



**BUILT TO WIN**

VISHAY EVERY DAY

AMERICAS SALES CONFERENCE

# Draloric / Beyschlag Resistors

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March 2026



The DNA of tech.®



Our resistors are everywhere – trusted for reliability and performance.  
We lead with the widest portfolio and unmatched technologies.

Under Vishay 3.0, we're transforming our portfolio and strategy –  
driving innovation and unlocking massive growth potential

# Draloric / Beyschlag at a Glance

**Strong brand. Broad portfolio. Competitive prices.**

- One of the largest Vishay divisions (\$250M - \$300M)
- We have a worldwide manufacturing base and can offer COO outside Greater China for all our product lines
- We have invested heavily in capacity expansion (mainly thick and thin film)
- We are the salt, pepper, and spice for any application, or any PCB
- Easy to work with: fast, reliable, and partnership-driven



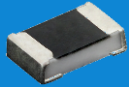
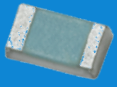
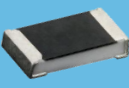
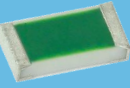

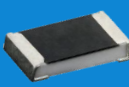
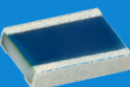


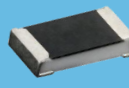



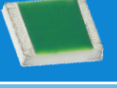

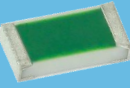

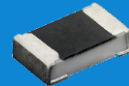


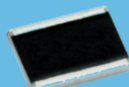
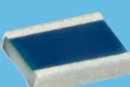
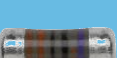
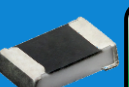
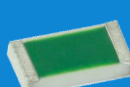
Upgrade in  
2025 / 2026

New in  
2025 / 2026



The DNA of tech.

# We Offer the Widest Portfolio in the Market

	Thick Film	Thin Film	MELF	Wirewound
General Purpose	 <b>CRCW</b>	 <b>MC Prof</b> <b>MC Prec</b>	-	-
Precision & Stability	 <b>CRCW-SP</b>	 <b>TNPW</b> <b>TNPU</b>	 <b>MM</b> <b>SMM</b>	-
High Power	 <b>CRCW-HP</b> <b>RCS</b>	 <b>MC-HP</b> <b>MCW-AT</b>	 <b>MM</b> <b>SMM</b>	 <b>AC-AT</b> <b>AC-CS</b>
High Pulse	 <b>CRCW-HP</b> <b>RCS</b>	-	 <b>CMA</b> <b>CMB</b>	 <b>AC-AT</b> <b>AC-CS</b>
High Voltage	 <b>RCV</b> <b>RCV-AT</b>	 <b>TNPV</b>	 <b>MM</b>	-
High Frequency	-	 <b>TNPR</b>	 <b>MM-HF</b> <b>CMA-HF</b>	-
Sulfur-Resistant	 <b>CRCW-SR</b> <b>RCA-SR</b>	 <b>TNP*</b> <b>MC-AT</b>	 <b>MM</b> , <b>CM</b> <b>SMM</b>	-
Temperature Cycling	 <b>RCL</b>	 <b>MCW-AT</b>	 <b>MM</b> , <b>CM</b> <b>SMM</b>	-
Miniaturization	 <b>CRCW0201-AT</b>	 <b>TNPW0201</b> <b>MC-AT0201</b>	-	-

# Products in Focus

Draloric / Beyschlag Resistors

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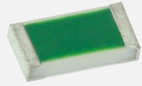
The DNA of tech.®



The DNA of tech:

# Focus Products Why Vishay?

## Thin Film



- TNPW, TNPV, TNPR
- Technology leader
- Capacity expansion
- Improved pricing
- Pb version available
- COO: Germany, Israel



*Precision,  
Stability*

## Thick Film



- CRCW, CRCW\*HP, RC\*
- Technology leader
- Capacity expansion
- Improved pricing
- Pb version available
- COO: Israel, Taiwan



*High Power,  
High Pulse*

## Wirewound



- AC-AT, AC-CS, AC-NI
- The only supplier offering AEC-Q200
- Most cost-effective solution for customers
- Capacity expansion
- COO: India, Czech Republic



*Pre-charge and  
Discharge*

## Melf



- MMA, MMB, SMM
- CMA, CMB
- Market & technology leader
- Very little competition
- Specification upgrades
- COO: Germany

