

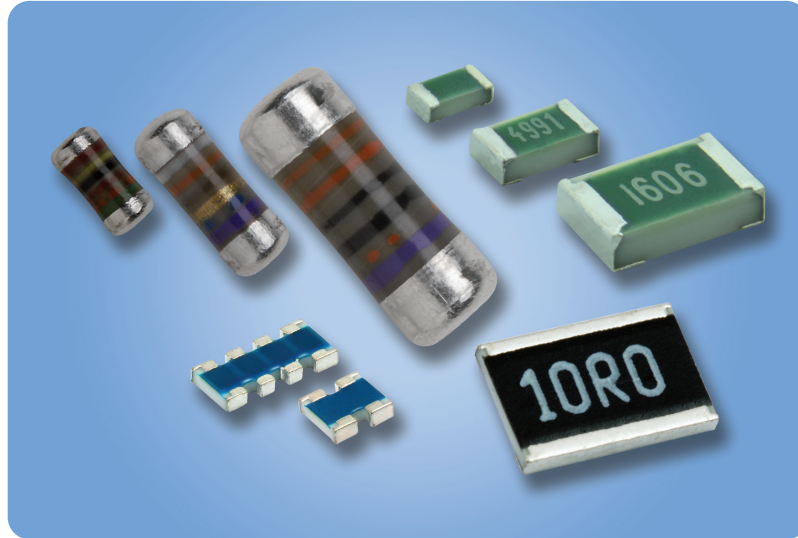


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SMD RESISTORS

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, thinilmchip@vishay.com, thickilmchip@vishay.com, thinilmarray@vishay.com, specialresistors@vishay.com
- Please find your relevant sales contacts at: www.vishay.com/doc?99914



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ACCURACY CLASSIFICATION

	Thin Film MELF (pp. 5-6)	Thin Film Chip and Array (pp. 7-9)	Thick Film Chip (pp. 10-12)
Standard e.g. TCR 100 / 1 %			D/CRCW e3 RCA e3 RCL e3 RCC e3
Semi-Precision e.g. TCR 100 / 0.5 %			D/CRCW-P e3
Professional e.g. TCR 50 / 1 %	MM SMM	MC MC AT MCW AT NCW AT ACAS	
Precision e.g. TCR 25 / 0.1 %	MM SMM	MC MC AT MCW AT ACAS ACAS AT TNPW e3	
Ultra Precision 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. 10-12)	Carbon Film MELF (p. 6)
High Pulse Load	MM SMM	MC MC AT MCW AT	CRCW-HP e3 D/CRCW-IF e3 RCA-IF e3 RCA-HP e3 RCS e3	CM
High Power	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 RCA-AU e4	CM
High Voltage	MM HV	TNPV e3	RCV e3 RCV-AT e3	CMB 0207
Sulfur-Resistant	MM SMM	MC MC AT MCW AT NCW AT TNPW e3 MC HP	RCA e3 RCA-LS e3 RCA-IF e3 RCA-HP e3 RCA-AU e4	CM
High Reliability	MM VG03 SMM0204 EN803 E8 MS1 ESCC MS1 EN803	MC VG01 TNPS		
High Frequency	MM HF			CMA 0204 HF
Low Ohmic 0.1 Ω to < 1 Ω	MM SMM	NCW AT		
High Ohmic > 10 MΩ	MMB 0207		D/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. 10-12)	Carbon Film MELF (p. 6)
Conductive Gluing		MC ATAU ACAS ATAU	D AP, CRCW-AP RCA AU e4	
Lead (Pb) Bearing	MS1 ESCC MS1 EN803	TNPS ESCC TNPW	D/CRCW D/CRCW-P D/CRCW-TR D/CRCW-HR RCA	
Voltage Divider		ACAS ACAS AT		
Trimmable		TC	D/CRCW-TR e3	
Fully Green	MM SMM		RCG e3	CM
AEC-Q200 Qualified	MM SMM	ACAS AT ACAS ATAU MC AT MC ATAU MCW AT MC HP NCW AT TNPW e3 TNPU e3 TNPV e3	D/CRCW e3 D/CRCW-P e3 D/CRCW-IF e3 RCA e3 RCL e3 RCA-HP e3 RCA-AU e4 RCA-LS e3 RCS e3 RCC e3 RCA-IF e3 RCV-AT e3 CRCW-HP e3	CM



