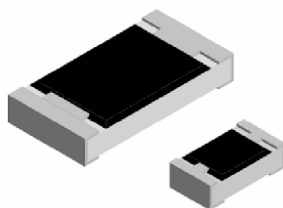


# Thick Film Surface Mount Chip Resistors, Wraparound, Extremely Low Value (0.01 $\Omega$ to 0.976 $\Omega$ )



## FEATURES

- Extremely low resistance values (0.01  $\Omega$  to 0.976  $\Omega$ )
- Suitable for current sensing and shunts
- Metal glaze on high quality ceramic
- Protective overglaze
- Lead (Pb)-free solder contacts on Ni barrier layer
- Compliant to RoHS Directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition



**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	24
			200	0.051 to 0.18	1, 5	
			100	0.2 to 0.976	1, 5	
RCWE0603	0603	0.2	700	0.010 to 0.018	5	24
			400	0.02 to 0.03	1, 5	
			200	0.033 to 0.1	1, 5	
RCWE0805	0805	0.25	100	0.11 to 0.976	1, 5	24
			400	0.010 to 0.018	5	
			300	0.02 to 0.03	1, 5	
RCWE1206	1206	0.5	200	0.033 to 0.05	1, 5	24
			100	0.051 to 0.976	1, 5	
			600	0.010 to 0.018	5	
RCWE1210	1210	1.0	300	0.02 to 0.03	1, 5	24
			200	0.033 to 0.05	1, 5	
			100	0.051 to 0.976	1, 5	
RCWE2010	2010	1.0	500	0.010 to 0.018	5	24
			300	0.02 to 0.03	1, 5	
			200	0.033 to 0.05	1, 5	
RCWE2512	2512	2.0	100	0.051 to 0.976	1, 5	24
			600	0.010 to 0.018	5	
			300	0.02 to 0.03	1, 5	

## 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).

## GLOBAL PART NUMBER INFORMATION

Part Number: RCWE060351L0FNEA

R C W E 0 6 0 3 5 1 L 0 F N E A

### GLOBAL MODEL

RCWE0402  
RCWE0603  
RCWE0805  
RCWE1206  
RCWE1210  
RCWE2010  
RCWE2512

### VALUE

L = m $\Omega$  \*  
R = Decimal  
10L0 = 0.01  $\Omega$   
R470 = 0.47  $\Omega$   
**Note:**  
\* Use "L" for resistance values < 0.1  $\Omega$

### TOLERANCE

F =  $\pm$  1.0 %  
J =  $\pm$  5.0 %

### TCR

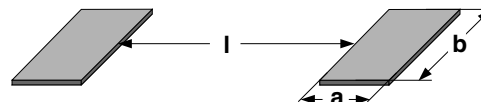
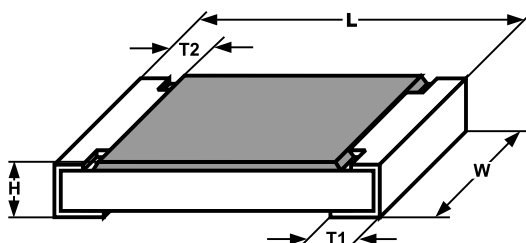
K =  $\pm$  100 ppm/ $^{\circ}\text{C}$   
N =  $\pm$  200 ppm/ $^{\circ}\text{C}$   
M =  $\pm$  300 ppm/ $^{\circ}\text{C}$   
Q =  $\pm$  400 ppm/ $^{\circ}\text{C}$   
P =  $\pm$  500 ppm/ $^{\circ}\text{C}$   
T =  $\pm$  600 ppm/ $^{\circ}\text{C}$   
G =  $\pm$  700 ppm/ $^{\circ}\text{C}$

### PACKAGING

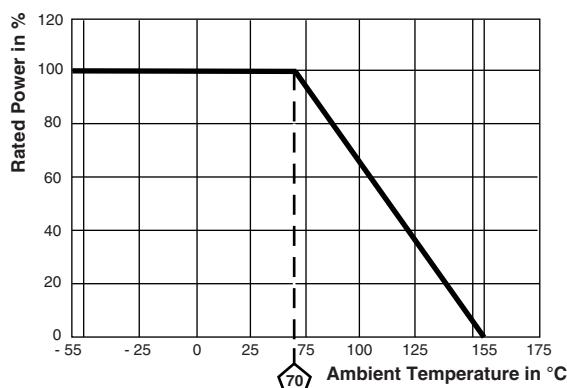
EA = Lead (Pb)-free, tape/reel

**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		1.0
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		1.2
	0.051 to 0.976				0.45 ± 0.2		1.0		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		2.0
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		3.2
	0.051 to 0.976				0.7 ± 0.3		1.4		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		3.8
	0.051 to 0.976				0.8 ± 0.3		1.6		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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