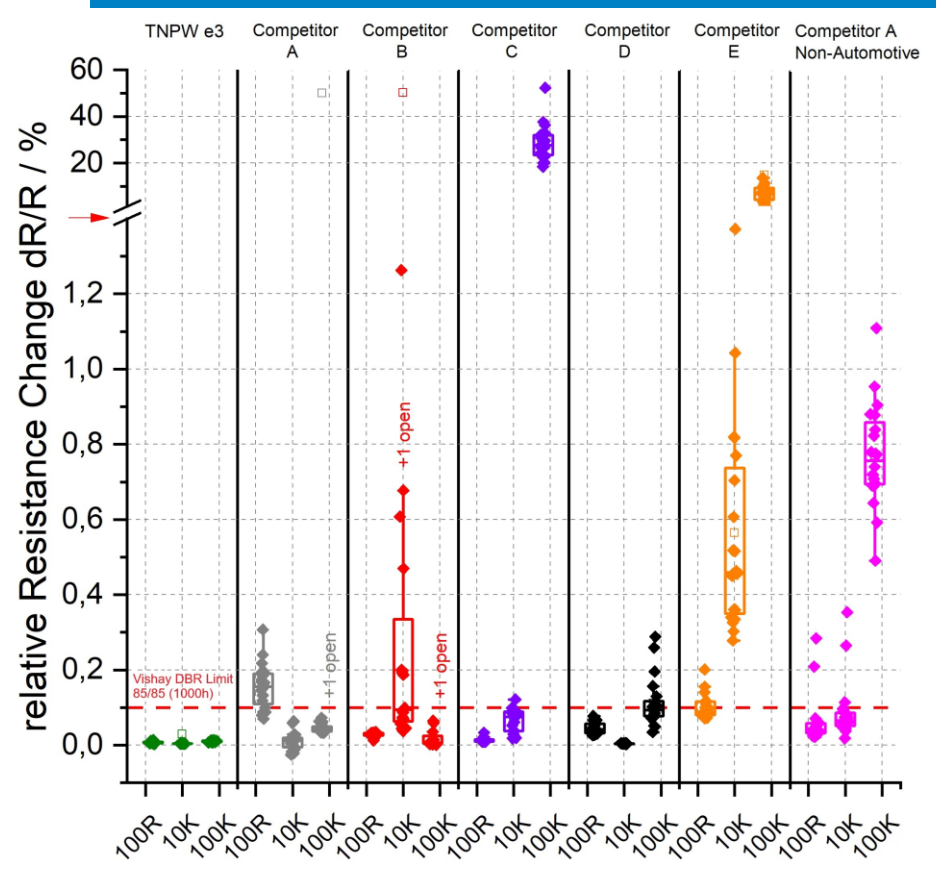


*High Pulse and  
High Precision*

# Thin Film Resistor

## Proven Reliability Beyond Industry Standards

- We offer the broadest thin film portfolio in the industry – covering all applications and needs
- When others fail, Vishay performs – proven after 10 000 h in the toughest AEC-Q200 test
- **NEXT BIG THING:** patented technology for the ultimate corrosion protection and long-term stability, launching in 2027
- Leading in sustainability: first to market with green and PFAS-free thin film resistors



# Thick Film Resistor

## Driving Performance and Competitiveness

- Specification Upgrades
  - CRCW (standard automotive R chip)
  - CRCW-HP, RCL, RCA, RCS (special R chips)
- New Product Launches:
  - CRCW0201-AT (miniaturization)
  - RCA-SR / CRCW-SR (anti-sulfur thick film)
  - CRCW-SP (precision thick film)
  - More subcon products (thick film specials)
- Competitive prices for all new products

**D/CRCW e3**  
Vishay

**CRCW-HP e3**  
Vishay Draloric

**RCL e3**  
Vishay Draloric

**RCS e3**  
Vishay

**Anti-Surge, High Power Thick Film Chip Resistors**

**CRCW0201-AT e3**  
Vishay

**Automotive 0201 Thick Film Chip Resistors**

**RCA-SR e3**  
Vishay

**Standard Sulfur Resistant Thick Film Chip Resistor**

**TECHNICAL SPECIFICATIONS**

DESCRIPTION	RCA0201-SR e3	RCA402-SR e3	RCA603-SR e3	RCA065-SR e3	RCA1206-SR e3
Imperial size	0201	0402	0603	0605	1206
Metric size code	RK0201M	RH1005M	RR1608M	RR2012M	RR3216M
Resistance range	10 Ω to 1 MΩ; jumper (D Ω)	10 Ω to 10 MΩ; jumper (D Ω)	10 Ω to 10 MΩ; jumper (D Ω)	10 Ω to 10 MΩ; jumper (D Ω)	10 Ω to 10 MΩ; jumper (D Ω)
Resistance tolerance	± 5 % ± 1 %				
Temperature coefficient	± 200 ppm/K; ± 100 ppm/K				
Rated dissipation, P <sub>tot</sub> <sup>(1)</sup>	0.05 W	0.1 W	0.125 W	0.25 W	0.25 W
Operating voltage, U <sub>max</sub> , AC/DC	30 V	75 V	75 V	150 V	200 V
Permissible film temperature, T <sub>max</sub> <sup>(1)</sup>	155 °C				
Operating temperature range	-55 °C to +155 °C				
Permissible voltage against ambient (insulation), 1 min, U <sub>iso</sub>	50 V	100 V	100 V	200 V	300 V
Failure rate: FIT <sub>base</sub>	< 0.1 × 10 <sup>-6</sup> /h				

**Notes**  
 (1) Please refer to "Application Information" below.  
 (2) Please refer to table "Maximum Resistance Change at Rated Dissipation and Operating Voltage", see below.

