



# SMD RESISTORS

Vishay Draloric / Beyschlag

## 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
  - High voltage
  - High power
  - High reliability
  - High frequency
  - Low ohmic ( $< 1 \Omega$ )
  - High ohmic ( $> 10 M\Omega$ )
  - Conductive gluing
  - Sulfur-resistant
  - Lead (Pb) bearing
  - Voltage divider
  - Trimmable
  - Fully green

### RESOURCES

- For technical questions, please contact: [melf@vishay.com](mailto:melf@vishay.com), [thinfilmchip@vishay.com](mailto:thinfilmchip@vishay.com), [thickfilmchip@vishay.com](mailto:thickfilmchip@vishay.com), [thinfilmmurray@vishay.com](mailto:thinfilmmurray@vishay.com), [specialresistors@vishay.com](mailto:specialresistors@vishay.com)
- Please find your relevant sales contacts at: [www.vishay.com/doc?99914](http://www.vishay.com/doc?99914)

A WORLD OF  
SOLUTIONS™



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## ACCURACY CLASSIFICATION

	Thin Film MELF (pp. 5-6)	Thin Film Chip and Array (pp. 7-9)	Thick Film Chip and Array (pp. 10-13)
<b>Standard</b> e.g. TCR 100 / 1 %			CRCW e3 RCA e3 CRA RCL e3 RCC e3
<b>Semi-Precision</b> e.g. TCR 100 / 0.5 %			CRCW-P e3
<b>Professional</b> e.g. TCR 50 / 1 %	MM SMM	MC MC AT MCW AT ACAS	
<b>Precision</b> e.g. TCR 25 / 0.1 %	MM SMM	MC MC AT MCW AT ACAS AT TNPW e3	
<b>Ultra Precision</b> e.g. TCR 5 / 0.05 %	UM	TNPU e3 ACAS ACAS AT	



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## RESISTOR SOLUTIONS FOR SPECIFIC APPLICATION REQUIREMENTS

	Thin Film MELF (pp. 5-6)	Thin Film Chip (pp. 7-9)	Thick Film Chip (pp. 10-13)	Carbon Film MELF (p. 6)
<b>High Pulse Load</b>	MM SMM	MC MC AT MCW AT	CRCW-HP e3 CRCW-IF e3 RCA-IF e3 RCA-HP e3 RCS e3	CM
<b>High Power</b>	MMA 0204 HT MM SMM	MC AT MCW AT NCW AT MC HP	CRCW-HP e3 RCL e3 RCC e3 RCS e3 RCA-HP e3 RCA-LS e3	CM
<b>High Voltage</b>	MM HV	TNPV e3	RCV e3	CMB 0207
<b>Sulfur-Resistant</b>	MM SMM	MC MC AT MCW AT TNPW e3 MC HP	RCA e3 RCA-LS e3 RCA-IF e3 RCA-HP e3 RCA-AP e4 RCA-AU e4	CM
<b>High Reliability</b>	MM VG03 SMM0204 EN803 E8 MS1	MC VG01 TNPS		
<b>High Frequency</b>	MM HF			CMA 0204 HF
<b>Low Ohmic 0.1 <math>\Omega</math> to &lt; 1 <math>\Omega</math></b>	MM SMM	NCW AT		
<b>High Ohmic &gt; 10 M<math>\Omega</math></b>			OC CRCW-HR e3	



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## RESISTOR SOLUTIONS FOR SPECIFIC APPLICATION REQUIREMENTS



	Thin Film MELF (pp. 5-6)	Thin Film Chip (pp. 7-9)	Thick Film Chip (pp. 10-13)	Carbon Film MELF (p. 6)
<b>Conductive Gluing</b>		MC ATAU ACAS ATAU	D AP CRCW-AP RCA AP e4 RCA AU e4	
<b>Lead (Pb) Bearing</b>	MS1 ESCC MS1 EN803	TNPW	CRCW CRCW-P CRCW-TR CRCW-HR RCA	
<b>Voltage Divider</b>		ACAS ACAS AT	CRAS	
<b>Trimmable</b>		TC	CRCW-TR e3	
<b>Fully Green</b>	MM SMM		RCG e3	CM
<b>AEC-Q200 Qualified</b>	MM SMM	ACAS AT ACAS ATAU MC AT MC ATAU MCW AT MC HP NCW AT TNPW e3 TNPU e3 TNPV e3 <sup>(1)</sup>	CRCW e3 CRCW-P e3 RCA e3 RCL e3 RCA-HP e3 RCA-AP e4 RCA-AU e4 RCA-LS e3 RCS e3 RCC e3 RCA-IF e3 CRCW-HP e3 CRCW-IF e3 CRA	CM

<sup>(1)</sup> Qualification under preparation.



