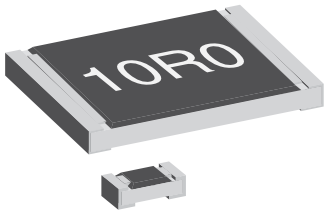
Pulse Proof Thick Film Chip Resistors



FEATURES

- High pulse performance, up to 10 kW
- Stability $\Delta R/R \leq 1$ % for 1000 h at 70 °C
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

HALOGEN FREE

STANDARD ELECTRICAL SPECIFICATIONS

TYPE	CASE SIZE IMPERIAL	CASE SIZE METRIC	POWER RATING P_{70} W	LIMITING ELEMENT VOLTAGE $U_{max.}$ AC_{RMS}/DC V	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	SERIES
D10/CRCW0402-IF	0402	RR1005M	0.063	50	± 200	± 5 ± 10	1.0 to 100K	E24
D11/CRCW0603-IF	0603	RR1608M	0.10	75	± 200	± 5 ± 10	1.0 to 100K	E24
D12/CRCW0805-IF	0805	RR2012M	0.125	150	± 200	± 5 ± 10	1.0 to 100K	E24
D25/CRCW1206-IF	1206	RR3216M	0.25	200	± 200	± 5 ± 10	1.0 to 100K	E24
CRCW1210-IF	1210	RR3225M	0.50	200	± 200	± 5 ± 10	1.0 to 100K	E24
CRCW2010-IF	2010	RR5025M	0.75	400	± 200	± 5 ± 10	1.0 to 100K	E24
CRCW2512-IF	2512	RR6332M	1.0	500	± 200	± 5 ± 10	1.0 to 100K	E24

Notes

- These resistors do not feature a limited lifetime when operated within the limits of rated dissipation, permissible operating voltage, and permissible film temperature. However, the resistance typically increase due to the resistor's film temperature over operating time, generally known as drift. The drift may exceed the stability requirements of an individual application circuit and thereby limits the functional time.
- Marking: See data sheet "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.

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	D10/ CRCW0402-IF	D11/ CRCW0603-IF	D12/ CRCW0805-IF	D25/ CRCW1206-IF	CRCW1210-IF	CRCW2010-IF	CRCW2512-IF
Rated dissipation P_{70} (1)	W	0.063	0.1	0.125	0.25	0.5	0.75	1.0
Operating voltage $U_{max.}$ AC_{RMS}/DC	V	50	75	150	200	200	400	500
Insulation voltage U_{ins} (1 min)	V	75	100	200	300	300	300	300
Insulation resistance	Ω	$> 10^9$						
Operating temperature range	°C	-55 to +155						
Failure rate	h^{-1}	$< 0.1 \times 10^{-9}$						
Mass	mg	0.65	2	5.5	10	16	25.5	40.5

Note

(1) The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printe-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

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

TYPE	VALUE	TOLERANCE	TCR	PACKAGING	SPECIAL
CRCW0402 **CRCW0603** **CRCW0805** **CRCW1206** **CRCW1210** **CRCW2010** **CRCW2512**	**R** = Decimal **K** = Thousand	**J** = ± 5 % **K** = ± 10 %	**N** = ± 200 ppm/K	**EA, EB,** **EC, ED,** **EE, EF,** **EG, EH,** **EI, EL**	Up to 2 digits **IF** = Pulse proof

