



# Newsletter

Vishay MarCom / October 2013

## Passives Quarterly Newsletter #13-Q3/2013

Welcome to the new Passives Quarterly Newsletter, which covers Q3 of 2013. Included in this newsletter are brief items on recent product releases, divisional news, new and updated literature, and other highlights of the past 90 days. Please remember that we encourage your feedback or suggestions on any additional pieces of information or improvements that we could consider for inclusion.

Paul Harrison

### Product News

## Capacitors

### Aluminum

#### 159 PUL-SI Series Snap-in Power Aluminum Capacitors

Vishay plans to announce that it has extended its 159 PUL-SI series of snap-in power aluminum capacitors with an extremely high rated voltage to 500 V at +105 °C. Designed for solar PV inverters, industrial motor controls, and power supplies, the enhanced devices feature a long useful life, high ripple current to 2.80 A at 120 Hz and +105 °C, and max. ESR down to 150 mΩ at 100 Hz.

Featuring a cylindrical aluminum case with a pressure relief valve, insulated with a blue sleeve, the new Vishay BCcomponents capacitors are available in a variety of case sizes ranging from 22 mm by 25 mm to 35 mm by 60 mm. At 500 V, the devices feature a maximum operating temperature to +105 °C and useful life of 3000 hours. At 450 V, the useful life can be extended to 5000 hours.

#### Electronic Design Top 101 Components

Vishay Intertechnology has a total of six products on this year's Top 101 Components list from Electronic Design, including:

**#8 - IWAS-3827EC-50**

#21 - VCNL3020

#40 - SMA6F TVS

**#73 - P16S (potentiometer)**

**#74 - 193 PUR-SI Solar (capacitors)**

#82 - VLMU3100 (UV LED)

The complete list is available on the magazine's website here:

<http://electronicdesign.com/components/top-101-components-2013>.

## Ceramic – Single-Layer

#### New VY1 and VY2 Series Leaded Ceramic Safety Capacitor Sample Kits Available

The new sample kits contain the most common capacitance values of both the VY1 and VY2 series of ceramic safety capacitors.

#### Product Benefits:

- Each kit contains samples of the seven most common capacitance values
- Give engineers the possibility to find the best AC-line-rated EMI filter capacitor for their application
- Compliant to IEC 60384-14, third edition
- VY1 series is X1 / Y1 classified with a rated voltage of 760 V<sub>AC</sub> / 500 V<sub>AC</sub>
- VY2 series is X1 / Y2 classified with a rated voltage of 440 V<sub>AC</sub> / 300 V<sub>AC</sub>
- RoHS-compliant
- Halogen-free
- SAP part numbers: VY11-KIT-HF (VY1 kit) and VY21-KIT-HF (VY2 kit)





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## Market Applications:

- Safety capacitors are mandatory in every device directly connected to the mains supply
- Power supplies, white goods, consumer electronics, smart and power meters, lighting ballasts, and more

## Datasheets Updated for High-Voltage Multiplier Cascades and Capacitor Stacks

The original datasheets have been reworked and updated to better reflect the possibilities and capabilities of our devices. Additionally, the layout has been changed and any errors have been corrected. A link section to the related documents has been implemented.

## 3D Step Files for the 715C and 660R Series High-Voltage Ceramic Disc Capacitors Have Been Uploaded to Our Website

### Benefits:

- Perfect tool for engineers and PCB layout designers
- Exact digital 3D drawings of our components, taking into account dimensions and tolerances
- Directly implement our components into standard PCB design programs

## Ceramic – MLCCs

### New VJ Safety Series Surface-Mount MLCCs

For safety-certified applications, Vishay Vitramon VJ Safety series surface-mount multilayer ceramic chip capacitors (MLCC) are available with C0G (NP0) and X7R dielectrics, and X1 / Y2 and X2 safety classifications.

### Product Benefits:

- Offer low profiles to save board space and fully conform with latest creepage distance requirements
- Manufactured in noble metal electrode technology (NME) with a wet build process
- Low capacitance down to 10 pF for C0G (NP0) dielectric
- High capacitance to 12 nF for X7R dielectric
- 250 VAC voltage ratings
- 2008, 2012, and 2220 case sizes
- Approved to IEC 60384-14:2005, 3rd edition
- Peak impulse voltages of 5000 V (X1 / Y2) and 2500 V (X2)
- RoHS-compliant, halogen-free, and comply with Vishay "Green" standards



### Market Applications:

- EMI and AC line filtering, and lightning strike and voltage surge protection in power supplies, battery chargers, and isolators for fax machines and telephones, modems and routers, and AC equipment and appliances

### Datasheet links:

<http://www.vishay.com/doc?45007> (VJ Safety Certified Capacitors C0G)

<http://www.vishay.com/doc?45020> (VJ Safety Certified Capacitors X7R)

### New QUAD Hi FREQ Series of MLCCs for High-Frequency Applications

For high-frequency RF applications in telecommunications, medical, military, and industrial equipment and instrumentation, Vishay's new QUAD HIFREQ surface-mount MLCCs combine ultra-high Q > 2000, ultra-low ESR down to 0.01  $\Omega$ , and voltage ratings to 1500 V in quad 0505 and 1111 case sizes.

### Product Benefits:

- Optimized for high-frequency RF applications
- Broad working voltages from 200 V to 1500 V
- Wide capacitance ranges from 1.0 pF to 1000 pF
- Tight tolerances to  $\pm 0.1$  pF





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- Excellent aging rate of 0 % per decade
- Operating temperature range of -55 °C to +125 °C
- Available with RoHS-compliant nickel barrier terminations and with a lead-bearing termination finish
- Halogen-free and conform to Vishay “Green” standards

## Market Applications

- High-frequency RF applications in telecommunications, medical, military, and industrial equipment and instrumentation
- Filter and impedance matching networks, timing circuits, mixers, and oscillators

## Data Sheet Link

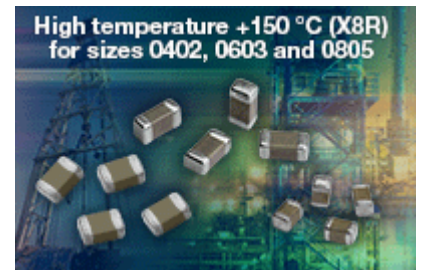
<http://www.vishay.com/doc?45221>

## Enhanced VJ X8R Series Surface-Mount MLCCs

Vishay has extended its VJ X8R series of surface-mount MLCCs with a new 0402 case size for board space savings, and higher 100 V ratings in the 0603 and 0805 case sizes.

## Product Benefits:

- X8R dielectric
- High operating temperature to +150 °C
- Available with a conductive epoxy assembly termination (termination code “E”) for hybrid applications
- Wide capacitance range of 470 pF to 390 nF
- Temperature coefficient of capacitance (TCC) of  $\pm 15$  % over the temperature range of -55 °C to +150 °C



## Market Applications:

- Sensors, power supplies, and signal converters in oil exploration, drilling monitoring, and industrial equipment

## Datasheet link:

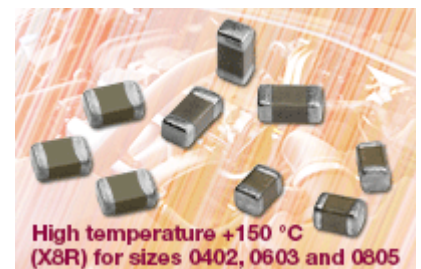
<http://www.vishay.com/doc?45006> (VJ X8R)

## Enhanced VJ Automotive Series Surface-Mount MLCCs

Vishay has extended its VJ automotive series of surface-mount MLCCs featuring an X8R dielectric with a new 0402 case size for board space savings, and higher 100 V ratings in the 0603 and 0805 case sizes for increased reliability.

