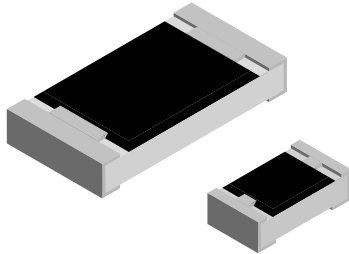


## Pulse Proof, High Power Thick Film Chip Resistors



### 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 $\Omega$	E-SERIES
	INCH	METRIC						
CRCW0402-HP e3	0402	1005	0.125 <sup>(1)</sup>	50	$\pm 100$	$\pm 1$	1R to 1M	E24 + E96 E24
					$\pm 200$	$\pm 5$		
Zero-Ohm-Resistor: $R_{max.} = 0.010 \Omega$ , $I_{max.} = 2.5 A$								
CRCW0603-HP e3	0603	1608	0.25	75	$\pm 100$	$\pm 1$	1R to 1M	E24 + E96 E24
					$\pm 200$	$\pm 5$		
Zero-Ohm-Resistor: $R_{max.} = 0.010 \Omega$ , $I_{max.} = 4 A$								
CRCW0805-HP e3	0805	2012	0.33	150	$\pm 100$	$\pm 1$	1R to 1M	E24 + E96 E24
					$\pm 200$	$\pm 5$		
Zero-Ohm-Resistor: $R_{max.} = 0.010 \Omega$ , $I_{max.} = 5 A$								
CRCW1206-HP e3	1206	3216	0.5	200	$\pm 100$	$\pm 1$	1R to 1M	E24 + E96 E24
					$\pm 200$	$\pm 5$		
Zero-Ohm-Resistor: $R_{max.} = 0.010 \Omega$ , $I_{max.} = 6 A$								
CRCW2010-HP e3	2010	5025	1.0	400	$\pm 100$	$\pm 1$	1R to 1M	E24 + E96 E24
					$\pm 200$	$\pm 5$		
Zero-Ohm-Resistor: $R_{max.} = 0.010 \Omega$ , $I_{max.} = 10 A$								
CRCW2512-HP e3	2512	6332	1.5	500	$\pm 100$	$\pm 1$	1R to 1M	E24 + E96 E24
					$\pm 200$	$\pm 5$		
Zero-Ohm-Resistor: $R_{max.} = 0.010 \Omega$ , $I_{max.} = 14 A$								

#### Notes

<sup>(1)</sup> 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 $P_{70}$ <sup>(1)</sup>	W	0.125	0.25	0.33	0.5	1.0	1.5
Limiting Element Voltage $U_{max. AC/DC}$	V	50	75	150	200	400	500
Insulation Voltage $U_{ins.}$ (1 min)	V	> 75	> 100	> 200	> 300		
Insulation Resistance	$\Omega$	> $10^9$					
Category Temperature Range	$^{\circ}C$	- 55 to + 155					
Weight	mg	0.65	2	5.5	10	25.5	42

#### Note

<sup>(1)</sup> 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  $^{\circ}C$  is not exceeded.



PART NUMBER AND PRODUCT DESCRIPTION																	
PART NUMBER: CRCW0603562RFKEAHP <sup>(1)</sup>																	
C	R	C	W	0	6	0	3	5	6	2	R	F	K	E	A	H	P
MODEL/SIZE		VALUE		TOLERANCE		TCR		PACKAGING <sup>(2)</sup>		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 <sup>(2)</sup>		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

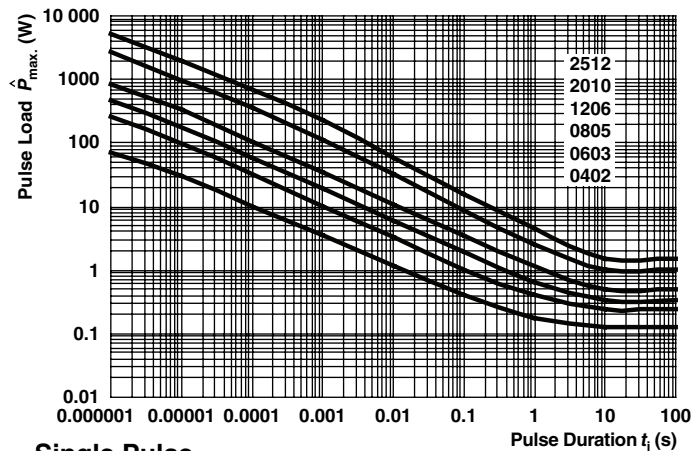
PACKAGING								
MODEL	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	REEL			
					PACKAGING CODE			
					PART NUMBER		PRODUCT DESC.	
					PAPER	BLISTER	PAPER	BLISTER
CRCW0402-HP	8 mm	180 mm/7" 330 mm/13"	2 mm 2 mm	10 000 50 000	ED		ET7	
					EE		EF4	
CRCW0603-HP	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm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

