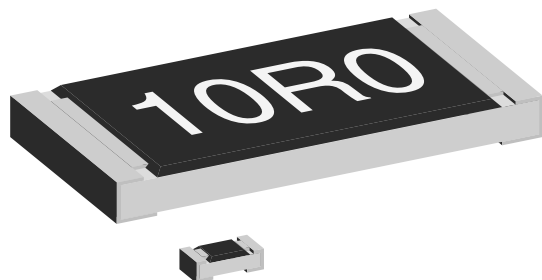


## Lead (Pb)-free Thick Film, Rectangular, Pulse Proof Chip Resistors



### FEATURES

- High pulse performance
- Metal glaze on high quality ceramic
- 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
- Compatible with "Restriction of the use of Hazardous Substances" (RoHS) directive 2002/95/EC (issue 2004)
- Excellent stability ( $\Delta R/R \leq \pm 1\%$  for 1000 h at 70 °C) in different environmental conditions



### STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING $P_{70\text{ }^\circ\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX. V	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE $\Omega$	E-SERIES
	INCH	METRIC						
D10/CRCW0402-IF	0402	1005	0.063	50	$\pm 200$	$\pm 5, \pm 10$	1R0 - 100K	E24
D11/CRCW0603-IF	0603	1608	0.10	75	$\pm 200$	$\pm 5, \pm 10$	1R0 - 100K	E24
D12/CRCW0805-IF	0805	2012	0.125	150	$\pm 200$	$\pm 5, \pm 10$	1R0 - 100K	E24
D25/CRCW1206-IF	1206	3216	0.25	200	$\pm 200$	$\pm 5, \pm 10$	1R0 - 100K	E24

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

### TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	D10/CRCW0402-IF	D11/CRCW0603-IF	D12/CRCW0805-IF	D25/CRCW1206-IF
Rated Dissipation at $P_{70}$ <sup>(1)</sup>	W	0.063	0.10	0.125	0.25
Limiting Element Voltage $U_{max}$ . AC/DC	V	50	75	150	200
Insulation Voltage $U_{ins}$ (1 min)	V	> 75	> 100	> 200	> 300
Thermal Resistance	K/W	$\leq 870$	$\leq 550$	$\leq 440$	$\leq 220$
Insulation Resistance	$\Omega$	$> 10^9$			
Category Temperature Range	$^\circ\text{C}$	- 55 to + 155			
Weight	mg	0.65	2	5.5	10

#### Note

<sup>(1)</sup> The power dissipation on the resistor 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: CRCW08051R00JNEAIF <sup>(2)</sup>

C R C W 0 8 0 5 1 R 0 0 J N E A I F

MODEL/SIZE	VALUE	TOLERANCE	TCR	PACKAGING <sup>(3)</sup>	SPECIAL
CRCW0402 CRCW0603 CRCW0805 CRCW1206	R = Decimal K = Thousand	J = $\pm 5\%$ K = $\pm 10\%$	N = $\pm 200$ ppm/K S = Special	EA, EB, EC ED, EE, EI, EL	Up to 2 digits IF = Pulse

PRODUCT DESCRIPTION: D12/CRCW0805-IF 200 1R0 5% ET1 e3

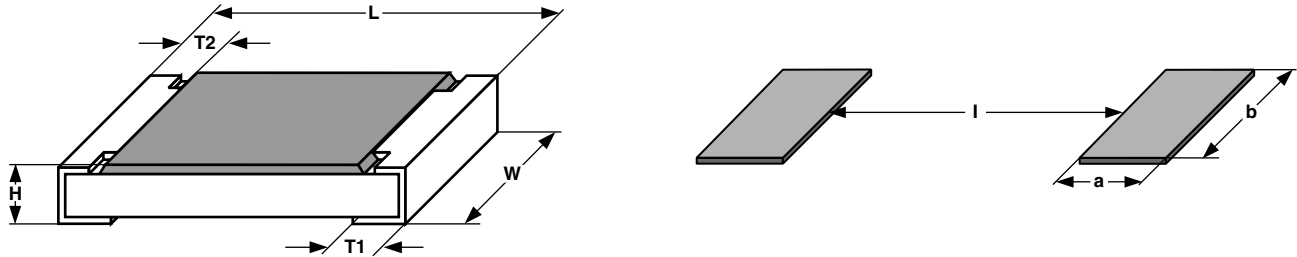
D12/CRCW0805-IF	200	1R0	5%	ET1	e3
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING <sup>(3)</sup>	LEAD (Pb)-FREE
D10/CRCW0402-IF D11/CRCW0603-IF D12/CRCW0805-IF D12/CRCW1206-IF	$\pm 200$ ppm/K	1R0 = 1 $\Omega$ 10K = 10.0 k $\Omega$	$\pm 5\%$ $\pm 10\%$	ET1, ET5, ET6, ET7, EF4, EG1, E20	e3 = Pure tin Terminal finish