**APPLICATION INFORMATION**  
 When the resistor dissipates power, a temperature rise above the ambient temperature occurs, dependent on the thermal resistance of the assembled resistor together with the printed circuit board. The rated dissipation applies only if the permitted film temperature is not exceeded. These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.

Revision: 17-Oct-2025  
 For technical questions, contact: [thickfilmchip@vishay.com](mailto:thickfilmchip@vishay.com)  
 THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT [www.vishay.com/doc?99121](http://www.vishay.com/doc?99121)

# Applications in Focus

Draloric / Beyschlag Resistors

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The DNA of tech.®





The DNA of tech:

# Focus Applications Where to position?

## High Voltage Dividers

- **TNPV**, MMx HV AT, RCV AT
- Precise measurement with thin film technology over lifetime  $\Delta R/R < \pm 1 \%$
- Redundant or basic measurement with thick film technology over lifetime  $\Delta R/R \geq \pm 6 \%$



*Precision, Stability,  
Redundancy*

## Gate & Snubber Circuits

- **CRCW HP**, MMx, RCL
- Limit peak current
- Suppress surge voltages
- Controlling switching speeds
- Prevent gate ringing
- Avoid parasitics turn-on



*High Power,  
High Pulse*

## Pre- and Discharge Circuits

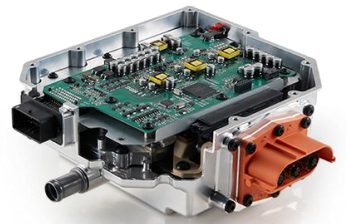
- **AC-AT**, MMx, RCL
- Active or passive discharge of capacitors
- Limit peak current
- Suppress surge voltage
- Safe open function in case of failure



*High Pulse,  
High Energy*



# Where to Find These Resistors in an Inverter



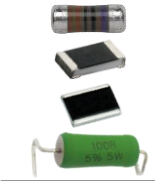
### DC-Link Discharge R

- MM\_, CM\_
- RCL,
- AC-AT



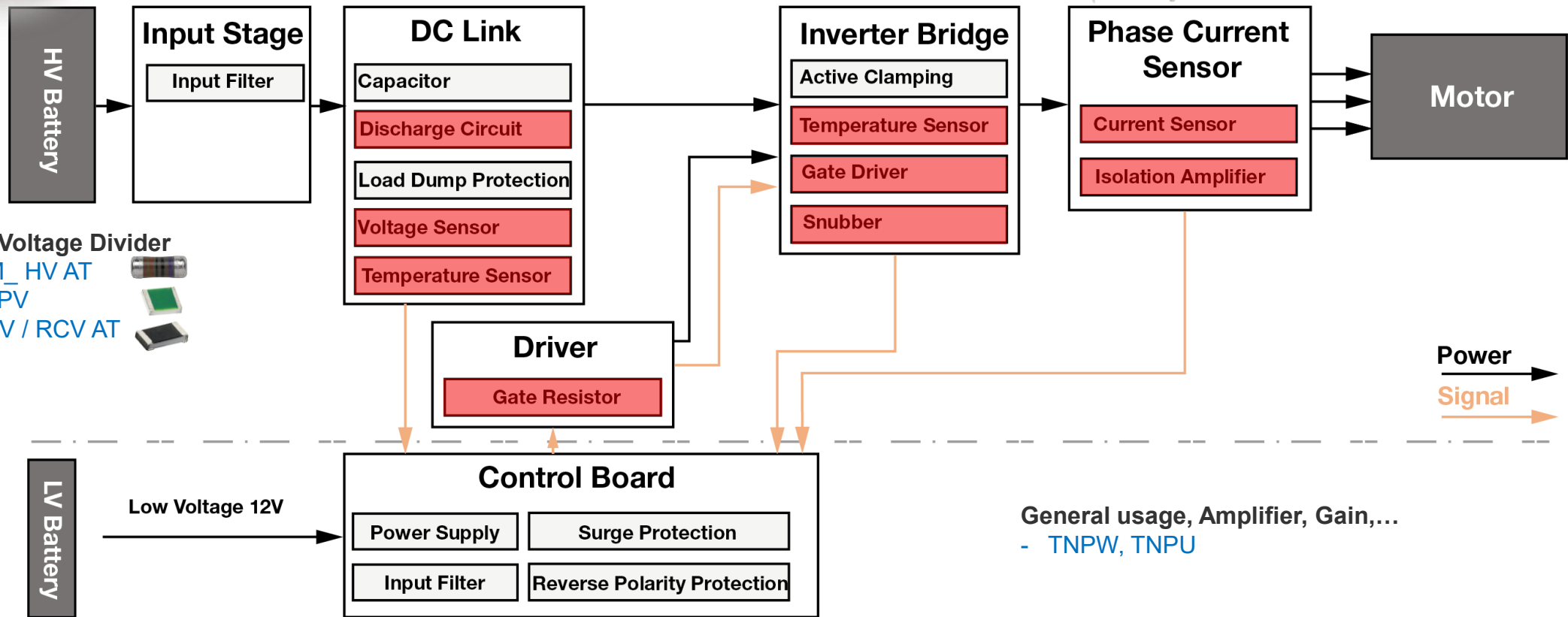
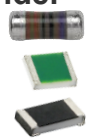
### Gate Resistor & Snubber

