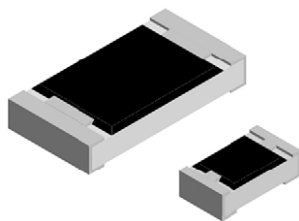


## Thick Film Surface Mount Chip Resistors, Wraparound, Extremely Low Value (0.01 Ω to 0.976 Ω)



### LINKS TO ADDITIONAL RESOURCES



### FEATURES

- Extremely low resistance values (0.01 Ω to 0.976 Ω)
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Enhanced power rating due to long side terminal construction (0612, 1020 types)
- Suitable for current sensing and shunts
- Metal glaze on high quality ceramic
- Protective overglaze
- Lead (Pb)-free solder contacts on Ni barrier layer
- AEC-Q200 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



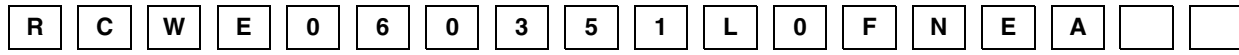
**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

STANDARD ELECTRICAL SPECIFICATIONS						
GLOBAL MODEL	CASE SIZE	POWER RATING $P_{70^\circ\text{C}}$ W	TEMPERATURE COEFFICIENT + ppm/°C	RESISTANCE RANGE Ω	TOLERANCE ± %	E-SERIES <sup>(2)</sup>
RCWE0402	0402	0.125	400	0.033 to 0.05	5.0	24
			200	0.051 to 0.196	1.0, 5.0	24; 96
			100	0.2 to 0.976	0.5 <sup>(1)</sup> , 1.0, 5.0	
RCWE0603	0603	0.2	700	0.010 to 0.018	5.0	24
			400	0.02 to 0.0324	1.0, 5.0	24; 96
			200	0.033 to 0.105	1.0, 5.0	
RCWE0805	0805	0.25	100	0.11 to 0.976	0.5 <sup>(1)</sup> , 1.0, 5.0	24; 96
			400	0.010 to 0.018	5.0	
			300	0.02 to 0.0324	1.0, 5.0	
RCWE0612	0612	1.0	200	0.033 to 0.05	1.0, 5.0	24; 96
			100	0.051 to 0.976	0.5 <sup>(1)</sup> , 1.0, 5.0	
			300	0.010 to 0.016	2.0, 5.0	
RCWE1206	1206	0.5	200	0.018 to 0.2	2.0, 5.0	24; 96
			100	0.205 to 0.976	1.0, 5.0	
			600	0.010 to 0.018	5.0	
RCWE1210	1210	1.0	300	0.010 to 0.018	5.0	24
			500	0.010 to 0.018	5.0	
			300	0.02 to 0.0324	1.0, 5.0	
RCWE1020	1020	2.0	200	0.033 to 0.05	1.0, 5.0	24; 96
			100	0.051 to 0.976	0.5 <sup>(1)</sup> , 1.0, 5.0	
			200	0.010 to 0.016	2.0, 5.0	
RCWE2010	2010	1.0	100	0.0162 to 0.976	1.0, 5.0	24; 96
			600	0.010 to 0.018	5.0	
			300	0.02 to 0.0324	1.0, 5.0	
RCWE2512	2512	2.0	200	0.033 to 0.05	1.0, 5.0	24; 96
			100	0.051 to 0.976	0.5 <sup>(1)</sup> , 1.0, 5.0	
			600	0.010 to 0.018	5.0	

### 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](http://www.vishay.com/doc?20020))
  - Temperature range of TCR rating is 0 °C to 150 °C. TCR values are (+) range only with no (-) range values; 1/2 of previous tolerance range
- <sup>(1)</sup> Tight tolerance of 0.5 % is available for resistance values above 0.300 Ω (0402 size) and above 0.200 Ω (0603 to 2512 sizes)
- <sup>(2)</sup> Use E24 decades only for 5.0 % tolerance. E24 or E96 decades are available for 0.5 % and 1.0 % tolerance. Refer to standard decade table ([www.vishay.com/doc?31001](http://www.vishay.com/doc?31001))

**GLOBAL PART NUMBER INFORMATION**

 Global Part Numbering Example: RCWE060351L0FNEA (visit [www.vishay.net](http://www.vishay.net) Vishay Dale parts numbering manual for all options)

**GLOBAL MODEL**  
(8 digits)

 RCWE0402  
 RCWE0603  
 RCWE0805  
 RCWE0612  
 RCWE1206  
 RCWE1210  
 RCWE1020  
 RCWE2010  
 RCWE2512

**VALUE**  
(4 digits)

 L = mΩ \*  
 R = decimal  
 10L0 = 0.01 Ω  
 R470 = 0.47 Ω  
**Note:**  
 \* Use "L" for resistance values < 0.1 Ω