#### Notes

<sup>(2)</sup> Preferred way for ordering products is by use of the PART NUMBER

<sup>(3)</sup> Please refer to table PACKAGING, see next page

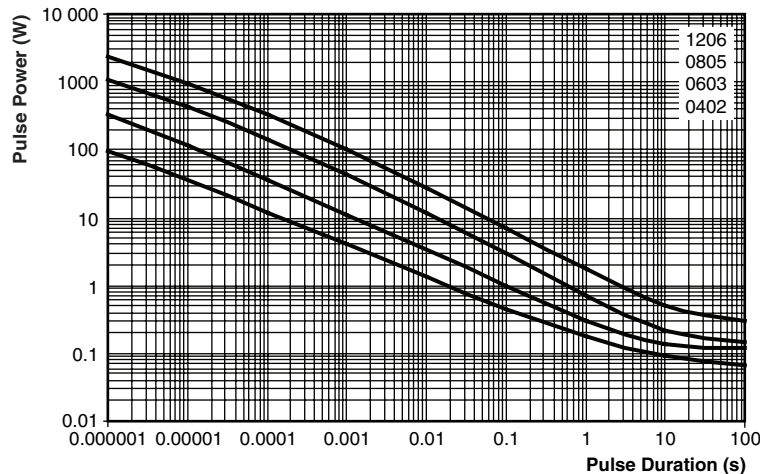
PACKAGING								
MODEL	REEL							
	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PACKING CODE			
					PART NUMBER		PRODUCT DESC.	
					PAPER	BLISTER	PAPER	BLISTER
D10/CRCW0402-IF	8 mm	180 mm/7" 330 mm/13"	2 mm 2 mm	10 000 50 000	ED		ET7	
					EE		EF4	
D11/CRCW0603-IF	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13"	4 mm	5000	EA	EI	ET1	EG1
			4 mm	10 000	EB		ET5	
			4 mm	20 000	EC	EL	ET6	E20
D12/CRCW0805-IF	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
D25/CRCW1206-IF	8 mm	180 mm/7" 285 mm/11.25" 330 mm/13" 330 mm/13"	4 mm	5000	EA	EI	ET1	EG1
			4 mm	10 000	EB		ET5	
			4 mm	15 000		EL		E20
			4 mm	20 000	EC		ET6	

**DIMENSIONS**


SIZE		DIMENSIONS (in millimeters)					SOLDER PAD DIMENSIONS (in millimeters)					
							REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	1005	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	0.4	0.6	0.5			
0603	1608	1.55 <sup>+0.10</sup> <sub>-0.05</sub>	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	2.0 <sup>+0.10</sup> <sub>-0.20</sub>	1.25 ± 0.15	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	3.2 <sup>+0.10</sup> <sub>-0.20</sub>	1.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	1.7	2.0	1.1	1.7	2.3

