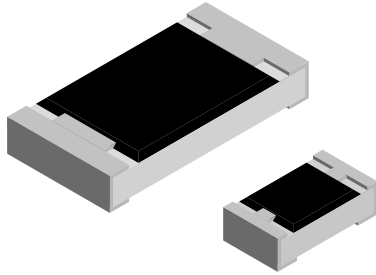


## Lead (Pb)-Free Thick Film, Rectangular High Value Chip Resistor



### 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](http://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 $\Omega$	SERIES
D11/CRCW0603-HR	0603	RR 1608M	0.10	75	$\pm 500$	$\pm 5$	11M to 470M	E24
D12/CRCW0805-HR	0805	RR 2012M	0.125	150	$\pm 500$	$\pm 5$	11M to 470M	E24
D25/CRCW1206-HR	1206	RR 3216M	0.25	200	$\pm 500$	$\pm 5$	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](http://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 $P_{70}$ <sup>(1)</sup>	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	$\Omega$	$> 10^9$		
Operating Temperature Range	$^{\circ}C$	- 55 to + 155		
Weight	mg	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  $^{\circ}C$  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
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MODEL/SIZE CRCW0603 CRCW0805 CRCW1206	RESISTANCE M = Million	TOLERANCE J = ± 5 %	TCR P = ± 500 ppm/K	PACKAGING EA EB EC	SPECIAL Up to 2 digits HR = High value
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Product Description: D11/CRCW0603-HR 500 16M 5 % ET1 e3

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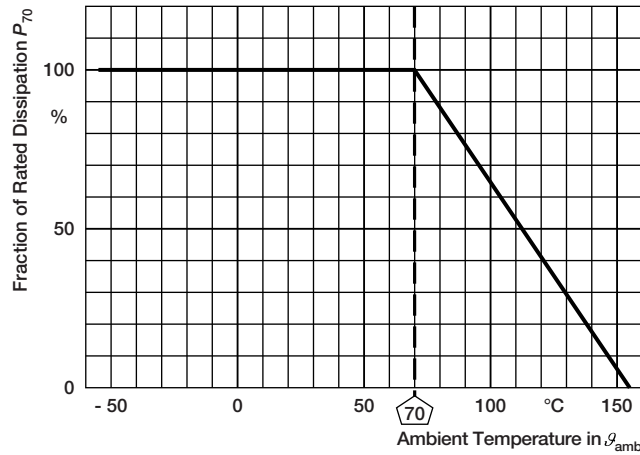
**PACKAGING**

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 <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>+0.20</sup> <sub>-0.10</sub>	1.25 ± 0.15	0.45 ± 0.05	0.3 <sup>+0.10</sup> <sub>-0.20</sub>	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

**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: <b>D/CRCW-HR e3</b>	11 M $\Omega$ to 470 M $\Omega$
4.5	-	Resistance	-	$\pm 5\%$
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$ ; Duration acc. to style	$\pm (0.5\% R + 0.05 \Omega)$
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40	Good tinning ( $\geq 95\%$ covered); no visible damage
			Solder bath method; Sn96, 5Ag3Cu0.5 or Sn99, 3Cu0.7 non-activated flux; (245 $\pm$ 5) °C or (250 $\pm$ 5) °C (3 $\pm$ 0.3) s	Good tinning ( $\geq 95\%$ covered); no visible damage
4.8.4.2	-	Temperature coefficient	20 °C/- 55 °C/20 °C and 20 °C/125 °/20 °C	$\pm 500$ ppm/K
4.32	21 (Uu <sub>3</sub> )	Shear (adhesion)	RR 1608: 9 N RR 2012 and RR 3216: 45N	No visible damage
4.33	21 (Uu <sub>1</sub> )	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 °C; 30 min. at 125 °C  5 cycles 1000 cycles	$\pm (0.5\% R + 0.05 \Omega)$ $\pm (1\% R + 0.05 \Omega)$
4.23 4.23.2 4.23.3	- 2 (Ba) 30 (Db)	Climatic sequence: Dry Heat Damp heat, cyclic	- 125 °C; 16 h 55 °C; $\geq 90\%$ RH; 24 h; 1 cycle	$\pm (2\% R + 0.1 \Omega)$
4.23.4	1 (Aa)	Cold	- 55 °C; 2 h	
4.23.5	13 (M)	Low air pressure	1 kPa; (25 $\pm$ 10) °C; 1 h	
4.23.6	30 (Db)	Damp heat, cyclic	55 °C; $\geq 90\%$ RH 24 h; 5 cycle	
4.23.7	-	D.C. Load	$U = \sqrt{P_{70} \times R}$	



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: <b>D/CRCW-HR e3</b>	11 M $\Omega$ to 470 M $\Omega$
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	$\pm (2 \% R + 0.1 \Omega)$ $\pm (4 \% R + 0.1 \Omega)$
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 $\pm$ 5) °C; (10 $\pm$ 1) s	$\pm (0.5 \% R + 0.05 \Omega)$
4.24	78 (Cab)	Damp heat, steady state	(40 $\pm$ 2) °C; (93 $\pm$ 3) % RH; 56 days	$\pm (2 \% R + 0.1 \Omega)$
4.25.3	–	Endurance at upper category temperature	155 °C; 1000 h	$\pm (2 \% R + 0.1 \Omega)$

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-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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