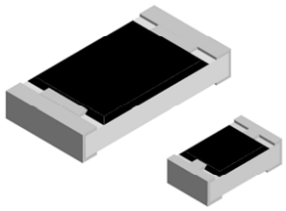
Thick Film Surface Mount Chip Resistors, Wraparound, Low Value (0.1 Ω to 0.91 Ω)



FEATURES

- Low resistance values (0.1 Ω to 0.91 Ω)
- Suitable for current sensing and shunts
- Metal glaze on high quality ceramic
- Protective overglaze
- Solder contacts on Ni barrier layer
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb Available

e3 RoHS* Available

HALOGEN FREE

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	CASE SIZE	POWER RATING $P_{70\,°C}$ W	TEMPERATURE COEFFICIENT ± ppm/°C	RESISTANCE RANGE Ω	TOLERANCE ± %	E-SERIES
RCWL0402 (1)(2)	0402	0.063	600	0.22 to 0.43	5	24
			400	0.47 to 0.91		
RCWL0603 (2)	0603	0.1	400	0.10 to 0.43	5	24
			200	0.47 to 0.91		
RCWL0805 (2)	0805	0.125	300	0.10 to 0.43	5	24
			200	0.47 to 0.91		
RCWL1206 (2)	1206	0.25	300	0.10 to 0.43	5	24
			200	0.47 to 0.91		
RCWL1210 (2)	1210	0.33	200	0.10 to 0.91	5	24
RCWL1218 (2)	1218	1.0	200	0.10 to 0.91	5	24
RCWL2010 (2)	2010	0.5	200	0.10 to 0.91	5	24
RCWL2512 (2)	2512	1.0	200	0.10 to 0.91	5	24

Notes

- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material
- Part marking: reference “Surface Mount Resistor Marking” (www.vishay.com/doc?20020)
- The resistance is measured from the top side

(1) Terminal strength tested per AEC-Q200-006 with the exception of 0.75 kg force is used

(2) Qualification to AEC-Q200 rev. D

GLOBAL PART NUMBER INFORMATION

Part Number: RCWL0402R470JQEA

R	C	W	L	0	4	0	2	R	4	7	0	J	Q	E	A		

GLOBAL MODEL (8 digits)	VALUE (4 digits)	TOLERANCE (1 digits)	TCR (1 digits)	PACKAGING (2 digits)	SPECIAL (up to 2 digits)
RCWL0402 **RCWL0603** **RCWL0805** **RCWL1206** **RCWL1210** **RCWL1218** **RCWL2010** **RCWL2512**	**R** = decimal **R470** = 0.47 Ω	**J** = ± 5.0 %	**N** = ± 200 ppm/°C **M** = ± 300 ppm/°C **Q** = ± 400 ppm/°C **T** = ± 600 ppm/°C	**EA** = lead (Pb)-free, tape/reel **TA** = tin/lead, tape/reel	(dash number) from **1 to 99** as applicable

For technical questions, contact: ww2bresistors@vishay.com

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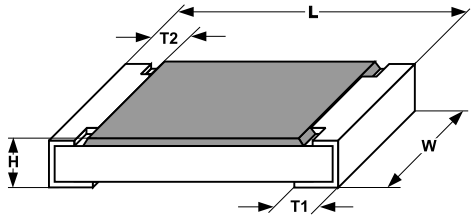
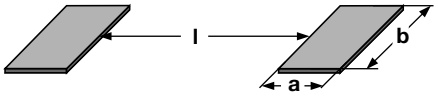
TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	RCWL0402	RCWL0603	RCWL0805	RCWL1206	RCWL1210	RCWL1218	RCWL2010	RCWL2512
Operating temperature range	°C	-55 to +155							
Maximum operating voltage	V	$(P \times R)^{1/2}$							
Insulation voltage U_{ins} (1 min)	V	> 75	> 100	> 200	> 300	> 300	> 300	> 300	> 300
Insulation resistance	Ω	> 10^9							
Weight/1000 pieces (typical)	g	0.65	2	5.5	10	16	29.5	25.5	40.5

DIMENSIONS

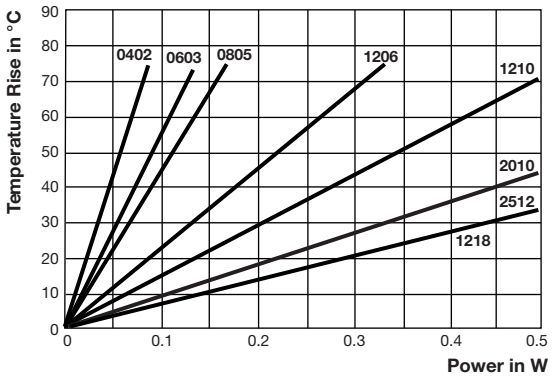




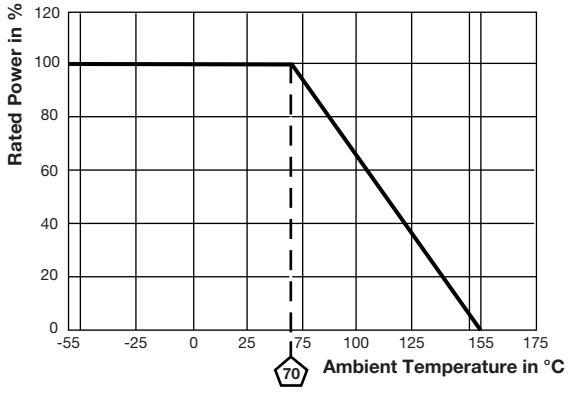
• Surface mount solder profile recommendations: www.vishay.com/doc?31052

