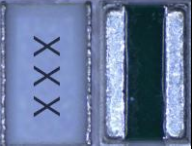





Product Family: 2-Terminal Current Sense Resistors

Part Number Series: WEL-Series

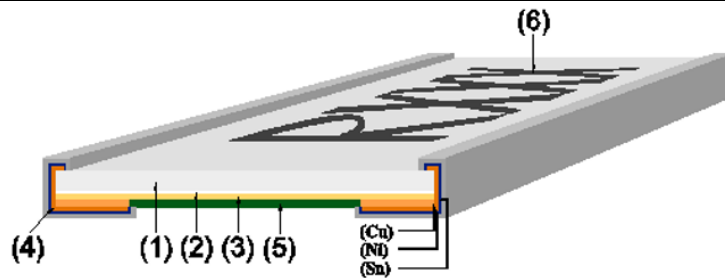


		<p>Construction:</p> <ul style="list-style-type: none"> Alumina Ceramic Metal foil resistive element Epoxy-resin overcoat 100% matte tin over Ni terminations WEL0508: Three-code WEL0612~2139 Four-code Halogen Free and Beryllium Free RoHS compliant without exemptions 	<p>Features:</p> <ul style="list-style-type: none"> 0805, 1206, 1508, 2010, 2512, 3008, 3015, 3618, 3921 English case size Partial power up to 5W Partial TCR down to $\pm 50\text{ppm}/^\circ\text{C}$
<p>WEL0508-Series</p>	<p>WEL0612~2139-Series</p>		

Description:

These low ohm current sense resistors are designed for tight resistance tolerance, low noise, long-term stability and high heat dissipation capability in a small package. This series is ideal for use in power management modules.

Product Construction

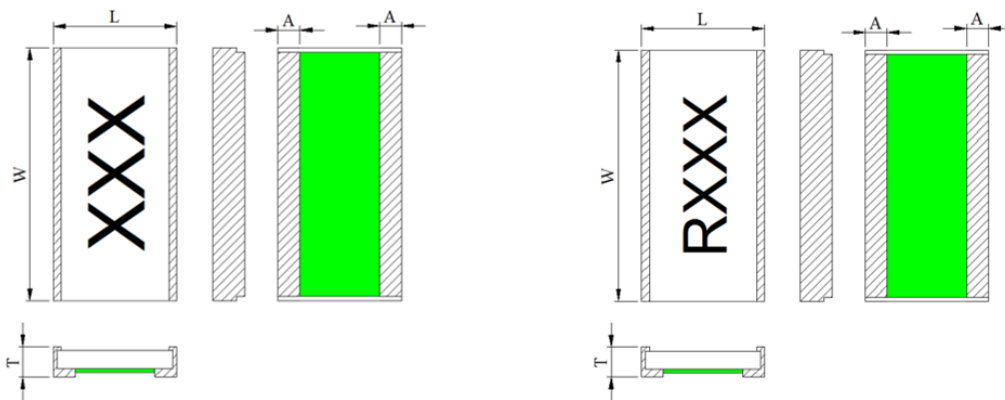


Number	Description
1	Substrate:Alumina Ceramic
2	Adhesion Layer:Epoxy
3	Resistive Element:Cu - alloy
4	Terminal Electrode:Sn, Ni, Cu
5	Protective Coating:Flame-retardant epoxy, meets UL94 V-0 requirements (green)
6	Marking*:Epoxy resin

*Note: Marking is 3 digits (XXX) for 0805 case size and 4 digits (RXXX) for all other case sizes.

Part Numbering: Ex: WEL0612MR002F-T2

Series Name	English Size	Material	Resistance Value	Resistance Tolerance	Packaging
WEL	0508 0612 0815 1020 1225 0830 1530 1836 2139	M	R002=2.0mΩ R001=1.0mΩ R002=2.0mΩ 0M50=0.5mΩ	F=±1.0% H=±3.0%	-T2 = 2,000 -T4 = 4,000 -T5 = 5,000

Product Dimensions

WEL0508-Series

WEL0612~2139-Series

Unit: inches (mm)

