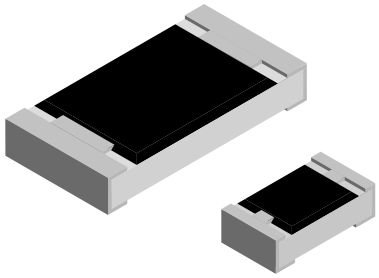
Lead (Pb)-Free Thick Film, Rectangular High Value Chip Resistor



FEATURES

- High resistance values (up to 470M)
- Suitable for voltage dividers and hybrids
- Pure tin plating provides compatibility with lead (Pb)-free and lead containing soldering processing
- Metal glaze on high quality ceramic
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT HALOGEN FREE

STANDARD ELECTRICAL SPECIFICATIONS

MODEL	CASE SIZE INCH	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
D11/CRCW0603-HR	0603	RR 1608M	0.10	75	± 500	± 5	11M to 470M	E24
D12/CRCW0805-HR	0805	RR 2012M	0.125	150	± 500	± 5	11M to 470M	E24
D25/CRCW1206-HR	1206	RR 3216M	0.25	200	± 500	± 5	11M to 470M	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 and packaging: See datasheet "Surface Mount Resistor Marking" (www.vishay.com/doc?20020)
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	D11/CRCW0603-HR	D12/CRCW0805-HR	D25/CRCW1206-HR
Rated Dissipation at P_{70} (1)	W	0.1	0.125	0.25
Operating Voltage $U_{max.}$ AC_{RMS}/DC	V	75	150	200
Voltage Coefficient	%/V	< 100M: < 0.1 > 100M: < 0.3		
Insulation Voltage U_{ins} (1 min)	V	100	200	300
Insulation Resistance	Ω	> 10^9		
Operating Temperature Range	°C	- 55 to + 155		
Weight	mg	2	5.5	10

Note

(1) 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: CRCW060316M0JPEAHR

C	R	C	W	0	6	0	3	1	6	M	0	J	P	E	A	H	R

MODEL/SIZE	RESISTANCE	TOLERANCE	TCR	PACKAGING	SPECIAL
CRCW0603 **CRCW0805** **CRCW1206**	**M** = Million	**J** = ± 5 %	**P** = ± 500 ppm/K	**EA** **EB** **EC**	Up to 2 digits **HR** = High value

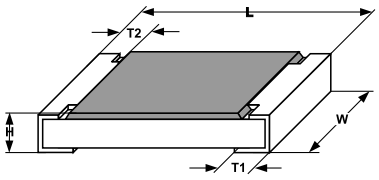
Product Description: D11/CRCW0603-HR 500 16M 5 % ET1 e3

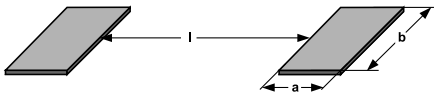
D11/CRCW0603-HR	500	16M	5 %	ET1	e3
MODEL	TCR	RESISTANCE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE
D11/CRCW0603-HR **D12/CRCW0805-HR** **D25/CRCW1206-HR**	± **500** ppm/K	**68M** = 68 MΩ **227M** = 227 MΩ	± **5** %	**ET1** **ET5** **ET6**	**e3** = Pure tin termination finish

PACKAGING

MODEL	CODE	QUANTITY	CARRIER TAPE	WIDTH	PITCH	REEL DIAMETER
D11/CRCW0603-HR	EA = ET1	5000	Paper tape acc. to IEC 60068-3 Type I	8 mm	4 mm	180 mm/7"
	EB = ET5	10 000				285 mm/11.25"
	EC = ET6	20 000				330 mm/13"
D12/CRCW0805-HR	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-HR	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"