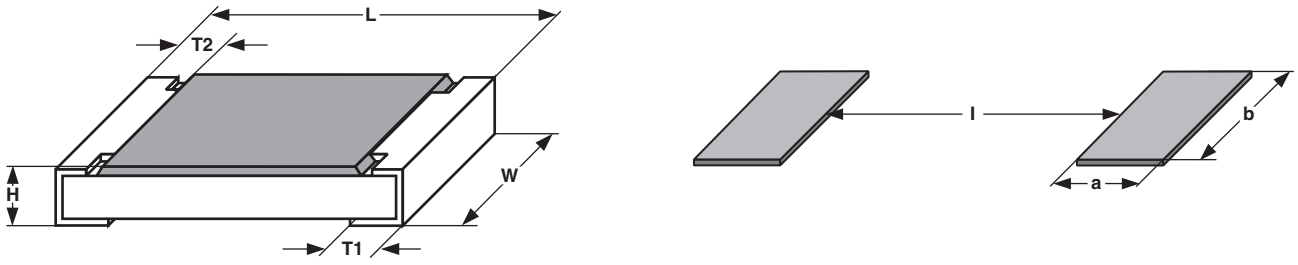
Product Description: D12/CRCW0805-IF 200 1R0 5 % ET1 e3

D12/CRCW0805-IF	200	1R0	5 %	ET1	e3
TYPE	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE
D10/CRCW0402-IF **D11/CRCW0603-IF** **D12/CRCW0805-IF** **D25/CRCW1206-IF** **CRCW1210-IF** **CRCW2010-IF** **CRCW2512-IF**	± **200** ppm/K	**1R0** = 1 Ω **10K** = 10 kΩ	± **5 %** ± **10 %**	**ET1, ET2,** **ET3, ET4,** **ET5, ET6,** **ET7, ET8,** **ET9, EF4,** **E02, E67,** **E82**	**e3** = Pure tin termination finish

PACKAGING

TYPE	CODE	QUANTITY	CARRIER TAPE	WIDTH	PITCH	REEL DIAMETER
D10/CRCW0402-IF	ED = ET7	10 000	Paper tape acc. to IEC 60286-3 Type 1a	8 mm	2 mm	180 mm/7"
	EE = EF4	50 000				330 mm/13"
D11/CRCW0603-IF	EI = ET2	5000		8 mm	2 mm	180 mm/7"
	ED = ET3	10 000				180 mm/7"
	EL = ET4	20 000				285 mm/11.25"
	EE = ET8	50 000				330 mm/13"
	EA = ET1	5000		8 mm	4 mm	180 mm/7"
	EB = ET5	10 000				285 mm/11.25"
	EC = ET6	20 000				330 mm/13"
D12/CRCW0805-IF	EA = ET1	5000		8 mm	4 mm	180 mm/7"
	EB = ET5	10 000				285 mm/11.25"
	EC = ET6	20 000				330 mm/13"
D25/CRCW1206-IF	EA = ET1	5000		8 mm	4 mm	180 mm/7"
	EB = ET5	10 000				285 mm/11.25"
	EC = ET6	20 000				330 mm/13"
CRCW1210-IF	EA = ET1	5000		8 mm	4 mm	180 mm/7"
	EB = ET5	10 000				285 mm/11.25"
	EC = ET6	20 000				330 mm/13"
CRCW2010-IF	EF = E02	4000	Pressed tape acc. to IEC 60286-3 Type 1b	12 mm	4 mm	180 mm/7"
CRCW2512-IF	EG = E67	2000		12 mm	8 mm	180 mm/7"
	EH = E82	4000			4 mm	