## Product Benefits:

- Two termination options
- 100 % tin plate matte finish (VJ....31)
- Conductive epoxy assembly termination (VJ....34) for hybrid applications
- Qualified according to AEC-Q200
- PPAP available on request
- Wide capacitance range of 330 pF to 27 nF
- Temperature coefficient of capacitance (TCC) of  $\pm 15$  % over the temperature range of -55 °C to +150 °C



## Market Applications:

- High-temperature automotive applications, including sensors, engine / ignition control, boardnet management, power steering and active safety controls, and control for doors, windows, and air conditioning

## Datasheet link:

<http://www.vishay.com/doc?45040> (VJ....31/VJ....34 Automotive MLCC)



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## Vishay's MLCC Division Earns ISO 13485:2003 Certification for Migdal Ha'Emek, Israel Plant

Vishay's Multilayer Ceramic Chip Capacitor (MLCC) Division has earned the International Organization for Standardization (ISO) 13485:2003 certification for its plant in Migdal Ha'Emek, Israel. Vishay's ISO 13485:2003 registration audit was conducted by the Standards Institution of Israel (SII), and the site was certified for the design and manufacture of MLCCs for the medical market.

ISO 13485:2003 certification specifies processes for an organization's quality management system to demonstrate its ability to provide medical devices and related services that consistently meet regulatory and customer requirements pertaining to medical device application standards.

At Vishay's Migdal Ha'Emek plant, the company manufactures MLCCs for implantable life support equipment, such as pacemakers and ICDs, as well as neurostimulation devices. By producing these components to the stringent requirements set by ISO 13485:2003, the company continues to demonstrate its commitment to the medical industry. For more information please visit: <http://www.vishay.com/company/press/releases/2013/130910MigdallISO/>.



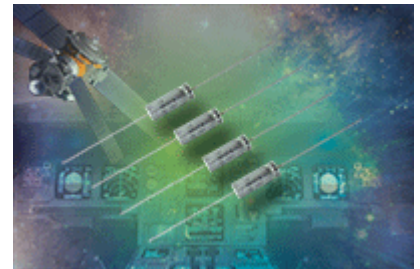
## Tantalum

### Tantalum-Cased Wet Tantalum Capacitors Approved to DLA Drawing 13017

Vishay has introduced a new tantalum-cased wet tantalum capacitor with a glass-to-tantalum hermetic seal that is approved to Defense Logistics Agency (DLA) drawing 13017. For avionics and aerospace systems, the device is the industry's first extended capacitance DLA-approved wet tantalum capacitor to combine a reverse voltage of 1.5 V at +85 °C with improved vibration and thermal shock capabilities.

#### Product Benefits:

- Provides all the advantages of Vishay's SuperTan® series devices, while offering improved reverse voltage, thermal shock, and high vibration capabilities
- Enhanced performance, high-reliability design
- Designed for the avionics and aerospace applications
- Improved vibration (sine: 50 g; random: 27.7 g) capability
- Improved thermal shock (300 cycles) capability
- High capacitance from 10  $\mu$ F to 680  $\mu$ F
- Capacitance tolerance of  $\pm 10\%$  and  $\pm 20\%$  standard at 120 Hz and +25 °C
- Low ESR down to 0.70  $\Omega$  at 120 Hz and +25 °C
- Standard tin / lead terminations, with RoHS-compliant 100 % tin terminations available



#### Market Applications:

- Timing, filtering, energy hold-up, and pulse power applications in power supplies for space and avionics equipment

#### Datasheet link:

<http://www.vishay.com/doc?40167> (DLA 13017)

### New TM3 Series of TANTAMOUNT® Surface-Mount Solid Tantalum Molded Chip Capacitors for Medical Instruments

For high performance and reliability in non-life-support medical monitoring and diagnostic instruments, Vishay's new TM3 series of TANTAMOUNT® surface-mount solid tantalum molded chip capacitors features a robust anode design, 100 % surge current testing (B, C, D, and E case sizes), and is available with Weibull grading and Hi-Rel screening options.

#### Product Benefits:

- Industry's only reliable tantalum capacitors to be manufactured in a facility certified to the ISO 13485 medical





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standard

- Offered in a molded package in five standard EIA-535BAAC case codes
- Capacitance range from 1  $\mu\text{F}$  to 220  $\mu\text{F}$  over voltage ratings from 4 V to 20 V
- Capacitance tolerances of  $\pm 10\%$  and  $\pm 20\%$
- High ripple current carrying capability to 11 A
- RoHS compliant and halogen free
- Available with 100 % matte tin or tin / lead terminations
- Compatible with high-volume automatic pick-and-place equipment
- Dry packaging is compliant to the JEDEC-033 standard



## Market Applications:

- Input capacitor filters on DC / DC converters, hot plugging surges on battery chargers, low-drop-out devices, and capacitor charge pumps in glucose meters, infusion pumps, nebulizers, and thermometers

## Datasheet link:

<http://www.vishay.com/doc?40166> (TM3)

## New HE4 Wet Tantalum High-Energy Capacitor

For military and aerospace applications, Vishay's new HE4 wet tantalum high-energy capacitor combines a low maximum ESR down to 0.025  $\Omega$  with ultra-high capacitance from 1100  $\mu\text{F}$  to 72000  $\mu\text{F}$  and a unique case design for improved reliability and performance.

## Product Benefits:

- Housed in an all-tantalum, hermetically sealed case featuring a double seal for increased reliability
- Offered in the A, B, and C case codes
- $\pm 20\%$  standard capacitance tolerance, with tolerances of  $\pm 10\%$  also available
- Manufactured to withstand high stress and hazardous environments
- Features a unique case design for improved reliability and performance
- Utilizes Vishay's proven SuperTan® hybrid cathode technology in combination with industry leading anode designs to achieve its low ESR



## Market Applications:

- Energy storage and pulse power applications in military and aerospace equipment

## Datasheet link:

<http://www.vishay.com/doc?42105> (HE4)

## New T18 Series of Wet Tantalum Capacitors

For avionics and aerospace applications, Vishay's new T18 series of tantalum-cased wet tantalum capacitors with glass-to-tantalum hermetic seals offers industry-high capacitance of 1000  $\mu\text{F}$  at 75 V in the D case size.

## Product Benefits:

- Low ESR values down to 0.50  $\Omega$  at 120 Hz and +25  $^{\circ}\text{C}$  in the D case size
- Reverse voltage of 1.5 V at +85  $^{\circ}\text{C}$
- Thermal shock of 300 cycles
- High vibration (sine: 50 g; random: 27.7 g) capability
- Capacitance tolerance of  $\pm 10\%$  and  $\pm 20\%$  standard
- Standard tin / lead terminations, with RoHS-compliant 100 % tin terminations available





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## Market Applications:

- Timing, filtering, energy hold-up, and pulse power applications in power supplies for space and avionics equipment

## Datasheet link:

<http://www.vishay.com/doc?40161> (T18)

## **New CWR26 TANTAMOUNT® Solid Tantalum Chip Capacitor**

Vishay's new CWR26 TANTAMOUNT® solid tantalum chip capacitor for military avionics and aerospace applications is qualified to MIL-PRF-55365/13 and offers exceptionally low ESR down to 0.180  $\Omega$  at 100 kHz.

## Product Benefits:

- Offered with Weibull level B, C, and T failure rates
- Capacitance range of 10  $\mu\text{F}$  to 100  $\mu\text{F}$  over voltage ratings from 15 VDC to 35 VDC
- Capacitance tolerance of  $\pm 5\%$ ,  $\pm 10\%$ , and  $\pm 20\%$
- Available in three case sizes
- High operating temperature to +125  $^{\circ}\text{C}$  with voltage derating
- Offered in tape-and-reel packaging per EIA 481
- Available with gold plate, solder plated, solder fused, and hot solder dipped terminations



## Market Applications:

- Military, avionics, and aerospace applications

## Datasheet link:

<http://www.vishay.com/doc?40163> (CWR26)

## **T16 Poster Presentation**

Vishay participated in the European Space Agency's (ESA) Space Passive Component Days symposium, which was held from Sept. 24 to 26 at the European Space Research and Technology Centre (ESTEC) in Noordwijk, South Holland.

Mike Mosier, Sr. Director, Product Marketing, Tantalum Capacitors at Vishay, presented the company's new T16 / DLA 13017 high-performance wet tantalum capacitors for space applications during the symposium's dedicated poster session.

