

Vishav

Lead (Pb)-free Commodity Thick Film Chip Resistors



FEATURES

· High volume product suitable for commercial applications RoHS



- Pure tin solder contacts on Ni barrier layer COMPLIANT HALOGEN provides compatibility with lead (Pb)-free and FREE lead containing soldering processes
- Metal glaze on high guality 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
					± 200	± 0.5	10.0 to 10M	E24; E96
					-200 / +400	± 0.5	1.0 to 9.76	L24, L30
					± 100		47.0 to 1M	
00000000	0001	RR 0603M	0.05	30	± 200	±1 ±5	10.0 to 10M	E24; E96 E24
CRCW0201	0201				-200 / +400		1.0 to 9.76	
					± 200		10.0 to 10M	
					-200 / +400		1.0 to 9.1	
Zero-Ohm-Resistor: R _{max.} = 50 mΩ, I _{max.} at 70 °C = 1.0 A								

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.

Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.

TECHNICAL SPECIFICATIONS					
PARAMETER	UNIT	CRCW0201			
Rated Dissipation at 70 °C ⁽¹⁾	W	0.05			
Operating Voltage Umax. ACRMS/DC	V	30			
Insulation Voltage U _{ins} (1 min)	V	50			
Insulation Resistance	Ω	> 10 ⁹			
Operating Temperature Range	°C	-55 to +155			
Weight	mg	0.17			

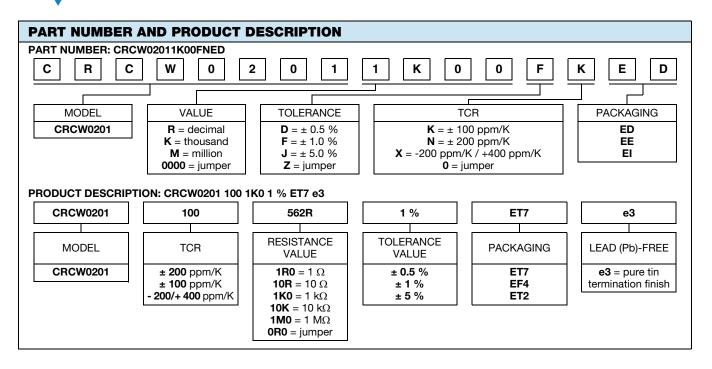
Note

⁽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.

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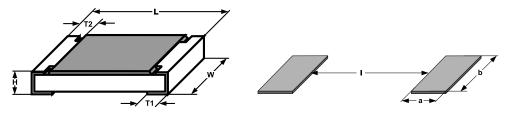
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PACKAGING							
MODEL	CODE	QUANTITY	CARRIER TAPE	WIDTH	PITCH	REEL DIAMETER	
	ED = ET7	10 000	Paper tape acc.		2 mm	180 mm/7"	
CRCW0201	EI = ET2	20 000	to IEC 60068-3	8 mm		254 mm/10"	
	EE = EF4	50 000	Type I			330 mm/13"	

DIMENSIONS in millimeters



SIZE		DIMENSIONS					SOLDER PAD DIMENSIONS		
INCH	METRIC	L	w	н	T1	T2	а	b	I
0201	0603	0.6 ± 0.05	0.3 ± 0.05	0.23 ± 0.05	0.15 ± 0.05	0.10 ± 0.05	0.28	0.43	0.23

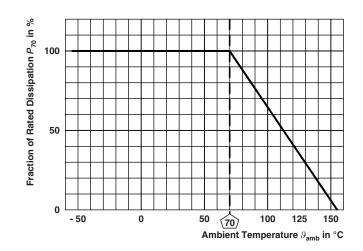
Note

• No marking for 0201 size.



