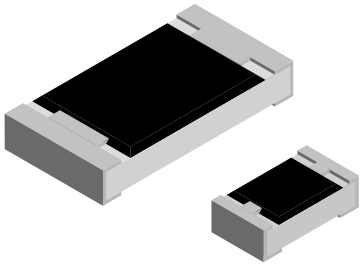
Lead (Pb)-free Thick Film, Rectangular, High Value Chip Resistors



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 $P_{70\,°C}$ W	LIMITING ELEMENT VOLTAGE MAX. V≅	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≅	75	150	200
Voltage Coefficient	%/V	< 100M: < 0.1/> 100M: < 0.3		
Insulation Voltage (1 min)	$V_{dc/ac\ peak}$	> 100	> 200	> 300
Thermal Resistance (1)	K/W	≤ 550	≤ 440	≤ 220
Insulation Resistance	Ω	> 10^9		
Category Temperature Range	°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.

For technical questions, contact: filmresistors.thickfilmchip@vishay.com
Document Number: 20022
Revision: 13-Oct-08

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

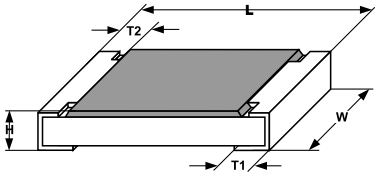
(1) Preferred way for ordering products is by use of the PART NUMBER

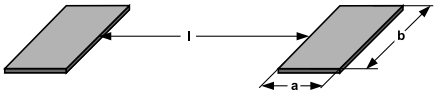
(2) Please refer to table PACKAGING, see next page

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			

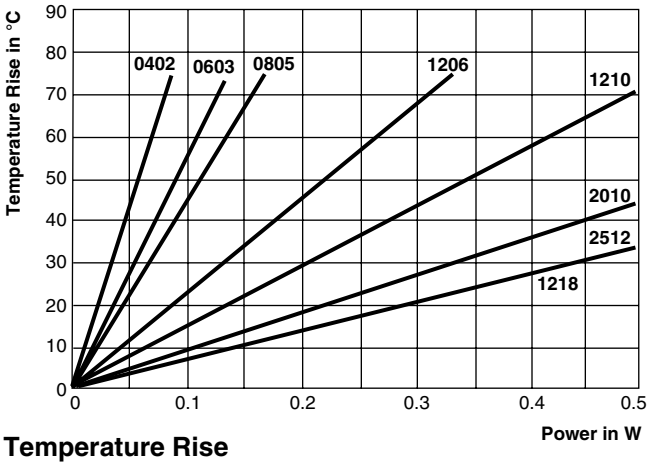
DIMENSIONS



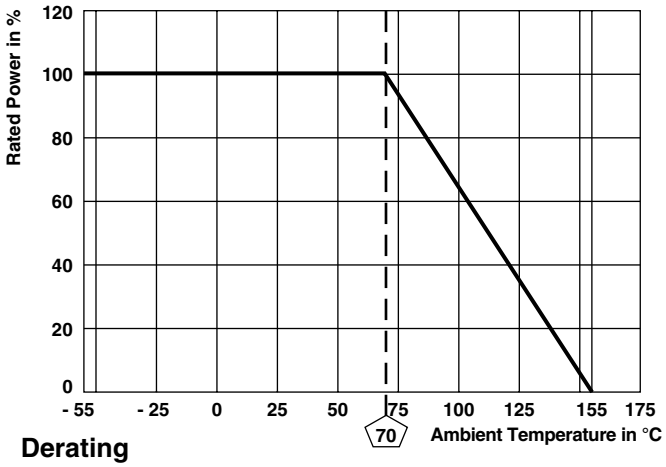


SIZE		DIMENSIONS [in millimeters]				
INCH	METRIC	L	W	H	T1	T2
0603	1608	1.55 + 0.10 - 0.05	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2
0805	2012	2.0 + 0.20 - 0.10	1.25 ± 0.15	0.45 ± 0.05	0.3 + 0.20 - 0.10	0.3 ± 0.2
1206	3216	3.2 + 0.10 - 0.20	1.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2

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



Temperature Rise



Derating

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 MΩ to 470 MΩ
Resistance (4.5)	-	± 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	± (0.5 % R + 0.05 Ω)
Solderability (4.17.5)	Aging 4 h at 155 °C, dryheat solder bath method; 235 °C; 2 s visual examination	Good tinning (≥ 95 % covered) no visible damage
Resistance to soldering heat (4.18.2)	Solder bath method; (260 ± 5) °C; (10 ± 1) s	± (0.5 % R + 0.05 Ω)
Rapid change of temperature (4.19)	30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles	± (0.5 % R + 0.05 Ω)
Damp heat, steady state (4.24)	(40 ± 2) °C; 56 days; (93 ± 3) % RH	± (2 % R + 0.1 Ω)
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	± (2 % R + 0.1 Ω)
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	± (2 % R + 0.1 Ω)
Extended endurance (4.25.1.8)	Duration extended to 8000 h	± (4 % R + 0.1 Ω)
Endurance at upper category temperature (4.25.3)	UCT = 125 °C; 1000 h	± (2 % R + 0.1 Ω)

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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