

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


**FEATURES**

- Extremely low resistance values (0.01 Ω to 0.976 Ω)
- Suitable for current sensing and shunts
- Metal glaze on high quality ceramic
- Protective overglaze
- Lead (Pb)-free solder contacts on Ni barrier layer
- 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 $\pm$ ppm/ $^{\circ}\text{C}$	RESISTANCE RANGE $\Omega$	TOLERANCE $\pm$ %	E-SERIES
RCWE0402	0402	0.125	400	0.033 to 0.05	5.0	24
			200	0.051 to 0.18	1.0, 5.0	
			100	0.2 to 0.976	0.5, 1.0, 5.0 <sup>(1)</sup>	
RCWE0603	0603	0.2	700	0.010 to 0.018	5.0	24
			400	0.02 to 0.03	1.0, 5.0	
			200	0.033 to 0.1	1.0, 5.0	
RCWE0805	0805	0.25	100	0.11 to 0.976	0.5, 1.0, 5.0 <sup>(1)</sup>	24
			400	0.010 to 0.018	5.0	
			300	0.02 to 0.03	1.0, 5.0	
RCWE1206	1206	0.5	200	0.033 to 0.05	1.0, 5.0	24
			100	0.051 to 0.976	0.5, 1.0, 5.0 <sup>(1)</sup>	
			600	0.010 to 0.018	5.0	
RCWE1210	1210	1.0	300	0.02 to 0.03	1.0, 5.0	24
			200	0.033 to 0.05	1.0, 5.0	
			100	0.051 to 0.976	0.5, 1.0, 5.0 <sup>(1)</sup>	
RCWE2010	2010	1.0	600	0.010 to 0.018	5.0	24
			300	0.02 to 0.03	1.0, 5.0	
			200	0.033 to 0.05	1.0, 5.0	
RCWE2512	2512	2.0	100	0.051 to 0.976	0.5, 1.0, 5.0 <sup>(1)</sup>	24
			600	0.010 to 0.018	5.0	
			300	0.02 to 0.03	1.0, 5.0	
			200	0.033 to 0.05	1.0, 5.0	
			100	0.051 to 0.976	0.5, 1.0, 5.0 <sup>(1)</sup>	

**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" (document number 20020).
- (1) Tight tolerance of 0.5 % is available for resistance values above 0.200 Ω.

GLOBAL PART NUMBER INFORMATION				
Global Part Numbering example: RCWE060351L0FNEA (visit <a href="http://www.vishay.net">www.vishay.net</a> Vishay Dale parts numbering manual for all options)				
R	C	W	E	0 6 0 3 5 1 L 0 F N E A
GLOBAL MODEL (8 digits)	VALUE (4 digits)		TOLERANCE (1 digit)	TCR (1 digit)
RCWE0402 RCWE0603 RCWE0805 RCWE1206 RCWE1210 RCWE2010 RCWE2512	L = mΩ * R = Decimal 10L0 = 0.01 Ω R470 = 0.47 Ω <b>Note:</b> * Use "L" for resistance values < 0.1 Ω		D = ± 0.5 % F = ± 1.0 % J = ± 5.0 %	K = ± 100 ppm/ $^{\circ}\text{C}$ N = ± 200 ppm/ $^{\circ}\text{C}$ M = ± 300 ppm/ $^{\circ}\text{C}$ Q = ± 400 ppm/ $^{\circ}\text{C}$ P = ± 500 ppm/ $^{\circ}\text{C}$ T = ± 600 ppm/ $^{\circ}\text{C}$ G = ± 700 ppm/ $^{\circ}\text{C}$
				PACKAGING (2 digits)
				EA = Lead (Pb)-free, tape/reel

TECHNICAL SPECIFICATIONS								
PARAMETER	UNIT	RCWE0402	RCWE0603	RCWE0805	RCWE1206	RCWE1210	RCWE2010	RCWE2512
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
Insulation resistance	$\Omega$	> $10^9$						
Weight/1000 pieces (typical)	g	0.7	3	5.5	10.5	17.5	26	40.5

### DIMENSIONS



MODEL	DIMENSIONS in millimeters						SOLDER PAD DIMENSIONS in millimeters			
	RESISTANCE RANGE $\Omega$	L	W	H	T1	T2	a	b	l	
RCWE0402	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	
RCWE0603	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	
RCWE0805	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		1.4	1.0
RCWE1206	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		1.8	1.2
	0.051 to 0.976				0.45 ± 0.2		1.0		1.8	1.6
RCWE1210	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		2.6	2.0
RCWE2010	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
RCWE2512	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		3.6	3.8
	0.051 to 0.976				0.8 ± 0.3		1.6		3.6	3.8

### DERATING





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

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
RCWE1206	8 mm/punched paper	180 mm/7"	4 mm	5000	EA
RCWE1210	8 mm/punched paper	180 mm/7"	4 mm	5000	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

**Note**

- Embossed carrier tape per EIA-481-1A.



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