Dimension (Metric)	Resistance Range	Material	L	W	A	T
WEL0508 (2012)	1~100mΩ	M	0.053±0.008 (1.35±0.20)	0.083±0.008 (2.10±0.20)	0.017±0.008 (0.43±0.20)	0.026±0.008 (0.65±0.20)
WEL0612 (3216)	1mΩ	M	0.067±0.008 (1.70±0.20)	0.130±0.008 (3.30±0.20)	0.022±0.012 (0.55±0.30)	0.026±0.008 (0.65±0.20)
	2~4mΩ				0.016±0.008 (0.40±0.20)	
	5~100mΩ					
WEL0815 (3720)	1mΩ	M	0.087±0.008 (2.20±0.20)	0.150±0.008 (3.80±0.20)	0.024±0.008 (0.61±0.20)	0.026±0.008 (0.65±0.20)
	2~100mΩ					

WEL1020 (5025)	0.5mΩ	M	0.102±0.008 (2.60±0.20)	0.201±0.008 (5.10±0.20)	0.037±0.008 (0.95±0.20)	0.026±0.008 (0.65±0.20)
	1mΩ				0.026±0.008 (0.65±0.20)	
	2~100mΩ					
WEL1225 (6432)	1mΩ	M	0.126±0.012 (3.20±0.30)	0.252±0.012 (6.40±0.30)	0.024±0.008 (0.60±0.20)	0.026±0.008 (0.65±0.20)
	2~100mΩ					
WEL0830 (7525)	1mΩ	M	0.102±0.012 (2.60±0.30)	0.299±0.012 (7.60±0.30)	0.027±0.012 (0.68±0.30)	0.026±0.008 (0.65±0.20)
	2~100mΩ					
WEL1530 (7638)	1mΩ	M	0.154±0.012 (3.90±0.30)	0.303±0.012 (7.70±0.30)	0.028±0.012 (0.70±0.30)	0.026±0.008 (0.65±0.20)
	2~100mΩ					
WEL1836 (9045)	1mΩ	M	0.181±0.012 (4.60±0.30)	0.358±0.012 (9.10±0.30)	0.031±0.012 (0.80±0.30)	0.026±0.008 (0.65±0.20)
	2~100mΩ					
WEL2139 (11050)	1mΩ	M	0.201±0.012 (5.10±0.30)	0.437±0.016 (11.10±0.40)	0.035±0.012 (0.90±0.30)	0.026±0.008 (0.65±0.20)
	2~100mΩ					

Electrical Specifications		
Type	WEL0508	
Metric Size (mm)	2012	
Power Rating (W)	1.0	
Resistance Range (mΩ)	1~9	10~100
Resistance Tolerance % (code)	±1.0 (F)	±0.5 (D), ±1.0 (F)
TCR ppm/°C	±100(R)	±50(Q)
Operating Temp. Range (°C)	-55~+155	

Type	WEL0612		
Metric Size (mm)	3216		
Power Rating (W)	2.0	1.5	
Resistance Range (mΩ)	1~3	4~9	10~100
Resistance Tolerance % (code)	±1.0 (F)		±0.5 (D), ±1.0 (F)
TCR ppm/°C	±100(R)		±50(Q)
Operating Temp. Range (°C)	-55~+155		

Type	WEL0815		
Metric Size (mm)	3720		
Power Rating (W)	2.0		
Resistance Range (mΩ)	1~9	10~100	
Resistance Tolerance % (code)	±1.0 (F)	±0.5 (D), ±1.0 (F)	
TCR ppm/°C	±100(R)	±50(Q)	
Operating Temp. Range (°C)	-55~+155		

Type	WEL1020			
Metric Size (mm)	5025			
Power Rating (W)	2.0			
Resistance Range (mΩ)	0.5	1~9	10~100	
Resistance Tolerance % (code)	±3.0 (H)	±1.0 (F)	±0.5 (D), ±1.0 (F)	
TCR ppm/°C	±150(G)	±100(R)	±50(Q)	
Operating Temp. Range (°C)	-55~+155			

Type	WEL1225		
Metric Size (mm)	6432		
Power Rating (W)	3.0		
Resistance Range (mΩ)	1~9	10~100	
Resistance Tolerance % (code)	±1.0 (F)	±0.5 (D), ±1.0 (F)	
TCR ppm/°C	±100(R)	±50(Q)	
Operating Temp. Range (°C)	-55~+155		