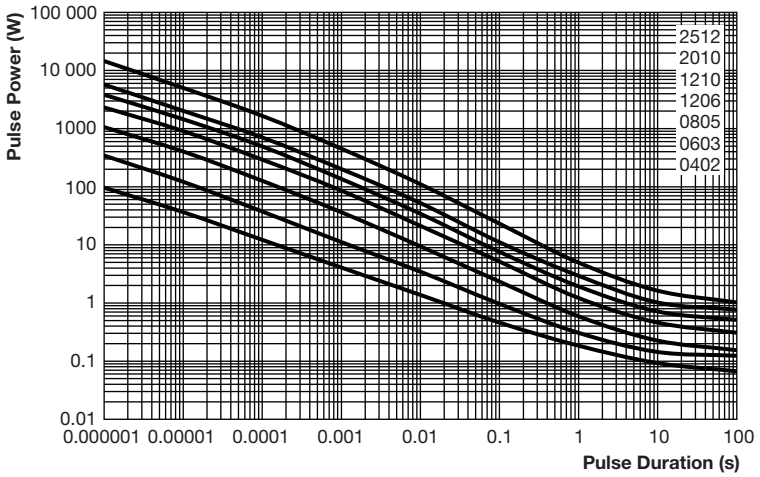
DIMENSIONS in millimeters



SIZE		DIMENSIONS					RECOMMENDED SOLDER PAD DIMENSIONS					
							REFLOW SOLDERING			WAVE SOLDERING		
IMPERIAL	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	RR1005M	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	RR1608M	1.55 $^{+0.10}_{-0.05}$	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	RR2012M	2.0 $^{+0.20}_{-0.10}$	1.25 ± 0.15	0.45 ± 0.05	0.3 $^{+0.20}_{-0.10}$	0.3 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3
1206	RR3216M	3.2 $^{+0.10}_{-0.20}$	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
1210	RR3225M	3.2 ± 0.2	2.5 ± 0.2	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	2.5	2.0	1.1	2.5	2.2
2010	RR5025M	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	RR6332M	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

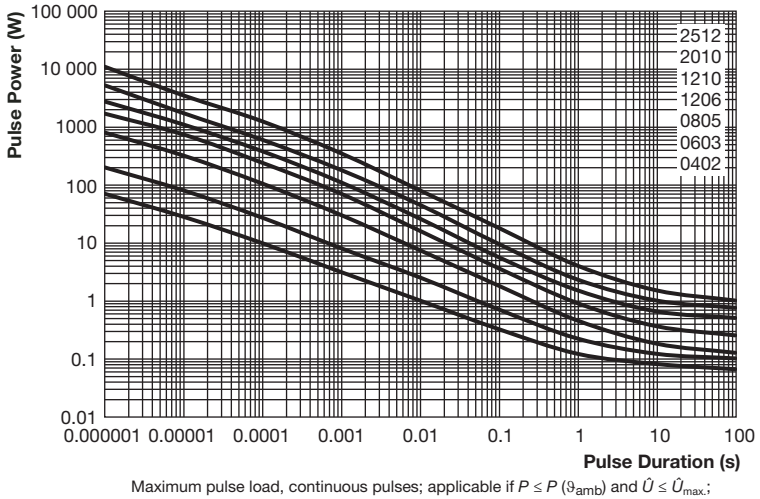
FUNCTIONAL PERFORMANCE

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

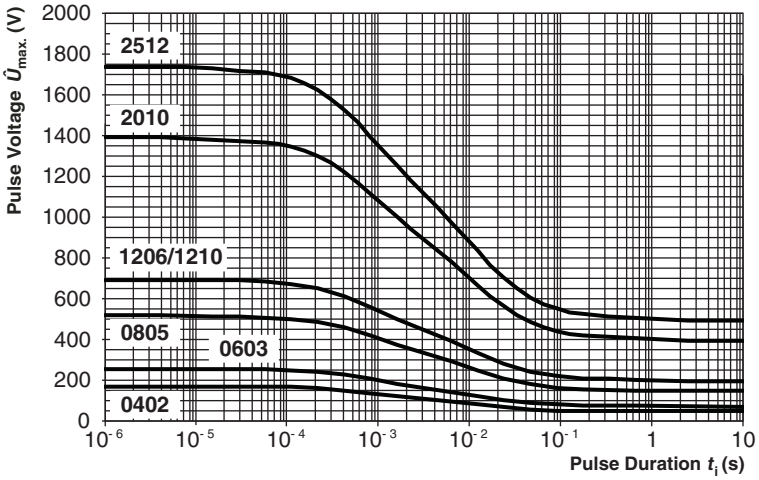


Maximum pulse load, single pulse; applicable if $\bar{P} \rightarrow 0$ and $n \leq 1000$ and $\hat{U} \leq \hat{U}_{max.}$; for permissible resistance change equivalent to 8000 h operation