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Thin Film MELF Resistors			
Series	Description	Features	Brand
<b>MMU, MMA, MMB Professional</b>  	<ul style="list-style-type: none"> <li>• Professional MELF Resistors</li> <li>• Size: 0102 to 0207</li> <li>• Tolerance: <math>\pm 0.5\%</math> to <math>\pm 5\%</math></li> <li>• TCR: <math>\pm 25</math> ppm/K to <math>\pm 100</math> ppm/K</li> <li>• Resistance range: <math>0.22\ \Omega</math> to <math>15\ M\Omega</math>; <math>0\ \Omega</math></li> <li>• Power rating: <math>0.3\ W</math> to <math>1\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Precise and stable thin film technology</li> <li>• High power rating</li> <li>• IECQ-CECC approval to EN 140401-803</li> <li>• AEC-Q200 qualified</li> </ul>	Beyschlag
<b>MMU, MMA, MMB Precision</b>  	<ul style="list-style-type: none"> <li>• Precision MELF Resistors</li> <li>• Size: 0102 to 0207</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 0.5\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K to <math>\pm 25</math> ppm/K</li> <li>• Resistance range: <math>10\ \Omega</math> to <math>1\ M\Omega</math></li> <li>• Power rating: <math>0.2\ W</math> to <math>0.4\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Precise and stable thin film technology</li> <li>• IECQ-CECC approval to EN 140401-803</li> <li>• Advanced level of precision and stability</li> <li>• AEC-Q200 qualified</li> </ul>	Beyschlag
<b>SMM 0102, 0204, 0207</b>  	<ul style="list-style-type: none"> <li>• Precision and Professional MELF Resistors</li> <li>• Size: 0102 to 0207</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 5\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K to <math>\pm 100</math> ppm/K</li> <li>• Resistance range: <math>0.16\ \Omega</math> to <math>10\ M\Omega</math>; (OMM) <math>0\ \Omega</math></li> <li>• Power rating: <math>0.2\ W</math> to <math>1\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Precise and stable thin film technology</li> <li>• High power rating</li> <li>• AEC-Q200 qualified</li> </ul>	Draloric
<b>UMA 0204, UMB 0207</b>  	<ul style="list-style-type: none"> <li>• Ultra Precision MELF Resistors</li> <li>• Size: 0204; 0207</li> <li>• Tolerance: <math>\pm 0.02\%</math> to <math>\pm 0.25\%</math></li> <li>• TCR: <math>\pm 5</math> ppm/K to <math>\pm 15</math> ppm/K</li> <li>• Resistance range: <math>22\ \Omega</math> to <math>390\ k\Omega</math></li> <li>• Power rating: <math>0.25\ W</math> to <math>0.4\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Superior overall stability</li> <li>• High precision thin film technology</li> <li>• IECQ-CECC approval to EN 140401-803</li> </ul>	Beyschlag
<b>SMM 0204... EN803 E0</b>  	<ul style="list-style-type: none"> <li>• MINI-MELF Resistors (CECC Approved)</li> <li>• Size: 0204</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 5\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K to <math>\pm 100</math> ppm/K</li> <li>• Resistance range: <math>1\ \Omega</math> to <math>2.21\ M\Omega</math></li> <li>• Power rating: <math>0.25\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• High reliability product</li> <li>• AEC-Q200 qualified</li> <li>• IECQ-CECC approval to EN 140401-803</li> </ul>	Draloric
<b>SMM 0204... EN803 E8</b>  	<ul style="list-style-type: none"> <li>• MINI-MELF Resistors With Established Reliability</li> <li>• Size: 0204</li> <li>• Tolerance: <math>\pm 0.1\%</math>; <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K; <math>\pm 50</math> ppm/K</li> <li>• Resistance range: <math>1\ \Omega</math> to <math>2.21\ M\Omega</math></li> <li>• Power rating: <math>0.25\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• IECQ-CECC approval to EN 140401-803 version E:</li> <li>• Established reliability, failure rate level E8</li> <li>• Stable metal film on high quality ceramic</li> </ul>	Draloric
<b>MS1...EN803 E8</b>  	<ul style="list-style-type: none"> <li>• Lead (Pb) Bearing MINI-MELF Resistors With Established Reliability</li> <li>• Size: 0204</li> <li>• Tolerance: <math>\pm 0.1\%</math>; <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K; <math>\pm 50</math> ppm/K</li> <li>• Resistance range: <math>1\ \Omega</math> to <math>2.21\ M\Omega</math></li> <li>• Power rating: <math>0.25\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• IECQ-CECC approval to EN 140401-803 version E:</li> <li>• Established reliability, failure rate level E8</li> <li>• Stable metal film on high quality ceramic</li> <li>• SnPb termination plating, Pb contents <math>&gt; 6\%</math></li> <li>• Meets Bellcore, MIL, and ESCC plating requirements</li> </ul>	Draloric



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Series	Description	Features	Brand
<b><a href="#">MS1...ESCC</a></b>  	<ul style="list-style-type: none"> <li>• <b>Hi-Rel Thin Film MINI-MELF Resistors</b></li> <li>• Size: 0204</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 2.21 <math>\Omega</math> to 5.11 M<math>\Omega</math></li> <li>• Power rating: 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• High reliability product</li> <li>• ESA approved to ESCC 4001/022</li> <li>• Advanced thin film technology</li> <li>• SnPb termination plating, minimum 6 % Pb</li> </ul>	Draloric
<b><a href="#">MMU 0102 HF</a></b> , <b><a href="#">MMA 0204 HF</a></b> , <b><a href="#">MMB 0207 HF</a></b> 	<ul style="list-style-type: none"> <li>• <b>High Frequency MELF Resistors</b></li> <li>• Size: 0102 to 0207</li> <li>• Tolerance: <math>\pm 1\%</math> to <math>\pm 2\%</math></li> <li>• TCR: <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 1.5 <math>\Omega</math> to 475 <math>\Omega</math></li> <li>• Power rating: 0.3 W to 1.0 W</li> </ul>	<ul style="list-style-type: none"> <li>• Speciality product for RF applications</li> <li>• Low inductance, non-helical trimmed product</li> </ul>	Beyschlag
<b><a href="#">MMU 0102 VG03</a></b> , <b><a href="#">MMA 0204 VG03</a></b> , <b><a href="#">MMB 0207 VG03</a></b>  	<ul style="list-style-type: none"> <li>• <b>Precision and Professional MELF Resistors With Established Reliability</b></li> <li>• Size: 0102 to 0207</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math>; 0 <math>\Omega</math></li> <li>• Power rating: 0.2 W to 0.4 W</li> </ul>	<ul style="list-style-type: none"> <li>• IECQ-CECC approval to EN 140401-803, version E</li> <li>• Established reliability, failure rate level E6 (corresponds to MIL level P)</li> <li>• Precise and stable thin film technology</li> </ul>	Beyschlag
<b><a href="#">MMA 0204 HT</a></b>  	<ul style="list-style-type: none"> <li>• <b>Professional High Temperature MINI-MELF Resistor</b></li> <li>• Size: 0204</li> <li>• Tolerance: <math>\pm 0.5\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 25</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 47 <math>\Omega</math> to 100 k<math>\Omega</math>; 0 <math>\Omega</math></li> <li>• Power rating: 0.5 W</li> </ul>	<ul style="list-style-type: none"> <li>• 175 °C specified operating temperature</li> <li>• AEC-Q200 qualified</li> <li>• Excellent stability &lt; 0.1 %</li> </ul>	Beyschlag
<b><a href="#">MMA 0204 HV</a></b> <b><a href="#">MMB 0207 HV</a></b> 	<ul style="list-style-type: none"> <li>• <b>Professional High Voltage Thin Film MELF Resistors</b></li> <li>• Size: 0204 and 0207</li> <li>• Tolerance: <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 340 k<math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.4 W to 1.0 W</li> </ul>	<ul style="list-style-type: none"> <li>• High operating voltage <math>U_{max.} = 1000</math> V</li> <li>• Advanced metal film technology</li> <li>• Matte Sn termination on Ni barrier layer</li> </ul>	Beyschlag
Carbon Film MELF Resistors			
Series	Description	Features	Brand
<b><a href="#">CMA 0204</a></b> , <b><a href="#">CMB 0207</a></b>   	<ul style="list-style-type: none"> <li>• <b>High Pulse Load MELF Resistors</b></li> <li>• Size: 0204 and 0207</li> <li>• Tolerance: <math>\pm 1\%</math> to <math>\pm 5\%</math></li> <li>• TCR: see datasheet</li> <li>• Resistance range: 2.2 <math>\Omega</math> to 1.5 M<math>\Omega</math></li> <li>• Power rating: 0.4 W to 1 W</li> <li>• Up to 3 kW single pulse capability</li> </ul>	<ul style="list-style-type: none"> <li>• Special carbon film technology</li> <li>• Outstanding pulse load stability</li> <li>• High power rating</li> <li>• AEC-Q200 qualified</li> <li>• CMB: VDE approval to IEC 60065, 14.2.a (= VDE 0860, 14.1.a)</li> </ul>	Beyschlag
<b><a href="#">CMA 0204 HF</a></b> 	<ul style="list-style-type: none"> <li>• <b>Pulse Load MELF Resistors for High Frequency Applications</b></li> <li>• Size: 0204</li> <li>• Tolerance: <math>\pm 2\%</math></li> <li>• TCR: -250 ppm/K</li> <li>• Resistance range: 47 <math>\Omega</math> to 300 <math>\Omega</math></li> <li>• Power rating: 0.4 W</li> </ul>	<ul style="list-style-type: none"> <li>• Specialty product for RF applications</li> <li>• ESD capability: 3 kV, human body model</li> <li>• Suitable for more than 10 GHz</li> </ul>	Beyschlag



