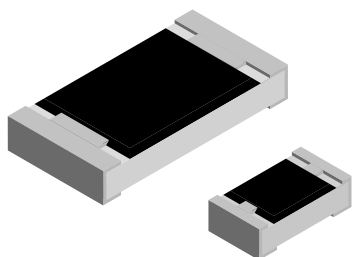


## Pulse Proof, High Power Thick Film Chip Resistors



### FEATURES

- Excellent pulse load capability
- Enhanced power rating
- Double side printed resistor element
- Protective overglaze
- Pure tin solder contacts on Ni barrier layer provides compatibility with lead (Pb)-free and lead containing soldering processes
- Compliant to RoHS Directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- AEC-Q200 qualified, rev. C compliant



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		RATED DISSIPATION $P_{70}$ W	LIMITING ELEMENT VOLTAGE $U_{max.}$ AC/DC	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE $\Omega$	SERIES
	INCH	METRIC						
CRCW0402-HP e3	0402	RR1005	0.125 <sup>(1)</sup>	50	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.010 \Omega$ , $I_{max.} = 3 A$					
CRCW0603-HP e3	0603	RR1608	0.25	75	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.008 \Omega$ , $I_{max.} = 5 A$					
CRCW0805-HP e3	0805	RR2012	0.33	150	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.005 \Omega$ , $I_{max.} = 6 A$					
CRCW1206-HP e3	1206	RR3216	0.5	200	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.005 \Omega$ , $I_{max.} = 10 A$					
CRCW1210-HP e3	1210	RR3225	0.75	200	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.004 \Omega$ , $I_{max.} = 12 A$					
CRCW1218-HP e3	1218	RR3246	1.5	200	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.004 \Omega$ , $I_{max.} = 20 A$					
CRCW2010-HP e3	2010	RR5025	1.0	400	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.005 \Omega$ , $I_{max.} = 12 A$					
CRCW2512-HP e3	2512	RR6332	1.5	500	$\pm 100$	$\pm 1$	1R to 1M	E24; E96 E24
					$\pm 200$	$\pm 5$		
			Zero-Ohm-Resistor: $R_{max.} = 0.005 \Omega$ , $I_{max.} = 16 A$					

#### Notes

- 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: See document "Surface Mount Resistor Marking" (document number 20020).
  - Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.
- <sup>(1)</sup> CRCW0402-HP resistors feature a single side printed resistive layer only.

### TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CRCW 0402-HP	CRCW 0603-HP	CRCW 0805-HP	CRCW 1206-HP	CRCW 1210-HP	CRCW 1218-HP	CRCW 2010-HP	CRCW 2512-HP
Rated dissipation $P_{70}$ <sup>(2)</sup>	W	0.125	0.25	0.33	0.5	0.75	1.5	1.0	1.5
Limiting element voltage $U_{max.}$ AC/DC	V	50	75	150	200	200	200	400	500
Insulation voltage $U_{ins.}$ (1 min)	V	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300
Insulation resistance	$\Omega$	> $10^9$							
Category temperature range	°C	- 55 to + 155							
Weight	mg	0.65	2	5.5	10	18	31	25.5	42

#### Note

- <sup>(2)</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 °C is not exceeded.

**PART NUMBER AND PRODUCT DESCRIPTION**Part Number: CRCW0603562RFKEAHP <sup>(1)</sup>

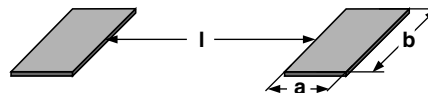
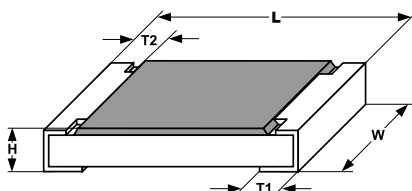
C	R	C	W	0	6	0	3	5	6	2	R	F	K	E	A	H	P
MODEL/SIZE				VALUE				TOLERANCE				TCR		PACKAGING		SPECIAL	
CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512				R = Decimal K = Thousand M = Million 0000 = Jumper				F = $\pm 1\%$ J = $\pm 5\%$ Z = Jumper				K = $\pm 100$ ppm/K N = $\pm 200$ ppm/K 0 = Jumper		EA EB EC ED EE EF EG EH EK		Up to 2 digits HP = Pulse proof, high power	