## **Marking of 293D and 593D – TANTAMOUNT® Molded Chip Tantalum Capacitors**

In order to better serve our TANTAMOUNT® molded chip capacitors customers and for improved delivery, Vishay's policy is to allow the replacement of standard products (293D, 593D) with capacitors from the same family of other series from existing stock. The substituted parts will be of equal or better quality, potentially having undergone added electrical screening, resulting in better electric performance.

For more information please visit:

[http://www.vishay.com/whatsnew/doc/ff\\_130909\\_Vishay\\_FastFacts\\_TantalumCapsnewratings.pdf](http://www.vishay.com/whatsnew/doc/ff_130909_Vishay_FastFacts_TantalumCapsnewratings.pdf).

## **New Ratings for Conformal-Coated, Molded, and MicroTan® Tantalum Capacitor Families**

The Tantalum Capacitors Division is pleased to announce new extended ratings for several of its product series.

For more information please visit:

[http://www.vishay.com/whatsnew/doc/ff\\_130909\\_Vishay\\_FastFacts\\_TantalumCapsnewratings.pdf](http://www.vishay.com/whatsnew/doc/ff_130909_Vishay_FastFacts_TantalumCapsnewratings.pdf).

## **Tantalum Capacitors Division Earns ISO 13485:2003 Certification for Dimona, Israel Plant**

Vishay's Tantalum Capacitors Division has earned the International Organization for Standardization (ISO) 13485:2003 certification for its Dimona, Israel plant. Vishay's ISO 13485:2003 registration audit was conducted by the Standards Institution of Israel (SII), and the site was certified for the design and manufacture of tantalum capacitors for the medical market.

For more information please visit: <http://www.vishay.com/company/press/releases/2013/130626Dimona/>.



## Inductors

### Vishay Dale

#### Electronic Design Top 101 Components

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**#8 - IWAS-3827EC-50**

#21 - VCNL3020

#40 - SMA6F TVS

**#73 - P16S (potentiometer)**

**#74 - 193 PUR-SI Solar (capacitors)**

#82 - VLMU3100 (UV LED)

The complete list is available on the magazine's website here:

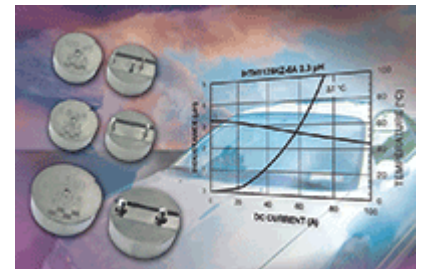
<http://electronicdesign.com/components/top-101-components-2013>.

#### New IHTH-0750IZ-5A and IHTH-1125KZ-5A High-Current, High-Temperature Through-Hole Inductors

For automotive applications, Vishay's new IHTH-0750IZ-5A and IHTH-1125KZ-5A high-current, high-temperature through-hole inductors in the 0750 and 1125 case sizes feature high operating temperatures to +155 °C and high rated currents to 125 A.

#### **Product Benefits:**

- AEC-Q200 qualified
- Wide range of inductance values from 0.47  $\mu$ H to 100  $\mu$ H
- Frequency range up to 10 MHz for some values
- Handle high transient current spikes without hard saturation
- Halogen-free and conform to Vishay "Green" standards



#### **Market Applications:**

- Voltage regulator modules (VRM) and DC / DC converters in high-temperature automotive applications, including engine and transmission control units, diesel injection drivers, LED drivers, HID lighting, and noise suppression for motors in windshield wipers, power seats and mirrors, and heating and ventilation blowers

#### **Datasheet link:**

<http://www.vishay.com/doc?34348> (IHTH-0750IZ-5A)

<http://www.vishay.com/doc?34349> (IHTH-1125KZ-5A)

## Resistors

### Vishay Dale

#### WANTED Posters

The Vishay Dale Resistor Division has begun issuing monthly "WANTED" posters based on the playing card marketing campaign. These posters contain the focus product(s) for the month and will contain the playing card, applications (Common Hideouts) they can be found in, competitors (Aliases) with similar products, and contact information. Along with the poster, there will be several training slides for the product – these can be used for training in the field or QBRs. Detailed information will be released via Fast Facts.

For this quarter – the three posters will be for liquid crystal displays – monochrome color TPT displays (10 of diamonds; high-voltage SMD and axial film resistors (Ace, 7 of hearts); and WSBS / WSBM battery shunts (10 of spades).





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**WANTED**  
LIQUID CRYSTAL DISPLAYS - MONOCHROME  
COLOR TFT DISPLAYS

LCD Character Modules, LCD Graphic Modules, Color TFT Modules

**COMMON HIDEOUTS**  
All Application requiring human interface such as:  
Medical Equipment, Oil and Gas Industry, Fire and Gas Detection, Machine Controllers, Hand held analyzers, Military applications, Agriculture, Pumps and Meters, Counters, Power Meters, and custom applications.

**ALIASES**  
Crystalfontz, Newhaven, Aplus, Lumex, Displaytech, Electronix Assembly, Fujitsu, Optrex, Microtip, Technology, Hantronix, Sharp Electronics, Varitronix, 4D Systems

VISHAY Vishay Dale [display@vishay.com](mailto:display@vishay.com)

**★ WANTED ★**  
**WSBS / WSBM, BATTERY SHUNT,  
CURRENT SENSE RESISTORS**

**WSBS8518, WSBM8518**

**COMMON HIDEOUTS**  
Intelligent Battery Sensor (IBS) for Lead-acid battery management  
IBS for Li-Ion battery management  
Inverter controls for welding equipment  
Battery management for Electric vehicles and Industrial Equipment

**ALIASES**  
Isabellenhütte BAS Series

VISHAY Vishay Dale [www.ohmresistor@vishay.com](http://www.ohmresistor@vishay.com)

**WANTED**  
High Voltage SMD and Thru-hole Resistors

**CRHV, CDHV, CRMV**      **RNX, ROX, FHV, TR, MVV, HVV, HVX**

**COMMON HIDEOUTS**  
Instrumentation/meters, High-end Circuit Breakers, High Voltage systems, Medical Instrumentation, Medical Implantables, Laboratory test equipment

**ALIASES**  
TT Group (Welwyn): HVC, HVP, WR-VL, 4500 or F series  
Ohmcraft: HVC series  
RARA: HVP, HVR series

VISHAY Vishay Dale [resistors@vishay.com](mailto:resistors@vishay.com)

If there are any questions, please contact [james.ryba@vishay.com](mailto:james.ryba@vishay.com).

## WSMS2908 – Power Metal Strip® Meter Shunt Resistor

Vishay Dale announces a new Power Metal Strip® meter shunt resistor that combines a 3 W power capability in the 2908 size package with very low resistance values down to 100  $\mu\Omega$ .

The **WSMS2908** meter shunt resistor features a proprietary processing technique that produces extremely low resistance values from 100  $\mu\Omega$  to 500  $\mu\Omega$ . These values allow for increased accuracy in current meter shunt applications for industrial and consumer single- or multiphase energy meters. With a tolerance of 5.0 %, the new resistor provides power companies with more accurate data to determine customer usage and to adjust billing terms.

The **WSMS2908** features a five-terminal connection design and an all-welded construction that contributes to its superior electrical performance. The resistor offers very low inductance values of < 5 nH and a low thermal EMF of < 3  $\mu\text{V}/^\circ\text{C}$ . The device is lead (Pb)-free and RoHS-compliant.

Samples and production quantities of the new meter shunt resistor are available now, with a lead time of eight to 10 weeks for larger orders.

To learn more about the **WSMS2908**, please visit [www.vishay.com/doc?30160](http://www.vishay.com/doc?30160).



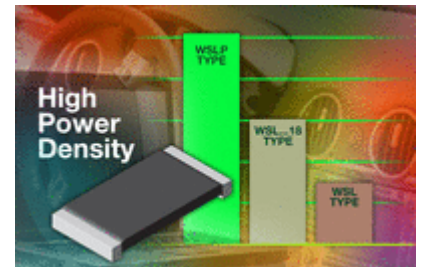
## WSLP0805 – Power Metal Strip® High-Power Resistor

The **WSP0805** surface-mount Power Metal Strip® resistor in the 0805 case size combines a very high power capacity of 0.5 W with extremely low resistance values down to 0.01  $\Omega$ .

