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Vishay Intertechnology, Inc.

# *Alternative Energy*

*(Energy Exploration)*



One of the World's Largest Manufacturers of  
**Discrete Semiconductors and Passive Components**





**Alternative  
Energy**

Energy Exploration

|                                 |   |
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More information on the Engineer's Toolbox, including product datasheet links, can be found at [www.vishay.com/ref/et3](http://www.vishay.com/ref/et3).

For inquiries, please contact your local sales representative.

## Key components for ENERGY EXPLORATION



### THE VISHAY ADVANTAGE

- Wide Operating Temperature Range
- Long Useful Life
- High Reliability
- Safety Approvals
- High Power Density
- High Surge Current Capability
- Ruggedized Construction  
and more....

**Oil and Gas  
Prospecting**



**Mining**













**Hydraulic  
Fracturing  
(Fracking)**





# Oil and Gas Prospecting



|   |   |  |
|---|---|--|
| <p>THYRISTORS</p> <p><b>Phase Control Thyristors (Hockey PUK Version), 1650 A</b></p>  <p><a href="#">ST1200C12K0</a></p> <ul style="list-style-type: none"> <li>• International standard case A-24 (K-PUK)</li> <li>• Metal case with ceramic insulator, designed and approved for industrial applications</li> </ul>  | <p>CERAMIC CAPACITORS</p> <p><b>High Operating Temperature Dielectric up to +150 °C</b></p>  <p><a href="#">MLCC X8R Capacitors</a></p> <ul style="list-style-type: none"> <li>• Maintains capacity at high temperature</li> <li>• Robust design build with wet process and noble metal electrode system</li> </ul>  | <p>MOSFETs</p> <p><b>Dual N-Channel 1.2 V (G-S) MOSFET</b></p>  <p><a href="#">SiB914DK</a></p> <ul style="list-style-type: none"> <li>• TrenchFET® technology with <math>R_{DS(on)}</math> guaranteed at a low gate voltage of 1.2 V</li> <li>• 1.6 mm x 1.6 mm PowerPAK® SC-75 packaging</li> </ul>   |
| <p>INDUCTORS</p> <p><b>Toroid, High-Current, High-Temperature, Radial Leaded</b></p>  <p><a href="#">TJ5-HT</a></p> <ul style="list-style-type: none"> <li>• High-temp. toroidal inductor available in several sizes and wind inductance range</li> <li>• High temperature continuous operation up to 200 °C</li> </ul>   | <p>ICs</p> <p><b>Precision Monolithic Quad SPST CMOS Analog Switches</b></p>  <p><a href="#">DG1411, DG1412, DG1413</a></p> <ul style="list-style-type: none"> <li>• Low and flat switch resistance over a wide voltage range</li> <li>• 50 % lower capacitance and 80 % lower charge injection versus competition</li> </ul>  | <p>ESTA POWER CAPACITORS</p> <p><b>HVAC Power Capacitor</b></p>  <p><a href="#">HV Harmonic Filter (AC)</a></p> <ul style="list-style-type: none"> <li>• Harmonic distortion removal</li> <li>• Improved voltage profile of the system</li> </ul>   |
| <p>TANTALUM CAPACITORS</p> <p><b>Solid Tantalum Surface-Mount Chip Capacitors, TANTAMOUNT®, Molded Case, HI-TMP®</b></p>  <p><a href="#">TH5</a></p> <ul style="list-style-type: none"> <li>• Very high temperature molded tantalum capacitor HI-TMP – 200 °C</li> <li>• Harsh environment filtering and decoupling</li> </ul>                                 | <p>INDUCTORS</p> <p><b>Low-Profile, High-Current IHLP® Inductors</b></p>  <p><a href="#">IHLP-2525CZ-8A</a></p> <ul style="list-style-type: none"> <li>• Ultra-high-temperature DC/DC conversion and filter inductor applications</li> <li>• Continuous operation up to 180 °C</li> </ul>  | <p>RESISTORS</p> <p><b>Universal Mount Edgewound Power Wirewound Resistors</b></p>  <p><a href="#">EDGU</a></p> <ul style="list-style-type: none"> <li>• High current capability</li> <li>• Enclosures and mounting frames available</li> </ul>   |
| <p>RESISTORS</p> <p><b>Thin Film, Center-Tapped Resistor Divider Network</b></p>  <p><a href="#">CTA</a></p> <ul style="list-style-type: none"> <li>• Tight ratio tolerances to <math>\pm 0.1</math> %, wire bondable, center tap feature</li> <li>• Low shunt capacitance &lt; 0.2 pF, excellent stability: <math>\pm 0.025</math> % maximum DR/R</li> </ul> | <p>RESISTORS</p> <p><b>High-Stability, High-Temperature 230 °C Thin Film Wraparound Chip Resistors</b></p>  <p><a href="#">PHT (Sizes 0402 to 2010)</a></p> <ul style="list-style-type: none"> <li>• Operating temp. up to 215 °C, low TCR down to 15 ppm/°C (-55 °C to +215 °C)</li> <li>• Sulfur resistant, from 10R up to 7.5M, tight tolerance down to 0.05 %</li> </ul> | <p>TANTALUM CAPACITORS</p> <p><b>Wet Tantalum HI-TMP Capacitors Tantalum Case with Glass-to-Tantalum Hermetic Seal</b></p>  <p><a href="#">134D</a></p> <ul style="list-style-type: none"> <li>• Extended capacitance, voltage range 50 V to 125 V, -55 °C to +200 °C operation</li> <li>• Axial leaded, industry standard case sizes (T1, T2, T3, T4)</li> </ul> |