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Thin Film MELF Resistors

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




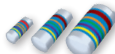

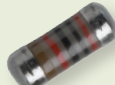

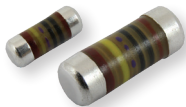


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Thin Film MELF Resistors

Series	Description	Features	Brand
MS1...ESCC  	<ul style="list-style-type: none"> • Hi-Rel Thin Film MINI-MELF Resistors • Size: 0204 • Tolerance: $\pm 0.1\%$ to $\pm 1\%$ • TCR: ± 15 ppm/K to ± 50 ppm/K • Resistance range: 2.21 Ω to 5.11 MΩ • Power rating: 0.25 W 	<ul style="list-style-type: none"> • High reliability product • ESA approved to ESCC 4001/022 • Advanced thin film technology • SnPb termination plating, minimum 6 % Pb 	Draloric
MMU 0102 HF, MMA 0204 HF, MMB 0207 HF 	<ul style="list-style-type: none"> • High Frequency MELF Resistors • Size: 0102 to 0207 • Tolerance: $\pm 1\%$ to $\pm 2\%$ • TCR: ± 50 ppm/K • Resistance range: 1.5 Ω to 475 Ω • Power rating: 0.3 W to 1.0 W 	<ul style="list-style-type: none"> • Speciality product for RF applications • Low inductance, non-helical trimmed product 	Beyschlag
MMU 0102 VG03, MMA 0204 VG03, MMB 0207 VG03  	<ul style="list-style-type: none"> • Precision and Professional MELF Resistors With Established Reliability • Size: 0102 to 0207 • Tolerance: $\pm 0.1\%$ to $\pm 1\%$ • TCR: ± 15 ppm/K to ± 50 ppm/K • Resistance range: 1 Ω to 10 MΩ; 0 Ω • Power rating: 0.2 W to 0.4 W 	<ul style="list-style-type: none"> • IECQ-CECC approval to EN 140401-803, version E • Established reliability, failure rate level E6 (corresponds to MIL level P) • Precise and stable thin film technology 	Beyschlag
MMA 0204 HT  	<ul style="list-style-type: none"> • Professional High Temperature MINI-MELF Resistor • Size: 0204 • Tolerance: $\pm 0.5\%$ to $\pm 1\%$ • TCR: ± 25 ppm/K to ± 50 ppm/K • Resistance range: 47 Ω to 100 kΩ; 0 Ω • Power rating: 0.5 W 	<ul style="list-style-type: none"> • 175 °C specified operating temperature • AEC-Q200 qualified • Excellent stability $\leq 0.25\%$ at 175 °C 	Beyschlag
MMA 0204 HV, MMB 0207 HV 	<ul style="list-style-type: none"> • Professional High Voltage Thin Film MELF Resistors • Size: 0204 and 0207 • Tolerance: $\pm 1\%$ • TCR: ± 50 ppm/K • Resistance range: 340 kΩ to 10 MΩ • Power rating: 0.4 W to 1.0 W 	<ul style="list-style-type: none"> • High operating voltage $U_{max.} = 1000$ V • Advanced metal film technology • Matte Sn termination on Ni barrier layer 	Beyschlag

Carbon Film MELF Resistors

Series	Description	Features	Brand
CMA 0204, CMB 0207   	<ul style="list-style-type: none"> • High Pulse Load MELF Resistors • Size: 0204 and 0207 • Tolerance: $\pm 1\%$ to $\pm 5\%$ • TCR: see datasheet • Resistance range: 2.2 Ω to 1.5 MΩ • Power rating: 0.4 W to 1 W • Up to 3 kW single pulse capability 	<ul style="list-style-type: none"> • Special carbon film technology • Outstanding pulse load stability • High power rating • AEC-Q200 qualified • CMB: tested and certified according to EN IEC 62368-1: 2020, Annex G.10 (includes former requirements of IEC 60065, 14.2a) 	Beyschlag
CMA 0204 HF 	<ul style="list-style-type: none"> • Pulse Load MELF Resistors for High Frequency Applications • Size: 0204 • Tolerance: $\pm 2\%$ • TCR: -250 ppm/K • Resistance range: 47 Ω to 300 Ω • Power rating: 0.4 W 	<ul style="list-style-type: none"> • Specialty product for RF applications • ESD capability: 3 kV, human body model • Suitable for more than 10 GHz 	Beyschlag



