



Thin Film Technology Corp.

Product Family: 2-Terminal Low Ohm Current Sense Resistors

Part Number Series: WEL Long Side Electrode

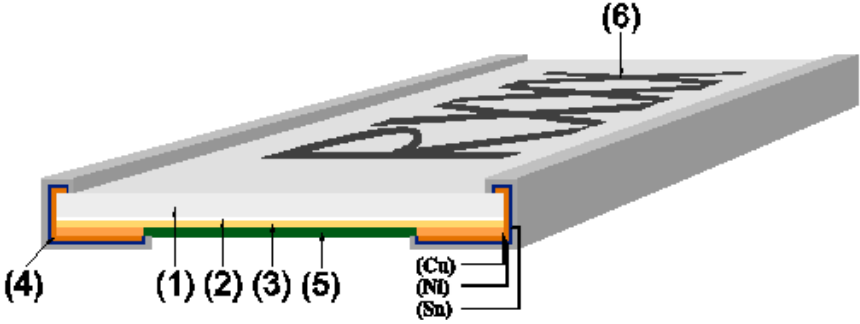


	Construction: • High purity alumina substrate • MnCu alloy resistive element • Epoxy-resin overcoat • Wrapped terminations • 100% matte tin over Ni terminations • Halogen free • RoHS complainant and Pb free • Inherently Anti-Sulfur	Features: • 0508, 0612, 0815, 1020, 125, 0830, 1530, 1836, 2043 English cases sizes • Power up to 5W • Resistance from 1mΩ~100mΩ • TCR down to ±50ppm/°C • Tolerance down to ±0.5% • Moisture Sensitivity Level (MSL) =1 • Optimal linearity in I/V conversion • High volume production suitable for commercial and special applications • Competitive pricing
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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:

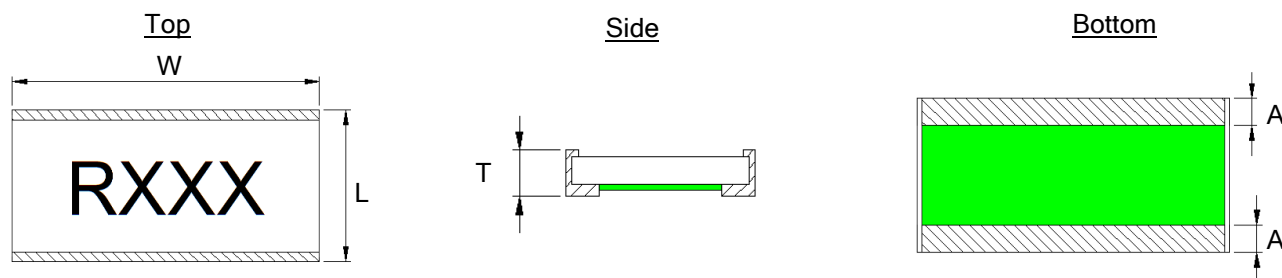
	
Number	Description
1	Substrate (Alumina Ceramic)
2	Adhesion Layer (Epoxy)
3	Resistive Element (Cu Alloy Foil)
4	Terminal Electrode (Cu, Ni, Sn)
5	Protective Coating (Flame-retardant epoxy, UL-94-V0)
6	Marking* (Flame-retardant epoxy, UL-94-V0)

* Note: Marking is 3 digits (XXX) 0508 case size, and 4 digits (RXXX) for all other case sizes.

Part Numbering: Ex: WEL0508MR010F-T5

Series Name	English Size	Material	Resistance Value	Resistance Tolerance	T&R Packaging Quantity
WEL	(refer to "type" in electrical tables)	M	4 digit code for all values. "R" denotes decimal position. Ex. R010 = 10mΩ R100 = 100mΩ	D = ±0.5%* F = ±1.0% H = ±3.0% (refer to tables)	-T2 = 2,000 -T4 = 4,000 -T5 = 5,000 (refer to tables)

* Note: ±0.5% (D) tolerance is not available for all resistance values. See electrical specifications table.