Product Description: CRCW0603-HP 100 562R 1 % ET1 e3

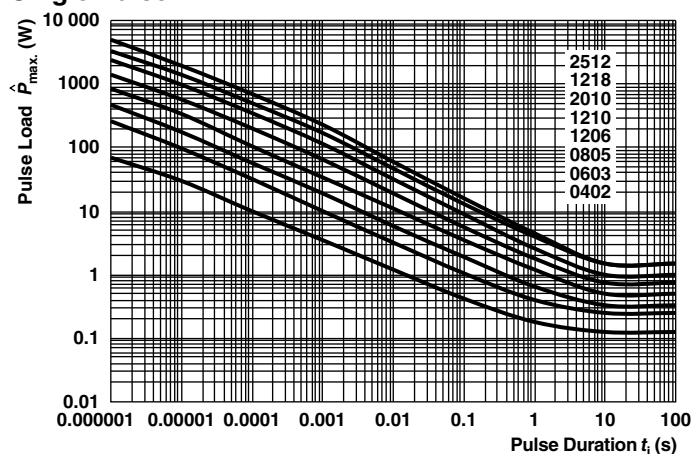
CRCW0603-HP	100	562R	1 %	ET1	e3
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE
CRCW0402-HP CRCW0603-HP CRCW0805-HP CRCW1206-HP CRCW1210-HP CRCW1218-HP CRCW2010-HP CRCW2512-HP	$\pm 100$ ppm/K $\pm 200$ ppm/K	10R = 10 $\Omega$ 562R = 562 $\Omega$ 10K = 10 k $\Omega$ 1M = 1 M $\Omega$ 0R0 = Jumper	$\pm 1\%$ $\pm 5\%$	ET1 ET5 ET6 ET7 EF4 EG1 E02 E67 E82 ET9	e3 = Pure tin termination finish

**Note**<sup>(1)</sup> Preferred way for ordering products is by use of the PART NUMBER.**PACKAGING**

MODEL	UNIT	PAPER TAPE ON REEL ACC. TO IEC 60286-3, TYPE I			BLISTER TAPE ON REEL ACC. TO IEC 60286-3, TYPE II		
		QUANTITY	PART NUMBER	PRODUCT DESC.	QUANTITY	PART NUMBER	PRODUCT DESC.
CRCW0402-HP	180 mm/7"	10 000	ED	ET7			
	330 mm/13"	50 000	EE	EF4			
CRCW0603-HP	180 mm/7"	5000	EA	ET1			
	285 mm/11.25"	10 000	EB	ET5			
	330 mm/13"	20 000	EC	ET6			
CRCW0805-HP	180 mm/7"	5000	EA	ET1			
	285 mm/11.25"	10 000	EB	ET5			
	330 mm/13"	20 000	EC	ET6			
CRCW1206-HP	180 mm/7"	5000	EA	ET1			
	285 mm/11.25"	10 000	EB	ET5			
	330 mm/13"	20 000	EC	ET6			
CRCW1210-HP	180 mm/7"	5000	EA	ET1			
	285 mm/11.25"	10 000	EB	ET5			
	330 mm/13"	20 000	EC	ET6			
CRCW1218-HP	180 mm/7"				4000	EK	ET9
CRCW2010-HP	180 mm/7"				4000	EF	E02
CRCW2512-HP	180 mm/7"				2000	EG	E67
					4000	EH	E82