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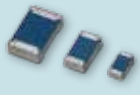

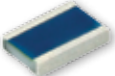
Thin Film Chip Resistors			
Series	Description	Features	Brand
<b>TNPW e3</b>  	<ul style="list-style-type: none"> <li>• <b>High Stability Precision Thin Film Chip Resistors</b></li> <li>• Size: 0402 to 1210</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 10</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: <math>4.7\ \Omega</math> to <math>3.01\ M\Omega</math></li> <li>• Power rating: <math>0.1\ W</math> to <math>0.5\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Low temperature coefficient and tight tolerances</li> <li>• Superior moisture resistivity</li> <li>• Excellent overall stability at different environmental conditions</li> <li>• AEC-Q200 qualified (sizes 0402 to 1206)</li> </ul>	Vishay
<b>TNPW</b> 	<ul style="list-style-type: none"> <li>• <b>High Stability Precision Thin Film Chip Resistors</b></li> <li>• Size: 0402 to 1210</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 10</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: <math>10\ \Omega</math> to <math>3.01\ M\Omega</math></li> <li>• Power rating: <math>0.063\ W</math> to <math>0.33\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• SnPb termination plating, minimum 6 % Pb</li> <li>• Excellent overall stability at different environmental conditions</li> <li>• Low temperature coefficient and tight tolerances</li> </ul>	Vishay
<b>TNPU e3</b>  	<ul style="list-style-type: none"> <li>• <b>High Precision Thin Film Chip Resistors</b></li> <li>• Size: 0603 to 1206</li> <li>• Tolerance: <math>\pm 0.02\%</math> to <math>\pm 0.1\%</math></li> <li>• TCR: <math>\pm 5</math> ppm/K to <math>\pm 10</math> ppm/K</li> <li>• Resistance range: <math>100\ \Omega</math> to <math>511\ k\Omega</math></li> <li>• Power rating: <math>0.1\ W</math> to <math>0.25\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Low temperature coefficient and tight tolerances</li> <li>• Superior moisture resistivity</li> <li>• AEC-Q200 qualified</li> </ul>	Draloric
<b>TNPV e3</b> 	<ul style="list-style-type: none"> <li>• <b>High Voltage Thin Film Flat Chip Resistors</b></li> <li>• Size: 1206 and 1210</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 10</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: <math>121\ k\Omega</math> to <math>3.01\ M\Omega</math></li> <li>• Power rating: <math>0.25\ W</math> to <math>0.33\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• High operating voltage <math>U_{max}</math> up to <math>1000\ V</math></li> <li>• Precision properties: TCR and tolerances down to <math>\pm 10</math> ppm/K; <math>\pm 0.1\%</math></li> <li>• Excellent overall stability at different environmental conditions</li> <li>• Superior moisture resistivity</li> </ul>	Draloric
<b>MC Professional</b>  	<ul style="list-style-type: none"> <li>• <b>Professional Thin Film Chip Resistors</b></li> <li>• Size: 0402 to 1206</li> <li>• Tolerance: <math>\pm 0.5\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 25</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: <math>1\ \Omega</math> to <math>10\ M\Omega</math>; <math>0\ \Omega</math></li> <li>• Power rating: <math>0.1\ W</math> to <math>0.4\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Excellent overall stability: Class 0.5</li> <li>• IECQ-CECC approval to EN 140401-801</li> </ul>	Beyschlag
<b>MC Precision</b>  	<ul style="list-style-type: none"> <li>• <b>Precision Thin Film Chip Resistors</b></li> <li>• Size: 0402 to 1206</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 0.25\%</math></li> <li>• TCR: <math>\pm 10</math> ppm/K to <math>\pm 25</math> ppm/K</li> <li>• Resistance range: <math>39\ \Omega</math> to <math>2\ M\Omega</math></li> <li>• Power rating: <math>0.063\ W</math> to <math>0.25\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Superior overall stability: Class 0.1 and 0.25</li> <li>• IECQ-CECC approval to EN 140401-801</li> </ul>	Beyschlag
<b>MC AT Professional</b>  	<ul style="list-style-type: none"> <li>• <b>Professional Automotive Grade Thin Film Chip Resistors</b></li> <li>• Size: 0402 to 1206</li> <li>• Tolerance: <math>\pm 0.5\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 25</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: <math>1\ \Omega</math> to <math>1\ M\Omega</math>; <math>0\ \Omega</math></li> <li>• Power rating: <math>0.1\ W</math> to <math>0.4\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• High temperature operation up to <math>175\ ^\circ C</math></li> <li>• IECQ-CECC approval to EN 140401-801</li> <li>• AEC-Q200 qualified</li> <li>• Superior moisture resistivity</li> </ul>	Beyschlag
<b>MC AT Precision</b>  	<ul style="list-style-type: none"> <li>• <b>Precision Automotive Grade Thin Film Chip Resistors</b></li> <li>• Size: 0402 to 1206</li> <li>• Tolerance: <math>\pm 0.1\%</math></li> <li>• TCR: <math>\pm 10</math> ppm/K to <math>\pm 25</math> ppm/K</li> <li>• Resistance range: <math>47\ \Omega</math> to <math>1\ M\Omega</math></li> <li>• Power rating: <math>0.1\ W</math> to <math>0.4\ W</math></li> </ul>	<ul style="list-style-type: none"> <li>• Advanced level of precision and stability</li> <li>• IECQ-CECC approval to EN 140401-801</li> <li>• AEC-Q200 qualified</li> <li>• Superior moisture resistivity</li> </ul>	Beyschlag