Product Dimensions:

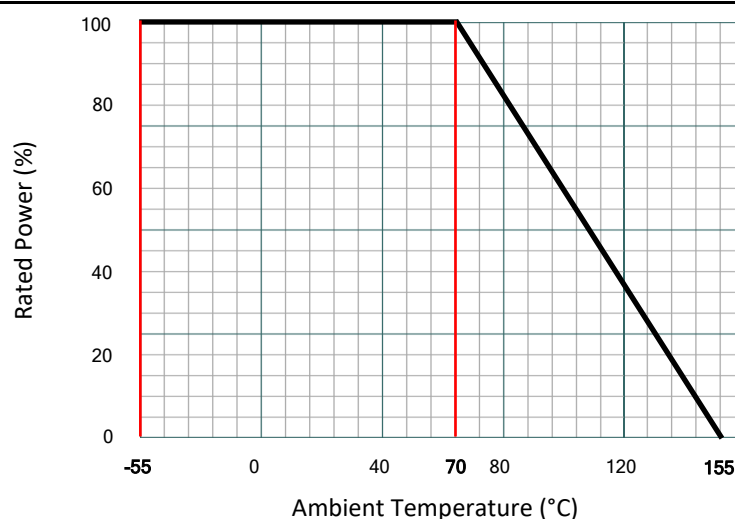
All dimensions shown in inches, mm in parentheses.

Dimension (Metric)	Resistance Range	Material	L	W	A	T
WEL0508 (1220)	1m Ω ~100m Ω	M	0.053 $\pm$ 0.008 (1.35 $\pm$ 0.20)	0.083 $\pm$ 0.008 (2.10 $\pm$ 0.20)	0.017 $\pm$ 0.008 (0.43 $\pm$ 0.20)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
WEL0612 (1632)	1m Ω		0.067 $\pm$ 0.008 (1.70 $\pm$ 0.20)	0.129 $\pm$ 0.008 (3.30 $\pm$ 0.20)	0.022 $\pm$ 0.012 (0.55 $\pm$ 0.30)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
	2m Ω ~4m Ω				0.016 $\pm$ 0.008 (0.40 $\pm$ 0.20)	
	5m Ω ~100m Ω					
WEL0815 (2040)	1m Ω ~100m Ω		0.087 $\pm$ 0.008 (2.20 $\pm$ 0.20)	0.150 $\pm$ 0.008 (3.80 $\pm$ 0.20)	0.024 $\pm$ 0.008 (0.61 $\pm$ 0.20)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
WEL1020 (2550)	0.50m Ω		0.102 $\pm$ 0.008 (2.60 $\pm$ 0.20)	0.201 $\pm$ 0.008 (5.10 $\pm$ 0.20)	0.037 $\pm$ 0.008 (0.95 $\pm$ 0.20)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
	1m Ω ~100m Ω				0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)	
WEL1225 (3264)	1m Ω ~100m Ω		0.126 $\pm$ 0.012 (3.20 $\pm$ 0.30)	0.252 $\pm$ 0.012 (6.40 $\pm$ 0.30)	0.024 $\pm$ 0.008 (0.60 $\pm$ 0.20)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
WEL0830 (2276)	1m Ω ~100m Ω		0.102 $\pm$ 0.012 (2.60 $\pm$ 0.30)	0.299 $\pm$ 0.012 (7.60 $\pm$ 0.30)	0.027 $\pm$ 0.012 (0.68 $\pm$ 0.30)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
WEL1530 (3876)	1m Ω ~100m Ω		0.153 $\pm$ 0.012 (3.90 $\pm$ 0.30)	0.303 $\pm$ 0.012 (7.70 $\pm$ 0.30)	0.027 $\pm$ 0.012 (0.70 $\pm$ 0.30)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
WEL1836 (4590)	1m Ω ~100m Ω		0.181 $\pm$ 0.012 (4.60 $\pm$ 0.30)	0.358 $\pm$ 0.012 (9.10 $\pm$ 0.30)	0.031 $\pm$ 0.012 (0.80 $\pm$ 0.30)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)
WEL2043 (05110)	1m Ω ~100m Ω		0.201 $\pm$ 0.012 (5.10 $\pm$ 0.30)	0.437 $\pm$ 0.016 (11.1 $\pm$ 0.40)	0.035 $\pm$ 0.012 (0.90 $\pm$ 0.30)	0.026 $\pm$ 0.008 (0.65 $\pm$ 0.20)