The advanced construction of the **WSP0805** resistor incorporates a solid metal nickel-chrome alloy resistive element with low TCR (< 20 PPM/ $^\circ\text{C}$ ) and specially selected and stabilized material. This results in a high-power resistor with an operating temperature range of  $-65^\circ\text{C}$  to  $+170^\circ\text{C}$  while maintaining the superior electrical characteristics of the Power Metal Strip construction.

The small size of the **WSP0805** resistor allows it to replace larger current sensing resistors, saving space on the circuit board that in turn will create smaller and lighter products for the consumer. It is intended for current sensing applications in dc-to-dc converters for computers, VRMs for laptops, and Li-Ion battery safety and management; and electronic automotive systems, including engine controls, multi-media electronics, climate controls, and anti-lock brakes.

The **WSP0805** resistor measures 0.080 in. by 0.050 in. by 0.013 in. [2.03 mm by 1.27 mm by 0.330 mm]. A proprietary processing technique produces extremely low resistance values ranging from 0.01  $\Omega$  to 0.05  $\Omega$ , with tight tolerances of  $\pm 1.0\%$  and  $\pm 5.0\%$ .







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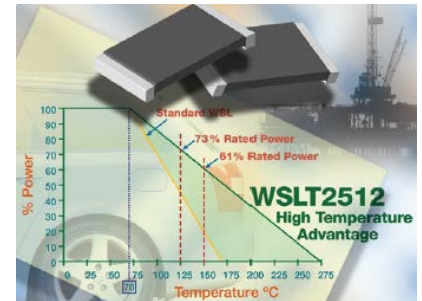
Like all Power Metal Strip resistors, these devices feature an all-welded construction that contributes to their superior electrical performance. The **WSLP0805** provides very low inductance of 0.5 nH to 5 nH and low thermal EMF (< 3  $\mu\text{V}/^\circ\text{C}$ ).

To learn more about the **WSLP0805**, please visit [www.vishay.com/doc?30122](http://www.vishay.com/doc?30122).

## WSLT2512 – Power Metal Strip® High-Temperature Resistor

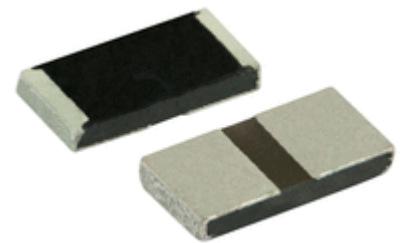
The **WSLT2512** 1 W surface-mount Power Metal Strip resistor is a current sensing resistor in the 2512 case size that is designed to operate in a temperature range of  $-65^\circ\text{C}$  to  $+275^\circ\text{C}$ . The **WSLT2512** features a very low 10 m $\Omega$  to 500 m $\Omega$  resistance value range, a tight tolerance down to  $\pm 0.5\%$ , and low TCR values down to  $\pm 75\text{ ppm}/^\circ\text{C}$ . The temperature range of the **WSLT2512** allows it to replace larger current sensing resistors with a similar  $+275^\circ\text{C}$  maximum operating temperature. Typical applications will include current sensing, voltage division, and pulse applications in harsh, high-temperature environments such as automotive and gas / oil exploration, which the **WSLT2512** is designed to handle without sacrificing power rating or electrical performance.

To learn more about the **WSLT2512**, please visit [www.vishay.com/doc?30121](http://www.vishay.com/doc?30121).



## New RCP – Thick Film High-Power Chip Resistor

The **RCP** series is a high-power thick film chip resistor on an aluminum nitride (AlN) substrate that comes in a 1206-sized chip, with a 1 W power rating (or up to 11 W using Active Temperature Control). The **RCP** series' aluminum nitride substrate allows it to have a very high thermal conductivity in a small package size. As optional construction, the **RCP** products are available with either traditional-sized bottom terminals (RCP1206B..) or with wide bottom terminals (RCP1206W..) for improved thermal dissipation. The **RCP** chip resistors can also be customized to meet specific application needs, including special testing, or many other custom options. The **RCP** series is available in either a Pb-bearing, or a Pb-free (compliant to RoHS Directive 2011/65/EU) construction.



### Features & Benefits:

- Thick film resistive element on an aluminum nitride (AlN) substrate
- Over three times more power than a standard 1206-sized product
- Resistance range from 10  $\Omega$  to 2 k $\Omega$
- Operating temperature range of  $-55^\circ\text{C}$  to  $+155^\circ\text{C}$
- Consult factory for availability of other case sizes

To learn more about **RCP**, please visit <http://www.vishay.com/doc?31098>.

## PTF: High-Precision, High-Stability Metal Film Resistors

The **PTF** series is a high-precision / high-stability axial film resistor that is available in three sizes, ranging in power from 0.05 W to 0.25 W, and available in either Pb-bearing or Pb-free (per RoHS Directive 2011/65/EU) construction. Higher power ratings are available when load-life restrictions are not critical (see data sheet for more details). **PTF** products are available from 15  $\Omega$  to 1 M $\Omega$ , in tolerances as tight as  $\pm 0.01\%$ , and TCR down to  $\pm 5\text{ ppm}/^\circ\text{C}$ . Custom and matched pairs are also available from this product series. For these, or values outside the catalog value range, please contact the factory.

To learn more about the **PTF** series, please visit [www.vishay.com/doc?31019](http://www.vishay.com/doc?31019).

For SMD alternatives to the **PTF** series, see **PSF** series [www.vishay.com/doc?30162](http://www.vishay.com/doc?30162).

- Features and Benefits:
  - Extremely low TCR down to 5  $\text{ppm}/^\circ\text{C}$
  - Very low noise (typically 0.10  $\mu\text{V}/\text{V}$ ) and voltage coefficient (typically to  $\pm 5\text{ ppm}/\text{V}$ )
  - Very good high-frequency characteristics
  - Can replace wirewound bobbins



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## LVR – Low-Value Precision Power Axial Lead Wirewound Resistor

Vishay Intertechnology, Inc. is pleased to announce that lead times for the **LVR03** and **LVR05** series are now back down to pre-factory relocation status of eight to 10 weeks. The **LVR series** provides precision tolerances to  $\pm 1\%$  for resistances as low as 3 m $\Omega$  at power ratings ranging from 1 W to 10 W. The **LVR** is ideal for all types of current sense applications including switching and linear power supplies, instrumentation, and power amplifiers. The LVR features low inductance, excellent load-life stability, and low TCR. The device is lead (Pb)-free and RoHS-compliant with lead (Pb)-bearing terminations also available. To learn more about **LVR series**, please visit [www.vishay.com/doc?30206](http://www.vishay.com/doc?30206).



## High-Power Wirewound

In 2011 Vishay Dale acquired Huntington Electric, which also included Milwaukee Resistor. This acquisition has allowed Vishay to expand its tubular wirewound portfolio significantly beyond 300 W and into the niche market of custom high-power resistor assemblies.

The below graphic represents how the three high-power brands in the Vishay Dale portfolio will be managed by marketing for future applications.

POWER RANGE	COATING	BRAND	PRODUCT SERIES
Over 300 W	Enamel or Silicone	VSH Milwaukee	RB, RD, OV, MRC, EDG, HEX, CS61 to CS71
Under 300 W	Silicone	VSH Dale	HL, HLA, HLM, HLT, HLW, HLZ, NHL, NHLM, NHLW
Under 300 W	Enamel	VSH Huntington	AxE, AxT, FS, FxE, FxT, CMx

## Product Images



## EDG Resistors

Vishay Milwaukee EDG style resistors feature an open coil resistive element design capable of sustaining high overloads in applications up to 85 A continuous duty.

