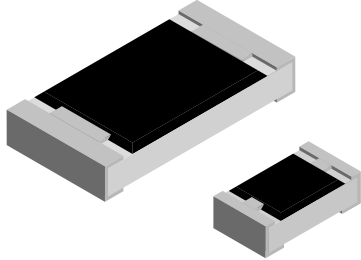


Lead (Pb)-free Thick Film, Rectangular, High Value Chip Resistors



FEATURES

- High resistance values (up to 470M)
- Suitable for voltage dividers and hybrids
- 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)



STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE		POWER RATING $P_{70^{\circ}\text{C}}$ W	LIMITING ELEMENT VOLTAGE MAX. V_{\equiv}	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	E-SERIES
	INCH	METRIC						
D11/CRCW0603-HR	0603	1608	0.1	75	± 500	± 5	11M - 470M	24
D12/CRCW0805-HR	0805	2012	0.125	150	± 500	± 5	11M - 470M	24
D25/CRCW1206-HR	1206	3216	0.25	200	± 500	± 5	11M - 470M	24

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	D11/CRCW0603-HR	D12/CRCW0805-HR	D25/CRCW1206-HR
Rated Dissipation at 70 °C ⁽²⁾	W	0.1	0.125	0.25
Limiting Element Voltage	V_{\equiv}	75	150	200
Voltage Coefficient	%/V	< 100M: < 0.1/> 100M: < 0.3		
Insulation Voltage (1 min)	$V_{\text{dc/ac peak}}$	> 100	> 200	> 300
Thermal Resistance ⁽¹⁾	K/W	≤ 550	≤ 440	≤ 220
Insulation Resistance	Ω	$> 10^9$		
Category Temperature Range	$^{\circ}\text{C}$	- 55 to + 155		
Weight/1000 pieces	g	2	5.5	10

Notes

⁽¹⁾ Measuring conditions in acc. to EN 140401-802

⁽²⁾ 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.



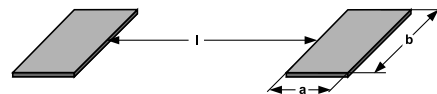
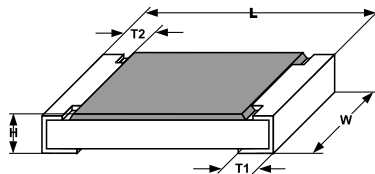
PART NUMBER AND PRODUCT DESCRIPTION						
PART NUMBER: CRCW060316M0JPEAHR ⁽¹⁾						
C	R	C	W	0	6	0
3	1	6	M	0	J	P
E	A	H	R			
MODEL/SIZE	VALUE	TOLERANCE	TCR	PACKAGING ⁽²⁾	SPECIAL	
CRCW0603 CRCW0805 CRCW1206	M = Million	J = ± 5 %	P = ± 500 ppm/K	EA EB EC EI EL	Up to 2 digits HR = High Value	
Product Description: D11/CRCW0603-HR 500 16M 5 % ET1 e3						
D11/CRCW0603-HR	500	16M	5 %	ET1	e3	
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING ⁽²⁾	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 EG1 E20	e3 = Pure tin Termination finish	

Notes

- (1) Preferred way for ordering products is by use of the PART NUMBER
- (2) Please refer to table PACKAGING, see next page