- MM\_, CM\_
- CRCW HP
- RCL
- AC-NI



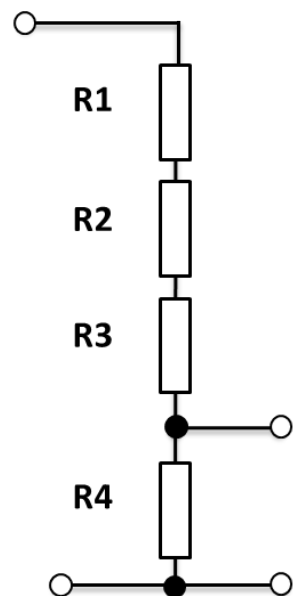
### High Voltage Divider

- MM\_ HV AT
- TNPV
- RCV / RCV AT



General usage, Amplifier, Gain, ...  
- TNPW, TNPU





# High Voltage Divider



## Application

- Battery management systems
  - Battery junction box, battery disconnect unit, power distribution unit
  - DC/DC converter
  - On-board and wall charger
  - Inverters
  - e-compressor / e-supercharger
  - Server and AI power supplies
  - Uninterruptible power supplies
- } Combo



## Benefits

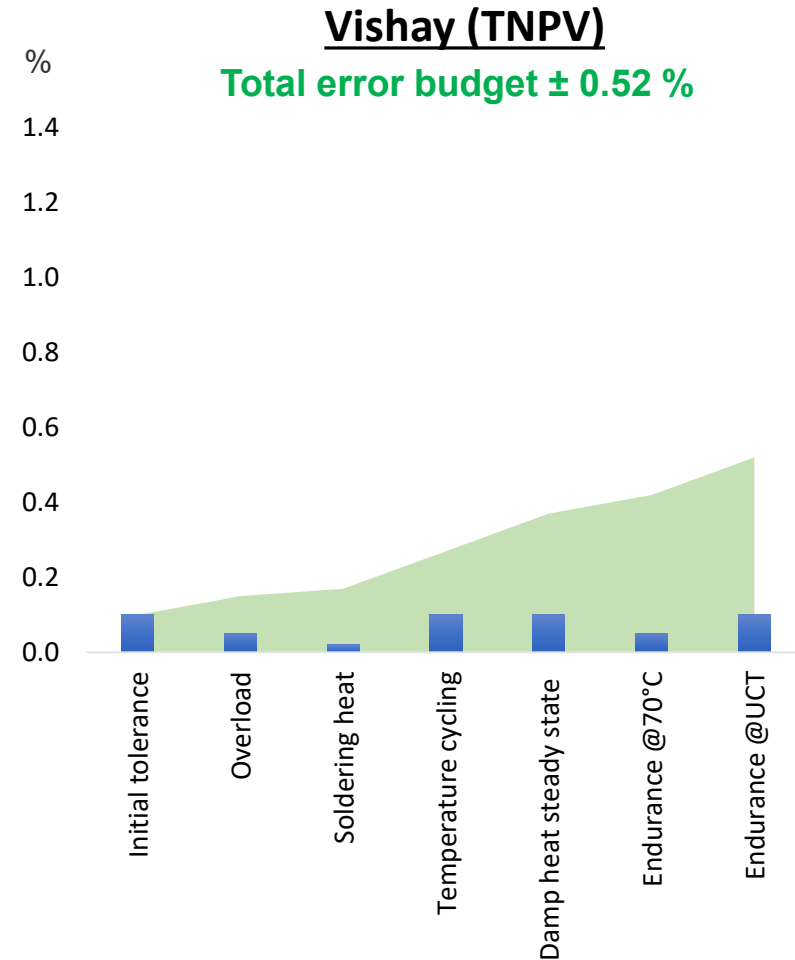
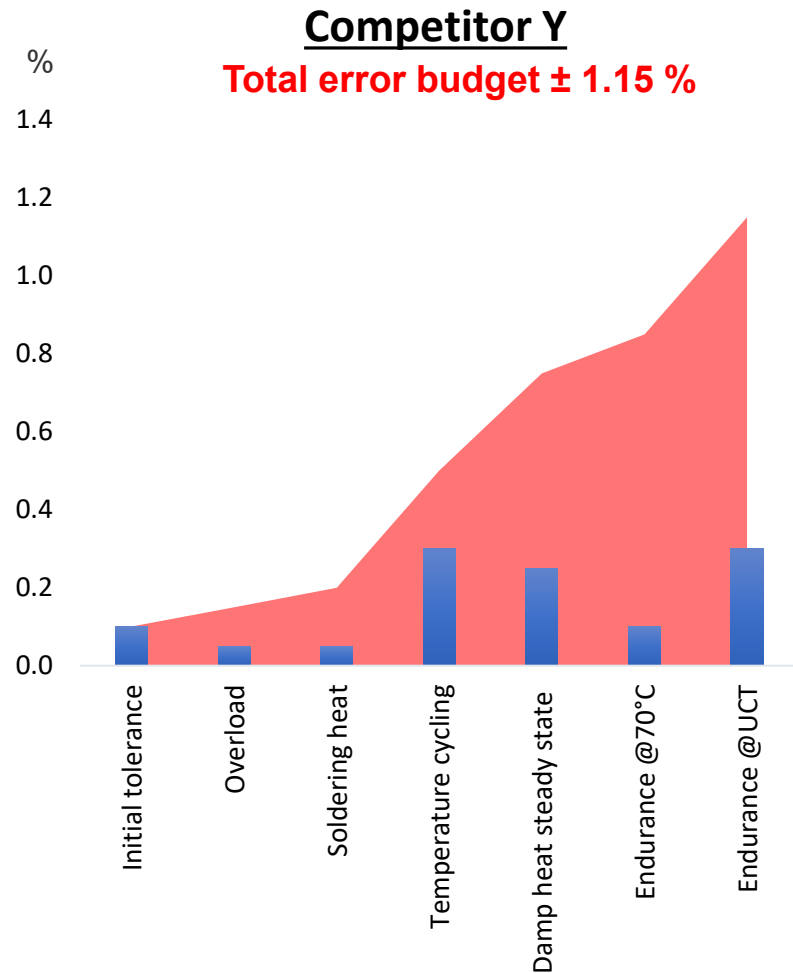
- Reduce component counts
- Reduce board space requirements
- Reduce assembly costs
- Reduce failure rate of entire circuit
- Reduce drift behavior over lifetime (thin film)





# High Voltage Thin Film – Vishay vs Competition

## ... Vishay Has 2x Lower Error Budget

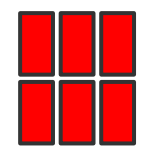
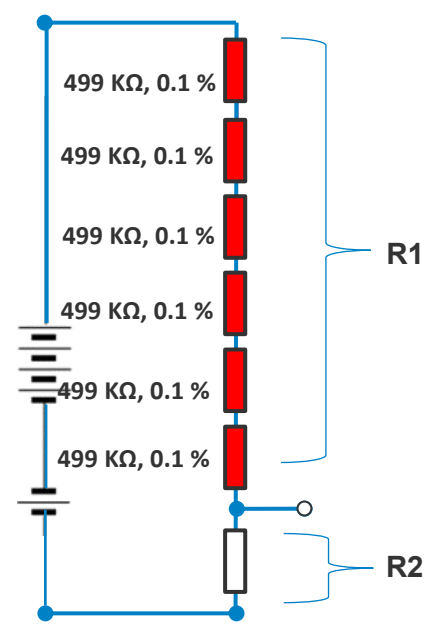