**FUNCTIONAL PERFORMANCE**

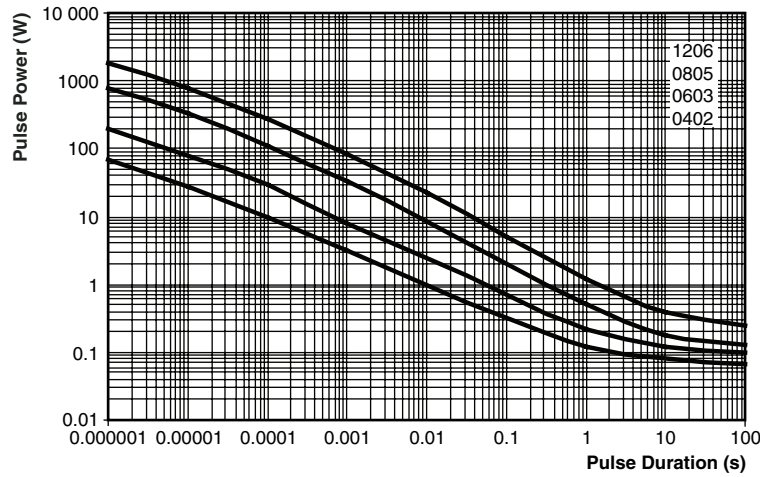
Maximum pulse dissipation as a function of the pulse duration, single pulse



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

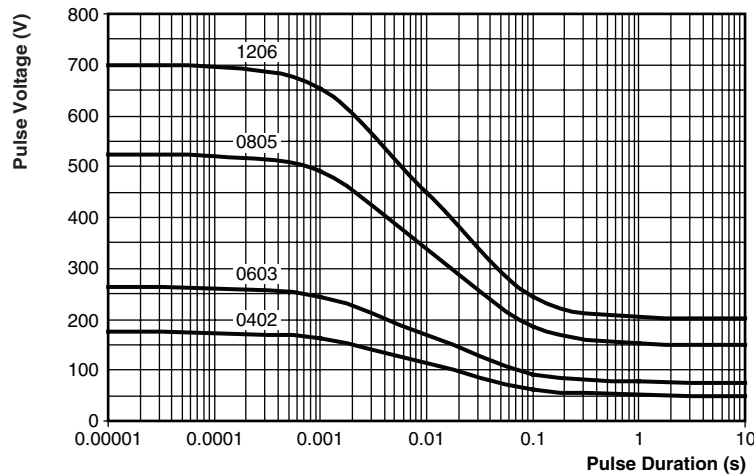


Maximum pulse dissipation as a function of the pulse duration, continuous pulse



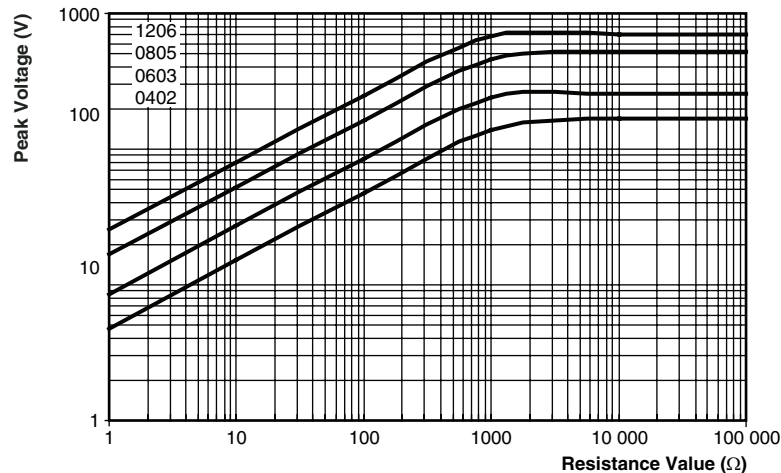
Maximum pulse load, continuous pulses; applicable if  $\bar{P} \leq P(\theta_{amb})$  and  $\dot{U} \leq \dot{U}_{max.}$ ; for permissible resistance change equivalent to 8000 h operation