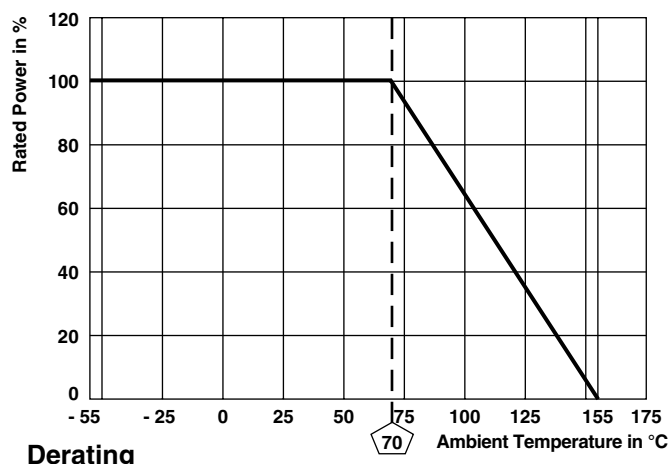
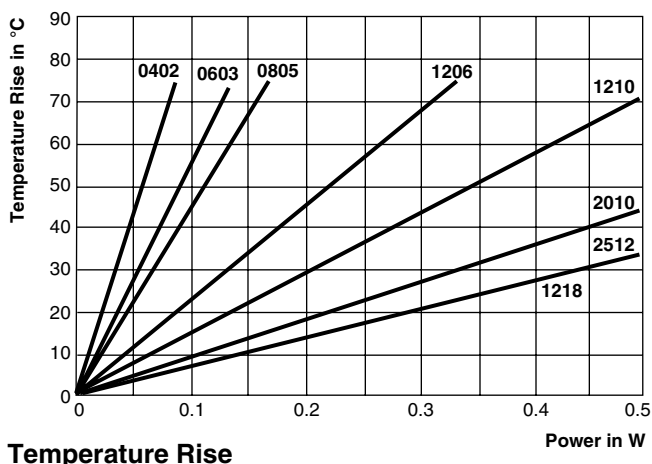
PACKAGING											
MODEL	REEL								BULK		
	TAPE WIDTH	DIAMETER	PITCH	PIECES/ REEL	PACKAGING CODE				PIECES	PACKAGING CODE	
					PART NUMBER		PRODUCT DESC.			PART NUMBER	PRODUCT DESC.
					PAPER	BLISTER	PAPER	BLISTER			
D11/CRCW0603-HR	8 mm	180 mm/7"	4 mm	5000	EA	EI	ET1	EG1	25 000	EY	E27
		285 mm/11.25"	4 mm	10 000	EB		ET5				
		330 mm/13"	4 mm	20 000	EC	EL	ET6	E20			
D12/CRCW0805-HR	8 mm	180 mm/7"	4 mm	5000	EA	EI	ET1	EG1	10 000	EY	E27
		285 mm/11.25"	4 mm	10 000	EB		ET5				
		330 mm/13"	4 mm	20 000	EC	EL	ET6	E20			
D25/CRCW1206-HR	8 mm	180 mm/7"	4 mm	5 000	EA	EI	ET1	EG1			
		285 mm/11.25"	4 mm	10 000	EB		ET5				
		330 mm/13"	4 mm	20 000	EC	EL	ET6	E20			

DIMENSIONS



SIZE		DIMENSIONS [in millimeters]				
INCH	METRIC	L	W	H	T1	T2
0603	1608	1.55 +0.10 -0.05	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2
0805	2012	2.0 +0.20 -0.10	1.25 ± 0.15	0.45 ± 0.05	0.3 +0.20 -0.10	0.3 ± 0.2
1206	3216	3.2 +0.10 -0.20	1.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2

SIZE		SOLDER PAD DIMENSIONS [in millimeters]					
		REFLOW SOLDERING			WAVE SOLDERING		
INCH	METRIC	a	b	l	a	b	l
0603	1608	0.5	0.9	1.0	0.9	0.9	1.0
0805	2012	0.7	1.3	1.2	0.9	1.3	1.3
1206	3216	0.9	1.7	2.0	1.1	1.7	2.3



TEST PROCEDURES AND REQUIREMENTS		
EN 60115-1		
TEST (clause)	CONDITIONS OF TEST	REQUIREMENTS PERMISSIBLE CHANGE ($\Delta R/R$)
		STABILITY CLASS 2 OR BETTER
	Stability for product types:	
	D../CRCW...-HR e3	11 M Ω to 470 M Ω
Resistance (4.5)	-	$\pm 5\%$
Temperature coefficient (4.8.4.2)	20/- 55/20 °C and 20/125/20 °C	± 500 ppm/K
Overload (4.13)	$U = 2.5 \times (P_{70} \times R)^{1/2} \leq 2 \times U_{max.}$ Duration: according the style	$\pm (0.5\% R + 0.05 \Omega)$
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	$\pm (0.5\% R + 0.05 \Omega)$
Rapid change of temperature (4.19)	30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles	$\pm (0.5\% R + 0.05 \Omega)$
Damp heat, steady state (4.24)	(40 \pm 2) °C; 56 days; (93 \pm 3) % RH	$\pm (2\% R + 0.1 \Omega)$
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	$\pm (2\% R + 0.1 \Omega)$
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	$\pm (2\% R + 0.1 \Omega)$
Extended endurance (4.25.1.8)	Duration extended to 8000 h	$\pm (4\% R + 0.1 \Omega)$
Endurance at upper category temperature (4.25.3)	UCT = 125 °C; 1000 h	$\pm (2\% R + 0.1 \Omega)$



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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