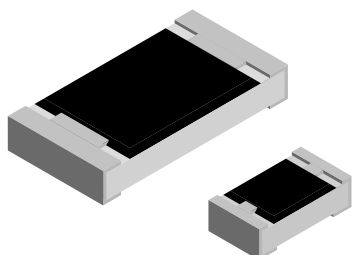


Pulse Proof, High Power Thick Film Chip Resistors



FEATURES

- Excellent pulse load capability
- Enhanced power rating
- Double side printed resistor element
- Protective overglaze
- Lead (Pb)-free solder contacts on Ni barrier layer
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compliant to RoHS directive 2002/95/EC
- AEC-Q200, rev. C compliant



STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING P_{70} W	LIMITING ELEMENT VOLTAGE MAX. V	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES
	INCH	METRIC						
CRCW0402-HP e3	0402	1005	0.125 ⁽¹⁾	50	± 100	± 1	1R to 1M	E24 + E96 E24
					± 200	± 5		
					Zero-Ohm-Resistor: $R_{\max.} = 0.010 \Omega$, $I_{\max.} = 2.5 A$			
CRCW0603-HP e3	0603	1608	0.25	75	± 100	± 1	1R to 1M	E24 + E96 E24
					± 200	± 5		
					Zero-Ohm-Resistor: $R_{\max.} = 0.010 \Omega$, $I_{\max.} = 4 A$			
CRCW0805-HP e3	0805	2012	0.33	150	± 100	± 1	1R to 1M	E24 + E96 E24
					± 200	± 5		
					Zero-Ohm-Resistor: $R_{\max.} = 0.010 \Omega$, $I_{\max.} = 5 A$			
CRCW1206-HP e3	1206	3216	0.5	200	± 100	± 1	1R to 1M	E24 + E96 E24
					± 200	± 5		
					Zero-Ohm-Resistor: $R_{\max.} = 0.010 \Omega$, $I_{\max.} = 6 A$			
CRCW2010-HP e3	2010	5025	1.0	400	± 100	± 1	1R to 1M	E24 + E96 E24
					± 200	± 5		
					Zero-Ohm-Resistor: $R_{\max.} = 0.010 \Omega$, $I_{\max.} = 10 A$			
CRCW2512-HP e3	2512	6332	1.5	500	± 100	± 1	1R to 1M	E24 + E96 E24
					± 200	± 5		
					Zero-Ohm-Resistor: $R_{\max.} = 0.010 \Omega$, $I_{\max.} = 14 A$			

Notes

⁽¹⁾ CRCW0402-HP resistors feature a single side printed resistive layer only

- 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
- Marking and packaging: see appropriate catalog or web page
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CRCW0402-HP	CRCW0603-HP	CRCW0805-HP	CRCW1206-HP	CRCW2010-HP	CRCW2512-HP
Rated Dissipation P_{70} ⁽¹⁾	W	0.125	0.25	0.33	0.5	1.0	1.5
Limiting Element Voltage $U_{\text{max. AC/DC}}$	V	50	75	150	200	400	500
Insulation Voltage $U_{\text{ins.}}$ (1 min)	V	> 75	> 100	> 200	> 300		
Insulation Resistance	Ω	> 10 ⁹					
Category Temperature Range	°C	- 55 to + 155					
Weight	mg	0.65	2	5.5	10	25.5	42

Note

⁽¹⁾ The power dissipation on the resistors generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

**PART NUMBER AND PRODUCT DESCRIPTION**PART NUMBER: CRCW0603562RFKEAHP ⁽¹⁾

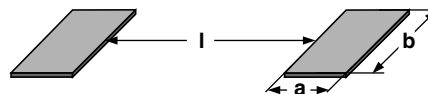
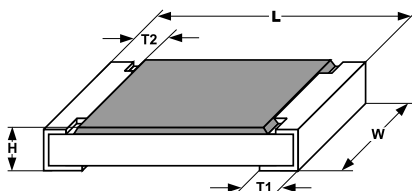
C	R	C	W	0	6	0	3	5	6	2	R	F	K	E	A	H	P
MODEL/SIZE				VALUE				TOLERANCE				TCR		PACKAGING ⁽²⁾		SPECIAL	
CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW2010 CRCW2512				R = Decimal K = Thousand M = Million 0000 = Jumper				F = ± 1 % J = ± 5 % Z = Jumper				K = ± 100 ppm/K N = ± 200 ppm/K 0 = Jumper		EA EB EC ED EE EI EL EF EG EH		Up to 2 digits HP = Pulse proof, High Power	

