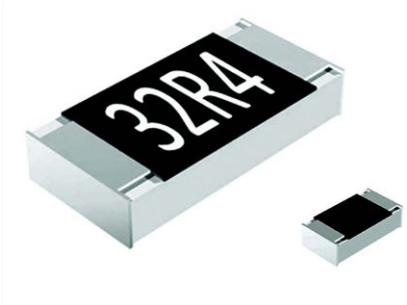
Green Thick Film Chip Resistors



FEATURES

- Green resistor - does not use RoHS exemptions
- Stability $\Delta R/R$ = 1 % for 1000 h at 70 ° C
- 2 mm pitch packaging option for 0603 size
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

HALOGEN FREE GREEN (5-2008)

STANDARD ELECTRICAL SPECIFICATIONS

TYPE	CASE SIZE IMPERIAL	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
RCG0402	0402	RR1005M	0.063	50	100	0.5, 1	150 to 10M	E24; E96
					150		1.0 to 147	
					200	5	1.0 to 10M	E24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ = 1.5 A					
RCG0603	0603	RR1608M	0.1	75	100	0.5, 1	1.0 to 10M	E24; E96
					200	5		E24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ = 2.0 A					
RCG0805	0805	RR2012M	0.125	150	100	0.5, 1	1.0 to 10M	E24; E96
					200	5		E24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ = 2.5 A					
RCG1206	1206	RR3216M	0.25	200	100	0.5, 1	1.0 to 10M	E24; E96
					200	5		E24
			Zero-Ohm-Resistor: $R_{max.}$ = 20 mΩ, $I_{max.}$ = 3.5 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.
- Marking: See datasheet “Surface Mount Resistor Marking” (document number 20020).
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material.

TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	RCG0402	RCG0603	RCG0805	RCG1206
Rated dissipation P_{70} (1)	W	0.063	0.1	0.125	0.25
Operating voltage $U_{max.}$ AC_{RMS}/DC	V	50	75	150	200
Insulation voltage U_{ins} (1 min)	V	75	100	200	300
Insulation resistance	Ω	$> 10^9$			
Operating temperature range	°C	- 55 to + 155			
Mass	mg	0.65	2	5.5	10

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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PART NUMBER AND PRODUCT DESCRIPTION

PART NUMBER: RCG080510K0FKEA

R	C	G	0	8	0	5	1	0	K	0	F	K	E	A

TYPE	VALUE	TOLERANCE	TCR	PACKAGING
RCG0402 **RCG0603** **RCG0805** **RCG1206**	**R** = Decimal **K** = Thousand **M** = Million **0000** = 0 Ω Jumper	**D** = ± 0.5 % **F** = ± 1.0 % **J** = ± 5.0 % **Z** = Jumper	**K** = ± 100 ppm/K **L** = ± 150 ppm/K **N** = ± 200 ppm/K **0** = Jumper	**EA, EB,** **EC, ED,** **EE, EI,** **EL**

PRODUCT DESCRIPTION: RCG0805 100 10K 1 % EA

RCG0805	100	10K	1 %	EA
TYPE	TCR	RESISTANCE VALUE	TOLERANCE	PACKAGING
RCG0402 **RCG0603** **RCG0805** **RCG1206**	**± 100** ppm/K **± 150** ppm/K **± 200** ppm/K	**10R** = 10 Ω **10K** = 10 kΩ **1M** = 1 MΩ **0R0** = Jumper	**± 0.5 %** **± 1 %** **± 5 %**	**EA, EB,** **EC, ED,** **EE, EI,** **EL**

PACKAGING

TYPE	CODE	QUANTITY	CARRIER TAPE	WIDTH	PITCH	REEL DIAMETER
RCG0402	ED	10 000	Paper tape acc. to IEC 60286-3 Type 1a	8 mm	2 mm	180 mm/7"
	EE	50 000				330 mm/13"
RCG0603	EI	5000	Paper tape acc. to IEC 60268-3 Type 1a	8 mm	2 mm	180 mm/7"
	ED	10 000				180 mm/7"
	EL	20 000				285 mm/11.25"
	EE	50 000				330 mm/13"
	EA	5000	Paper tape acc. to IEC 60268-3 Type 1a	8 mm	4 mm	180 mm/7"
	EB	10 000				285 mm/11.25"
	EC	20 000				330 mm/13"
RCG0805	EA	5000	Paper tape acc. to IEC 60268-3 Type 1a	8 mm	4 mm	180 mm/7"
	EB	10 000				285 mm/11.25"
	EC	20 000				330 mm/13"
RCG1206	EA	5000	Paper tape acc. to IEC 60268-3 Type 1a	8 mm	4 mm	180 mm/7"
	EB	10 000				285 mm/11.25"
	EC	20 000				330 mm/13"

