

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



FEATURES

**HALOGEN
FREE**

- High resistance values (up to 470M)
- Suitable for voltage dividers and hybrids
- Lead (Pb)-bearing termination plating on Ni barrier layer
- Metal glaze on high quality ceramic
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

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
- 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 ⁽²⁾	%/V	< 100M: < 0.1 ppm/V > 100M: < 0.3 ppm/V		
Insulation voltage U_{ins} (1 min)	V	100	200	300
Insulation resistance	Ω	$> 10^9$		
Operating temperature range	$^{\circ}C$	- 55 to + 155		
Weight	mg	2	5.5	10

Notes

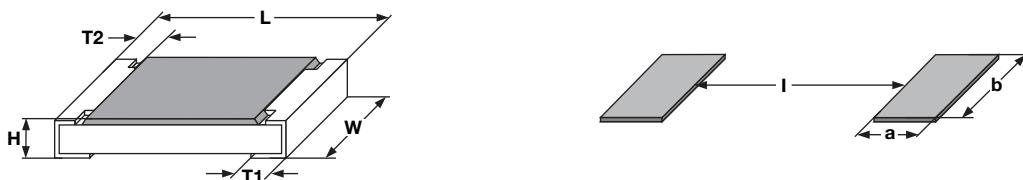
(1) The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded

(2) Voltage coefficient was tested according to 10 V measurements

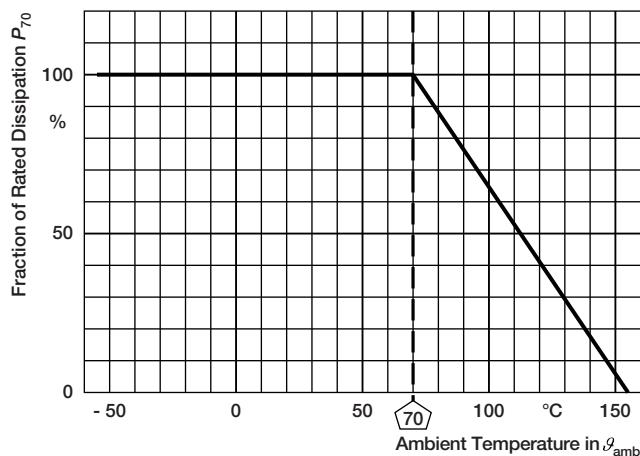
PART NUMBER AND PRODUCT DESCRIPTION																										
Part Number: CRCW060316M0JPTAHR																										
C	R	C	W	0	6	0	3	1	6	M	0	J	P	T												
MODEL / SIZE			RESISTANCE			TOLERANCE			TCR			PACKAGING														
CRCW0603			M = million			J = ± 5 %			P = ± 500 ppm/K			TA, TC														
CRCW0805												SPECIAL														
CRCW1206												Up to 2 digits														
HR = high value																										
Product Description: CRCW0603-HR 500 16M 5% RT1																										
CRCW0603-HR	500			16M			J			RT1																
MODEL			TCR			RESISTANCE			TOLERANCE			PACKAGING														
CRCW0603-HR			± 500 ppm/K			68M = 68 MΩ			± 5 %			RT1, RT6														
CRCW0805-HR																										
CRCW1206-HR																										

PACKAGING						
MODEL	CODE	QUANTITY	CARRIER TAPE	WIDTH	PITCH	REEL DIAMETER
CRCW0603-HR	TA = RT1	5000	Paper tape acc. to IEC 60068-3 Type I	8 mm	4 mm	180 mm/7"
	TC = RT6	20 000				330 mm/13"
CRCW0805-HR	TA = RT1	5000		8 mm	4 mm	180 mm/7"
	TC = RT6	20 000				330 mm/13"
CRCW1206-HR	TA = RT1	5000		8 mm	4 mm	180 mm/7"
	TC = RT6	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	I	a	b	I	
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	0.5 ± 0.10	0.3 ^{+ 0.20} _{- 0.10}	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	11 MΩ to 470 MΩ		
6.1	-	Measurements of resistance and tolerance	-	± 5 %		
8.1	-	Short-term overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{\max};$ whichever is the less severe; 5 s	± (0.5 % $R + 0.05 \Omega$)		
11.1.4.3	58 (Td)	Solderability	Solder bath method; Sn60Pb40	Good tinning (95 % covered); no visible damage		
6.2	-	Temperature coefficient of resistance	At (20/-55/20) °C and (20/125/20) °C	± 500 ppm/K		
7.1	-	Endurance at rated temperature 70 °C	$U = \sqrt{P_{70} \times R}$ or $U = U_{\max}.$ 1.5 h on; 0.5 h off; 70 °C; 1000 h 70 °C; 8000 h	± (2 % $R + 0.1 \Omega$) ± (4 % $R + 0.1 \Omega$)		
7.3	-	Endurance at maximum temperature	155 °C, 1000 h	± (2 % $R + 0.1 \Omega$)		
10.4	78 (Cab)	Damp heat, steady state	(40 ± 2) °C; 56 days (93 ± 3) % RH	± (2 % $R + 0.1 \Omega$)		
10.3	-	Climatic sequence:				
10.3.4.2	2 (Ba)	Dry heat	125 °C; 16 h			
10.3.4.3	30 (Db)	Damp heat, cyclic	55 °C; 24 h; ≥ 90 % RH; 1 cycle			
10.3.4.4	1 (Aa)	Cold	-55 °C; 2 h	± (2 % $R + 0.1 \Omega$)		
10.3.4.5	13 (M)	Low air pressure	1 kPa; 1 h; (25 ± 10) °C			
10.3.4.6	30 (Db)	Damp heat, cyclic	55 °C; 24 h; ≥ 90 % RH; 5 cycles			
10.3.4.7	-	DC load	$U = \sqrt{P_{70} \times R} \leq U_{\max}.$			

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		
				11 M Ω to 470 M Ω		
10.1	14 (Na)	Rapid change of temperature	30 min. at -55 °C and 30 min. at 125 °C 5 cycles 1000 cycles	$\pm (0.5 \% R + 0.05 \Omega)$ $\pm (1 \% R + 0.05 \Omega)$		
9.7	21 (Ue ₃)	Shear (adhesion)	RR 1608: 9 N RR 2012 and RR 3216: 45 N	No visible damage		
9.8	21 (Ue ₁)	Substrate bending	Depth 2 mm; 3 times	$\pm (0.25 \% R + 0.05 \Omega)$ no visible damage, no open circuit in bent position		

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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