PRODUCT DESCRIPTION: CRCW0603-HP 100 562R 1 % ET1 e3

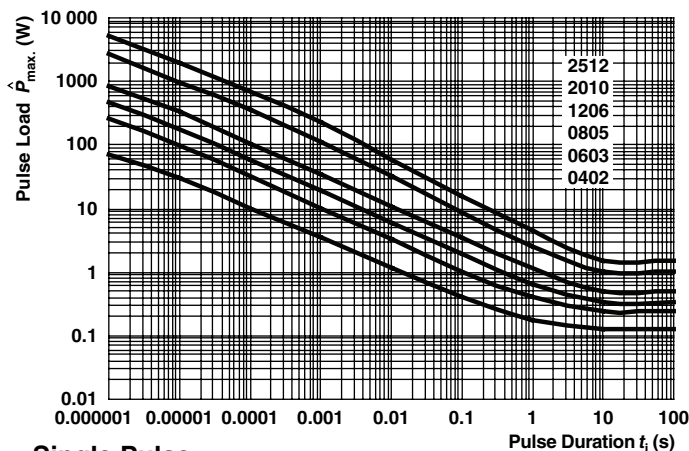
CRCW0603-HP	100	562R	1 %	ET1	e3
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING ⁽²⁾	LEAD (Pb)-FREE
CRCW0402-HP CRCW0603-HP CRCW0805-HP CRCW1206-HP CRCW2010-HP CRCW2512-HP	± 100 ppm/K ± 200 ppm/K	10R = 10 Ω 562R = 562 Ω 10K = 10 kΩ 1M = 1 MΩ 0R0 = Jumper	± 1 % ± 5 %	ET1 ET5 ET6 ET7 EF4 EG1 E20 E02 E67 E82	e3 = Pure tin termination finish

Notes⁽¹⁾ Preferred way for ordering products is by use of the PART NUMBER⁽²⁾ Please refer to table PACKAGING, see below**PACKAGING**

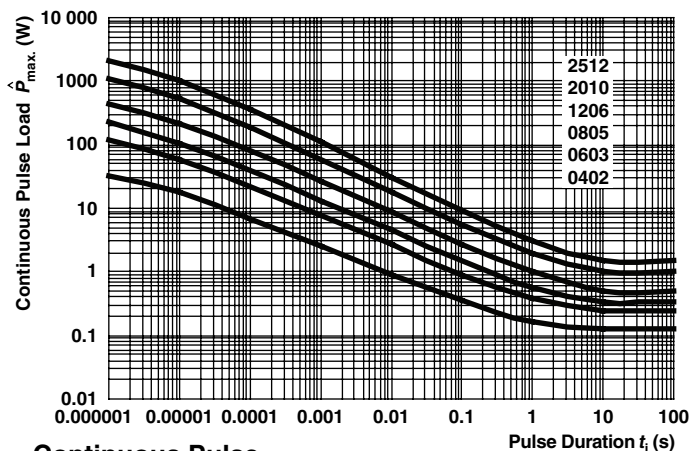
MODEL	REEL							
	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PACKAGING CODE			
					PART NUMBER		PRODUCT DESC.	
					PAPER	BLISTER	PAPER	BLISTER
CRCW0402-HP	8 mm	180 mm/7" 330 mm/13"	2 mm 2 mm	10 000 50 000	ED EE		ET7 EF4	
CRCW0603-HP	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20
CRCW0805-HP	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20
CRCW1206-HP	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm 4 mm 4 mm	5000 10 000 20 000	EA EB EC	EI EL	ET1 ET5 ET6	EG1 E20
CRCW2010-HP	12 mm	180 mm/7"	4 mm	4000		EF		E02
CRCW2512-HP	12 mm	180 mm/7"	8 mm 4 mm	2000 4000		EG EH		E67 E82

DIMENSIONS in millimeters

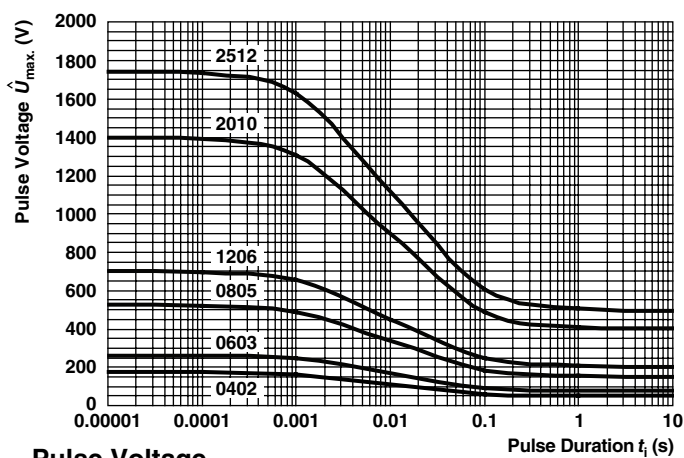
SIZE		RESISTANCE RANGE Ω	DIMENSIONS					SOLDER PAD DIMENSIONS					
								REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC		L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	1R - 1M	1.0 ± 0.05	0.5 ± 0.05	0.3 ± 0.1	0.25 ± 0.1	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1R - 1M	1.6 ± 0.1	0.85 ± 0.1	0.45 ± 0.1	0.3 ± 0.2	0.3 ± 0.2	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	1R - 1M	2.0 ± 0.15	1.25 ± 0.15	0.50 ± 0.1	0.4 ± 0.2	0.35 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	1R - 1M	3.1 ± 0.2	1.6 ± 0.15	0.50 ± 0.15	0.5 ± 0.2	0.45 ± 0.2	0.9	1.7	2.0	1.1	1.7	2.3
2010	5025	1R - 1M	5.0 ± 0.15	2.5 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	2.5	3.9	1.2	2.5	3.9
2512	6332	1R - 1M	6.3 ± 0.2	3.15 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	3.2	5.2	1.2	3.2	5.2