## Product Overview:

- High power rating
  - 400 W to 1600 W
- Resistance ranges
  - 0.053  $\Omega$  to 5.44  $\Omega$
- Drop-in replacements are available for competitors product
- Highly customizable for dynamic braking applications
  - Available individually, mounted on brackets, wired, and / or in enclosures with adjustable or fixed resistance ranges





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## Market Applications

Dynamic braking, motor control, rail car, ballast resistor

## Perspective

High-power EDG resistors are constructed by winding a coiled resistance wire alloy on edge over specially designed ceramic insulators with turn-by-turn spacing.

## Availability

Sample quantities are available now, with a lead time of one to two weeks.

Production quantities of resistors are available now, with a lead time of five weeks.

Rush services available.

To access the product datasheets on the Vishay Web site, go to [www.vishay.com/doc?31831](http://www.vishay.com/doc?31831) (EDG datasheet)

## Global contact information

Milwaukee Resistor

Zak Paulus

Email: [zak.paulus@vishay.com](mailto:zak.paulus@vishay.com)

Phone: +1 414-434-1716

## Vishay Dale Thin Film

### **Automotive Thin Film Chip Resistor With High Operating Temperature Range**

Vishay Intertechnology, Inc. (NYSE: VSH) introduces a new precision automotive thin film chip resistor featuring high-temperature operation to +155 °C with 100 % power, derated linearly to 0 mW power at +250 °C. The AEC-Q200-qualified PATT combines its high-temperature performance with an absolute TCR as low as  $\pm 25$  ppm/°C and laser-trimmed tolerances down to  $\pm 0.1$  %.

#### Product Benefits:

- High-temperature operation to +155 °C with 100 % power, derated linearly to 0 mW power at +250 °C
- AEC-Q200 qualified
- Low absolute TCR down to  $\pm 25$  ppm/°C
- Laser-trimmed tolerances down to  $\pm 0.1$  %
- Load-life stability of < 0.2 % at 155 °C and full rated power for 1000 hours
- Compact 0603 case size
- Wide resistance range from 2.75  $\Omega$  to 120 k $\Omega$ , with non-standard values available
- Very low noise of < -35 dB
- Low voltage coefficients of 0.1 ppm/V
- Withstands ESD to 2 kV per AEC-Q200 Class 1C
- Moisture resistant to MIL-STD-202, method 202
- Flame resistant in accordance to UL 94 V-0
- Sulfur resistant per ASTM B809-95 humid vapor test
- 100 % visually inspected per MIL-PRF-55342
- Lead (Pb)-free, RoHS-compliant, halogen-free, and conforms to Vishay "green" standards



#### Market Applications:

- Low-noise, single-signal processing
- Under-the-hood automotive applications; high-precision oil and gas exploration; and telecommunications and industrial equipment

#### Datasheet link:

<http://www.vishay.com/doc?60124> (PATT)



# Newsletter

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## **New E/H (Ta<sub>2</sub>N) Series of QPL MIL-PRF-55342-Qualified Thin Film SMD Chip Resistors With “R” Level Failure Rate**

For military and aerospace applications, Vishay’s new E/H (Ta<sub>2</sub>N) series of QPL MIL-PRF-55342-qualified surface-mount chip resistors offers an established reliability “R” failure rate of 0.01 % per 1000 hours, in addition to tolerances to  $\pm 0.1$  % and a TCR of  $\pm 25$  ppm/°C.

### **Product Benefits:**

- Built on a moisture-resistant tantalum nitride resistive film technology
- Moisture resistance level exceeds MIL-PRF-55342 limits by a factor of 50
- Very low noise of less than –25 dB
- Low voltage coefficient of 0.5 ppm/V
- All sputtered wraparound terminations for excellent adhesion and dimensional uniformity
- Wraparound resistance of less than 0.010  $\Omega$  typical
- Offered in 12 case sizes
- Power ratings from 50 mW to 1000 mW
- Working voltages from 30 V to 200 V
- Resistance ranges from 49.9  $\Omega$  to 3.3 M $\Omega$ , depending on tolerance



### **Market Applications:**

- Control systems for military and aerospace applications

### **Datasheet link:**

<http://www.vishay.com/doc?60120> (E/H Ta<sub>2</sub>N)

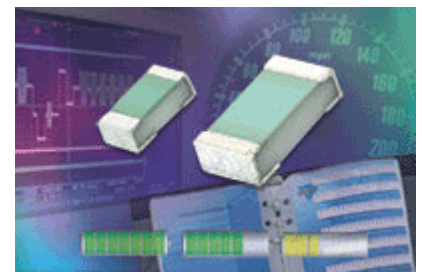
## **Vishay Draloric/Beyschlag**

### **New MCS 0402 (LCS 96/4) and MCT 0603 (LCT 96/4) Precision Thin Film Chip Resistor Sample Kits**

The Vishay Beyschlag MCS 0402 (LCS 96/4) and MCT 0603 (LCT 96/4) precision thin film chip resistor sample kits provide every fourth value of the E-96 series in MCS 0402 and MCT 0603 packages, respectively.

### **Product Benefits:**

- Each kit offers roughly 100 different resistance values
- Enclosed in cardboard tape on clearly labeled six-ring A5 binder pages, sorted in ascending order of resistance value
- Give engineers the freedom to experiment until they've found the perfect fit for their designs
- RoHS-compliant
- Approved according to EN 140401-801
- Lead (Pb)-free solder terminations



### **Market Applications:**

- Precision amplifiers in industrial electronics; sensors and scales; telecommunication base stations; and medical equipment
- Engine control units, gearbox controls, and safety and power supply systems; and battery management, measurement control, and steering technology

### **Datasheet links:**

<http://www.vishay.com/doc?28859> (Laboratory Sample Kit, MCS 0402-25 0.1 %)

<http://www.vishay.com/doc?28860> (Laboratory Sample Kit, MCT 0603-25 0.1 %)





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## **Enhanced ACAS 0612 Precision Series of Thin Film Chip Resistor Arrays**

For stable performance in automotive, industrial, and telecommunications applications, Vishay has enhanced its ACAS 0612 precision series of thin film chip resistor arrays with tighter absolute TCR down to  $\pm 10$  ppm/K, relative TCR down to  $\pm 5$  ppm/K, and relative tolerance down to  $\pm 0.05$  %.

### **Product Benefits:**

- Built on an advanced thin film technology
- Ideal for precision applications that require extraordinarily stable fixed resistance ratios
- Feature four matched resistors in one package
- Lower costs when compared to using multiple high-precision discrete resistors
- Stable divider ratio improves stability
- 75 V operating voltage
- Resistance values from 47  $\Omega$  to 221 k $\Omega$  in two pairs or four equal resistor values
- Rated dissipation to 0.1 W per element
- Suitable for processing on automatic SMD assembly systems
- RoHS-compliant
- Compatible with lead (Pb)-free and tin/lead (Sn/Pb) reflow and vapor-phase soldering processes



### **Market Applications:**

- Precision analog circuit, voltage divider, feedback circuit, and signal conditioning applications
- Automotive electronics, including engine control units, gear box controls, information, safety, power supply, body electronics, and braking systems
- Industrial electronics, such as energy management, measurement control, steering technology, sensors, scales, and bridged and precision amplifiers
- Telecommunication base stations

### **Datasheet link:**

<http://www.vishay.com/doc?28751> (ACAS 0612 - Precision)

## **New HCTF Series of Thermal Fuses**

For high-current automotive applications, Vishay's HCTF series of thermal fuses is the industry's first to offer high current capabilities up to 55 A and operation at temperatures to +160 °C for 1,000 hours without unexpected breakdown.