Maximum permissible pulse voltage as a function of pulse duration



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

Single-pulse high voltage overload test 1.2/50  $\mu$ s EN140000 4.27



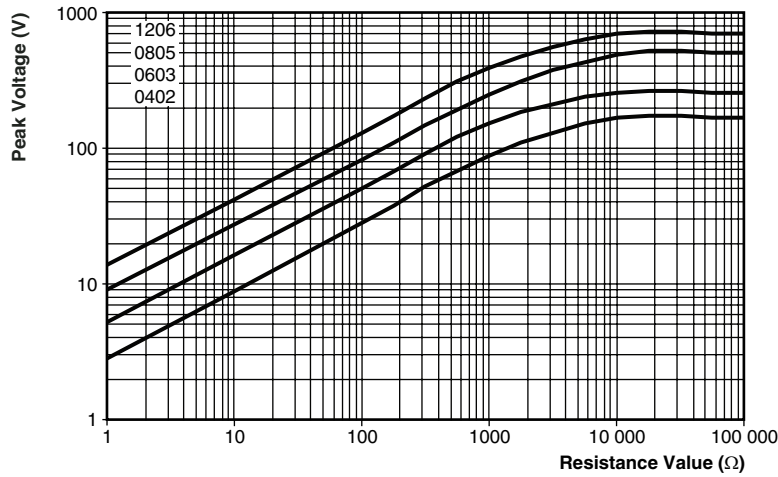
Pulse load rating in accordance to EN 60115-1, 4.27; 1.2  $\mu$ s/50  $\mu$ s; 5 pulses at 12 s intervals; for permissible resistance change 1 %



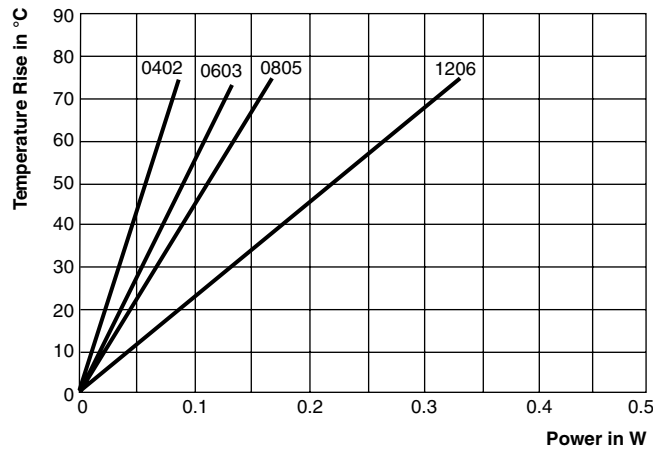
Lead (Pb)-free Thick Film, Rectangular,  
Pulse Proof Chip Resistors

Vishay

Single-pulse high voltage overload test 10/700  $\mu$ s EN140000 4.27



Pulse load rating in accordance to EN 60115-1, 4.27; 10  $\mu$ s/700  $\mu$ s;  
10 pulses at 1 min intervals; for permissible resistance change 1 %



Temperature Rise

TEST PROCEDURES AND REQUIREMENTS		
EN 60115-1		
TEST (clause)	CONDITIONS OF TEST	REQUIREMENTS PERMISSIBLE CHANGE ( $\Delta R/R$ )
		STABILITY CLASS 1 OR BETTER
	Stability for product types:	
	<b>D../CRCW....-IF e3</b>	1 $\Omega$ to 100 k $\Omega$
Resistance (4.5)	-	$\pm 5\%$   $\pm 10\%$
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	$\pm 200$ ppm/K
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{max.}$ ; Duration: according the style	$\pm (0.25\% R + 0.05 \Omega)$
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	$\pm (0.25\% R + 0.05 \Omega)$
Rapid change of temperature (4.19)	30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles	$\pm (0.25\% R + 0.05 \Omega)$
Damp heat, steady state (4.24)	(40 $\pm$ 2) °C; 56 days; (93 $\pm$ 3) % RH	$\pm (1\% R + 0.05 \Omega)$
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 $U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$ ; whichever is less severe	$\pm (1\% R + 0.05 \Omega)$
Endurance at 70 °C (4.25.1)	$U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$ ; whichever is less severe 1.5 h on; 0.5 h off; 70 °C; 1000 h	$\pm (1\% R + 0.05 \Omega)$
Extended endurance (4.25.1.8)	Duration extended to 8000 h	$\pm (2\% R + 0.1 \Omega)$
Endurance at upper category temperature (4.25.3)	UCT = 125 °C; 1000 h	$\pm (1\% R + 0.05 \Omega)$

APPLICABLE SPECIFICATIONS	
• EN 60115-1	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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