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 $P_{70\,°C}$ W	LIMITING ELEMENT VOLTAGE $U_{max.}$ 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: $R_{max.}$ = 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 P_{70} (1)	W	0.05
Limiting element voltage $U_{max.}$ AC/DC	V	30
Insulation voltage U_{ins} (1 min)	V	50
Insulation resistance	Ω	> 10^9
Category 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.

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	VALUE	TOLERANCE	TCR	PACKAGING
CRCW0201	**R** = Decimal **K** = Thousand **M** = Million **0000** = Jumper	**F** = ± 1.0 % **J** = ± 5.0 % **Z** = Jumper	**K** = ± 100 ppm/K **N** = ± 200 ppm/K **0** = Jumper	**ED** **EE**

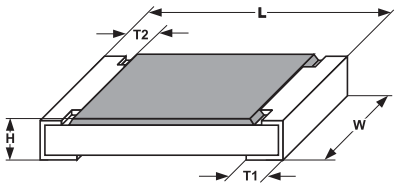
Product Description: CRCW0201 200 1K0 1 % ET7 e3

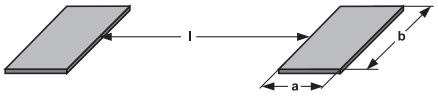
CRCW0201	200	1K0	1 %	ET7	E3
MODEL	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING	LEAD (Pb)-FREE
CRCW0201	± **200** ppm/K ± **100** ppm/K	**10R** = 10 Ω **1K0** = 1 kΩ **10K** = 10 kΩ **1M0** = 1 MΩ **0R0** = Jumper	± **5 %** ± **1 %**	**ET7** **EF4**	**e3** = Pure tin termination finish

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



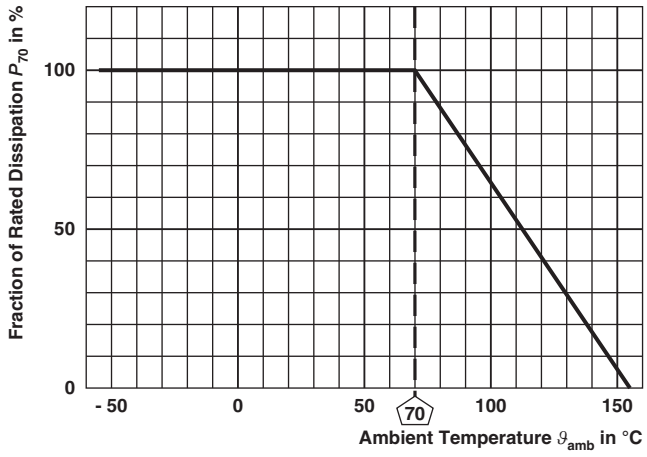


SIZE		DIMENSIONS					SOLDER PAD DIMENSIONS REFLOW SOLDERING		
INCH	METRIC	L	W	H	T1	T2	a	b	l
0201	0603	0.6 ± 0.05	0.3 ± 0.05	0.23 ± 0.05	0.15 ± 0.05	$0.15^{+0.05}_{-0.10}$	0.28	0.43	0.23

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 MΩ
4.5	-	Resistance	-	± 1 %; ± 5 %
4.7	-	Voltage proof	U = 1.4 x U_{ins}; 60 s	No flashover or breakdown
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R}$ ≤ 2 x $U_{max.}$; duration: 0.5 s	± (1 % R + 0.05 Ω)
4.17.2	58 (Td)	Solderability	Solder bath method; Sn60Pb40 non activated flux; (235 ± 5) °C (2 ± 0.2) s	Good tinning (≥ 95 % covered) no visible damage
			Solder bath method; Sn96.5Ag3Cu0.5 non-activated flux; (245 ± 5) °C (3 ± 0.3) s	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
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 ± (0.5 % R + 0.05 Ω)
4.19	14 (Na)	Rapid change of temperature	30 min. at - 55 °C; 30 min. at 125 °C 5 cycles 1000 cycles	± (0.5 % R + 0.05 Ω) ± (1 % R + 0.05 Ω)

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			Stability for product types:	
			CRCW0201 e3	10 Ω to 1 MΩ
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	± (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; ≥ 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	± (2 % R + 0.1 Ω)
			70 °C; 8000 h	± (4 % R + 0.1 Ω)
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 ± 5) °C; (10 ± 1) s	± (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 ± 2) °C; (93 ± 3) % RH; 56 days	± (2 % R + 0.1 Ω)
4.25.3	-	Endurance at upper category temperature	155 °C, 1000 h	± (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 ≤ 1.5 mm; A ≤ 200 m/s^2; 10 sweeps per axis	± (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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