### **Product Benefits:**

- AEC-Q200 tested
- Functioning temperature of +235 °C ( $\pm 15$  K)
- Robust, solid-state design
- Low cold resistance of  $\leq 0.1$  m $\Omega$
- RoHS compliant
- Rated voltage of 24 V
- Assembly options:
  - Crimping units (HCTF 235 and HCTF 235 CP)
  - Electric resistance welding (HCTF 235)
  - Insertion into clamp terminations (HCTF 235 CP)



### **Market Applications:**

- Safety interrupt of electrical power in high-current automotive applications



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- Automotive power electronics that are connected to steady battery power (B+ or terminal number 30), such as control units of fans and pumps for liquid engine cooling, inlet air control units, diesel pre-heaters, engine control units, ABS control units, and diesel heater plugs

## Datasheet link:

<http://www.vishay.com/doc?28798> (HCTF 235)

<http://www.vishay.com/doc?28850> (HCTF 235 CP)

## Vishay Sfernice

### Space Passive Component Days

Vishay Sfernice participated in the European Space Agency's (ESA) Space Passive Component Days symposium, which was held from Sept. 24 to 26 at the European Space Research and Technology Centre (ESTEC) in Noordwijk, South Holland. Passive components represent more than 80 % of the EEE (electrical, electronic, and electromechanical) parts used in spacecraft.

"Vishay has been supplying qualified passive components to the space market since the early 1980s, beginning with leaded wirewound and metal film resistors," said Dominique Vignolo, Global Product Marketing Manager, Vishay Sfernice Division. "As the market continued to evolve and the need for miniaturization increased, the company responded with high-reliability MINI-MELF and wraparound thin film and thick film chip resistors and networks. Today, Vishay offers all levels of qualification required by the space market, and its products can be found in almost any space project, including the Mars Rover; Globalstar, Galileo, and Iridium satellites; Ariane launchers; the International Space Station; and many more." For more information please see <http://www.vishay.com/company/press/releases/2013/130923Passive/>.



### International Symposium for Fireworks

Vishay Sfernice participated in the International Symposium for Fireworks, held in Changsha, China, from October 14 to 18. Vishay used the opportunity to present a paper outlining the benefits of utilizing the company's soon-to-be-launched MEPIC integrated resistor in such applications. The paper raised a lot of interest and a great number of customers came to the Vishay Sfernice booth to learn more and order samples

### Wraparound Chip Resistors

Vishay Sfernice is now offering new "standard packaging" for all wraparound thin film products, allowing distributors and customers to stock the devices and receive the benefits of larger order quantities. All wraparound chip resistor and network datasheets are being updated.

### Vishay Sfernice AEC-Q and AGP-Qualified Products

Vishay Sfernice is pleased to announce that its D2TO020 and D2TO035 power thick film resistors are officially AEC-Q200 qualified. These SMD D<sup>2</sup>PAK resistors are mostly used in HEV / EV battery management applications. They bring high power and high pulse capabilities to new designs requiring low profiles and small footprints. The D2TO will now be displayed in two Vishay Marcom brochures:

Overview of Automotive-Grade Products

Overview of AEC-Qualified Products

### Electronic Design Top 101 Components

Vishay Intertechnology has a total of six products on this year's Top 101 Components list from Electronic Design, including:

#8 - IWAS-3827EC-50

#21 - VCNL3020

#40 - SMA6F TVS

#73 - P16S (potentiometer)

#74 - 193 PUR-SI Solar (capacitors)



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#82 - VLMU3100 (UV LED)

The complete list is available on the magazine's website here:

<http://electronicdesign.com/components/top-101-components-2013>.

## **Vishay Intertechnology Announces Acquisition of MCB Industrie S.A., a Specialty Resistor Company**

Vishay announced the acquisition of MCB Industrie S.A., a manufacturer of specialty resistors for professional market segments. MCB Industrie S.A. resistors are used as motion sensors in avionics, military, and space applications and as power resistors in traction, energy distribution, and various other industrial applications.

For more information please see: <http://www.snl.com/irweblinkx/file.aspx?IID=4165163&FID=17457412>.

## Non-Linear Resistors

### **NTCALUG Series Thermistors Gain UL Recognition**

Based on an extensive testing program, Vishay's NTCALUG series of NTC thermistors, including the NTCALUG01, NTCALUG02, and NTCALUG03, have gained official UL recognition under the UL1434 standard for thermistor type devices.

Component recognition / certification can save equipment manufacturers time and money when applying for safety approvals. Safety recognition guarantees that the NTCALUG products have been inspected for safe design practices and construction. To ensure continued product integrity, the safety agencies inspect Vishay manufacturing facilities on a periodic basis. The safety recognition numbers assigned to Vishay non-linear resistor products are listed both for U.S. and Canada usage as follows:

UL, Vishay File Number E148885

Link for UL-US recognized parts: [UL certificate XGPU2 file E148885](#)

Link for cUL-Canada recognized parts: [UL certificate XPGU8 file E148885](#)



The updated datasheets can be found at:

<http://www.vishay.com/doc?29092> (NTCALUG01)

<http://www.vishay.com/doc?29094> (NTCALUG02)

<http://www.vishay.com/doc?29114> (NTCALUG03)

### **NTCSxxxE3xxxSMT High-Precision, Enhanced-Stability Bulk Ceramic Thermistors**

The NTCSxxxE3xxxSMT series of high-precision, enhanced-stability SMD NTC thermistors is available in three sizes — 0402, 0603, and 0805 — with a Pb-Free construction per RoHS Directive 2011/65/EU. The devices' enhanced stability results from the choice of ceramic composition used to produce the bulk ceramic die. Vishay presents these devices with a tolerance of  $\pm 1\%$  on both R25 and B25/85 parameters, and a maximum drift of  $\pm 0.5\%$  on R25 throughout the life of the components, including the thermal effects at soldering. Each available case corresponds to one electrical resistance value at ambient temperature, from 100 K $\Omega$  to 210 K $\Omega$ .

Datasheet link: [www.vishay.com/doc?29151](http://www.vishay.com/doc?29151) (NTCSxxxE3xxxSMT)

### **NTCLE101E3C90172 and NTCLE101E3C90173**

These two new leaded, epoxy-coated NTC thermistors are now featured in a new data sheet and provide an alternative B25/85 to the standard NTCLE100 series. The lower B25/85 values, 3324 K and 3435 K respectively, allow for a better linearization of the NTC curves over a wider temperature range, even if their associated temperature coefficients are lower. In addition, those B25/85 values are commonly used in the Asian market. These components are also featured in the cross reference section just launched on the Vishay website.

Datasheet link: [www.vishay.com/doc?29152](http://www.vishay.com/doc?29152) (NTCLE101E3C90172, NTCLE101E3C90173)

### **My Vishay NTC Curve**

A new update to My Vishay NTC Curve (Version 4.4) will be uploaded soon. In addition to information related to the enhanced-stability NTC thermistors mentioned above, customers will be able to build the curve of the electrical resistance versus temperature for any NTC part number available on the NLR web page. The temperature limits are now automatically pre-populated as soon as the temperature unit is defined. The new update will be reached from the userform menu of the previous version, helping our customers easily access the most recent information.

For more information, please see <http://www.vishay.com/resistors-non-linear/ntc-curve-list/>.



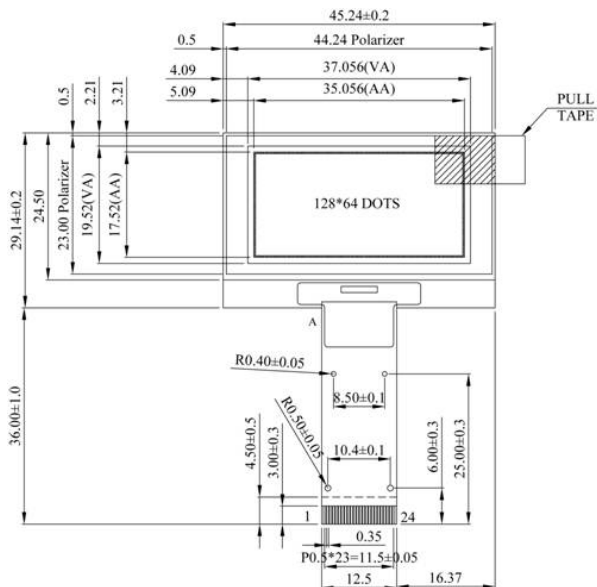
## Displays

### Vishay Dale

#### New Product Introduction - OLED COG (Chip On Glass) OLED-128O064B series

Vishay Intertechnology has released a new OLED COG graphic design, Vishay series # OLED-128H064B. This display has a built-in SSD1305Z IC with the outline dimension of 45.24 mm x 29.14 mm. Below is the basic specification of the OLED-128H064B as a reference. If you need further information or samples, please contact Neal Kratochvil for more information.