# High Voltage Thin Film – Why Our TNPV Is the Best Choice

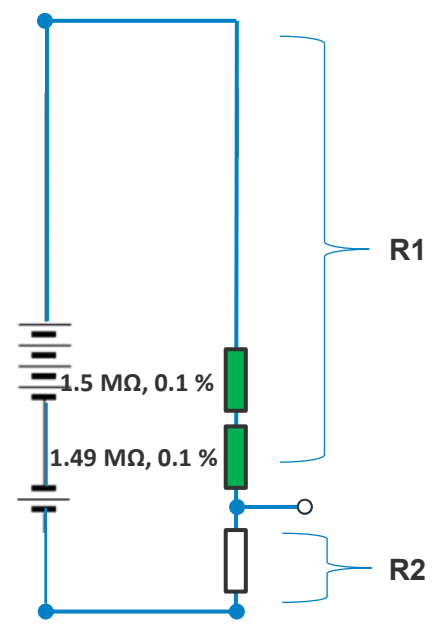
## ... Save Space and Money

**Standard Thin Film  
(1206)**



**3.0x smaller**

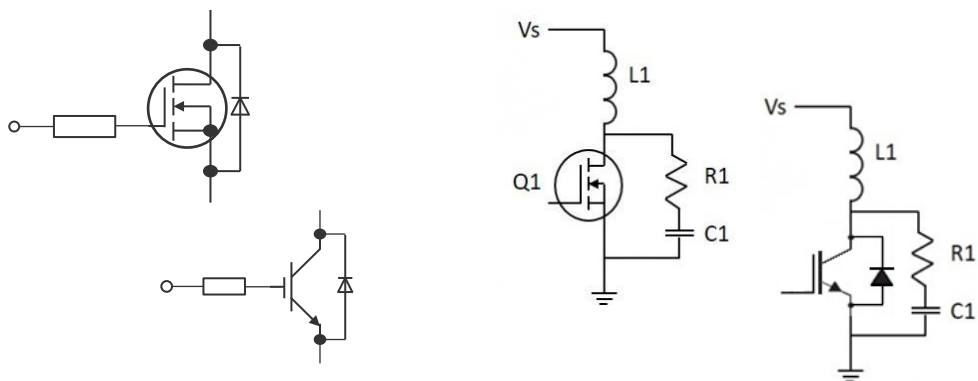
**Vishay TNPV  
(1206)**



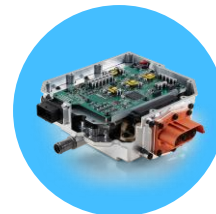
	Standard	TNPV
Products	499 KΩ 6pcs	1.5 MΩ 1pcs 1.49 MΩ 1pcs
R1 (Total)	2.994 MΩ	2.99 MΩ
Voltage (Umax)	1200 V	1400V
Tolerance	0.1 %	0.1 %
TCR	25 ppm/°C	25 ppm/°C
Size (inch)	1206	1206
Total Q'ty	6	2
Price (pcs)	\$	\$ \$ \$
Price (total)	\$ \$ \$ \$ \$ \$	\$ \$ \$ \$ \$ \$ \$ \$

**Cost savings up to 55 %**





# Gate & Snubber Circuits



## Applications

- DC/DC converters
- On-board and wall chargers
- Inverters
- eFuses / circuit breakers
- e-compressor / e-supercharger
- Server / AI power supplies
- Uninterruptible power supplies



## Benefits

- Reduce component counts
- Reduce board space requirements
- Reduce assembly costs
- Reduce failure rate of entire circuit