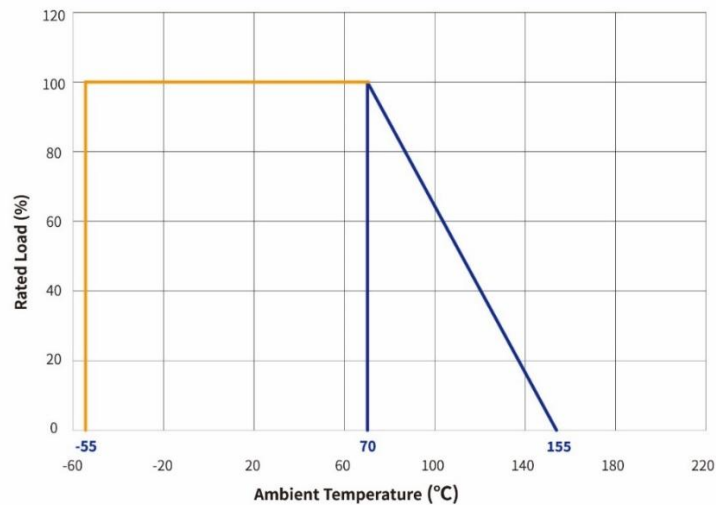
Type	WEL0830		
Metric Size (mm)	7525		
Power Rating (W)	3.0		
Resistance Range (mΩ)	1~9	10~100	
Resistance Tolerance % (code)	±1.0 (F)	±0.5 (D), ±1.0 (F)	
TCR ppm/°C	±100(R)	±50(Q)	
Operating Temp. Range (°C)	-55~+155		

Type	WEL1530	
Metric Size (mm)	7638	
Power Rating (W)	4.0	
Resistance Range (mΩ)	1~9	10~100
Resistance Tolerance % (code)	±1.0 (F)	±0.5 (D), ±1.0 (F)
TCR ppm/°C	±100(R)	±50(Q)
Operating Temp. Range (°C)	-55~+155	

Type	WEL1836	
Metric Size (mm)	9045	
Power Rating (W)	4.0	
Resistance Range (mΩ)	1~9	10~100
Resistance Tolerance % (code)	±1.0 (F)	±0.5 (D), ±1.0 (F)
TCR ppm/°C	±100(R)	±50(Q)
Operating Temp. Range (°C)	-55~+155	

Type	WEL2139	
Metric Size (mm)	11050	
Power Rating (W)	5.0	
Resistance Range (mΩ)	1~9	10~100
Resistance Tolerance % (code)	±1.0 (F)	±0.5 (D), ±1.0 (F)
TCR ppm/°C	±100(R)	±50(Q)
Operating Temp. Range (°C)	-55~+155	

Power Derating Curve



Reliability Specifications

Electrical Characteristics

Test Item	Test Method	Specification
Resistance Data IEC60115-1 6.1	Resistance data at 25°C.	Must meet datasheet requirements
TCR Data IEC60115-1 6.2	TCR = (Rb-Ra)/Ra × 1/(Tb-Ta) × 10 ⁶ . Tested at 25°C and 125°C	Must meet datasheet requirements
Short Time Overload IEC60115-1 8.1	Applied power: 2.5X rated power. Test duration: 5 seconds.	$\Delta R \leq \pm 1.0\%$

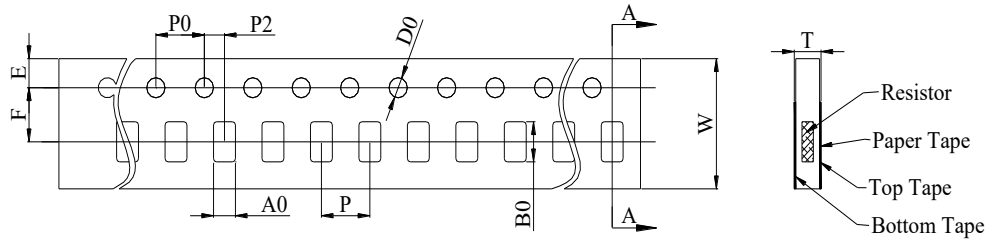
Mechanical Characteristics

Test Item	Test Method	Specification
Substrate Bending IEC60115-1 9.8	90mm span between fulcrums, 2mm bend, Glass-Epoxy test board thickness: 1.6mm.	$\Delta R \leq \pm 1.0\%$
Mechanical Shock IEC60115-1 9.10	Force: 100G Test Duration: 6 ± 1 ms	$\Delta R \leq \pm 1.0\%$