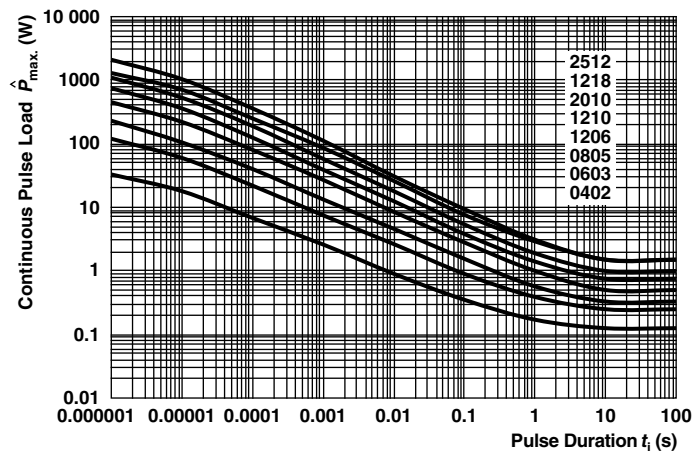
**DIMENSIONS** in millimeters

SIZE		DIMENSIONS					SOLDER PAD DIMENSIONS					
							REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	$1.0 \pm 0.05$	$0.5 \pm 0.05$	$0.3 \pm 0.1$	$0.25 \pm 0.1$	$0.2 \pm 0.1$	0.4	0.6	0.5			
0603	1608	$1.6 \pm 0.1$	$0.85 \pm 0.1$	$0.45 \pm 0.1$	$0.3 \pm 0.2$	$0.3 \pm 0.2$	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	$2.0 \pm 0.15$	$1.25 \pm 0.15$	$0.50 \pm 0.1$	$0.4 \pm 0.2$	$0.35 \pm 0.2$	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	$3.1 \pm 0.2$	$1.6 \pm 0.15$	$0.50 \pm 0.15$	$0.5 \pm 0.2$	$0.45 \pm 0.2$	0.9	1.7	2.0	1.1	1.7	2.3
1210	3225	$3.2 \pm 0.2$	$2.5 \pm 0.2$	$0.6 \pm 0.1$	$0.45 \pm 0.2$	$0.4 \pm 0.2$	0.9	2.5	2.0	1.1	2.5	2.2
1218	3246	$3.1 \pm 0.2$	$4.6 \pm 0.2$	$0.6 \pm 0.1$	$0.45 \pm 0.2$	$0.4 \pm 0.2$	1.05	4.9	1.9	1.25	4.8	1.9
2010	5025	$5.0 \pm 0.15$	$2.5 \pm 0.15$	$0.6 \pm 0.1$	$0.6 \pm 0.2$	$0.6 \pm 0.2$	1.0	2.5	3.9	1.2	2.5	3.9
2512	6332	$6.3 \pm 0.2$	$3.15 \pm 0.15$	$0.6 \pm 0.1$	$0.6 \pm 0.2$	$0.6 \pm 0.2$	1.0	3.2	5.2	1.2	3.2	5.2

**FUNCTIONAL PERFORMANCE****Single Pulse**

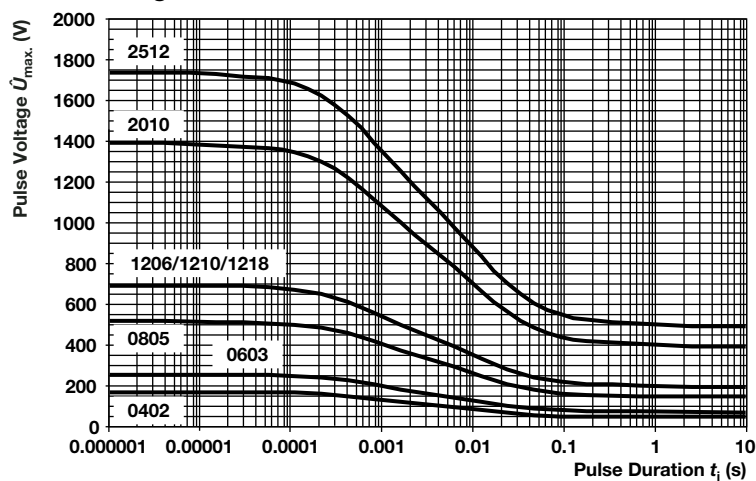
Maximum pulse load, single pulse; applicable if  $\bar{P} \rightarrow 0$  and  $n < 1000$  and  $\dot{U} \leq \dot{U}_{\max.}$ ;  
for permissible resistance change equivalent to 8000 h operation