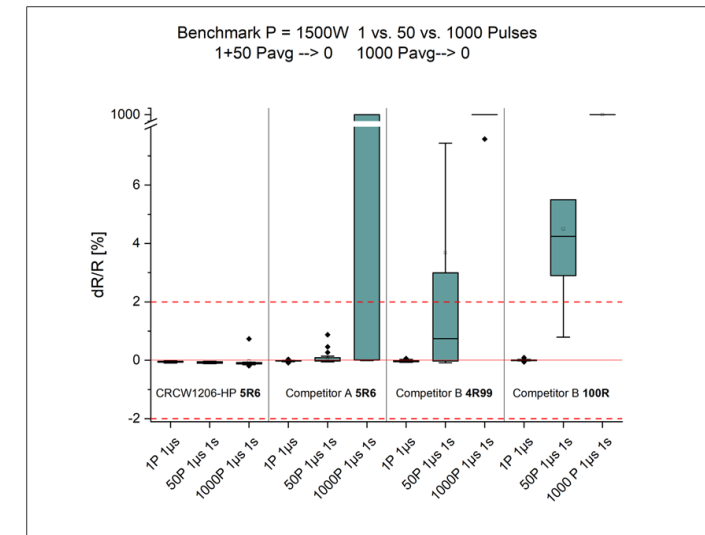


# Vishay CRCW-HP Series

## ... High Pulse and High Power Handling in Small Form Factors

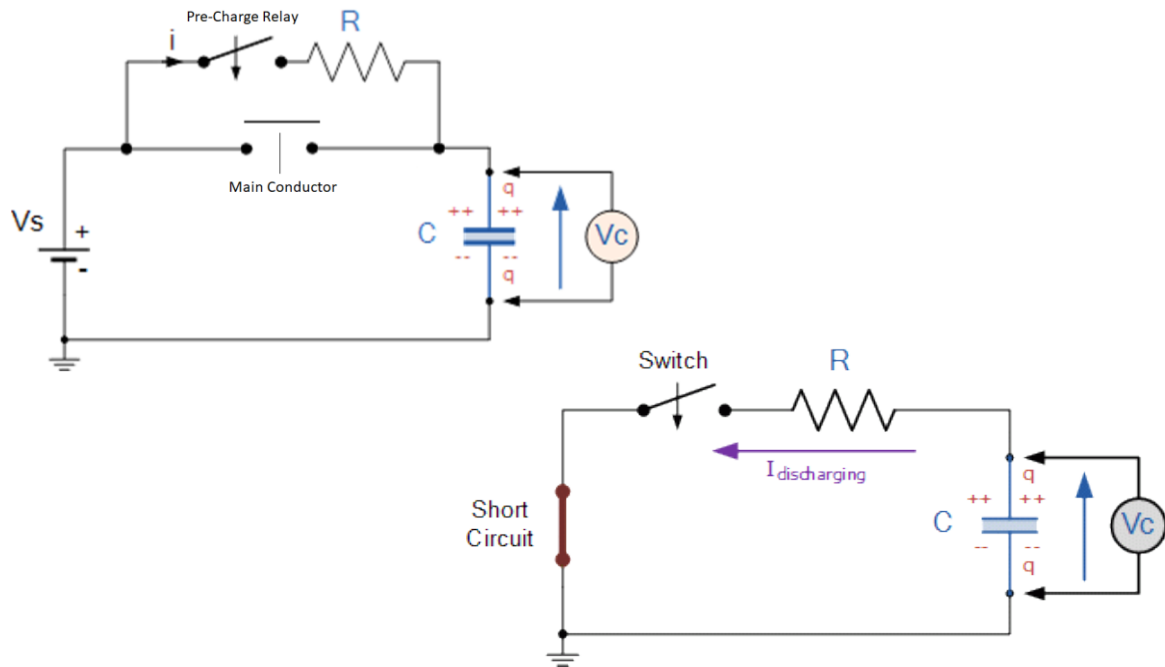
### Features

- Double-sided printed design with flexible terminations
- Increased power rating to footprint ratio
- Superior pulse characteristics
- Better thermal cycling performance
- Rated power is 1.5x to 3x higher than std. R chips
- New pulse upgrade implemented



Size	Power [W]		CRCW-HP TPT <sub>105</sub>
	Standard	CRCW-HP P <sub>70</sub>	
0402	0.063	<b>0.200</b>	<b>0.330</b>
0603	0.100	<b>0.330</b>	<b>0.750</b>
0805	0.125	<b>0.500</b>	<b>1.500</b>
1206	0.250	<b>0.750</b>	<b>1.500</b>
1210	0.500	<b>0.750</b>	<b>2.500</b>
1218	1.000	<b>1.500</b>	<b>3.500</b>
2010	0.750	<b>1.000</b>	<b>1.750</b>
2512	1.000	<b>1.500</b>	<b>2.000</b>





# Pre- and Discharge Circuits



## Applications

- Battery management systems
- Battery junction boxes, battery disconnect units, power distribution units
- DC/DC converters
- On-board and wall chargers
- Inverters
- e-compressors / e-superchargers



## Benefits

- Reduce component counts
- Reduce board space requirements
- Reduce assembly costs
- Reduce failure rate of entire circuit
- Reduce drift behavior over lifetime (thin film)

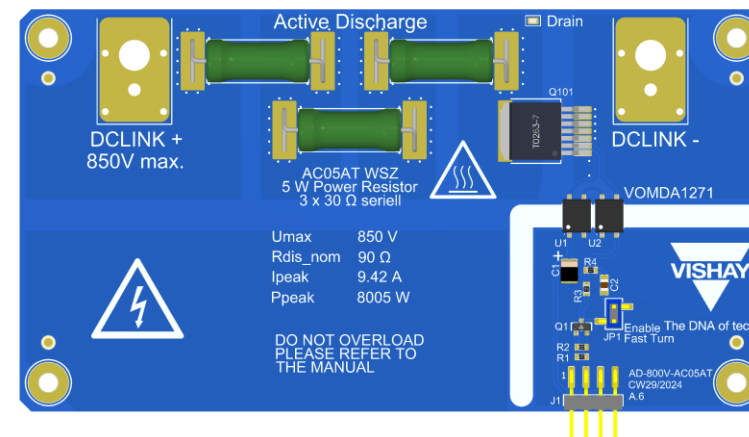
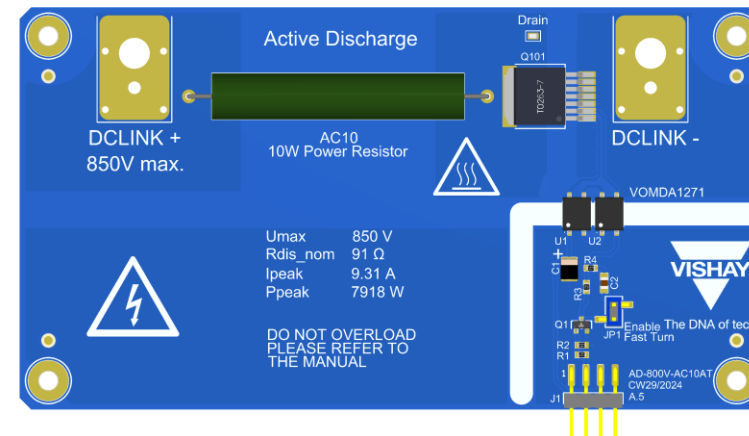