Item	Dimension
Number of Graphic	128 x 64 Dots
Module dimension	45.24 x 29.14 x 2.05 (mm)
Active Area	35.056 x 17.52 (mm)
Pixel Pitch	0.274 x 0.274 (mm)
Pixel Size	0.258 x 0.258 (mm)
Display Mode	Passive Matrix
Interface	1.) Parallel - 6800 or option 8080 2.) Serial SPI 3.) I2C
Display Color	Yellow
Drive Duty	1/64 Duty



## MarCom News

### Awards

#### AWARD ASSODEL: "Best Manufacturer" 2013

Vishay announced that the company has received an award from the Italian Association of Electronic Suppliers (ASSODEL) in the Passives category. Presented annually, the ASSODEL awards honor manufacturers in the electronics industry who demonstrate excellent product quality and collaboration with Italian customers and distribution partners.

Now in its 11th year, the ASSODEL Awards program recognizes manufacturers in nine product categories, in addition to a Best Manufacturer of the Electronics Market Award.

For more information please see:

<http://www.vishay.com/company/press/releases/2013/130814ASSODELaward/>.







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## **Vishay Intertechnology Claims Six Spots on Electronic Design's Annual "Top 101 Components"**

Vishay announced that the company's IWAS-3827EC-50 wireless charging receiving coil, VCNL3020 proximity sensor, SMA6F transient voltage suppressors (TVS), P16S panel potentiometer, 193 PUR-SI Solar power aluminum capacitors, and VLMU3100 ultraviolet (UV) LED have been selected for Electronic Design's "Top 101 Components."

The complete list is available on the magazine's website here:

<http://electronicdesign.com/components/top-101-components-2013>.



## **LPS 1100 Thick Film Power Resistor Honored With 2013 EE Times and EDN ACE Award**

The Vishay Sfernice LPS 1100 thick film power resistor has received a UBM Tech 2013 EE Times and EDN Annual Creativity in Electronics (ACE) Award (<http://ubm-ace.com/winners.php>) in the Ultimate Products of the Year: Passives, Interconnects, and Electromechanical category.

The EE Times and EDN ACE Awards are judged by a panel of industry experts, composed of the leading voices of academia and the industry. The Ultimate Products of the Year — awarded to the most significant products introduced in the last 12 months in 11 categories — are determined by large-scale peer review.

For more information please see: <http://www.vishay.com/company/press/releases/2013/130508ACEAward/index.html>.



## **PRAHT High-Precision Thin Film SMD Wraparound Chip Resistor Arrays Receive 2012 Design News Golden Mousetrap Award**

Vishay's PRAHT series of high-precision thin film SMD wraparound chip resistor arrays has received a 2012 Design News Golden Mousetrap Award in the category of Electronics & Test: Analog/Power Management/Control. Optimized for high-temperature down-hole and aeronautics applications, Vishay Sfernice PRAHT resistors are the first such products on the market to offer the combination of an operating temperature range to +215 °C and industry-high maximum storage temperature up to +230 °C.

A complete list of Golden Mousetrap Award winners can be found at [www.designnews.com](http://www.designnews.com).

For more information please see: <http://www.vishay.com/company/press/releases/2013/130312PRAHT/>.



## **Polypropylene Film Capacitor MKP1848S Honored With China Electronic Market Editors' Choice Awards**

Vishay's [Si7655DN](#) -20 V p-channel power MOSFET and [MKP1848S](#) high-performance metalized DC polypropylene film capacitor have received China Electronic Market (CEM) magazine 2012 Editors' Choice Awards in the categories of "The Most Competitive Power Devices Product in China" and "The Most Competitive Capacitor Product in China," respectively.

Winners of the CEM 2012 Editors' Choice Awards were chosen based on their sales performance in the Chinese market and technological innovation. Vishay's [Si7655DN](#) and [MKP1848S](#) were selected because of their demonstrated success in the power devices and capacitor categories.

For more information please see: <http://www.vishay.com/company/press/releases/2013/130321CEMAward/>.



## **Vishay Intertechnology Honored by SPDEI, the French Association of Distributors of Electronic Components, in "Standard Semiconductors" and "Passive Components" Categories**

This year's SPDEI Awards recognize the best semiconductor and passive component manufacturers of 2012 in nine product categories. Members of Syndicat Professionnel de la Distribution en Electronique Industrielle (SPDEI) evaluated suppliers based on five criteria: partnership with the distributor, innovation, price, quality, and durability of products; product range; profitability for the retailer; resources to support the distributor; and protection and traceability of designs.

For more information please see:

<http://www.vishay.com/company/press/releases/2013/130128SPDEI/>.





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## **PRAHT Series of High-Precision Thin Film SMD Wraparound Resistor Arrays Receives 2012 Product of the Year Award From Electronic Products Magazine**

Vishay's PRAHT series of high-precision thin film SMD wraparound resistor arrays has been honored with a 2012 Product of the Year Award from Electronic Products magazine. Presented annually, the Product of the Year Awards are bestowed by the editors of Electronic Products magazine on those new products they feel are among the most significant of the thousands introduced during the year. Their selection is based on a significant advance in technology or its application, innovation in design, or improvement in price and performance. The Vishay Sfernice PRAHT series was selected for its performance in high-temperature down-hole and aeronautics applications.

For more information please see: <http://www.vishay.com/company/press/releases/2013/130114PRAHTaward/>.



## **Power Resistor Among Trio of Vishay Products in EDN's List of Hot 100 Products for 2012**

The Vishay Draloric VSGR stainless steel power resistor is one of three Vishay products to be featured in EDN magazine's prestigious list of Hot 100 Products for 2012, which highlights the electronics industry's most significant products of the year based on innovation, significance, usefulness, and popularity.

The VSGR is a stainless steel power resistor with high power capability up to 20 kW (higher values on demand) at 40°C and a high operating temperature range of -25 °C to +250 °C for applications in extreme environments. The VSGR provides IP00 to IP23 protection and is designed as a converter and brake resistor in windmill, solar, diesel generator, turbine, and railway applications. The device features a resistance range from 0.1 Ω to 75 Ω (with other values available on request), resistance tolerance of ± 5 % and ± 10 %, and a temperature coefficient (TCR) of 250 ppm/K.

For more information please see: <http://www.vishay.com/company/press/releases/2012/121203hotproducts>.



## **VJ Non-Magnetic Series MLCCs Win EDN China 2012 Innovation Awards**

Our VJ Non-Magnetic Series MLCCs have won an EDN China 2012 Innovation Award. Presented at an award ceremony on Nov. 15 in Shanghai, the VJ Non Magnetic Series was honored with a Leading Product Award in the Passive Components and Sensors category. The EDN China Innovation Awards were introduced in 2005 to recognize achievements in the design of ICs and related products in the Chinese market. This year, 128 products from 71 companies entered the competition in nine technology categories.

For more information please see:

<http://www.vishay.com/company/press/releases/2012/121119EDNChina/>.



## **Top-10 Power Product Awards 2012**

Our WSK0612 4-terminal, 1 W surface-mount Power Metal Strip® resistor was chosen as a winner in *Electronic Products China* magazine's Tenth Annual Top-10 Power Product Awards. The editors of *Electronic Products China* evaluated hundreds of products launched in the previous year on the basis of innovative design, significant advancement in technology or application, and substantial achievement in price and performance. Vishay's WSK0612 resistor was selected because of its innovation and demonstrated success in current sensing, voltage division, and pulse applications.

For more information please see:

<http://www.vishay.com/company/press/releases/2012/121024metalstrip/>.



## **Website Update**

### **NEW - Cross-Reference Search Tool**

Vishay's new cross-reference search tool is now available on [www.vishay.com](http://www.vishay.com). The new feature allows the company's customers to cross-reference part numbers from other manufacturers with Vishay's entire product offering, making it easy to identify matching devices and make substitutions.