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Thin Film Chip Resistors			
Series	Description	Features	Brand
TNPW e3  	<ul style="list-style-type: none"> • High Stability Precision Thin Film Chip Resistors • Size: 0201 to 1210 • Tolerance: $\pm 0.1\%$ to $\pm 1\%$ • TCR: ± 10 ppm/K to ± 50 ppm/K • Resistance range: $1\ \Omega$ to $3.01\ \text{M}\Omega$ • Power rating: $0.075\ \text{W}$ to $0.5\ \text{W}$ 	<ul style="list-style-type: none"> • Low temperature coefficient and tight tolerances • Superior moisture resistivity • Excellent overall stability at different environmental conditions • AEC-Q200 qualified 	Vishay
TNPW  	<ul style="list-style-type: none"> • High Stability Precision Thin Film Chip Resistors • Size: 0402 to 1210 • Tolerance: $\pm 0.1\%$ to $\pm 1\%$ • TCR: ± 10 ppm/K to ± 50 ppm/K • Resistance range: $10\ \Omega$ to $3.01\ \text{M}\Omega$ • Power rating: $0.063\ \text{W}$ to $0.33\ \text{W}$ 	<ul style="list-style-type: none"> • SnPb termination plating, minimum 6 % Pb • Excellent overall stability at different environmental conditions • Low temperature coefficient and tight tolerances 	Vishay
TNPU e3  	<ul style="list-style-type: none"> • Ultra Precision Thin Film Chip Resistors • Size: 0402 to 1206 • Tolerance: $\pm 0.02\%$ to $\pm 0.1\%$ • TCR: ± 2 ppm/K to ± 10 ppm/K • Resistance range: $100\ \Omega$ to $511\ \text{k}\Omega$ • Power rating: $0.063\ \text{W}$ to $0.25\ \text{W}$ 	<ul style="list-style-type: none"> • Low temperature coefficient and tight tolerances • Superior moisture resistivity • AEC-Q200 qualified 	Draloric
TNPV e3  	<ul style="list-style-type: none"> • High Voltage Thin Film Flat Chip Resistors • Size: 1206 and 1210 • Tolerance: $\pm 0.1\%$ to $\pm 1\%$ • TCR: ± 10 ppm/K to ± 50 ppm/K • Resistance range: $121\ \text{k}\Omega$ to $3.01\ \text{M}\Omega$ • Power rating: $0.25\ \text{W}$ to $0.33\ \text{W}$ 	<ul style="list-style-type: none"> • High operating voltage U_{max} up to $1000\ \text{V}$ • Precision properties: TCR and tolerances down to ± 10 ppm/K; $\pm 0.1\%$ • Excellent overall stability at different environmental conditions • Superior moisture resistivity • AEC-Q200 qualified 	Draloric
MC Professional  	<ul style="list-style-type: none"> • Professional Thin Film Chip Resistors • Size: 0402 to 1206 • Tolerance: $\pm 0.5\%$ to $\pm 1\%$ • TCR: ± 25 ppm/K to ± 50 ppm/K • Resistance range: $1\ \Omega$ to $10\ \text{M}\Omega$; $0\ \Omega$ • Power rating: $0.1\ \text{W}$ to $0.4\ \text{W}$ 	<ul style="list-style-type: none"> • Excellent overall stability: Class 0.5 • IECQ-CECC approval to EN 140401-801 	Beyschlag
MC Precision  	<ul style="list-style-type: none"> • Precision Thin Film Chip Resistors • Size: 0402 to 1206 • Tolerance: $\pm 0.1\%$ to $\pm 0.25\%$ • TCR: ± 10 ppm/K to ± 25 ppm/K • Resistance range: $39\ \Omega$ to $2\ \text{M}\Omega$ • Power rating: $0.063\ \text{W}$ to $0.25\ \text{W}$ 	<ul style="list-style-type: none"> • Superior overall stability: Class 0.1 and 0.25 • IECQ-CECC approval to EN 140401-801 	Beyschlag
MC AT Professional  	<ul style="list-style-type: none"> • Professional Automotive Grade Thin Film Chip Resistors • Size: 0402 to 1206 • Tolerance: $\pm 0.5\%$ to $\pm 1\%$ • TCR: ± 25 ppm/K to ± 50 ppm/K • Resistance range: $1\ \Omega$ to $1\ \text{M}\Omega$; $0\ \Omega$ • Power rating: $0.1\ \text{W}$ to $0.4\ \text{W}$ 	<ul style="list-style-type: none"> • High temperature operation up to $175\ ^\circ\text{C}$ • IECQ-CECC approval to EN 140401-801 • AEC-Q200 qualified • Superior moisture resistivity 	Beyschlag
MC AT Precision  	<ul style="list-style-type: none"> • Precision Automotive Grade Thin Film Chip Resistors • Size: 0402 to 1206 • Tolerance: $\pm 0.1\%$ • TCR: ± 5 ppm/K to ± 25 ppm/K • Resistance range: $47\ \Omega$ to $10\ \text{M}\Omega$ • Power rating: $0.1\ \text{W}$ to $0.4\ \text{W}$ 	<ul style="list-style-type: none"> • Advanced level of precision and stability • IECQ-CECC approval to EN 140401-801 • AEC-Q200 qualified • Superior moisture resistivity 	Beyschlag



