etc...	7
1.09	3.44	1.18	2	3.9		8
1.1	3.48	1.21	2.2	4.7		9
1.11	3.52	1.24	2.4	5.6		10
1.13	3.57	1.27	2.7	6.8		11
1.14	3.61	1.3	3	8.2		12
1.15	3.65	1.33	3.3	10 etc...		13
1.17	3.7	1.37	3.6			14
1.18	3.74	1.4	3.9			15
1.2	3.79	1.43	4.3			16
1.21	3.83	1.47	4.7			17
1.23	3.88	1.5	5.1			18
1.24	3.92	1.54	5.6			19
1.26	3.97	1.58	6.2			20
1.27	4.02	1.62	6.8			21
1.29	4.07	1.65	7.5			22
1.3	4.12	1.69	8.2			23
1.32	4.17	1.74	9.1			24
1.33	4.22	1.78	10 etc...			25
1.35	4.27	1.82				26
1.37	4.32	1.87				27
1.38	4.37	1.91				28
1.4	4.42	1.96				29
1.42	4.48	2				30
1.43	4.53	2.05				31
1.45	4.59	2.1				32
1.47	4.64	2.15				33
1.49	4.7	2.21				34
1.5	4.75	2.26				35
1.52	4.81	2.32				36
1.54	4.87	2.37				37
1.56	4.93	2.43				38
1.58	4.99	2.49				39
1.6	5.05	2.55				40
1.62	5.11	2.61				41
1.64	5.17	2.67				42
1.65	5.23	2.74				43
1.67	5.3	2.8				44
1.69	5.36	2.87				45
1.72	5.42	2.94				46
1.74	5.49	3.01				47
1.76	5.56	3.09				48
1.78	5.62	3.16				49
1.8	5.69	3.24				50
1.82	5.76	3.32				51
1.84	5.83	3.4				52
1.87	5.9	3.48				53
1.89	5.97	3.57				54
1.91	6.04	3.65				55
1.93	6.12	3.74				56
1.96	6.19	3.83				57
1.98	6.26	3.92				58
2	6.34	4.02				59
2.03	6.42	4.12				60
2.05	6.49	4.22				61
2.08	6.57	4.32				62
2.1	6.65	4.42				63
2.13	6.73	4.53				64
2.15	6.81	4.64				65
2.18	6.9	4.75				66
2.21	6.98	4.87				67
2.23	7.06	4.99				68
2.26	7.15	5.11				69
2.29	7.23	5.23				70
2.32	7.32	5.36				71
2.34	7.41	5.49				72
2.37	7.5	5.62				73
2.4	7.59	5.76				74
2.43	7.68	5.9				75
2.46	7.77	6.04				76
2.49	7.87	6.19				77
2.52	7.96	6.34				78
2.55	8.06	6.49				79
2.58	8.16	6.65				80
2.61	8.25	6.81				81
2.64	8.35	6.98				82
2.67	8.45	7.15				83
2.71	8.56	7.32				84
2.74	8.66	7.5				85
2.77	8.76	7.68				86
2.8	8.87	7.87				87
2.84	8.98	8.06				88
2.87	9.09	8.25				89
2.91	9.2	8.45				90
2.94	9.31	8.66				91
2.98	9.42	8.87				92
3.01	9.53	9.09				93
3.05	9.65	9.31				94
3.09	9.76	9.53				95
3.12	9.88	9.76				96
10 etc...	10 etc...					10 etc...

Terms and Definitions

Ambient Temperature	The temperature which would be adopted by the body of the resistor under application conditions except with negligible power dissipation in the resistor.
Critical Resistance	The resistance value at which application of the LEV causes dissipation of the full rated power.
Isolation Voltage (Voltage Proof)	The maximum continuous voltage which may be applied between the resistor and a conductor in contact with its insulated body.
LEV (Max Volts)	The maximum continuous voltage which may be applied across a resistor whose ohmic value is greater than the critical resistance.
Overload	Power dissipation which exceeds the power rating for durations exceeding 0.1s.
Power Rating	The maximum continuous power that may be dissipated by a resistor whose ohmic value is less than the critical resistance and at a defined maximum ambient temperature.
Pulse (Surge)	Power dissipation which exceeds the power rating for durations less than 0.1s.
Series	A set of components with the same basic design features and performance and usually a range of sizes and ratings.
TCR	Temperature Coefficient of Resistance; the maximum magnitude of reversible ohmic value change per degree centigrade due to deviation in body temperature from a reference normally of 20°C.
Tolerance	The maximum allowable magnitude of deviation from nominal ohmic value measured at delivery and at room temperature.
Type	An individual member of a series with specified size and rating.
VCR	Voltage Coefficient of Resistance; the maximum reversible reduction in ohmic value per volt due to an increase in applied voltage.



<https://www.ttelectronics.com/resistors>

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