"Customers have been asking us for the cross-reference feature to help them find Vishay replacements for competitor parts. Most often they're looking for access to





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better supply-chain support, as well as the quality and reliability that Vishay products are so well known for,” said Craig Hunter, Senior Director of Global MarCom. “Providing access to information on hundreds of thousands of industry part numbers is a major new feature we’re happy to offer to our customers.”

The new cross-reference search tool can be accessed from the "Search" box on Vishay's website. Users simply select the "Cross-Reference" option, enter the part number they wish to replace, and receive the corresponding Vishay part number and links to product datasheets to review against their application requirements.

## Improved web search

Vishay has improved its web search functionality, which allows you to find the products that you are looking for faster than ever before.

Once a part number or keyword search has been initiated, search results are then displayed in an organized, easy-to-read web table.

You can then explore all of the available products from your search result. From the search results table you can access product datasheets and supporting product materials like technical notes, app notes, SPICE models, packaging information, and more.

## eNewsletters

### Mandarin eNewsletter

This publication provides translated press releases on new product introductions, information on translated technical articles and application notes, and highlights key Vishay products in target applications for the China market.

Oct 2013 > Automotive - <http://www.vishay.com/landingpage/newsletters/mandarin/1309/index.html>

Jun 2013 > Telecommunications - <http://www.vishay.com/landingpage/newsletters/mandarin/1306/index.html>

Apr 2013 > EV/HEV - <http://www.vishay.com/landingpage/newsletters/mandarin/1303/index.html>

### Asia eNewsletter

This publication provides press releases on new product introductions, and highlights key Vishay products in target applications for the Asian market.

Dec 2012 > Solutions for Solar - <http://www.vishay.com/landingpage/newsletters/asia/1212/>

Sep 2012 > Powerfully Good Ideas for E-Meters - <http://www.vishay.com/landingpage/newsletters/asia/0912/>

### India eNewsletter

This publication provides press releases on new product introductions, and highlights key Vishay products in target applications for the Indian market.

Jun 2012 > Lighting Applications - <http://www.vishay.com/landingpage/newsletters/india/0512/index.html>

Apr 2012 > Industrial Applications - <http://www.vishay.com/landingpage/newsletters/india/0412/>

## New/Updated Application and Technical Notes:

<a href="#">NSR Noise Suppressors - Wirewound Resistors</a>	Resistors, Dale	Oct-13
<a href="#">Versatile Planar Transformer - PLAC 100 SOFT</a>	Resistors, Sfernice	Oct-13
<a href="#">PLAC 100 Versatile Planar Transformer</a>	Resistors, Sfernice	Oct-13
<a href="#">Potentiometers and Trimmers</a>	Resistors, Sfernice	Sep-13
<a href="#">Fixed Wirewound Enameled High-Dissipation Resistors</a>	Resistors, Sfernice	Sep-13
<a href="#">Varistors Introduction</a>	Varistors	Sep-13
<a href="#">Guidelines for Vishay Sfernice Resistive and Inductive Components</a>	Resistors, Sfernice	Sep-13
<a href="#">Mechanical Stress and Deformation of SMT Components During Temperature Cycling and PCB Bending</a>	Resistors, Beyschlag	Aug-13
<a href="#">Pulse Load on SMD Resistors: At the Limit</a>	Resistors, Beyschlag	Aug-13
<a href="#">Using Laser Trimmable Resistors</a>	Resistors, Beyschlag	Aug-13
<a href="#">AC Film Capacitors in Connection with the Mains</a>	Capacitors, Film	Jul-13



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## Trade Shows - Recent

### eCarTec 2013: Oct 15 – 17, Munich, Germany

Vishay exhibited its latest passive components at eCarTec Munich 2013, the world's largest trade fair for electric and hybrid mobility, held at the Munich Trade Fair Center. At the event, the Company highlighted industry-leading inductors, resistors, thermal fuses, and more for a wide range of applications in hybrid electric vehicles (HEV) and full electric vehicles (FEV).

### Space Passive Components Days: Sep 24 – 26, Noordwijk, Netherlands

Vishay participated in the European Space Agency's (ESA) Space Passive Component Days symposium, which was held from Sept. 24 to 26 at the European Space Research and Technology Centre (ESTEC) in Noordwijk, South Holland.

"Vishay has been supplying qualified passive components to the space market since the early 1980s, beginning with leaded wirewound and metal film resistors," said Dominique Vignolo, Global Product Marketing Manager, Vishay Sfernice Division. "As the market continued to evolve and the need for miniaturization increased, the company responded with high-reliability MINI-MELF and wraparound thin film and thick film chip resistors and networks. Today, Vishay offers all levels of qualification required by the space market, and its products can be found in almost any space project, including the Mars Rover; Globalstar, Galileo, and Iridium satellites; Ariane launchers; the International Space Station; and many more." For more information please see:

<http://www.vishay.com/company/press/releases/2013/130923Passive/>.



### Techno Frontier: Jul 17 – 19, Tokyo, Japan

Vishay exhibited its latest semiconductors and passive components at Power System Japan, A component solutions provider for connectivity, mobility, and sustainability, Vishay highlighted industry-leading innovations across all of its product lines that provide increased efficiency and reliability for a wide range of applications.

### CEF Summer Chengdu: Jun 20 – 22, Chengdu, China

Vishay highlighted its latest industry-leading innovations, including passive components, diodes, power MOSFETs, power ICs, and optoelectronics.

### InterSolar: Jun 19 – 21, Munich, Germany

Vishay showcased semiconductors and passive components for solar panel junction boxes and grid-connected large-scale- and micro-inverters, including components for high-efficiency energy conversion, smart grid, and energy management applications.

## Virtual Trade Shows

High Temperature > <http://www.vishay.com/landingpage/tradeshows/virtual/temperature/>

Medical > <http://www.vishay.com/landingpage/tradeshows/virtual/medical/>

Alternative Energy > <http://www.vishay.com/landingpage/tradeshows/virtual/alternative/>

Power Management > <http://www.vishay.com/landingpage/tradeshows/virtual/power/>

## Asset Bank

This library of product images is continuing to grow and in turn it is becoming a very useful tool for Product Marketing. You may want to note that any good quality images you may have can be sent to me for upload. Any photography of new products shot will enable us to further populate the image library.

Most of our recent tradeshow posters can be found and downloaded from the Asset Bank library:

<http://images.vishay.com/asset-bank/action/viewHome>.

If you'd like access to Asset Bank or to learn more about it, please contact either myself [paul.harrison@vishay.com](mailto:paul.harrison@vishay.com) or Connie [connie.kurzeznabe@vishay.com](mailto:connie.kurzeznabe@vishay.com) and information will be sent to you.





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## Published Articles

Several articles were published last year and a few of the more recent ones are listed below. Publishing articles is a great way to advertise Vishay and our offerings. However, as you may well know, we're restricted from marketing a particular product, but we can tout our product offerings for certain applications and technologies. Please keep an open mind when we in MarCom (including Bob Decker and Rae Morrow from Redpines) approach you for an article.

- **Widerstände in der Energietechnik**  
by Ove Hach, *Markt&Technik*, Jun 2013
- **New Performance Requirements for Resistors in Aeronautics Applications**  
by Dominique Vignolo, *EDN*, Oct 2012. *Elektor*, Jun 2013.
- **Trends in Components for Solar and Wind Inverter Applications**  
by Theo van de Steeg, *Arrow Times*, Jun 2013.
- **Passive Spezialbauteile für den Automotive Einsatz**  
by Olaf Lüthje, *Markt&Technik*, Mar 2013
- **Increased Performance with Cost-Effective HDI Technology**  
by William Cuviallo, *PCB Design Magazine*, Mar 2013.
- **Increasing Accuracy in Feedback Circuits and Voltage Dividers**  
by Sebastian Weihausen, *Electronic Products*, Jan 2013.
- **Selecting Capacitors for the Energy Buffer in Solar Inverters**  
by Theo van de Steeg, *Elektronik Praxis*, Mar 2012, *AIC China*, Jun 2012.
- **Using Capacitors in Medical Electronic Applications**  
by Pat Gormally, *Practical Electronic Design Circuits*, Jan 2012

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