View datasheets for these products [www.vishay.com/ref/et3ae4a](http://www.vishay.com/ref/et3ae4a)




# Mining



View datasheets for these products  
[www.vishay.com/ref/et3ae4b](http://www.vishay.com/ref/et3ae4b)

**RESISTORS**

**Molded, 50 mil Pitch, High Temp. (215 °C); Thin Film Surface-Mount, Dual-In-Line Resistor Network**




[HTRN](#)

- Multiple resistance offerings with 0.05 % ratio tolerance and 5 ppm/°C tracking
- Ratio stability of 0.1 % at 2000 h, 215 °C at 25 % rated power

**OPTOELECTRONICS**

**Optocoupler with Phototransistor Output and Trigger Current of  $I_F = 1$  mA**




[VOL618A](#)

- High current transfer ratio, and high isolation voltage of 5000 V<sub>RMS</sub>
- Operating temp. from -55 °C to +110 °C in a 4-pin LSOP, mini-flat package

**TANTALUM CAPACITORS**

**Wet Tantalum Capacitors Tantalum-Case with Glass-to-Tantalum Hermetic Seal**




[135D](#)

- High capacitance, voltage range 6 V to 125 V, -55 °C to +200 °C operation
- Axial-leaded, industry-standard case sizes (T1, T2, T3, T4)

**RESISTORS**

**High-Power, High-Current Grid Resistors, 1 kW and Larger**



[GRE1](#)

- High active mass with good thermal dissipation
- IP00, IP20, and IP23 rated enclosures available

**DIODES**

**Surface-Mount TRANSZORB® Transient Voltage Suppressors**




[SMAJ](#)

- 400 W peak pulse power capability with a 10/1000 μs waveform
- AEC-Q101 qualified

**INDUCTORS**

**High-Current Through-Hole Inductor, High-Temperature Series**



[IHTH](#)

- Composite through-hole design inductor for filtering and DC/DC conversion
- Compact solution to toroidal power inductors

**RESISTORS**

**Electro-Pyrotechnic Initiator Thin Film Chip Resistor**




[EPIC](#)

- Low firing energy down to 50 μJ, fast firing time down to 50 μs
- Standard SMD case 0603, alternative to bridge wire technology

**ESTA POWER CAPACITORS**

**HVAC Power Capacitor**


[HV Harmonic Filter \(AC\)](#)



- Harmonic distortion removal
- Improved voltage profile of the system

**SENSORS**

**Ten-Turns Servo or Bushing Mount Hall Effect Sensor in Size 09 (22.2 mm)**




[34 THE](#)

- Accurate linearity: ± 0.5 %, long life: 50M cycles for servo, 10M for bushing
- All electrical angles available up to 360°, dedicated to long-life applications

**MOSFETS**

**N-Channel 100 V (D-S) MOSFET**



[SiR870ADP](#)

- Medium-voltage ThunderFET® technology, maximum R<sub>DS(on)</sub> 6.6 mΩ
- Thermally enhanced PowerPAK® SO-8 packaging

**OPTOELECTRONICS**

**Optocoupler with Phototransistor Output; ATEX Certified for Explosive Environments**




[CNY65Exi](#)

- ATEX certificate: PTB 03 ATEX 2033 U, Gas: II (1) G (EX ia) IIC, Dust: II (1) D (EX ia) IIIC
- V<sub>ISO</sub> of 11 600 V<sub>peak</sub> for 1 minute

**RESISTORS**

**Stainless Steel Medium-Power Resistors**



[Medium Power Grid Resistors](#)

- High permanent power dissipation, high pulse energy dissipation
- Rugged construction