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DERATING



TEST PROCEDURES AND REQUIREMENTS						
EN 60115-1	IEC 60068-2		PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (∆ <i>R</i>)		
CLAUSE	TEST	TEST	Stability for product types:			
	METHOD		CRCW0201 e3	1 Ω to 10 M Ω		
4.5	-	Resistance	-	± 0.5 %; ± 1 %; ± 5 %		
4.7	-	Voltage proof	$U = 1.4 \text{ x } U_{\text{ins}}; 60 \text{ s}$	No flashover or breakdown		
4.12	59 (Td)	Solderskilite	Solder bath method; Sn60Pb40 non activated flux; $(235 \pm 5) \degree C$ $(2 \pm 0.2) \$$	Good tinning (≥ 95 % covered) no visible damage		
4.13	58 (Td)	Solderability	Solder bath method; Sn96.5Ag3Cu0.5 non-activated flux; $(245 \pm 5) \degree C$ $(3 \pm 0.3) \$$	Good tinning (≥ 95 % covered) no visible damage		
4.8.4.2	-	Temperature coefficient	(20 / -55 / 20) °C and (20 / 125 / 20) °C	± 100 ppm/K, ± 200 ppm/K, -200 ppm/K / +400 ppm/K		
4.32	21 (Uu ₃)	Shear (adhesion)	9 N	No visible damage		
4.33	21 (Uu ₁)	Substrate bending	Depth 2 mm; 3 times	No visible damage, no open circuit in bent position \pm (0.5 % R + 0.05 Ω)		
		Rapid change	30 min. at -55 °C; 30 min. at 125 °C			
4.19	14 (Na)	of temperature	5 cycles	± (0.5 % <i>R</i> + 0.05 Ω)		
			1000 cycles	± (1 % <i>R</i> + 0.05 Ω)		
4.23	-	Climatic sequence:	-			
4.23.2	2 (Ba)	Dry heat	125 °C; 16 h			
4.23.3	30 (Db)	Damp heat, cyclic	55 °C; ≥ 90 % RH; 24 h; 1 cycle			
4.23.4	1 (Aa)	Cold	-55 °C; 2 h	\pm (2 % R + 0.1 Ω)		
4.23.5	13 (M)	Low air pressure	1 kPa; (25 ± 10) °C; 1 h			
4.23.6	30 (Db)	Damp heat, cyclic	55 °C; \geq 90 % RH; 24 h; 5 cycles			
4.23.7	- DC load		$U = \sqrt{P_{70} \times R} \le U_{\text{max.}}$			



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TEST PROCEDURES AND REQUIREMENTS								
EN 60115-1	IEC 60068-2	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (\(\Delta R))				
CLAUSE	TEST METHOD		Stability for product types:					
			CRCW0201 e3	1 Ω to 10 M Ω				
4.05.4	-	Endurance at 70 °C	$U = \sqrt{P_{70} \times R} \le U_{\text{max.}};$ 1.5 h on; 0.5 h off;					
4.25.1			70 °C; 1000 h	± (2 % <i>R</i> + 0.1 Ω)				
			70 °C; 8000 h	± (4 % <i>R</i> + 0.1 Ω)				
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 \pm 5) °C; (10 \pm 1) s	± (1 % <i>R</i> + 0.05 Ω)				
4.35	-	Flamability, needle flame test	IEC 60695-11-5; 10 s	No burning after 30 s				
4.24	78 (Cab)	Damp heat, steady state	(40 ± 2) °C; (93 ± 3) % RH; 56 days	± (2 % <i>R</i> + 0.1 Ω)				
4.25.3	-	Endurance at upper category temperature	155 °C, 1000 h	\pm (2 % R + 0.1 Ω)				
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol; 50 °C; method 2	No visible damage				
4.22	6 (Fc)	Vibration, endurance by sweeping	$ \begin{array}{l} f=10 \ Hz \ to \ 2000 \ Hz; \\ x, y, z \leq 1.5 \ mm; \\ A \leq 200 \ m/s^2; \\ 10 \ sweeps \ per \ axis \end{array} $	± (0.5 % <i>R</i> + 0.05 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, environmental test procedures

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



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