Environmental Characteristics

Test Item	Test Method	Specification
Load Life IEC60115-1 7.1	Test Temperature: 70°C , Applied power: rated power, Test period: 1,000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF.	$\Delta R \leq \pm 2.0\%$
Moisture Load Life IEC60115-1 10.4	Test Temperature: 60°C ± 2°C Humidity: 95% Applied power: 10% rated power Test period: 1,000 hours with power cycling as follows: 90 min. power ON/30 min. power OFF	$\Delta R \leq \pm 1.0\%$
Thermal Shock IEC60115-1 10.1	-55°C 30min. → R.T. 3min. → +155°C 30min. → R.T. 3min. Repeat 100 cycles as follows.	$\Delta R \leq \pm 1.0\%$
High Temp. Exposure IEC60115-1 7.3	Test Temperature: +155°C ± 2°C, Test period: 1,000 hours.	$\Delta R \leq \pm 1.0\%$
Resistance to Solder Heat IEC60115-1 11.2	Parts are subjected to 3 reflow cycles.	$\Delta R \leq \pm 1.0\%$
Solderability IEC60115-1 11.1	Dipped into molten solder for 3 ± 1.0 seconds at 245 ± 5°C.	New solder coverage of 95% minimum

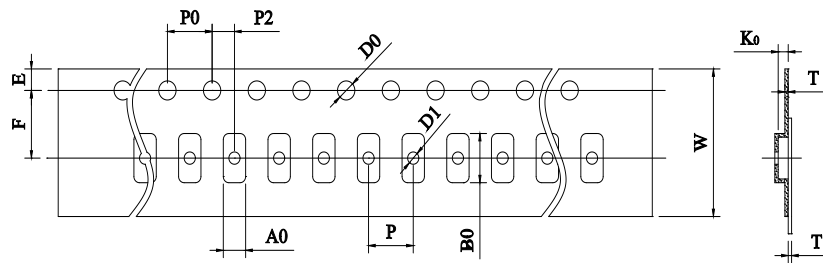
Paper Tape Dimensions



Unit: mm

Size	W	P0	P	P2	A0	B0	D0	F	E	T
0508	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	1.55 ±0.10	2.30 ±0.10	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.87 ±0.10
0612	8.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.05 ±0.20	3.65 ±0.20	1.50 ±0.10	3.50 ±0.10	1.75 ±0.10	0.87 ±0.10

Plastic Tape Dimensions

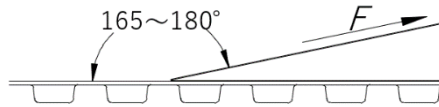


Unit: mm

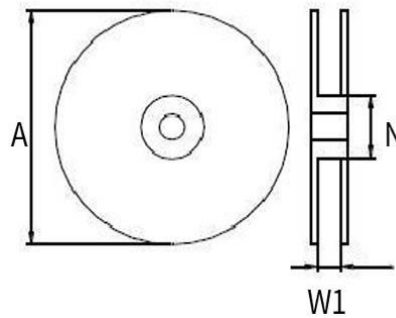
Size	W	P0	P	P2	A0	B0	D0	F	E	T	T1	K0
0815	12.00 ±0.40	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.30 ±0.20	4.10 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max. 0.10	0.75 ±0.20
1020	12.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.85 ±0.20	5.45 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max. 0.10	0.80 ±0.20
1225	12.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	3.40 ±0.20	6.75 ±0.20	1.50 ±0.10	5.50 ±0.10	1.75 ±0.10	0.25 ±0.10	Max. 0.10	1.00 ±0.20
0830	16.00 ±0.30	4.00 ±0.10	4.00 ±0.10	2.00 ±0.10	2.80 ±0.20	8.00 ±0.20	1.50 ±0.10	7.50 ±0.10	1.75 ±0.10	0.30 ±0.10	Max. 0.10	0.80 ±0.20
1530	16.00 ±0.30	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10	4.15 ±0.20	7.95 ±0.20	1.50 ±0.10	7.50 ±0.10	1.75 ±0.10	0.30 ±0.10	Max. 0.10	0.90 ±0.20
1836	16.00 ±0.30	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10	4.85 ±0.20	9.35 ±0.20	1.50 ±0.10	7.50 ±0.10	1.75 ±0.10	0.30 ±0.10	Max. 0.10	0.90 ±0.20
2139	24.00 ±0.30	4.00 ±0.10	8.00 ±0.10	2.00 ±0.10	5.50 ±0.20	11.50 ±0.20	1.50 ±0.10	11.50 ±0.10	1.75 ±0.10	0.30 ±0.10	Max. 0.10	0.90 ±0.20