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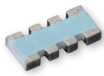
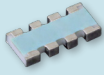
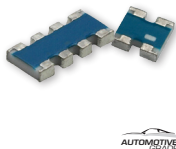
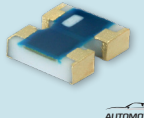
Series	Description	Features	Brand
MC ATAU Precision 	<ul style="list-style-type: none"> • Precision Gold-Terminated Thin Film Chip Resistors for Conductive Gluing • Size: 0402, 0603 • Tolerance: $\pm 0.1\%$ • TCR: ± 15 ppm/K and ± 25 ppm/K • Resistance range: 100 Ω to 100 kΩ • Power rating: 0.1 W to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



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



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Thick Film Chip Resistors			
Series	Description	Features	Brand
D/CRCW e3 	<ul style="list-style-type: none"> • Standard Thick Film Chip Resistors • Size: 0402 to 2512 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.063 W to 1 W • Zero ohm jumper: available for all sizes 	<ul style="list-style-type: none"> • AEC-Q200 qualified 	Vishay
D/CRCW 	<ul style="list-style-type: none"> • Lead (Pb)-Bearing Thick Film Chip Resistors • Size: 0402 to 2512 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.063 W to 1 W • Zero ohm jumper: available for all sizes 	<ul style="list-style-type: none"> • SnPb termination plating on Ni barrier, minimum 10 % Pb 	Vishay
RCA e3 	<ul style="list-style-type: none"> • Automotive Grade, Sulfur-Resistant, Lead (Pb)-Free, Thick Film Chip Resistors • Size: 0402 to 2512 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.063 W to 1 W • Zero ohm jumper: available for all sizes 	<ul style="list-style-type: none"> • Superior resistance against H₂S atmosphere • AEC-Q200 qualified 	Draloric
RCA 	<ul style="list-style-type: none"> • Lead (Pb)-Bearing Automotive Grade, Sulfur-Resistant, Thick Film Chip Resistors • Size: 0402 to 2512 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.063 W to 1 W • Zero ohm jumper: available for all sizes 	<ul style="list-style-type: none"> • Superior resistance against H₂S atmosphere • SnPb termination plating on Ni barrier, minimum 10 % Pb 	Vishay
D/CRCW-P e3 	<ul style="list-style-type: none"> • Thick Film Semi-Precision Chip Resistor • Size: 0402 to 2512 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.063 W to 1 W 	<ul style="list-style-type: none"> • AEC-Q200 qualified • Tight tolerances (\pm 0.25 %) • Low TCR (\pm 50 ppm/K) 	Vishay
D/CRCW-P 	<ul style="list-style-type: none"> • Lead (Pb)-Bearing Thick Film Semi-Precision Chip Resistors • Size: 0402 to 2512 • Resistance range: 10 Ω to 10 MΩ • Power rating: 0.063 W to 1 W 	<ul style="list-style-type: none"> • Tight tolerances (\pm 0.25 %) • Low TCR (\pm 50 ppm/K) • SnPb termination plating on Ni barrier, minimum 10 % Pb 	Vishay
RCC e3 	<ul style="list-style-type: none"> • Medium Power Thick Film Chip Resistors • Size: 0402 to 1206 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.125 W to 0.5 W • Zero ohm jumper available 	<ul style="list-style-type: none"> • Enhanced power rating up to 0.5 W • Increased operating voltage • AEC-Q200 qualified 	Vishay
CRCW-HP e3 	<ul style="list-style-type: none"> • Pulse-Proof, High Power Thick Film Chip Resistors • Size: 0402 to 2512 • Resistance range: 1 Ω to 1 MΩ • Power rating: 0.2 W to 1.5 W • Tolerance: \pm 0.5 % 	<ul style="list-style-type: none"> • Excellent pulse load capability • Enhanced power rating • Double-sided printed resistor element • AEC-Q200 qualified 	Draloric