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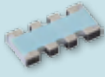
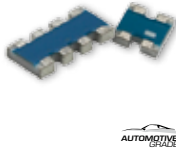
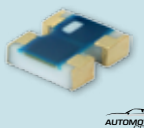
Thin Film Chip Resistors			
Series	Description	Features	Brand
<b>MC ATAU Precision</b> 	<ul style="list-style-type: none"> <li>• <b>Precision Gold-Terminated Thin Film Chip Resistors for Conductive Gluing</b></li> <li>• Size: 0402 and 0603</li> <li>• Tolerance: <math>\pm 0.1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K and <math>\pm 25</math> ppm/K</li> <li>• Resistance range: 100 <math>\Omega</math> to 100 k<math>\Omega</math></li> <li>• Power rating: 0.1 W to 0.125 W</li> </ul>	<ul style="list-style-type: none"> <li>• Gold terminations for conductive gluing</li> <li>• Superior temperature cycling robustness</li> <li>• Superior moisture resistivity</li> <li>• AEC-Q200 qualified</li> </ul>	Beyschlag
<b>MC HP</b> 	<ul style="list-style-type: none"> <li>• <b>High Power Thin Film Chip Resistors</b></li> <li>• Size: 0402 to 0805</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 25</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 1 <math>\Omega</math> to 100 k<math>\Omega</math></li> <li>• Power rating: 0.2 W to 0.4 W</li> </ul>	<ul style="list-style-type: none"> <li>• Rated dissipation <math>P_{85}</math> up to 0.4 W for size 0805</li> <li>• High temperature operation up to 175 <math>^{\circ}\text{C}</math></li> <li>• Superior temperature cycling robustness</li> <li>• AEC-Q200 qualified</li> </ul>	Beyschlag
<b>MCW AT Professional</b> 	<ul style="list-style-type: none"> <li>• <b>Professional Wide Terminal Thin Film Chip Resistor</b></li> <li>• Size: 0406; 0612</li> <li>• Tolerance: <math>\pm 0.5\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 25</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 1 <math>\Omega</math> to 100 k<math>\Omega</math></li> <li>• Power rating: 0.3 W to 1.0 W</li> </ul>	<ul style="list-style-type: none"> <li>• Rated dissipation <math>P_{85}</math> up to 1 W</li> <li>• Superior temperature cycling robustness</li> <li>• High temperature operation up to 175 <math>^{\circ}\text{C}</math></li> <li>• AEC-Q200 qualified</li> </ul>	Beyschlag
<b>MCW 0406 AT Precision</b> 	<ul style="list-style-type: none"> <li>• <b>Precision Wide Terminal Thin Film Chip Resistor</b></li> <li>• Size: 0406</li> <li>• Tolerance: <math>\pm 0.1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K to <math>\pm 25</math> ppm/K</li> <li>• Resistance range: 1 <math>\Omega</math> to 100 k<math>\Omega</math></li> <li>• Power rating: 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced level of precision and stability</li> <li>• Precision (TCR of <math>\pm 15</math> ppm/K; <math>\pm 0.1\%</math> tolerance) down to 1 <math>\Omega</math></li> <li>• Superior temperature cycling robustness</li> <li>• AEC-Q200 qualified</li> </ul>	Beyschlag
<b>NCW 0406 AT</b> 	<ul style="list-style-type: none"> <li>• <b>Low Ohmic Wide Terminal Thin Film Chip Resistors</b></li> <li>• Size: 0406</li> <li>• Tolerance: <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 0.33 <math>\Omega</math> to 0.91 <math>\Omega</math></li> <li>• Power rating: 0.3 W</li> </ul>	<ul style="list-style-type: none"> <li>• Rated power dissipation <math>P_{85} = 300</math> mW</li> <li>• Resistance range down to 0.33 <math>\Omega</math></li> <li>• Superior temperature cycling robustness</li> <li>• Superior moisture resistivity</li> <li>• AEC-Q200 qualified</li> </ul>	Beyschlag
<b>MC VG01</b> 	<ul style="list-style-type: none"> <li>• <b>Thin Film Chip Resistors With Established Reliability</b></li> <li>• Size: 0402 to 1206</li> <li>• Tolerance: <math>\pm 0.1\%</math>; <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K; <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 1 <math>\Omega</math> to 1 M<math>\Omega</math>; 0 <math>\Omega</math></li> <li>• Power rating: 0.063 W to 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• Established reliability, failure rate level 6 (corresponds to MIL level P)</li> <li>• Advanced level of precision and stability</li> <li>• IECQ-CECC Approval to EN 140401-801, Version E</li> </ul>	Beyschlag
<b>TNPS...ESCC</b> 	<ul style="list-style-type: none"> <li>• <b>Hi-Rel Thin Film Chip Resistors</b></li> <li>• Size: 0603 to 1206</li> <li>• Tolerance: <math>\pm 0.1\%</math> to <math>\pm 1\%</math></li> <li>• TCR: <math>\pm 15</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>• Resistance range: 10 <math>\Omega</math> to 1 M<math>\Omega</math></li> <li>• Power rating: 0.1 W to 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• ESA approval to ESCC 4001/029</li> <li>• Advanced level of precision and stability</li> <li>• SnPb termination plating, minimum 6 % Pb</li> </ul>	Draloric





