

Green Commodity Thick Film Chip Resistors



FEATURES

- High volume product suitable for commercial applications
- Green resistor - does not use exemptions
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

TECHNICAL SPECIFICATIONS	
DESCRIPTION	RCG0201...C e3
Imperial size	0201
Metric size code	RR0603M
Resistance range	15 Ω to 1 M Ω ; jumper (0 Ω)
Resistance tolerance	$\pm 5\%$; $\pm 1\%$
Temperature coefficient	± 250 ppm/K
Rated dissipation, P_{70} ⁽¹⁾	0.05 W
Operating voltage, U_{max} . AC _{RMS} /DC	25 V
Permissible film temperature, $\vartheta_{F max}$. ⁽¹⁾	125 °C
Operating temperature range	-55 °C to +125 °C
Max. resistance change at P_{70} for resistance range, $ \Delta R/R $ after: 1000 h	$\leq 3.0\%$
Permissible voltage against ambient (insulation): 1 min, U_{ins}	50 V

Note

⁽¹⁾ Please refer to APPLICATION INFORMATION below

APPLICATION INFORMATION

When the resistor dissipates power, a temperature rise above the ambient temperature occurs, dependent on the thermal resistance of the assembled resistor together with the printed circuit board. The rated dissipation applies only if the permitted film temperature is not exceeded.

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.

TEMPERATURE COEFFICIENT AND RESISTANCE RANGE				
TYPE / SIZE	TCR	TOLERANCE	RESISTANCE	E-SERIES
RCG0201...C e3	± 250 ppm/K	$\pm 5\%$	15 Ω to 1 M Ω	E24
		$\pm 1\%$	15 Ω to 1 M Ω	E24; E96
	Jumper, $I_{max} = 0.5$ A	≤ 50 m Ω	0 Ω	-

Note

- The temperature coefficient of resistance (TCR) is not specified for 0 Ω jumpers



PACKAGING						
TYPE / SIZE	CODE	QUANTITY	PACKAGING STYLE	WIDTH	PITCH	PACKAGING DIMENSIONS
RCG0201...C e3	ED = ET7	10 000	Paper tape acc. to IEC 60068-3 Type I	8 mm	2 mm	Ø 180 mm/7"
	EI = ET2	20 000				Ø 254 mm/10"
	EE = EF4	50 000				Ø 330 mm/13"

PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: RCG02011K00FREDC

R	C	G	0	2	0	1	1	K	0	0	F	R	E	D	C
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TYPE / SIZE RCG0201	RESISTANCE R = decimal K = thousand M = million 0000 = jumper	TOLERANCE F = ± 1.0 % J = ± 5.0 % Z = jumper	TCR R = ± 250 ppm/K 0 = jumper	PACKAGING ED EE EI	SPECIAL Up to 2 digits C = commodity
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PRODUCT DESCRIPTION: RCG0201-C 250 1K0 1 % ET7 e3

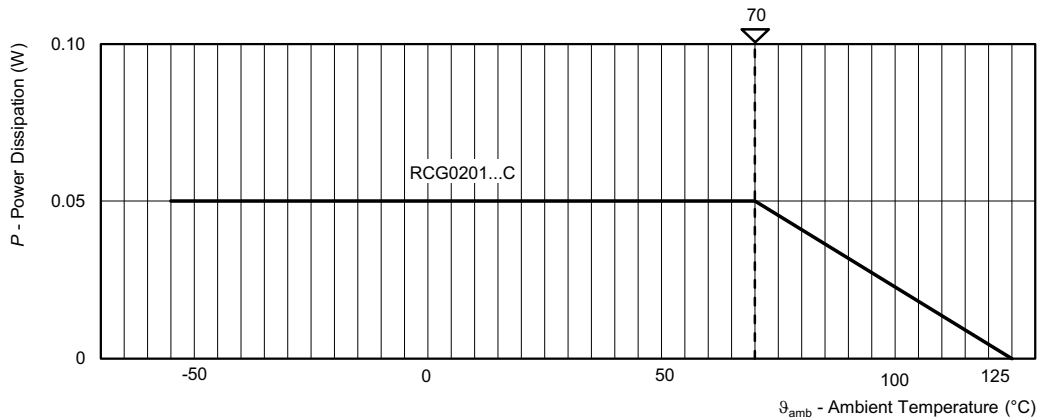
RCG0201-C	250	1K0	1 %	ET7	e3
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TYPE / SIZE RCG0201-C	TCR ± 250 ppm/K	RESISTANCE 15R = 15 Ω 1K0 = 1 kΩ 10K = 10 kΩ 1M0 = 1 MΩ 0R0 = jumper	TOLERANCE ± 1 % ± 5 %	PACKAGING ET7 EF4 ET2	LEAD (Pb)-FREE e3 = pure tin termination finish
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VISHAY GREEN REQUIREMENTS	
SUBSTANCES	CONCENTRATION LIMIT
Lead (Pb)	< 1000 ppm
Mercury (Hg)	< 1000 ppm
Cadmium (Cd)	< 100 ppm
Hexavalent chromium	< 1000 ppm
Polybrominated biphenyl (PBB)	< 1000 ppm
Polybrominated diphenyl ether (PBDE)	< 1000 ppm
Bromine (Br)	< 900 ppm
Chlorine (Cl)	< 900 ppm
Sum of bromine and chlorine	≤ 1500 ppm max.
Antimony (Sb)	< 900 ppm
Red phosphorous	< 100 ppm