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

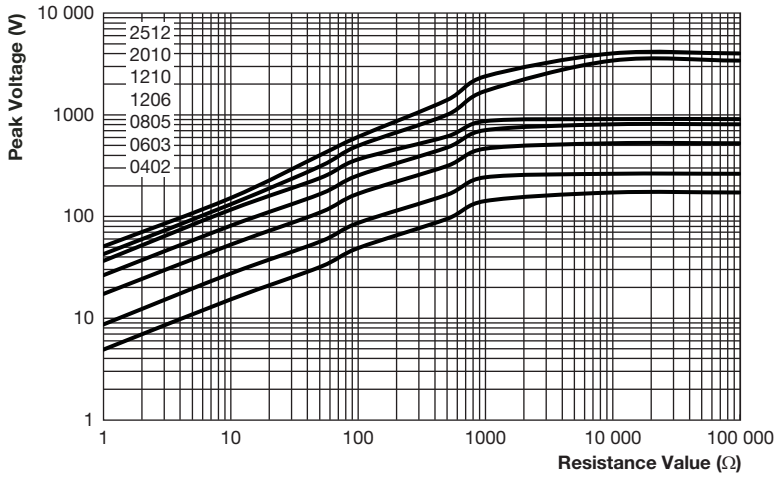


Maximum pulse load, continuous pulses; applicable if $P \le P\,(\vartheta_{amb})$ and $\hat{U} \le \hat{U}_{max.}$; for permissible resistance change equivalent to 8000 h operation



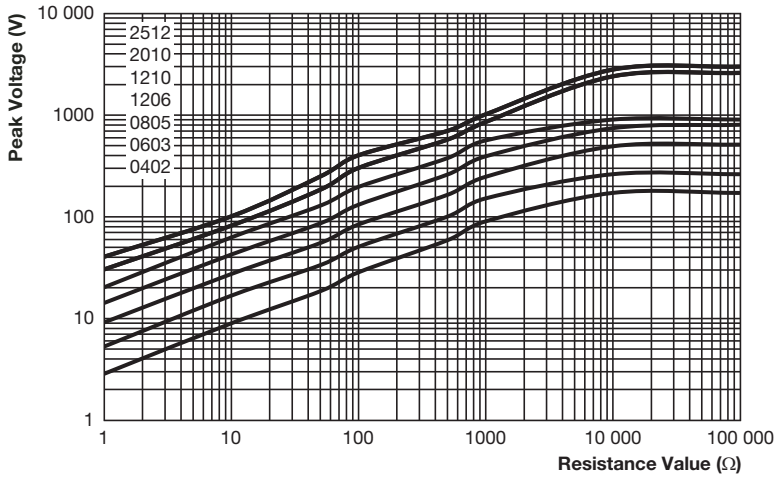
Maximum pulse voltage, single and continuous pulses; applicable if $\hat{P} \le \hat{P}_{max.}$; for permissible resistance change equivalent to 8000 h operation