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Thick Film Chip Resistors

Series	Description	Features	Brand
RCA-HP e3 	<ul style="list-style-type: none"> • Sulfur-Resistant, Pulse-Proof, High Power Thick Film Chip Resistor • Size: 0402 to 2512 • Resistance range: 1 Ω to 1 MΩ • Power rating: 0.2 W to 1.5 W 	<ul style="list-style-type: none"> • Superior resistance against H₂S atmosphere • Excellent pulse load capability • Enhanced power rating • Double-sided resistor element • AEC-Q200 qualified 	Draloric
RCL e3 	<ul style="list-style-type: none"> • Long Side Termination Thick Film Chip Resistors • Size: 0406 to 1225 • Resistance range: 1 Ω to 2.2 MΩ • Power rating: 0.25 W to 2 W 	<ul style="list-style-type: none"> • Enhanced power rating • Long side terminations • Better performance in temperature cycles • AEC-Q200 qualified 	Draloric
RCA-LS e3 	<ul style="list-style-type: none"> • Sulfur-Resistant, Long Side Termination Thick Film Chip Resistors • Size: 0406 to 1225 • Resistance range: 1 Ω to 2.2 MΩ • Power rating: 0.25 W to 2 W 	<ul style="list-style-type: none"> • Superior resistance against H₂S atmosphere • Enhanced power rating • Long side terminations • Better performance in temperature cycles • AEC-Q200 qualified 	Draloric
RCV-AT e3 	<ul style="list-style-type: none"> • AEC-Q200 Qualified High Voltage Thick Film Chip Resistors • Size: 2010, 2512 • Resistance range: 100 kΩ to 100 MΩ • Power rating: 0.75 W to 1 W 	<ul style="list-style-type: none"> • High operating voltage (up to 3000 V) • Low voltage coefficient of resistance (VCR): 25 ppm/V • AEC-Q200 qualified 	Draloric
RCV e3 	<ul style="list-style-type: none"> • High Voltage Thick Film Chip Resistors • Size: 0805 to 2010 • Resistance range: 100 kΩ to 10 MΩ • Power rating: 0.125 W to 0.75 W 	<ul style="list-style-type: none"> • High operating voltage (up to 2000 V) • Low voltage coefficient of resistance (VCR): 25 ppm/V 	Draloric
RCG e3 	<ul style="list-style-type: none"> • Fully RoHS-Compliant, Green, Thick Film, Rectangular Chip Resistors • Size: 0402 to 1206 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.063 W to 0.25 W 	<ul style="list-style-type: none"> • Green resistor – does not use RoHS exemptions • Stability: $\pm 1\%$ for 1000 h at 70 °C, for $\pm 1\%$ tolerance 	Draloric
D/CRCW-IF e3 	<ul style="list-style-type: none"> • Thick Film, Rectangular, Pulse-Proof Chip Resistors • Size: 0402 to 2512 • Resistance range: 1 Ω to 100 kΩ • Power rating: 0.063 W to 1.0 W 	<ul style="list-style-type: none"> • High pulse performance • AEC-Q200 qualified 	Vishay
RCA-IF e3 	<ul style="list-style-type: none"> • Sulfur-Resistant, Pulse-Proof Thick Film Chip Resistors • Size: 0402 to 2512 • Resistance range: 1 Ω to 100 kΩ • Power rating: 0.063 W to 1.0 W 	<ul style="list-style-type: none"> • Superior resistance against H₂S atmosphere • High pulse performance • AEC-Q200 qualified 	Draloric
RCS e3 	<ul style="list-style-type: none"> • Anti-Surge, High Power Thick Film Chip Resistors • Size: 0402 to 1206 • Resistance range: 1 Ω to 10 MΩ • Power rating: 0.2 W to 0.5 W • Zero ohm jumper available 	<ul style="list-style-type: none"> • Excellent surge pulse capability • High power rating • AEC-Q200 qualified 	Vishay