Notes

- No exemptions (e.g. lead (Pb) in glass) may be applied to any substances or application for the "Vishay Green" category
- All concentration levels are based on homogenous materials

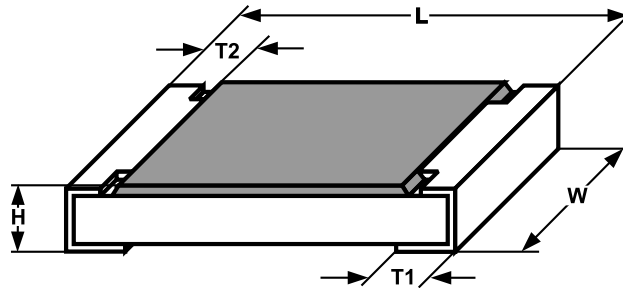
DERATING


TEST PROCEDURES AND REQUIREMENTS				
EN 60115-1 CLAUSE	IEC 60068-2 (1) TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
			Stability for product types: RCG0201...C e3	15 Ω to 1 M Ω
4.5	-	Resistance	-	$\pm 1\%$ $\pm 5\%$
4.8	-	Temperature coefficient	(20 / -55 / 20) °C and (20 / 125 / 20) °C	± 250 ppm/K
4.25.1	-	Endurance at 70 °C	$U = \sqrt{P_{70} \times R}$ or $U = U_{max.}$; ; whichever is less; 1.5 h on; 0.5 h off; 70 °C; 1000 h	$\pm (3\% R + 0.1 \Omega)$
4.25.3	-	Endurance at upper category temperature	125 °C, 1000 h	$\pm (2\% R + 0.1 \Omega)$
4.24	78 (Cab)	Damp heat, steady state	(40 \pm 2) °C; (93 \pm 3) % RH; 56 days	$\pm (3\% R + 0.1 \Omega)$
4.36	1 (Aa)	Operation at low temperature	-55 °C; 1 h	$\pm (1\% R + 0.05 \Omega)$
4.19	14 (Na)	Rapid change of temperature	30 min. at -55 °C; 30 min. at 125 °C 5 cycles 300 cycles	$\pm (0.5\% R + 0.05 \Omega)$ $\pm (1\% R + 0.05 \Omega)$
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$; whichever is the less severe; 5 s	$\pm (2\% R + 0.1 \Omega)$
4.22	6 (Fc)	Vibration	Endurance by sweeping; 10 Hz to 2000 Hz; no resonance; amplitude ≤ 1.5 mm or ≤ 200 m/s ² ; 7.5 h	$\pm (0.5\% R + 0.05 \Omega)$
4.17	58 (Td)	Solderability	Solder bath method; Sn60Pb40 non-activated flux; (235 \pm 5) °C (2 \pm 0.2) s 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

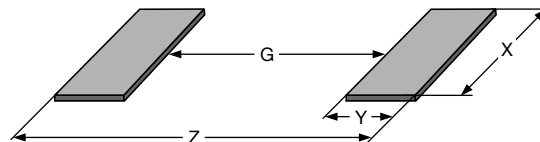
TEST PROCEDURES AND REQUIREMENTS				
EN 60115-1 CLAUSE	IEC 60068-2 (1) TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)
			Stability for product types:	15 Ω to 1 M Ω
			RCG0201...C e3	
4.18	58 (Td)	Resistance to soldering heat	Solder bath method (260 \pm 5) $^{\circ}$ C; (10 \pm 1) s	\pm (1.0 % R + 0.05 Ω)
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol; 50 $^{\circ}$ C; method 2	No visible damage
4.32	21 (U ₃)	Shear (adhesion) test	RR0603M: 3 N	No visible damage
4.33	21 (U ₁)	Substrate bending	Depth 2 mm; 3 times	\pm (1 % R + 0.05 Ω)
				No visible damage, no open circuit in bent position
4.7	-	Voltage proof	$U = 1.4 \times U_{ins}$; 60 s	No flashover or breakdown

Note

(1) The quoted IEC standards are also released as EN standards with the same number and identical contents

DIMENSIONS in millimeters


DIMENSIONS AND MASS						
TYPE / SIZE	L (mm)	W (mm)	H (mm)	T1 (mm)	T2 (mm)	MASS (mg)
RCG0201...C e3	0.60 \pm 0.05	0.30 \pm 0.05	0.23 \pm 0.05	0.15 \pm 0.05	0.10 \pm 0.05	0.17

SOLDER PAD DIMENSIONS


RECOMMENDED SOLDER PAD DIMENSIONS				
TYPE / SIZE	REFLOW SOLDERING			
	G (mm)	Y (mm)	X (mm)	Z (mm)
RCG0201...C e3	0.3	0.35	0.4	1.0

Notes

- The given solder pad dimensions reflect the considerations for board design and assembly as outlined e.g in standards IEC 61188-5-x (1) or in publication IPC-7351
- (1) The quoted IEC standards are also released as EN standards with the same number and identical contents



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