MODEL	DIMENSIONS in millimeters											
	L	W	H	T1	T2	REFLOW SOLDERING			WAVE SOLDERING		
						a	b	l	a	b	l
RCWL0402	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	0.5	0.6	0.5
RCWL0603	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
RCWL0805	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
RCWL1206	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
RCWL1210	3.2 ± 0.2	2.5 ± 0.2	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	0.9	2.5	2.0	1.1	2.5	2.2
RCWL1218	3.2 + 0.10 - 0.20	4.6 ± 0.15	0.55 ± 0.05	0.45 ± 0.2	0.4 ± 0.2	1.05	4.9	1.9	1.25	4.8	1.9
RCWL2010	5.0 ± 0.15	2.5 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	2.5	3.9	1.2	2.5	3.9
RCWL2512	6.3 ± 0.2	3.15 ± 0.15	0.6 ± 0.1	0.6 ± 0.2	0.6 ± 0.2	1.0	3.2	5.2	1.2	3.2	5.2

TEMPERATURE RISE



DERATING



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PERFORMANCE		
TEST	**CONDITIONS OF TEST**	**TEST LIMITS**
Thermal shock	MIL-STD-202, method 107, -55 °C to +125 °C, 300 cycles at each extreme	± (2.0 % + 0.005 Ω) Δ*R*
Short time overload	2 x rated power; duration according the model	± (0.5 % + 0.005 Ω) Δ*R*
High temperature exposure	MIL-STD-202, method 108, 1000 h at T = 125 °C, 0 % power	± (2.0 % + 0.005 Ω) Δ*R*
Temperature cycling	JESD 22, method JA-104, 1000 cycles (-55 °C to +125 °C)	± (2.0 % + 0.005 Ω) Δ*R*
Biased humidity	MIL-STD-202, method 103, 1000 h 85 °C / 85 % RH, 10 % x $(P \times R)^{1/2}$	± (2.0 % + 0.005 Ω) Δ*R*
Mechanical shock	MIL-STD-202, method 213, condition C, 10 *g*'s, 6 ms (half sine), 3 directions	± (0.5 % + 0.005 Ω) Δ*R*
Vibration	MIL-STD-202, method 204, 5 *g*'s, 20 min, 12 cycles, 3 directions, 10 Hz to 2000 Hz	± (0.5 % + 0.005 Ω) Δ*R*
Operational life	MIL-STD-202, method 108, 1000 h at T = 125 °C at rated power	± (2.0 % + 0.005 Ω) Δ*R*
Resistance to solder heat	MIL-STD-202, method 210, +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± (1.0 % + 0.005 Ω) Δ*R*
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± (2.0 % + 0.005 Ω) Δ*R*

Note

- Contact ww2bresistors@vishay.com for application specific performance requirements or qualification data. Typical performance is better than stated test limits

PACKAGING					
MODEL	**REEL**				
	TAPE WIDTH	**DIAMETER**	**PITCH**	**PIECES/REEL**	**CODE**
RCWL0402	8 mm/punched paper	180 mm/7"	2 mm	10 000	EA
RCWL0603	8 mm/punched paper	180 mm/7"	4 mm	5000	EA
RCWL0805	8 mm/punched paper	180 mm/7"	4 mm	5000	EA
RCWL1206	8 mm/punched paper	180 mm/7"	4 mm	5000	EA
RCWL1210	12 mm/punched paper	180 mm/7"	4 mm	5000	EA
RCWL1218	12 mm/embossed plastic	180 mm/7"	4 mm	4000	EA
RCWL2010	12 mm/embossed plastic	180 mm/7"	4 mm	4000	EA
RCWL2512	12 mm/embossed plastic	180 mm/7"	8 mm	2000	EA

Note

- Embossed carrier tape per EIA-481-1A

LINKS TO RELATED DOCUMENTS	
SELECTOR GUIDE	
Overview of Automotive Grade Products	www.vishay.com/doc?49924
TECHNICAL NOTES	
SMD Current Sense: AEC-Q200 vs. Vishay Qualification	www.vishay.com/doc?30416
MIL-PRF vs. AEC-Q200: Do You Know What You Are Getting?	www.vishay.com/doc?11000
WHITE PAPER	
Thermal Management for Surface-Mount Devices	www.vishay.com/doc?30380
Temperature Coefficient of Resistance for Current Sensing	www.vishay.com/doc?30405

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