# SMD RESISTORS







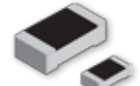

## Vishay Draloric / Beyschlag

Thin Film Chip Resistors			
Series	Description	Features	Brand
<a href="#">ACAS 0612 Professional</a> 	<ul style="list-style-type: none"> <li>Professional Thin Film Chip Resistor Array</li> <li>Size: 0612</li> <li>Tolerance: <math>\pm 0.5\%</math>; <math>\pm 1\%</math></li> <li>TCR: <math>\pm 25</math> ppm/K to <math>\pm 50</math> ppm/K</li> <li>Resistance range: 47 <math>\Omega</math> to 221 k<math>\Omega</math></li> <li>Power rating per element: 0.1 W</li> </ul>	<ul style="list-style-type: none"> <li>Four insulated resistors on one substrate</li> <li>Two pairs or four equal resistor values</li> <li>Resistance ratio up to 10:1</li> <li>Professional applications with space constraints</li> </ul>	Beyschlag
<a href="#">ACAS 0612 Precision</a> 	<ul style="list-style-type: none"> <li>Precision Thin Film Chip Resistor Array</li> <li>Size: 0612</li> <li>Relative tolerance: down to <math>\pm 0.05\%</math></li> <li>Relative TCR: down to <math>\pm 5</math> ppm/K</li> <li>Resistance range: 47 <math>\Omega</math> to 221 k<math>\Omega</math></li> <li>Power rating per element: 0.1 W</li> </ul>	<ul style="list-style-type: none"> <li>Four insulated resistors on one substrate</li> <li>Tight TCR tracking and tolerance matching</li> <li>Resistance ratio up to 5:1</li> <li>For all applications with matched resistors like voltage dividers or feedback circuits</li> </ul>	Beyschlag
<a href="#">ACAS 0606 AT, ACAS 0612 AT</a> 	<ul style="list-style-type: none"> <li>Precision Automotive Grade Thin Film Chip Resistor Array</li> <li>Size: 0606 and 0612</li> <li>Relative tolerance: down to <math>\pm 0.05\%</math></li> <li>Relative TCR: down to <math>\pm 5</math> ppm/K</li> <li>Resistance Range: 47 <math>\Omega</math> to 150 k<math>\Omega</math></li> <li>Power rating per element: 0.125 W</li> </ul>	<ul style="list-style-type: none"> <li>Superior moisture resistivity</li> <li>Two or four insulated resistors on one substrate</li> <li>Tight TCR tracking and tolerance matching</li> <li>Resistance ratio up to 20:1</li> <li>AEC-Q200 qualified</li> <li>Perfect for automotive and industrial applications with matched resistors like voltage dividers or feedback circuits</li> </ul>	Beyschlag
<a href="#">ACAS 0606 ATAU Precision</a> 	<ul style="list-style-type: none"> <li>Precision Gold-Terminated Thin Film Chip Resistor Array for Conductive Gluing</li> <li>Size: 0606</li> <li>Relative tolerance: down to <math>\pm 0.05\%</math></li> <li>Relative TCR: down to <math>\pm 5</math> ppm/K</li> <li>Resistance range: 100 <math>\Omega</math> to 150 k<math>\Omega</math></li> <li>Power rating per element: 0.125 W</li> </ul>	<ul style="list-style-type: none"> <li>Gold terminations for conductive gluing</li> <li>Two insulated resistors on one substrate</li> <li>Tight TCR tracking and tolerance matching</li> <li>Resistance ratio up to 20:1</li> <li>Superior moisture resistivity</li> <li>AEC-Q200 qualified</li> </ul>	Beyschlag



# SMD RESISTORS




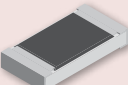


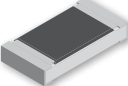
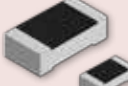

## Vishay Draloric / Beyschlag

Thick Film Chip Resistors			
Series	Description	Features	Brand
<b>D/CRCW e3</b> 	<ul style="list-style-type: none"> <li>• <b>Standard Thick Film Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1 W</li> <li>• Zero ohm jumper: available for all sizes</li> </ul>	<ul style="list-style-type: none"> <li>• AEC-Q200 qualified</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Vishay
<b>D/CRCW</b> 	<ul style="list-style-type: none"> <li>• <b>Lead (Pb)-Bearing Thick Film Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1 W</li> <li>• Zero ohm jumper: available for all sizes</li> </ul>	<ul style="list-style-type: none"> <li>• SnPb termination plating on Ni barrier, minimum 10 % Pb</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Vishay
<b>RCA e3</b> 	<ul style="list-style-type: none"> <li>• <b>Automotive Grade, Sulfur-Resistant, Lead (Pb)-Free, Thick Film Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1 W</li> <li>• Zero ohm jumper: available for all sizes</li> </ul>	<ul style="list-style-type: none"> <li>• Superior resistance against H<sub>2</sub>S atmosphere</li> <li>• AEC-Q200 qualified</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Draloric
<b>RCA</b> 	<ul style="list-style-type: none"> <li>• <b>Lead (Pb)-Bearing Automotive Grade, Sulfur-Resistant, Thick Film Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1 W</li> <li>• Zero ohm jumper: available for all sizes</li> </ul>	<ul style="list-style-type: none"> <li>• Superior resistance against H<sub>2</sub>S atmosphere</li> <li>• SnPb termination plating on Ni barrier, minimum 10 % Pb</li> </ul>	Vishay
<b>D/CRCW-P e3</b> 	<ul style="list-style-type: none"> <li>• <b>Thick Film Semi-Precision Chip Resistor</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1 W</li> </ul>	<ul style="list-style-type: none"> <li>• AEC-Q200 qualified</li> <li>• Tight tolerances (<math>\pm</math> 0.25 %)</li> <li>• Low TCR (<math>\pm</math> 50 ppm/K)</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Vishay
<b>D/CRCW-P</b> 	<ul style="list-style-type: none"> <li>• <b>Lead (Pb)-Bearing Thick Film Semi-Precision Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 10 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1 W</li> </ul>	<ul style="list-style-type: none"> <li>• Tight tolerances (<math>\pm</math> 0.25 %)</li> <li>• Low TCR (<math>\pm</math> 50 ppm/K)</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Vishay
<b>RCC e3</b> 	<ul style="list-style-type: none"> <li>• <b>Medium Power Thick Film Chip Resistors</b></li> <li>• Size: 0603; 0805</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.2 W to 0.25 W</li> <li>• Zero ohm jumper available</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced power rating up to 0.25 W</li> <li>• AEC-Q200 qualified</li> </ul>	Vishay
<b>CRCW-HP e3</b> 	<ul style="list-style-type: none"> <li>• <b>Pulse-Proof, High Power Thick Film Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 1 M<math>\Omega</math></li> <li>• Power rating: 0.125 W to 1.5 W</li> <li>• Tolerance: <math>\pm</math> 0.5 %</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent pulse load capability</li> <li>• Enhanced power rating</li> <li>• Double-sided printed resistor element</li> <li>• Protective overglaze</li> <li>• AEC-Q200 qualified, rev. C compliant</li> </ul>	Draloric