# Vishay AC, AC-AT Series

## ... Only Automotive Grade Wirewound Resistor

### Features

- AC-AT = AEC-Q200 qualified
- Extremely high adiabatic energy handling up to 100 J, equal to 100 kW for 1 ms
- No active cooling necessary
- SMD and customized solutions
- Failure rate  $< 0.7 \cdot 10^{-9}/h$ , with safe open fail
- Non-inductive and AEC-Q200 qualified
- Thermal simulation supported by Vishay to decrease time to market



# Vishay AC, AC-AT Series

... the most cost-effective solution for precharge and discharge applications

Technology	Wirewound THT	Wirewound SMD	Melf	Thick Film Long Side 1225	Other solutions
Resistor Space					...
Resistor Solution Cost (relative)					...



Vishay Draloric / Beyschlag SMD Resistor Solutions for All Types of Applications

**KEY BENEFITS**

- Broadest portfolio
- High performing products
- Standard, professional, precision, semi-precision, and ultra precision product range

**FEATURES**

Resistor solutions for application-specific requirements, such as:

- High pulse load
- Surge
- Conductive gluing
- Sulfur-resistant
- Lead (Pb) bearing
- Voltage divider
- Termination
- Pulse

TNPW0402 e3 - Precision

www.vishay.com

**Sample Kit**  
High Stability Thin Film Chip Resistors  
TNPW0402 0.1 % T-9 e3

**FEATURES**

- Superior moisture resistivity (85 °C; 85 % RH)
- Excellent overall stability at different environmental conditions  $\leq 0.05$  % (1000 h rated power at 70 °C)
- AEC-Q200 qualified
- Sulfur resistance verified according to AEC-Q200
- Material categorization: Category 1 - Halogen-free

# Design Resources & Selling Tools

**RESISTOR ARRAYS**  
WHERE A STABLE RESISTANCE RATIO IS REQUIRED

**THIN FILM CHIP RESISTOR ARRAYS**  
ACAS 9102  
ACAS 9103  
Wtd. 4 or 8 Terminals

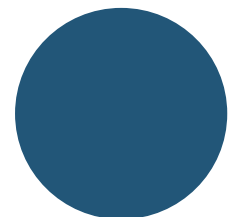
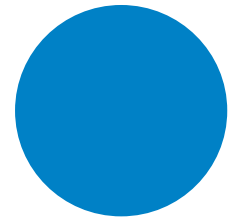
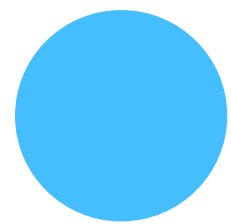
**TEMPERATURE COEFFICIENT**  
Resistor TCR  
Relative TCR (Tracking)

**APPLICATIONS**  
VOLTAGE DIVIDER  
FEEDBACK LOOP  
CURRENT SENSE  
TEMPERATURE COMPENSATION

**EQUIVALENT AGING DRIFT**  
Divider ratio stability aging over lifetime

**RESISTOR ARRAYS**  
WHERE A STABLE RESISTANCE RATIO IS REQUIRED

**DC/DC CONVERTER**  
LOAD  
DC/DC CONVERTER



## Promotion Materials

- Cheat Sheets
- Selector Guides
- Infographics
- Application Notes, White Papers
- Sample Kits

## Simulation Tools

- 3D Models
- S-Parameters
- Parasitics
- Calculators

## Reference Designs

- Insulated Voltage Sensor
- Precharge
- Active Discharge
- DC/DC Converter
- eFuse

# BUILT TO WIN

## Vishay Everyday – DBR Everywhere

- **Our products are everywhere**, the “salt, pepper and spice” of every electronics design: essential, reliable, always present (CRCW, TNPW)
- **We make customers’ lives easier**, fewer components, less board space, lower cost, higher reliability – with solutions like TNPV and AC-AT
- **We lead the technology game** in Thin Film, Thick Film, MELF and Wirewound – and with our upgrades, the gap to competitors is bigger than ever
- **We deliver – today and tomorrow** with expanded capacity, stronger pricing and global COO options that ensure stability and performance

**Better specs. More capacity. Global COO flexibility. Stronger prices.**

**DBR is more competitive than ever – and ready to win with you, everywhere.**



The DNA of tech.®



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