**TOLERANCE**  
(1 digit)

 D = ± 0.5 %  
 F = ± 1.0 %  
 G = ± 2.0 %  
 J = ± 5.0 %

**TCR**  
(1 digit)

 K = +100 ppm/°C  
 N = +200 ppm/°C  
 M = +300 ppm/°C  
 Q = +400 ppm/°C  
 P = +500 ppm/°C  
 T = +600 ppm/°C  
 G = +700 ppm/°C

**PACKAGING**  
(2 digits)

EA = lead (Pb)-free, tape/reel

**SPECIAL**  
(up to 2 digits)

(dash number) from 1 to 99 as applicable

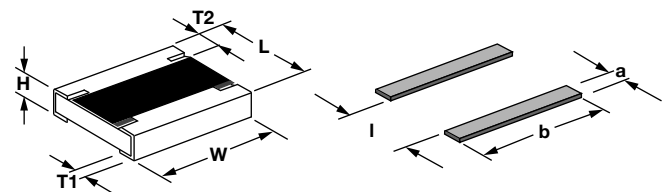
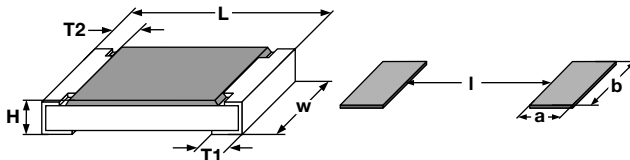
**TECHNICAL SPECIFICATIONS**

PARAMETER	UNIT	0402	0603	0805	0612	1206	1210	1020	2010	2512
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	> 100	> 300	> 300	> 300	> 300	> 300
Insulation resistance	Ω	> 10 <sup>9</sup>								
Weight/1000 pieces (typical)	g	0.7	3	5.5	11.5	10.5	17.5	27.5	26	40.5

**DIMENSIONS**

RCWE0402 to RCWE2512

RCWE0612, RCWE1020



SIZE	DIMENSIONS in millimeters						SOLDER PAD DIMENSIONS in millimeters			
	RESISTANCE RANGE Ω	L	W	H	T1	T2	a	b	l	
0402	0.033 to 0.976	1.05 ± 0.05	0.55 ± 0.05	0.35 ± 0.1	0.3 ± 0.15	0.25 ± 0.1	0.7	0.7	0.3	
0603	0.01 to 0.03	1.6 ± 0.1	0.85 ± 0.1	0.5 ± 0.1	0.5 ± 0.2	0.3 ± 0.2	0.9	1.0	0.4	
	0.033 to 0.976				0.3 ± 0.2		0.7		0.8	
0805	0.01 to 0.03	2.0 ± 0.15	1.3 ± 0.1	0.55 ± 0.1	0.6 ± 0.2	0.35 ± 0.2	1.0	1.4	0.6	
	0.033 to 0.976				0.4 ± 0.2		0.8		1.0	
0612	0.01 to 0.976	1.6 ± 0.2	3.2 ± 0.2	0.6 ± 0.1	0.4 ± 0.15	0.25 ± 0.15	0.9	3.5	0.8	
1206	0.01 to 0.03	3.1 ± 0.15	1.6 ± 0.15	0.6 ± 0.1	0.9 ± 0.2	0.45 ± 0.2	1.3	1.8	1.0	
	0.033 to 0.05				0.8 ± 0.2		1.2		1.2	
	0.051 to 0.976				0.45 ± 0.2		1.0		1.8	1.6
1210	0.01 to 0.03	3.1 ± 0.2	2.5 ± 0.2	0.6 ± 0.1	0.8 ± 0.2	0.4 ± 0.2	1.3	2.6	1.1	
	0.033 to 0.976				0.4 ± 0.2		0.9		2.0	
1020	0.01 to 0.976	2.5 ± 0.2	5.0 ± 0.2	0.6 ± 0.1	0.55 ± 0.15	0.30 ± 0.15	1.2	5.5	1.4	
2010	0.01 to 0.03	5.0 ± 0.2	2.5 ± 0.15	0.6 ± 0.1	1.6 ± 0.3	0.6 ± 0.2	2.3	3.0	1.4	
	0.033 to 0.05				0.7 ± 0.3		1.4		3.0	3.2
	0.051 to 0.976				0.7 ± 0.3		1.4		3.0	3.2
2512	0.01 to 0.03	6.3 ± 0.2	3.15 ± 0.15	0.6 ± 0.1	2.0 ± 0.3	0.6 ± 0.2	2.8	3.6	1.4	
	0.033 to 0.05				0.8 ± 0.3		1.6		3.8	
	0.051 to 0.976				0.8 ± 0.3		1.6		3.6	3.8