# SMD RESISTORS


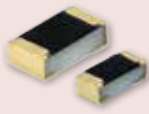

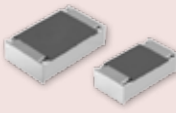

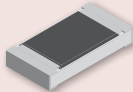
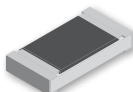
## Vishay Draloric / Beyschlag

Thick Film Chip Resistors			
Series	Description	Features	Brand
 <p><b>RCA-HP e3</b></p>	<ul style="list-style-type: none"> <li>• Sulfur-Resistant, Pulse-Proof, High Power Thick Film Chip Resistor</li> <li>• Size : 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 1 M<math>\Omega</math></li> <li>• Power rating: 0.2 W to 1.5 W</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent performance in sulfur environments</li> <li>• Excellent pulse load capability</li> <li>• Enhanced power rating</li> <li>• Double-sided resistor element</li> <li>• AEC-Q200 qualified</li> </ul>	Draloric
 <p><b>RCL e3</b></p>	<ul style="list-style-type: none"> <li>• Long Side Termination Thick Film Chip Resistors</li> <li>• Size: 0406 to 1225</li> <li>• Resistance range: 1 <math>\Omega</math> to 2.2 M<math>\Omega</math></li> <li>• Power rating: 0.25 W to 2 W</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced power rating</li> <li>• Long side terminations</li> <li>• Protective overglaze</li> <li>• AEC-Q200 qualified, rev. C compliant</li> <li>• Better performance in temperature cycles</li> </ul>	Draloric
 <p><b>RCA-LS e3</b></p>	<ul style="list-style-type: none"> <li>• Sulfur-Resistant, Long Side Termination Thick Film Chip Resistors</li> <li>• Size: 0406 to 1225</li> <li>• Resistance range: 1 <math>\Omega</math> to 2.2 M<math>\Omega</math></li> <li>• Power rating: 0.25 W to 2 W</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent performance in sulfur environments</li> <li>• Better performance in temperature cycles</li> <li>• Enhanced power rating</li> <li>• Long side terminations</li> <li>• Protective overglaze</li> <li>• AEC-Q200 qualified</li> </ul>	Draloric
 <p><b>RCV e3</b></p>	<ul style="list-style-type: none"> <li>• High Voltage Thick Film Chip Resistors</li> <li>• Size: 0805 to 1206</li> <li>• Resistance range: 100 k<math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.125 W to 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• High operating voltage (up to 500 V)</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Draloric
 <p><b>RCG e3</b></p>	<ul style="list-style-type: none"> <li>• Fully RoHS-Compliant, Green, Thick Film, Rectangular Chip Resistors</li> <li>• Size: 0402 to 1206</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• Green resistor – does not use RoHS exemptions</li> <li>• Stability: <math>\pm 1\%</math> for 1000 h at 70 <math>^{\circ}\text{C}</math>, for <math>\pm 1\%</math> tolerance</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Draloric
 <p><b>D/CRCW-IF e3</b></p>	<ul style="list-style-type: none"> <li>• Thick Film, Rectangular, Pulse-Proof Chip Resistors</li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 100 k<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1.0 W</li> </ul>	<ul style="list-style-type: none"> <li>• AEC-Q200 qualified</li> <li>• High pulse performance</li> <li>• Metal glaze on high quality ceramic</li> <li>• Protective overglaze</li> <li>• Lead (Pb)-free solder contacts on Ni barrier layer</li> </ul>	Vishay
 <p><b>RCA-IF e3</b></p>	<ul style="list-style-type: none"> <li>• Sulfur-Resistant, Pulse-Proof Thick Film Chip Resistors</li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 1 <math>\Omega</math> to 100 k<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1.0 W</li> </ul>	<ul style="list-style-type: none"> <li>• AEC-Q200 qualified</li> <li>• Excellent performance in sulfur environments</li> <li>• High pulse performance</li> <li>• Metal glaze on high quality ceramic</li> <li>• Protective overglaze</li> <li>• Lead (Pb)-free solder contacts on Ni barrier layer</li> </ul>	Draloric
 <p><b>RCS e3</b></p>	<ul style="list-style-type: none"> <li>• Anti-Surge, High Power Thick Film Chip Resistors</li> <li>• Size: 0402 to 1206</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.2 W to 0.5 W</li> <li>• Zero ohm jumper available</li> </ul>	<ul style="list-style-type: none"> <li>• Excellent surge pulse capability</li> <li>• Superior ESD surge characteristics</li> <li>• High power rating</li> <li>• AEC-Q200 qualified</li> </ul>	Vishay
 <p><b>D AP, CRCW-AP</b></p>	<ul style="list-style-type: none"> <li>• Thick Film, Rectangular Chip Resistors for Conductive Gluing</li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 3.6 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1 W</li> <li>• Zero ohm jumper: available for all sizes</li> </ul>	<ul style="list-style-type: none"> <li>• AgPd terminations for conductive gluing</li> <li>• Stability: <math>\pm 1\%</math> for 1000 h at 70 <math>^{\circ}\text{C}</math>, for <math>\pm 1\%</math> tolerance</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Draloric