Single-pulse high voltage overload test 1.2 µs/50 µs EN 140000 4.27



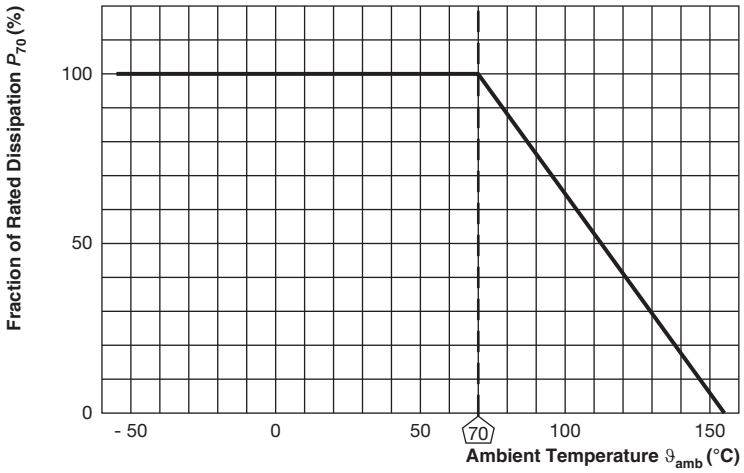
Pulse load rating in accordance to EN 60115-1, 4.27; 1.2 µs/50 µs;
5 pulses at 12 s intervals; for permissible resistance change 1 %

Single-pulse high voltage overload test 10 µs/700 µs EN 140000 4.27



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

Derating



TEST PROCEDURES AND REQUIREMENTS				
EN 60115-1 CLAUSE	IEC 60082-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
				STABILITY CLASS 1 OR BETTER
			Stability for product type:	1 Ω to 100 kΩ
			D/CRCW-IF e3	
4.5	-	Resistance	-	± 5 %; ± 10 %
4.7	-	Voltage proof	U = 1.4 x U_{ins}; 60 s	No flashover or breakdown
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$; duration acc. to style	± (0.25 % R + 0.05 Ω)
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40; non-activated flux; (235 ± 5) °C, (2 ± 0.2) s	Good tinning (≥ 95 % covered); no visible damage
			Solder bath method; Sn96.5Ag3Cu0.5; non-activated flux; (245 ± 5) °C, (3 ± 0.3) s	Good tinning (≥ 95 % covered); no visible damage
4.8.4.2	-	Temperature coefficient	(20/- 55/20) °C and (20/125/20) °C	± 200 ppm/K
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 °C; 30 min. at 125°C 5 cycles 1000 cycles	± (0.25 % R + 0.05 Ω) ± (1 % R + 0.05 Ω)

TEST PROCEDURES AND REQUIREMENTS				
EN 60115-1 CLAUSE	IEC 60082-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
				STABILITY CLASS 1 OR BETTER
			Stability for product type:	1 Ω to 100 kΩ
			D/CRCW-IF e3	
4.23	-	Climatic sequence:	-	± (1 % R + 0.05 Ω)
4.23.2	2 (Ba)	Dry heat	125 °C; 16 h	
4.23.3	30 (Db)	Damp heat, cyclic	55 °C; ≥ 90 % RH; 24 h; 1 cycle	
4.23.4	1 (Aa)	Cold	- 55 °C; 2 h	
4.23.5	13 (M)	Low air pressure	1 kPa; (25 ± 10) °C; 1 h	
4.23.6	30 (Db)	Damp heat, cyclic	55 °C; ≥ 90 % RH; 24 h; 5 cycles	
4.23.7	-	DC load	$U = \sqrt{P_{70} \times R}$	
4.25.1	-	Endurance at 70 °C	$U = \sqrt{P_{70} \times R} \leq U_{max.}$ 1.5 h on; 0.5 h off; 70 °C; 1000 h 70 °C; 8000 h	± (1 % R + 0.05 Ω) ± (2 % R + 0.1 Ω)
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 ± 5) °C; (10 ± 1) s	± (0.25 % R + 0.05 Ω)
4.24	78 (Cab)	Damp heat, steady state	(40 ± 2) °C; (93 ± 3) % RH; 56 days	± (1 % R + 0.05 Ω)
4.25.3	-	Endurance at upper category temperature	155 °C; 1000 h	± (1 % R + 0.05 Ω)
4.27	-	Single pulse high voltage overload, 10 µs/700 µs	$\hat{U} = 10 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$; 10 pulses	± (1 % R + 0.05 Ω)

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-x, environmental test procedures

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

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

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 in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay’s knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specifications do not expand or otherwise modify Vishay’s terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

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