### Continuous Pulse



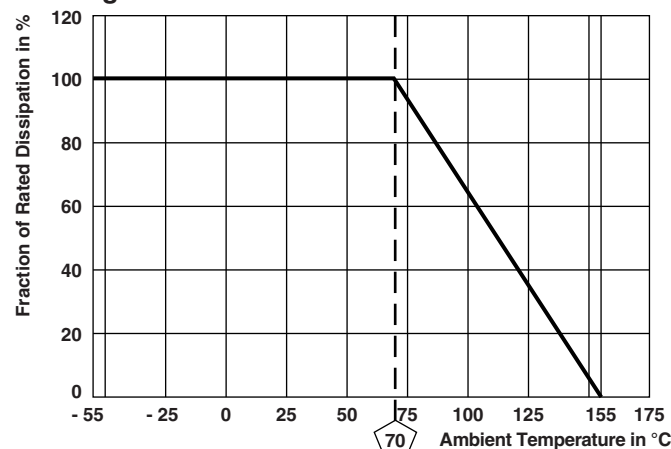
Maximum pulse load, continuous pulses; applicable if  $\bar{P} \leq P(\vartheta_{amb})$  and  $\hat{U} \leq \hat{U}_{max}$ ; for permissible resistance change equivalent to 8000 h operation

### Pulse Voltage



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

### Derating



**TEST PROCEDURES AND REQUIREMENTS**

EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE ( $\Delta R$ )
				STABILITY CLASS 2 OR BETTER
			Stability for product types:	1 $\Omega$ to 1 M $\Omega$
			CRCW-HP e3	
4.5	-	Resistance	-	$\pm 1 \%$ , $\pm 5 \%$
4.7	-	Voltage proof	$U = 1.4 \times U_{\text{ins}}$ ; 60 s	-
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R}$ $\leq 2 \times U_{\text{max}}$ ; duration: According to style	$\pm (0.5 \% R + 0.05 \Omega)$
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40; non-activated flux; (235 $\pm$ 5) $^{\circ}\text{C}$ ; (2 $\pm$ 0.2) s	Good tinning ( $\geq 95 \%$ covered) no visible damage
			Solder bath method; Sn96.5Ag3Cu0.5; non-activated flux; (245 $\pm$ 5) $^{\circ}\text{C}$ ; (3 $\pm$ 0.3) s	Good tinning ( $\geq 95 \%$ covered) no visible damage
4.8.4.2	-	Temperature coefficient	(20/- 55/20) $^{\circ}\text{C}$ and (20/125/20) $^{\circ}\text{C}$	$\pm 100$ ppm/K, $\pm 200$ ppm/K
4.32	21 ( $U_{\text{U}3}$ )	Shear (adhesion)	RR 1608 and smaller: 9 N RR 2012 and larger: 45 N	No visible damage
4.33	21 ( $U_{\text{U}1}$ )	Substrate bending	Depth 2 mm; 3 times	No visible damage, no open circuit in bent position $\pm (0.25 \% R + 0.05 \Omega)$
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 $^{\circ}\text{C}$ ; 30 min at 125 $^{\circ}\text{C}$ 5 cycles 1000 cycles	$\pm (0.5 \% R + 0.05 \Omega)$ $\pm (1 \% R + 0.05 \Omega)$
4.23	-	Dry heat	-	$\pm (2 \% R + 0.1 \Omega)$
4.23.2	2 (Ba)	Damp heat, cyclic	125 $^{\circ}\text{C}$ ; 16 h	
4.23.3	30 (Db)	cold	55 $^{\circ}\text{C}$ ; $\geq 90 \%$ RH; 24 h; 1 cycle	
4.23.4	1 (Aa)	Low air pressure	- 55 $^{\circ}\text{C}$ ; 2 h	
4.23.5	13 (M)	-	1 kPa; (25 $\pm$ 10) $^{\circ}\text{C}$ ; 1 h	
4.23.6	30 (Db)	Damp heat, cyclic	55 $^{\circ}\text{C}$ ; $\geq 90 \%$ RH; 24 h; 5 cycle	
4.23.7	-	D.C. load	$U = \sqrt{P_{70} \times R}$	
4.25.1	-	Endurance at 70 $^{\circ}\text{C}$	$U = \sqrt{P_{70} \times R} \leq U_{\text{max}}$ . 1.5 h on; 0.5 h off; 70 $^{\circ}\text{C}$ ; 1000 h 70 $^{\circ}\text{C}$ ; 8000 h	$\pm (2 \% R + 0.1 \Omega)$ $\pm (4 \% R + 0.1 \Omega)$
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method; (260 $\pm$ 5) $^{\circ}\text{C}$ ; (10 $\pm$ 1) s	$\pm (0.5 \% R + 0.05 \Omega)$
4.35	-	Flammability, needle flame test	IEC 60695-15-5; 10 s	No burning after 30 s
4.24	78 (Cab)	Damp heat, steady state	(40 $\pm$ 2) $^{\circ}\text{C}$ ; (93 $\pm$ 3) % RH; 56 days	$\pm (1 \% R + 0.05 \Omega)$
4.25.3	-	Endurance at upper category temperature	155 $^{\circ}\text{C}$ ; 1000 h	$\pm (2 \% R + 0.1 \Omega)$
4.40	-	Electrostatic discharge (human body model)	IEC 61340-3-1; 3 positive and 3 negative discharges; ESD voltage according to size	$\pm (1 \% R + 0.05 \Omega)$
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol; 50 $^{\circ}\text{C}$ ; method 2	No visible damage
4.30	45 (XA)	Solvent resistance of marking	Isopropyl alcohol; 50 $^{\circ}\text{C}$ ; method 1; toothbrush	Marking legible, no visible damage
4.22	6 (Fc)	Vibration, endurance by sweeping	f = 10 Hz to 2000 Hz; x, y, z $\leq 1.5$ mm; A $\leq 200$ m/s <sup>2</sup> ; 10 sweeps per axis	$\pm (0.5 \% R + 0.05 \Omega)$
4.37	-	Periodic electric overload	$U = \sqrt{15 \times P_{70} \times R} \leq 2 \times U_{\text{max}}$ . 0.1 s "ON"; 2.5 s "OFF"; 1000 cycles	$\pm (1 \% R + 0.05 \Omega)$
4.27	-	Single pulse high voltage overload, 10 $\mu\text{s}$ /700 $\mu\text{s}$	$\hat{U} = 10 \times \sqrt{P_{70} \times R} \leq 2 \times U_{\text{max}}$ . 10 pulses	$\pm (1 \% R + 0.05 \Omega)$