# SMD RESISTORS

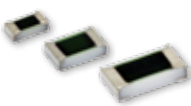

## Vishay Draloric / Beyschlag

Thick Film Chip Resistors			
Series	Description	Features	Brand
<b>RCA-AP e4</b> 	<ul style="list-style-type: none"> <li>• <b>Robust Thick Film Chip Resistors for Conductive Gluing</b></li> <li>• Size: 0603</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.15 W</li> <li>• Zero ohm jumper available</li> </ul>	<ul style="list-style-type: none"> <li>• AgPd terminations for conductive gluing</li> <li>• Excellent performance in sulfur environments</li> <li>• High temperature operation up to 175 <math>^{\circ}</math>C</li> <li>• AEC-Q200 qualified</li> </ul>	Vishay
<b>RCA-AU e4</b> 	<ul style="list-style-type: none"> <li>• <b>Sulfur-Resistant, Gold-Terminated Thick Film Chip Resistors for Conductive Gluing</b></li> <li>• Size: 0402; 0603</li> <li>• Resistance range: 1 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.1 W to 0.15 W</li> <li>• Zero ohm jumper available</li> </ul>	<ul style="list-style-type: none"> <li>• Gold (Au) terminations for conductive gluing</li> <li>• Excellent performance in sulfur environments</li> <li>• High temperature operation up to 175 <math>^{\circ}</math>C</li> <li>• AEC-Q200 qualified</li> </ul>	Vishay
<b>D/CRCW-HR e3</b> 	<ul style="list-style-type: none"> <li>• <b>Thick Film, Rectangular, High Value Chip Resistors</b></li> <li>• Size: 0603 to 1206</li> <li>• Resistance range: 11 M<math>\Omega</math> to 470 M<math>\Omega</math></li> <li>• Power rating: 0.1 W to 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• High resistance values (up to 470 M<math>\Omega</math>)</li> <li>• Suitable for voltage dividers and hybrids</li> <li>• Metal glaze on high quality ceramic</li> <li>• Protective overglaze</li> </ul>	Vishay
<b>OCT 0603, OCU 0805</b> 	<ul style="list-style-type: none"> <li>• <b>High Ohmic Thick Film Flat Chip Resistors</b></li> <li>• Size: 0603; 0805</li> <li>• Tolerance: <math>\pm</math> 5 %</li> <li>• TCR: <math>\pm</math> 100 ppm/K to <math>\pm</math> 250 ppm/K</li> <li>• Resistance range: 11 M<math>\Omega</math> to 130 M<math>\Omega</math></li> <li>• Power rating: limited by <math>U_{max}</math></li> </ul>	<ul style="list-style-type: none"> <li>• Wide ohmic range from 11 M<math>\Omega</math> to 130 M<math>\Omega</math></li> <li>• Excellent overall stability</li> </ul>	Beyschlag
<b>D/CRCW-HR</b> 	<ul style="list-style-type: none"> <li>• <b>Lead (Pb)-bearing Thick Film, Rectangular High Value Chip Resistor</b></li> <li>• Size: 0603 to 1206</li> <li>• Resistance range: 11 M<math>\Omega</math> to 470 M<math>\Omega</math></li> <li>• Power rating: 0.1 W to 0.25 W</li> </ul>	<ul style="list-style-type: none"> <li>• High resistance values (up to 470 M<math>\Omega</math>)</li> <li>• Suitable for voltage dividers and hybrids</li> <li>• SnPb termination plating on Ni barrier, minimum 10 % Pb</li> <li>• Metal glaze on high quality ceramic</li> <li>• Protective overglaze</li> </ul>	Vishay
<b>D/CRCW-TR e3</b> 	<ul style="list-style-type: none"> <li>• <b>Thick Film, Rectangular, Trimmable Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 0.47 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1.0 W</li> </ul>	<ul style="list-style-type: none"> <li>• Can be trimmed to the required value after insertion</li> <li>• For applications in precision circuitry where relative tolerances can be compensated by trimming</li> <li>• Metal glaze on high quality ceramic</li> <li>• Protective overglaze</li> </ul>	Vishay
<b>D/CRCW-TR</b> 	<ul style="list-style-type: none"> <li>• <b>Lead (Pb) Bearing Thick Film, Rectangular, Trimmable Chip Resistors</b></li> <li>• Size: 0402 to 2512</li> <li>• Resistance range: 0.47 <math>\Omega</math> to 10 M<math>\Omega</math></li> <li>• Power rating: 0.063 W to 1.0 W</li> </ul>	<ul style="list-style-type: none"> <li>• Can be trimmed to the required value after insertion</li> <li>• For applications in precision circuitry where relative tolerances can be compensated by trimming</li> <li>• SnPb termination plating on Ni barrier, minimum 10 % Pb</li> <li>• Metal glaze on high quality ceramic</li> <li>• Protective overglaze</li> </ul>	Vishay