FUNCTIONAL PERFORMANCE**Single Pulse**

Maximum pulse dissipation as a function of the pulse duration, single pulse for CRCW...-HP

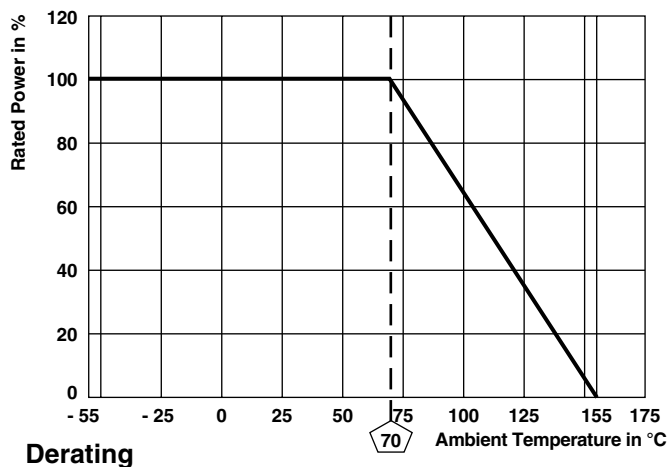
**Continuous Pulse**

Maximum pulse dissipation as a function of the pulse duration, continuous pulse for CRCW...-HP



Pulse Voltage

Maximum pulse voltage, single and continuous pulses; applicable if $\hat{P} \leq \hat{P}_{max}$; for permissible resistance change equivalent to 8000 h operation



Derating

TEST PROCEDURES AND REQUIREMENTS

EN 60115-1

TEST (clause)	CONDITIONS OF TEST	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
		STABILITY CLASS 2 OR BETTER
	Stability for product types:	1 Ω - 1 M Ω
	CRCW....-HP e3	
Resistance (4.5)	-	$\pm 1\%$, $\pm 5\%$
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	± 100 ppm/K, ± 200 ppm/K
Overload (4.13)	$U = 2.5 \times \sqrt{P_{70} \times R}$ $\leq 2 \times U_{\max.}$ Duration: according the style	$\pm (0.5\% R + 0.05 \Omega)$
Solderability (4.17.5)	Aging 4 h at 155 °C, dryheat Solder bath method; 235 °C; 2 s Visual examination	Good tinning ($\geq 95\%$ covered) no visible damage
Resistance to soldering heat (4.18.2)	Solder bath method; (260 $\pm$ 5) °C; (10 $\pm$ 1) s	$\pm (1\% R + 0.05 \Omega)$
Rapid change of temperature (4.19)	30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles	$\pm (1\% R + 0.05 \Omega)$
Damp heat, steady state (4.24)	(40 $\pm$ 2) °C; 56 days; (93 $\pm$ 3) % RH	$\pm (2\% R + 0.05 \Omega)$
Climatic sequence (4.23)	16 h at UCT = 125 °C; 1 cycle at 55 °C; 2 h at LCT = - 55 °C; 1 h/1 kPa at 15 °C to 35 °C; 5 cycles at 55 °C $U = \sqrt{P_{70} \times R}$ $U = U_{\max.}$; whichever is less severe	$\pm (2\% R + 0.05 \Omega)$
Endurance at 70 °C (4.25.1)	$U = \sqrt{P_{70} \times R}$ $U = U_{\max.}$; whichever is less severe 1.5 h ON; 0.5 h OFF; 70 °C; 1000 h	$\pm (2\% R + 0.05 \Omega)$
Endurance at upper category temperature (4.25.3)	UCT = 155 °C; 1000 h	$\pm (2\% R + 0.05 \Omega)$

APPLICABLE SPECIFICATIONS

- EN 60115-1 Generic specification
- AEC-Q200 Generic specification
- EN 140400 Sectional specification
- EN 140401-802 Detail specification
- IEC 60068-2-X Variety of environmental test procedures
- IEC 60286-3 Packaging of SMD components



Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.