All tests are carried out in accordance with the following specifications:

- EN 60115-1, generic specification
- EN 140400, sectional specification
- EN 140401-802, detail specification
- IEC 60068-2, environmental test procedures

Packaging of components is done in paper or blister tapes according to IEC 60286-3.



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## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

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# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Vishay:

<a href="#">CRCW040251R0FKTD</a>	<a href="#">CRCW25123K16FKTG</a>	<a href="#">CRCW12062K00FKEAHP</a>	<a href="#">CRCW120610K0FKEAHP</a>
<a href="#">CRCW201010R0FKEFHP</a>	<a href="#">CRCW1206100KFKEAHP</a>	<a href="#">CRCW120615K0FKEAHP</a>	<a href="#">CRCW12061R00JNEAHP</a>
<a href="#">CRCW120610R0FKEAHP</a>	<a href="#">CRCW12061K00FKEAHP</a>	<a href="#">CRCW04020000Z0EDHP</a>	<a href="#">CRCW06030000Z0EAHP</a>
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<a href="#">CRCW1210510RJNEAHP</a>	<a href="#">CRCW1210240RJNEAHP</a>	<a href="#">CRCW12103K30FKEAHP</a>	<a href="#">CRCW1210750RFKEAHP</a>
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<a href="#">CRCW06032K00FKEAHP</a>	<a href="#">CRCW06032K20JNEAHP</a>	<a href="#">CRCW06032R20JNEAHP</a>	<a href="#">CRCW060330K9FKEAHP</a>