# SMD RESISTORS

## Vishay Draloric / Beyschlag

Thick Film Chip Resistors			
Series	Description	Features	Brand
 <p><b>TC</b></p>	<ul style="list-style-type: none"> <li>• <b>Trimmable Thick Film Flat Chip Resistors</b></li> <li>• Size: 0603 to 1206</li> <li>• TCR: <math>\pm 50</math> ppm/K to <math>\pm 100</math> ppm/K</li> <li>• Resistance range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> <li>• Power rating: <math>0.125 \text{ W}</math> to <math>0.250 \text{ W}</math></li> </ul>	<ul style="list-style-type: none"> <li>• Designed for state of the art laser trimming</li> <li>• Wide ohmic range from <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> <li>• Excellent stability <math>\leq \pm 0.25 \%</math> (<math>1000 \text{ h}</math> rated power at <math>70 \text{ }^\circ\text{C}</math>)</li> </ul>	Beyschlag
 <p><b>CRCW0201 e3</b></p>	<ul style="list-style-type: none"> <li>• <b>Commodity Thick Film Chip Resistors</b></li> <li>• Size: 0201</li> <li>• Resistance range: <math>1 \Omega</math> to <math>10 \text{ M}\Omega</math></li> <li>• Power rating: <math>0.05 \text{ W}</math></li> <li>• Tolerance: <math>\pm 0.5 \%</math></li> </ul>	<ul style="list-style-type: none"> <li>• High volume product suitable for commercial applications</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Vishay
 <p><b>CRCW01005 e3</b></p>	<ul style="list-style-type: none"> <li>• <b>Commodity Thick Film Chip Resistors</b></li> <li>• Size: 01005</li> <li>• Resistance range: <math>1 \Omega</math> to <math>1 \text{ M}\Omega</math></li> <li>• Power rating: <math>0.031 \text{ W}</math></li> <li>• Tolerance: <math>\pm 1 \%</math></li> </ul>	<ul style="list-style-type: none"> <li>• High volume product suitable for commercial applications</li> <li>• Metal glaze on high quality ceramic</li> </ul>	Vishay
 <p><b>CRA04S</b></p>	<ul style="list-style-type: none"> <li>• <b>Thick Film Chip Resistor Array</b></li> <li>• Size: 0404 to 0408</li> <li>• Power rating per element: <math>0.063 \text{ W}</math></li> <li>• Resistance range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> </ul>	<ul style="list-style-type: none"> <li>• Convex terminal array with square corners</li> <li>• 4- or 8-terminal package with isolated resistors</li> </ul>	Vishay
 <p><b>CRA04P</b></p>	<ul style="list-style-type: none"> <li>• <b>Thick Film Chip Resistor Array</b></li> <li>• Size: 0408</li> <li>• Power rating: <math>0.063 \text{ W}</math></li> <li>• Resistance range: <math>1 \Omega</math> to <math>1 \text{ M}\Omega</math></li> </ul>	<ul style="list-style-type: none"> <li>• Concave terminal array with square corners</li> <li>• 8-terminal package with isolated resistors</li> </ul>	Vishay
 <p><b>CRA06E, CRA06S</b></p>	<ul style="list-style-type: none"> <li>• <b>Thick Film Chip Resistor Array</b></li> <li>• Size: 0606 to 0612</li> <li>• Power rating per element: <math>0.063 \text{ W}</math></li> <li>• Resistance range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> </ul>	<ul style="list-style-type: none"> <li>• Convex terminal array available with either scalloped corners (E version) or square corners (S version)</li> <li>• 4- or 8-terminal package with isolated resistors</li> </ul>	Vishay
 <p><b>CRA06P</b></p>	<ul style="list-style-type: none"> <li>• <b>Thick Film Chip Resistor Array</b></li> <li>• Size: 0606 to 0612</li> <li>• Power rating per element: <math>0.063 \text{ W}</math></li> <li>• Resistance range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> </ul>	<ul style="list-style-type: none"> <li>• Concave terminal array with square corners</li> <li>• 4- or 8-terminal package with isolated resistors</li> </ul>	Vishay
 <p><b>CRA12E, CRA12S</b></p>	<ul style="list-style-type: none"> <li>• <b>Thick Film Chip Resistor Array</b></li> <li>• Size: 1220 to 1225</li> <li>• Power rating per element: <math>0.1 \text{ W}</math> to <math>0.125 \text{ W}</math></li> <li>• Resistance range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> </ul>	<ul style="list-style-type: none"> <li>• Convex terminal array available with either scalloped corners (E version) or square corners (S version)</li> <li>• Wide ohmic range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> <li>• 8- or 10-terminal package with isolated resistors</li> </ul>	Vishay
 <p><b>CRAS0606, CRAS0612, CRAE0612</b></p>	<ul style="list-style-type: none"> <li>• <b>Thick Film Chip Resistor Array, Different Values</b></li> <li>• Size: 0606; 0612</li> <li>• Power rating per element: <math>0.063 \text{ W}</math></li> <li>• Resistance range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> </ul>	<ul style="list-style-type: none"> <li>• 4- or 8-terminal package with isolated resistors</li> <li>• Different values (CRAS0606 model) or two pairs of values (CRAS0612 / CRAE0612 model)</li> <li>• Wide ohmic range: <math>10 \Omega</math> to <math>1 \text{ M}\Omega</math></li> <li>• Convex terminal array available with either scalloped corners (E version) or square corners (S version)</li> <li>• AEC-Q200 qualified</li> </ul>	Draloric





# SMD RESISTORS

## Selector Guide

### Vishay Intertechnology – A Global Industry Leader

Vishay Intertechnology components are used in virtually all types of electronic devices and equipment, in the industrial, computing, automotive, consumer, telecommunications, military, aerospace, power supplies, and medical markets. Vishay has manufacturing plants in the Americas, Asia, Europe, and Israel, as well as sales offices worldwide. Vishay Intertechnology has a diverse portfolio of semiconductors and passive components, including diodes, MOSFETs (metal-oxide semiconductor field-effect transistors), optoelectronic products, selected integrated circuits (ICs), resistors, inductors, and capacitors. This enables it to provide “one-stop shop” service and offer many different parts for each customer design. Its innovations in technology, successful acquisition strategy, superior product quality, and “one-stop shop” service to customers have made the Company a global industry leader.

[www.vishay.com](http://www.vishay.com)

Two of the most important manufacturers of fixed film resistors are the Vishay Draloric and the Vishay Beyschlag brands.

#### About Draloric

In 1900, in Germany, Mr. Philip Rosenthal, as a sideline to his established business of porcelain tableware, started to manufacture ceramics for electronic applications. Starting in 1910, these were also made in Selb, Germany. In 1936, this electronic ceramics activity was separated from Rosenthal AG and made part of a joint venture with AEG named Rosenthal Isolatoren GmbH, or “RIG.”

The RIG name lasted until 1974, when AEG took over all of RIG and renamed it “CRL” because of its portfolio of passive components. The name was changed again in 1974 to Draloric Electronic GmbH. With the acquisition of Draloric Electronic GmbH by the electronics division of Corning Glass Works in 1981, the name was changed to Corning-Draloric, which lasted until its acquisition by Vishay Intertechnology in 1987.

Vishay Draloric is a leading brand for MELF resistors and ceramic capacitor products. The Vishay Draloric product portfolio also includes thin film flat chip resistors, leaded film and wirewound resistors, and large ceramic power capacitors. As part of Vishay Intertechnology, Draloric Electronic has had production sites in Israel since 1989, and in the Czech Republic since 1991.

Draloric competitors Roederstein GmbH (resistors and capacitors), and Vitramon GmbH (capacitors only) were acquired by Vishay Intertechnology in 1993 and 1994, respectively, and merged with Draloric Electronic GmbH, which has its headquarters in Selb. Since then, the name Vishay Draloric has been used as a brand name for resistor products.

Visit us at:

<http://www.vishay.com/company/brands/draloric>

#### About Beyschlag

A look back into the history of the company shows a solid business based on natural growth. From the moment the company was founded in 1931, the customer has always come first. At the time, Dr. Bernhard Beyschlag started producing rectifiers in Berlin, Germany, to meet the growing needs of the new radio industry. Soon, carbon film resistors were in production. The company spent periods in Hitzacker and Westerland on the Island of Sylt before finally relocating to Heide in 1974. From the early 1970s, Beyschlag belonged to Philips Components, until 1999, when Philips divested itself of its passive components business to allow the foundation of BCcomponents. In 2002, BCcomponents was bought by Vishay.

For more than 80 years, Beyschlag has stood for expertise in thin film technology, continuous innovation, excellence in service and logistics, and customer-oriented solutions.

Visit us at:

<http://www.vishay.com/company/brands/beyschlag>