

Lead (Pb)-free Commodity Thick Film Chip Resistors



FEATURES

- High volume product suitable for commercial applications
- Pure tin solder contacts on Ni barrier layer provides compatibility with lead (Pb)-free and lead containing soldering processes
- Metal glaze on high quality ceramic
- Compliant to RoHS Directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition



RoHS
COMPLIANT
HALOGEN
FREE

STANDARD ELECTRICAL SPECIFICATIONS								
MODEL	SIZE		RATED DISSIPATION $P_{70\text{ }^\circ\text{C}}$ W	LIMITING ELEMENT VOLTAGE $U_{\text{max. AC/DC}}$	TEMPERATURE COEFFICIENT ppm/K	TOLERANCE %	RESISTANCE RANGE Ω	SERIES
	INCH	METRIC						
CRCW0201	0201	RR 0603M	0.05	30	± 100	± 1	47R to 1M0	E24; E96
					± 200	± 1 ± 5	10R to 1M0	E24; E96 E24
Zero-Ohm-Resistor: $R_{\text{max.}} = 50\text{ m}\Omega$, $I_{\text{max.}}$ at $70\text{ }^\circ\text{C} = 1.0\text{ A}$								

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 P_{70} ⁽¹⁾	W	0.05
Limiting element voltage $U_{\text{max. AC/DC}}$	V	30
Insulation voltage U_{ins} (1 min)	V	50
Insulation resistance	Ω	$> 10^9$
Category temperature range	$^\circ\text{C}$	- 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 $155\text{ }^\circ\text{C}$ is not exceeded.

PART NUMBER AND PRODUCT DESCRIPTION															
Part Number: CRCW02011K00FNED															
C	R	C	W	0	2	0	1	1	K	0	0	F	N	E	D
MODEL CRCW0201		VALUE R = Decimal K = Thousand M = Million 0000 = Jumper			TOLERANCE F = ± 1.0 % J = ± 5.0 % Z = Jumper			TCR K = ± 100 ppm/K N = ± 200 ppm/K 0 = Jumper			PACKAGING ED EE				
Product Description: CRCW0201 200 1K0 1 % ET7 e3															
CRCW0201	200	1K0	1 %	ET7	E3										
MODEL CRCW0201	TCR ± 200 ppm/K ± 100 ppm/K	RESISTANCE VALUE 10R = 10 Ω 1K0 = 1 kΩ 10K = 10 kΩ 1M0 = 1 MΩ 0R0 = Jumper	TOLERANCE ± 5 % ± 1 %	PACKAGING ET7 EF4	LEAD (Pb)-FREE e3 = Pure tin termination finish										

PACKAGING				
MODEL	UNIT	PAPER TAPE ON REEL ACC. TO IEC 60286-3, TYPE I		
		QUANTITY	PART NUMBER	PRODUCT DESC.
CRCW0201	180 mm/7"	10 000	ED	ET7
	330 mm/13"	50 000	EE	EF4

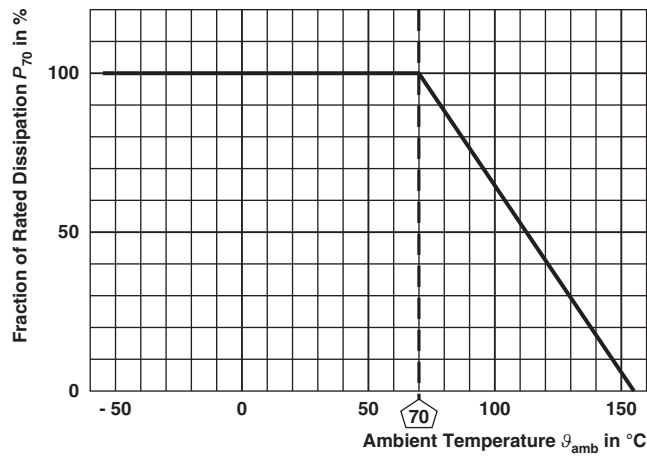
DIMENSIONS in millimeters



SIZE		DIMENSIONS					SOLDER PAD DIMENSIONS REFLOW SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l
0201	0603	0.6 ± 0.05	0.3 ± 0.05	0.23 ± 0.05	0.15 ± 0.05	0.15 ^{+0.05} / _{-0.10}	0.28	0.43	0.23

Note

- No marking for 0201 size

DERATING


TEST PROCEDURES AND REQUIREMENTS				
EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
			Stability for product types:	
			CRCW0201 e3	10 Ω to 1 M Ω
4.5	-	Resistance	-	$\pm 1\%$; $\pm 5\%$
4.7	-	Voltage proof	$U = 1.4 \times U_{Ins}$; 60 s	No flashover or breakdown
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max}$; duration: 0.5 s	$\pm (1\% R + 0.05 \Omega)$
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40 non activated flux; (235 \pm 5) °C (2 \pm 0.2) s	Good tinning ($\geq 95\%$ covered) no visible damage
			Solder bath method; Sn96.5Ag3Cu0.5 non-activated flux; (245 \pm 5) °C (3 \pm 0.3) s	Good tinning ($\geq 95\%$ 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
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 $\pm (0.5\% R + 0.05 \Omega)$
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 °C; 30 min. at 125 °C	
			5 cycles 1000 cycles	$\pm (0.5\% R + 0.05 \Omega)$ $\pm (1\% R + 0.05 \Omega)$

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EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
			Stability for product types:	
			CRCW0201 e3	10 Ω to 1 M 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; \geq 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 \pm 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	$U = \sqrt{P_{70}} \times R$	
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 Ω) \pm (4 % R + 0.1 Ω)
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 \pm 5) °C; (10 \pm 1) s	\pm (1 % R + 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 \pm 2) °C; (93 \pm 3) % RH; 56 days	\pm (2 % R + 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	f = 10 Hz to 2000 Hz; x, y, z \leq 1.5 mm; A \leq 200 m/s ² ; 10 sweeps per axis	\pm (0.5 % R + 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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