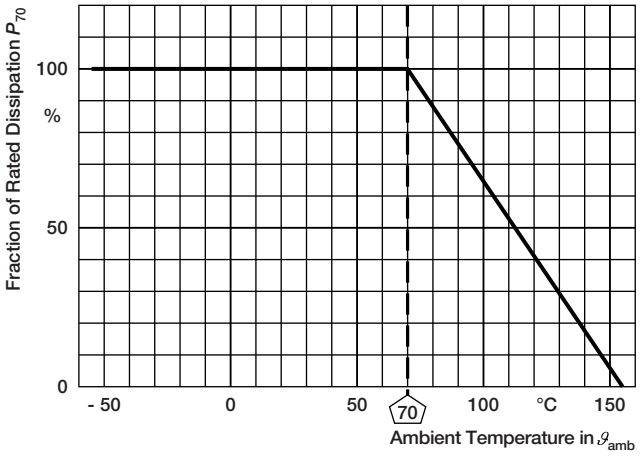
DIMENSIONS





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
0603	1608	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	2012	2.0 $^{+0.20}_{-0.10}$	1.25 ± 0.15	0.45 ± 0.05	0.3 $^{+0.10}_{-0.20}$	0.3 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	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

DERATING



TEST PROCEDURES AND REQUIREMENTS

EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
				STABILITY CLASS 2 OR BETTER
			Stability for product types:	
			D/CRCW-HR e3	11 MΩ to 470 MΩ
4.5	_	Resistance	-	± 5 %
4.13	_	Short time overload	$U = 2.5 \times \sqrt{P_{70}} \times R \leq 2 \times U_{max.}$; Duration acc. to style	± (0.5 % R + 0.05 Ω)
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40	Good tinning (≥ 95 % covered); no visible damage
			Solder bath method; Sn96, 5Ag3Cu0.5 or Sn99, 3Cu0.7 non-activated flux; (245 ± 5) °C or (250 ± 5) °C (3 ± 0.3) s	Good tinning (≥ 95 % covered); no visible damage
4.8.4.2	_	Temperature coefficient	20 °C/- 55 °C/20 °C and 20 °C/125 °/20 °C	± 500 ppm/K
4.32	21 (Uu_3)	Shear (adhesion)	RR 1608: 9 N RR 2012 and RR 3216: 45N	No visible damage
4.33	21 (Uu_1)	Substrate bending	Depth 2 mm; 3 times	No visible damage, no open circuit in bent position ± (0.25 % R + 0.05 Ω)
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 °C; 30 min. at 125 °C 5 cycles 1000 cycles	± (0.5 % R + 0.05 Ω) ± (1 % R + 0.05 Ω)
4.23 4.23.2 4.23.3 4.23.4 4.23.5 4.23.6 4.23.7	_ 2 (Ba) 30 (Db) 1 (Aa) 13 (M) 30 (Db) _	Climatic sequence: Dry Heat Damp heat, cyclic Cold Low air pressure Damp heat, cyclic D.C. Load	- 125 °C; 16 h 55 °C; ≥ 90 % RH; 24 h; 1 cycle - 55 °C; 2 h 1 kPa; (25 ± 10) °C; 1 h 55 °C; ≥ 90 % RH 24 h; 5 cycle $U = \sqrt{P_{70}} \times R$	± (2 % R + 0.1 Ω)

TEST PROCEDURES AND REQUIREMENTS				
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
				STABILITY CLASS 2 OR BETTER
			Stability for product types:	
			D/CRCW-HR e3	11 MΩ to 470 MΩ
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	 ± (2 % R + 0.1 Ω) ± (4 % R + 0.1 Ω)
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 ± 5) °C; (10 ± 1) s	± (0.5 % R + 0.05 Ω)
4.24	78 (Cab)	Damp heat, steady state	(40 ± 2) °C; (93 ± 3) % RH; 56 days	± (2 % R + 0.1 Ω)
4.25.3	–	Endurance at upper category temperature	155 °C; 1000 h	± (2 % R + 0.1 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, variety of environmental test procedures

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

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