Peeling Strength of Seal Tape

F = Peeling Strength: 0.1 – 1.0N (10 - 100gf)



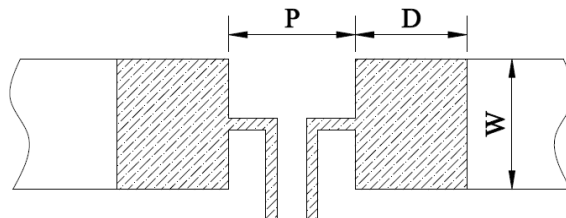
Reel Dimensions



Unit: mm

Size	0508	0612	0815	1020	1225	0830	1530	1836	2139
Quantity	5,000 pcs per reel		4,000 pcs per reel			2,000 pcs per reel			
A	178.00±5.00								
N	60.00±2.00								
W1	9.00±1.00		13.00±1.00			17.00±1.00		24.5±1.00	

Recommended Land Pattern



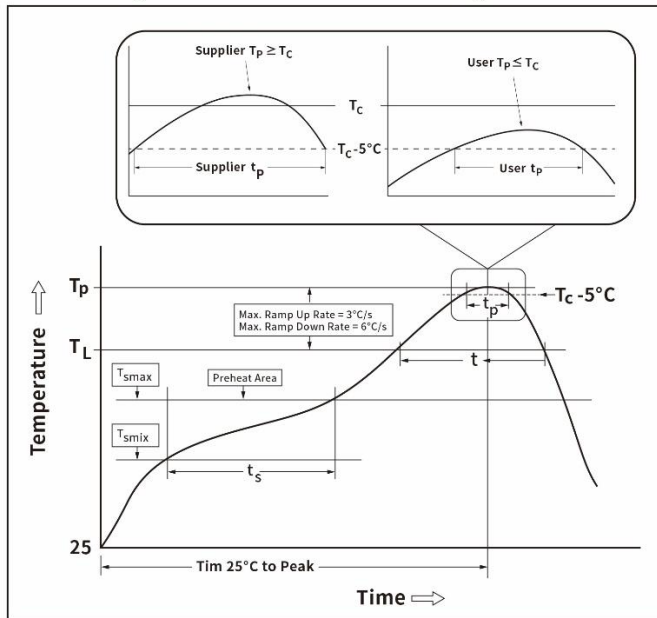
Unit: mm

Size	Resistance Range	P	W	D
0508	1~100mΩ	0.60	2.30	1.10
0612	1mΩ	0.50	3.68	1.35
	2~100mΩ	0.60		1.30
0815	1~100mΩ	0.7	4.26	1.45

1020	0.5mΩ	0.55	5.75	2.48
	1~100mΩ	1.00		2.25
1225	1~100mΩ	1.40	7.25	2.35
0830	1~100mΩ	0.95	8.63	2.28
1530	1~100mΩ	1.70	8.74	2.55
1836	1~100mΩ	2.10	10.35	2.70
2139	1~100mΩ	2.40	12.65	2.80

Soldering Profile

Soldering Parameters-Reflow Soldering



Profile Feature	Pb-Free Assembly
Average Ramp-Up Rate (T_{smax} to T_p)	3 °C / second max
Preheat	
Temperature Minimum (T_{Smin})	150 °C
Temperature Maximum (T_{Smax})	200 °C
Time (T_{Smin} to T_{Smax})	60-120 seconds
Time maintained above	
Temperature Minimum (T_L)	217 °C
Time (t_l)	60-150 seconds
Peak Temperature (T_p)	260 +0 °C
Time within 5 °C of Actual Peak Temperature (t_p)	30 seconds
Ramp-Down Rate	6 °C / second Maximum
Time 25 °C to Peak Temperature	8 minutes Maximum

Rework temperature (hot air equipment) : 350°C, 4~6seconds

Electric soldering iron, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Storage Conditions

Environment Conditions:

Products should be stored under the following environmental conditions.

- Temperature: +5 to +40°C
- Humidity: 10%~75% relative humidity
- Under airtight can store 2 years.
- Do not keep products in environments where they may be subject to particulate contamination or harmful gases such as sulfuric acid or hydrogen chloride as it may cause oxidization on electrodes, resulting in poor solderability.
- Products should be stored in a space that does not expose it to high temperatures, vibration, or direct sunlight.
- Products should be stored in the original airtight packaging until use.