**Notes**

- 3D models available: [www.vishay.com/doc?31106](http://www.vishay.com/doc?31106)
- Surface mount solder profile recommendations: [www.vishay.com/doc?31052](http://www.vishay.com/doc?31052)

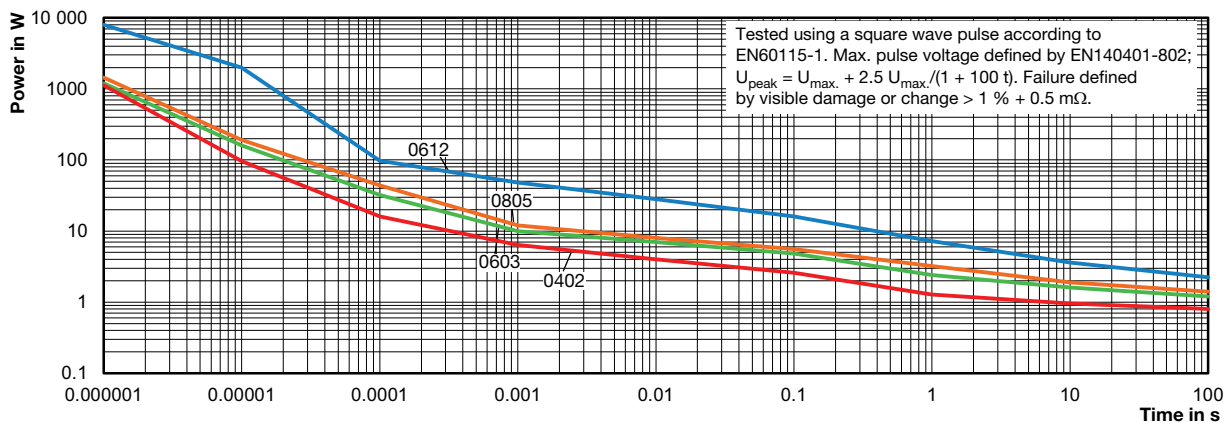
**DERATING**



**SINGLE PULSE**



**SINGLE PULSE**





PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	MIL-STD-202, method 107, -55 °C to +125 °C, 300 cycles at each extreme	± 1.0 % + 0.0005 Ω
Short time overload	2 x rated power; size and duration - 0402: 0.5 s, 0603 and 0805: 1 s, 1206 and larger: 2 s	± 0.5 % + 0.0005 Ω
High temperature exposure	MIL-STD-202, method 108, 1000 h at T = 125 °C, 0 % power	± 2.0 % + 0.0005 Ω
Temperature cycling	JESD 22, method JA-104, 1000 cycles (-55 °C to +125 °C)	± 2.0 % + 0.0005 Ω
Biased humidity	MIL-STD-202, method 103, 1000 h 85 °C / 85 % RH, 10 % x (P x R) <sup>1/2</sup>	± 2.0 % + 0.0005 Ω
Mechanical shock	MIL-STD-202, method 213, condition C, 10 g's, 6 ms (half sine), 3 directions	± 1.0 % + 0.0005 Ω
Vibration	MIL-STD-202, method 204, 5 g's, 20 min, 12 cycles, 3 directions, 10 Hz to 2000 Hz	± 1.0 % + 0.0005 Ω
Operational life	MIL-STD-202, method 108, 1000 h at T = 125 °C at rated power	± 2.0 % + 0.0005 Ω
Resistance to solder heat	MIL-STD-202, method 210, +260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± 1.0 % + 0.0005 Ω
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± 2.0 % + 0.0005 Ω

PACKAGING					
MODEL	REEL				
	TAPE WIDTH	DIAMETER	PITCH	PIECES/REEL	CODE
RCWE0402	8 mm / punched paper	180 mm / 7"	2 mm	10 000	EA
RCWE0603	8 mm / punched paper	180 mm / 7"	4 mm	5000	EA
RCWE0805	8 mm / punched paper	180 mm / 7"	4 mm	5000	EA
RCWE0612	8 mm / punched paper	180 mm / 7"	4 mm	5000	EA
RCWE1206	8 mm / punched paper	180 mm / 7"	4 mm	5000	EA
RCWE1210	8 mm / punched paper	180 mm / 7"	4 mm	5000	EA
RCWE1020	12 mm / embossed plastic	180 mm / 7"	4 mm	4000	EA
RCWE2010	12 mm / embossed plastic	180 mm / 7"	4 mm	4000	EA
RCWE2512	12 mm / embossed plastic	180 mm / 7"	8 mm	2000	EA

**Notes**

- Embossed carrier tape per EIA-481-1A
- Additional packaging details at: [www.vishay.com/doc?31543](http://www.vishay.com/doc?31543)



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