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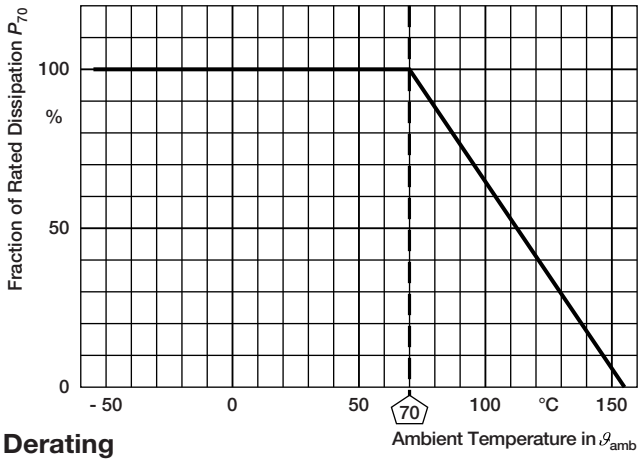
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DIMENSIONS in millimeters



SIZE		DIMENSIONS					SOLDER PAD DIMENSIONS					
							REFLOW SOLDERING			WAVE SOLDERING		
IMPERIAL	METRIC	L	W	H	T1	T2	a	b	l	a	b	l
0402	RR1005M	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.25 ± 0.05	0.2 ± 0.1	0.4	0.6	0.5			
0603	RR1608M	1.55 $^{+0.10}_{-0.05}$	0.85 ± 0.1	0.45 ± 0.05	0.3 ± 0.2	0.3 ± 0.2	0.5	0.9	1.0	0.9	0.9	1.0
0805	RR2012M	2.0 $^{+0.20}_{-0.10}$	1.25 ± 0.15	0.45 ± 0.05	0.3 $^{+0.20}_{-0.10}$	0.3 ± 0.2	0.7	1.3	1.2	0.9	1.3	1.3
1206	RR3216M	3.2 $^{+0.10}_{-0.20}$	1.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	1.7	2.0	1.1	1.7	2.3

FUNCTIONAL PERFORMANCE



Derating

GREEN REQUIREMENTS

SUBSTANCES	CONCENTRATION LIMIT
Lead (Pb)	< 1000 ppm
Mercury (Hg)	< 1000 ppm
Cadmium (Cd)	< 100 ppm
Hexavalent Chronium	< 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. Pb in glass) may be applied to any substances or application for the “Green” category
- All concentration levels are based on homogenous materials

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TEST PROCEDURES AND REQUIREMENTS

EN 60115-1 CLAUSE	IEC 60068-2 TEST METHOD	TEST	PROCEDURE	REQUIREMENTS PERMISSIBLE CHANGE (ΔR)	
			Stability for product types:	STABILITY CLASS 1 OR BETTER	STABILITY CLASS 2 OR BETTER
			RCG e3	1 Ω to 10 MΩ	1 Ω to 10 MΩ
4.5	-	Resistance	-	± 0.5 %, ± 1 %	± 5 %
4.7	-	Voltage proof	U = 1.4 x U_{ins}; 60 s	No flashover or breakdown	
4.13	-	Short time overload	$U = 2.5 \times \sqrt{P_{70} \times R} \leq 2 \times U_{max.}$; Duration acc. to style	± (0.25 % R + 0.05 Ω)	± (0.5 % R + 0.05 Ω)
4.17.2	58 (Td)	Solderability	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, ± 150 ppm/K	± 200 ppm/K
4.32	21 (Uu_3)	Shear (adhesion)	RR 1608 and smaller: 9 N RR 2012 and larger: 45 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	
				± (0.25 % R + 0.05 Ω)	± (0.5 % R + 0.05 Ω)
4.23	-	Climatic sequence:	-	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
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		
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	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
4.18.2	58 (Td)	Resistance to soldering heat	Solder bath method (260 ± 5) °C; (10 ± 1) s	± (0.25 % R + 0.05 Ω)	± (0.5 % 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	± (1 % R + 0.05 Ω)	± (1 % R + 0.1 Ω)
4.25.3	-	Endurance at upper category temperature	155 °C, 1000 h	± (1 % R + 0.05 Ω)	± (2 % R + 0.1 Ω)
4.40	-	Electrostatic discharge (human body model)	IEC 61340-3-1; 3 pos. + 3 neg. discharges; ESD test voltage acc. to size	± (1 % R + 0.05 Ω)	

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TEST PROCEDURES AND REQUIREMENTS					
EN 60115-1 CLAUSE	**IEC 60068-2 TEST METHOD**	**TEST**	**PROCEDURE**	**REQUIREMENTS PERMISSIBLE CHANGE (ΔR)**	
			Stability for product types:	**STABILITY CLASS 1 OR BETTER**	**STABILITY CLASS 2 OR BETTER**
			RCG e3	1 Ω to 10 MΩ	1 Ω to 10 MΩ
4.29	45 (XA)	Component solvent resistance	Isopropyl alcohol; 50 °C; method 2	No visible damage	
4.30	45 (XA)	Solvent resistance of marking	Isopropyl alcohol; 50 °C; method 1, toothbrush	Marking legible, 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	± (0.25 % R + 0.05 Ω)	± (0.5 % R + 0.05 Ω)
4.37	-	Periodic electric overload	$U = \sqrt{15 \times P_{70} \times R}$ ≤ 2 x $U_{max.}$; 0.1 s on; 2.5 s off; 1000 cycles	± (1 % R + 0.05 Ω)	
4.27	-	Single pulse high voltage overload, 10 µs/700 µs	$\hat{U} = 10 \times \sqrt{P_{70} \times R}$ ≤ 2 x $U_{max.}$; 10 pulses	± (1 % 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, environmental test procedures

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

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