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Thick Film Chip Resistors			
Series	Description	Features	Brand
D AP, CRCW-AP 	<ul style="list-style-type: none"> Thick Film, Rectangular Chip Resistors for Conductive Gluing Size: 0402 to 2512 Resistance range: 3.6 Ω to 10 MΩ Power rating: 0.063 W to 1 W Zero ohm jumper: available for all sizes 	<ul style="list-style-type: none"> AgPd terminations for conductive gluing Stability: $\pm 1\%$ for 1000 h at 70 °C, for $\pm 1\%$ tolerance 	Draloric
RCA-AU e4 	<ul style="list-style-type: none"> Sulfur-Resistant, Gold-Terminated Thick Film Chip Resistors for Conductive Gluing Size: 0402; 0603 Resistance range: 1 Ω to 10 MΩ Power rating: 0.1 W to 0.15 W Zero ohm jumper available 	<ul style="list-style-type: none"> Gold (Au) terminations for conductive gluing Superior resistance against H₂S atmosphere High temperature operation up to 175 °C AEC-Q200 qualified 	Vishay
D/CRCW-HR e3 	<ul style="list-style-type: none"> Thick Film, Rectangular, High Value Chip Resistors Size: 0603 to 1206 Resistance range: 11 MΩ to 470 MΩ Power rating: 0.1 W to 0.25 W 	<ul style="list-style-type: none"> High resistance values (up to 470 MΩ) Suitable for voltage dividers and hybrids 	Vishay
D/CRCW-HR 	<ul style="list-style-type: none"> Lead (Pb)-bearing Thick Film, Rectangular High Value Chip Resistor Size: 0603 to 1206 Resistance range: 11 MΩ to 470 MΩ Power rating: 0.1 W to 0.25 W 	<ul style="list-style-type: none"> High resistance values (up to 470 MΩ) Suitable for voltage dividers and hybrids SnPb termination plating on Ni barrier, minimum 10 % Pb 	Vishay
D/CRCW-TR e3 	<ul style="list-style-type: none"> Thick Film, Rectangular, Trimmable Chip Resistors Size: 0402 to 2512 Resistance range: 0.47 Ω to 10 MΩ Power rating: 0.063 W to 1.0 W 	<ul style="list-style-type: none"> Can be trimmed to the required value after insertion For applications in precision circuitry where relative tolerances can be compensated by trimming 	Vishay
D/CRCW-TR 	<ul style="list-style-type: none"> Lead (Pb) Bearing Thick Film, Rectangular, Trimmable Chip Resistors Size: 0402 to 2512 Resistance range: 0.47 Ω to 10 MΩ Power rating: 0.063 W to 1.0 W 	<ul style="list-style-type: none"> Can be trimmed to the required value after insertion For applications in precision circuitry where relative tolerances can be compensated by trimming SnPb termination plating on Ni barrier, minimum 10 % Pb 	Vishay
TC 	<ul style="list-style-type: none"> Trimmable Thick Film Flat Chip Resistors Size: 0603 to 1206 TCR: ± 50 ppm/K to ± 100 ppm/K Resistance range: 10 Ω to 1 MΩ Power rating: 0.125 W to 0.250 W 	<ul style="list-style-type: none"> Designed for state of the art laser trimming Wide ohmic range from 10 Ω to 1 MΩ Excellent stability $\leq \pm 0.25\%$ (1000 h rated power at 70 °C) 	Beyschlag
CRCW0201 e3 	<ul style="list-style-type: none"> Commodity Thick Film Chip Resistors Size: 0201 Resistance range: 1 Ω to 10 MΩ Power rating: 0.05 W Tolerance: $\pm 0.5\%$ 	<ul style="list-style-type: none"> High volume product suitable for commercial applications 	Vishay
CRCW01005 e3 	<ul style="list-style-type: none"> Commodity Thick Film Chip Resistors Size: 01005 Resistance range: 1 Ω to 1 MΩ Power rating: 0.031 W Tolerance: $\pm 1\%$ 	<ul style="list-style-type: none"> High volume product suitable for commercial applications Very small standard size (0.4 mm x 0.2 mm) 	Vishay



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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

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:

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:

www.vishay.com/company/brands/beyschlag