**DIMENSIONS** in millimeters



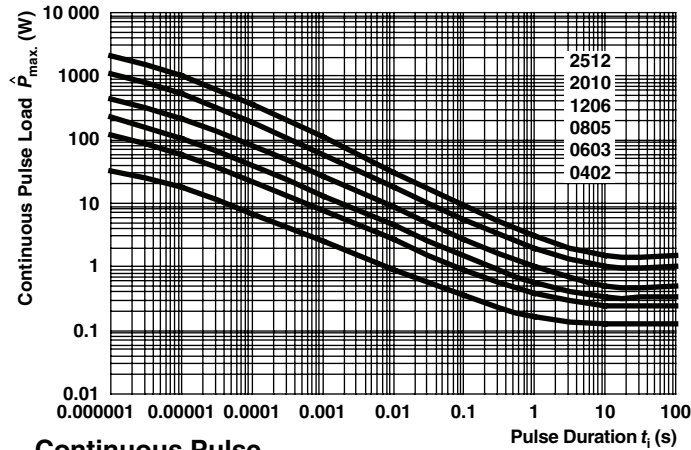
SIZE		RESISTANCE RANGE $\Omega$	DIMENSIONS					SOLDER PAD DIMENSIONS					
								REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC		L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	1R - 1M	1.0 ± 0.05	0.5 ± 0.05	0.3 ± 0.1	0.25 ± 0.1	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1R - 1M	1.6 ± 0.1	0.85 ± 0.1	0.45 ± 0.1	0.3 ± 0.2	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**



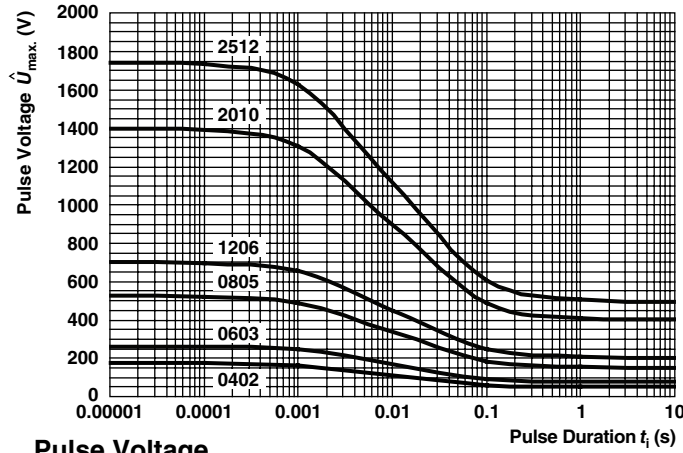
**Single Pulse**

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



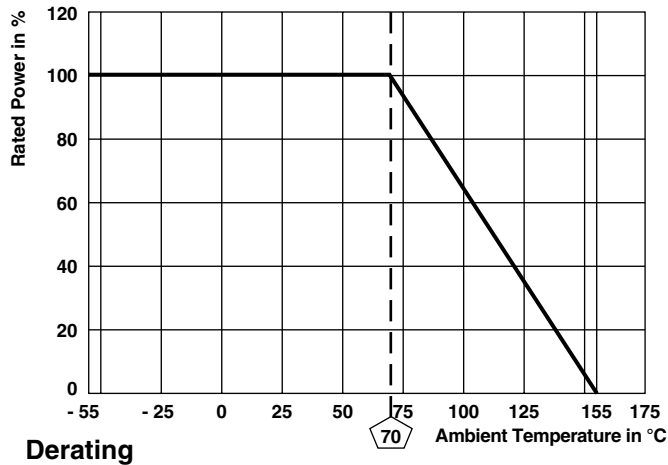
**Continuous Pulse**

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 ( $\Delta R$ )
		STABILITY CLASS 2 OR BETTER
	Stability for product types:	1 $\Omega$ - 1 M $\Omega$
	<b>CRCW....-HP e3</b>	
Resistance (4.5)	-	$\pm 1\%$ , $\pm 5\%$
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	$\pm 100$ ppm/K, $\pm 200$ 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



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