# Hydraulic Fracturing (Fracking)



|  |  |   |
|--|--|---|
| <p><b>DIODES</b></p> <p><b>Surface-Mount TRANSZORB® Transient Voltage Suppressors</b></p>  <p><a href="#">SMP TVS</a></p> <ul style="list-style-type: none"> <li>• Meets MSL level 1, per J-STD-020C, LF maximum peak of 260 °C</li> <li>• Very low profile – typical height of 0.65 mm</li> </ul>   | <p><b>RESISTORS</b></p> <p><b>Massive Electro-Pyrotechnic Initiator Chip Resistor</b></p>  <p><a href="#">MEPIC</a></p> <ul style="list-style-type: none"> <li>• Low firing energy down to 1.5 mJ, fast firing time down to 250 μs</li> <li>• Standard SMD case 0805, alternative to bridge wire technology, AKLV16 qualification</li> </ul>                                  | <p><b>MODULES</b></p> <p><b>ADD-A-PAK Generation VII Power Modules, Schottky Rectifier, 200 A</b></p>  <p><a href="#">VS-VSKDS409/150</a></p> <ul style="list-style-type: none"> <li>• 175 °C T<sub>j</sub> operation</li> <li>• UL approved file E78996</li> </ul>                                  |
| <p><b>RESISTORS</b></p> <p><b>Power Metal Strip® SMD Resistors, High Power (7 W), Low Value (Down to 0.001 Ω)</b></p>  <p><a href="#">WSHM2818</a></p> <ul style="list-style-type: none"> <li>• Very high power rating of 7 W in small 2818 package</li> <li>• Very low resistance values, 0.001 Ω to 0.10 Ω, with tolerance of 1 %</li> </ul>                         | <p><b>MOSFETs</b></p> <p><b>E Series 600 V Power MOSFET</b></p>  <p><a href="#">SiHG47N60E</a></p> <ul style="list-style-type: none"> <li>• High-performance E Series high-voltage technology, maximum R<sub>DS(on)</sub> 64 mΩ</li> <li>• Popular TO-247 packaging, maximum continuous current of 47 A</li> </ul>  | <p><b>FILM CAPACITORS</b></p> <p><b>Metallized Polypropylene Film DC-Link Capacitor</b></p>  <p><a href="#">MKP1848</a></p> <ul style="list-style-type: none"> <li>• High-performance DC-Link capacitor with high RMS current capabilities</li> <li>• Automotive Grade AEC-Q200 compliant</li> </ul> |
| <p><b>INDUCTORS</b></p> <p><b>Toroid, High-Current, High-Temperature, Radial Leded</b></p>  <p><a href="#">TJ3-HT</a></p> <ul style="list-style-type: none"> <li>• High-temp. toroidal inductor available in several sizes and wind inductance range</li> <li>• High temperature continuous operation up to 200 °C</li> </ul>  | <p><b>MELF RESISTORS</b></p> <p><b>Professional Thin Film MELF Resistors</b></p>  <p><a href="#">MMB0207</a></p> <ul style="list-style-type: none"> <li>• Approved according to EN 140401-803, AEC-Q200 qualified</li> <li>• High surge voltage capability</li> </ul>   | <p><b>NON-LINEAR RESISTORS</b></p> <p><b>Platinum SMD Flat Chip Temperature Sensor</b></p>  <p><a href="#">PTS...AT</a></p> <ul style="list-style-type: none"> <li>• Standardized characteristics according to IEC 60751</li> <li>• Short reaction times down to 2 s (in air)</li> </ul>             |
| <p><b>RESISTORS</b></p> <p><b>Precision Low-TCR, High-Temperature Thin Film Resistor, Surface-Mount Chip</b></p>  <p><a href="#">PLTT</a></p> <ul style="list-style-type: none"> <li>• Wide resistance range with 5 ppm/°C TCR tracking and 0.02 % tolerance</li> <li>• Operation up to 230 °C with 0.5 % stability at 2000 h, 215 °C at 25 % rated power</li> </ul> | <p><b>RESISTORS</b></p> <p><b>High-Stability, High-Temperature 230 °C Thin Film Chip Resistors</b></p>  <p><a href="#">PHT / PRAHT / RMKHT / CHPHT</a></p> <ul style="list-style-type: none"> <li>• Operating temp. up to 215 °C, low TCR down to 15 ppm/°C (-55 °C to +215 °C)</li> <li>• Sulfur resistant, from 10R up to 7.5M, tight tolerance down to 0.05 %</li> </ul> | <p><b>TANTALUM CAPACITORS</b></p> <p><b>Wet Tantalum Capacitor Assembly</b></p>  <p><a href="#">211D</a></p> <ul style="list-style-type: none"> <li>• High temperature of +200 °C, high vibration</li> <li>• Standard and custom assemblies</li> </ul>   |

View datasheets for these products [www.vishay.com/ref/et3ae4c](http://www.vishay.com/ref/et3ae4c)





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## ***ABOUT TTI, INC.***

TTI Inc., a subsidiary of Berkshire Hathaway, is a world leading specialist distributor of connectors and passive, electromechanical and discrete components. TTI's philosophy is "Lead by Design", and the company differentiates itself by focusing on people, parts and processes. The company's aim is to become the distributor of choice for customers and suppliers in Europe alike by introducing new product technologies and by stocking broad and deep across its franchise base. TTI employs sophisticated inventory management processes which ensure that the company can react immediately to changes in component demand due to fluctuating markets and supply chains. For further information about TTI, please refer to: [www.ttieurope.com](http://www.ttieurope.com).



**A WORLD OF**  
**SOLUTIONS**

### **TTI, INC.**

Ganghoferstr. 34  
82216 Maisach-Gernlinden  
Germany  
Tel.: +49 (0)8142 6680 – 0  
Fax: +49 (0)8142 6680 – 490  
Email: [sales@de.ttiinc.com](mailto:sales@de.ttiinc.com)  
[www.ttieurope.com](http://www.ttieurope.com)