Electrical Specifications:

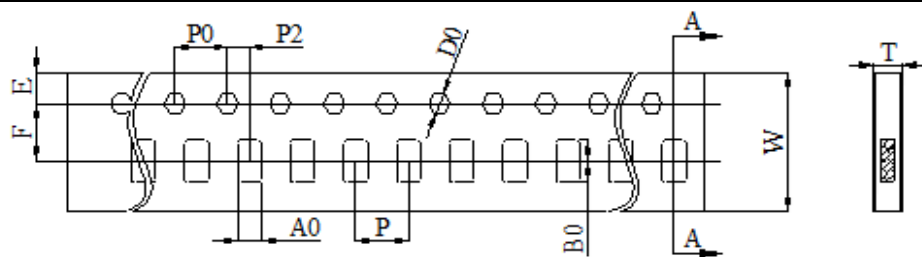
Type	WEL0508		WEL0612		WEL0815		WEL1020			WEL1225	
Metric Size	1220		1632		2040		2550			3264	
Power Rating	1W		1.5W		2W		2W			3W	
Resistance Range (mΩ)	1~9	10~100	1~9	10~100	1~9	10~100	0.5	1~9	10~100	1~9	10~100
Resistance Tolerance % (code)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±3.0 (H)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)
TCR ppm/°C	±100	±50	±100	±50	±100	±50	±150	±100	±50	±100	±50
Operating Temp. Range	-55°C~+155°C										
Rated Voltage	$\sqrt{(\text{Power} \times \text{Resistance})}$										
Packaging (code)	5,000 pcs/reel (-T5)					4,000 pcs/reel (-T4)					

Type	WEL0830		WEL1530		WEL1836		WEL2043	
Metric Size	2276		3876		4590		05110	
Power Rating	3W		4W		4W		5W	
Resistance Range (mΩ)	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100
Resistance Tolerance % (code)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)	±1.0(F)	±0.5(D) ±1.0(F)
TCR ppm/°C	±100	±50	±100	±50	±100	±50	±100	±50
Operating Temp. Range	-55°C~+155°C							
Rated Voltage	$\sqrt{(\text{Power} \times \text{Resistance})}$							
Packaging (code)	4,000 pcs/reel (-T4)			2,000 pcs/reel (-T2)				

Power Derating Curve:

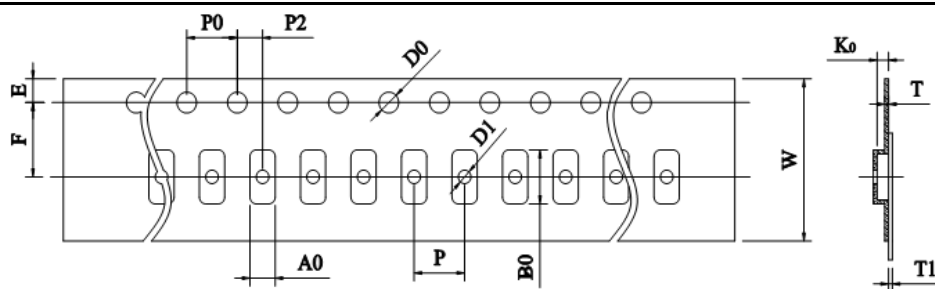
Reliability Specifications:

Test	Procedure	Specification
Short Time Overload JIS-C-5201, 4.13	P= 2.5Pr; T=25±2°C, t = 5sec.	±1.0%
High Temperature Exposure IEC60115-1 4.25	T = +155±2°C; t = 1000h	±1.0%
Low Temp. Storage IEC60115-1 4.25	T = -55±2°C; t = 1000h	±1.0%
Moisture Load Life IEC60115-1 4.25	Vtest = Vmax; T=60±2°C; RH=95%; t= 90min ON , 30min OFF , 1000h	±2.0%+
Thermal Shock IEC60115-1 4.19	-55°C 30min. → R.T. 3min. → +155°C 30min. → R.T. 3min, 100 Cycles	±1.0%
Load life at 70°C IEC60115-1 4.25	Vtest = Vmax; T=70±2°C; t= 90min ON , 30min OFF, 1000h	±2.0%
Solderability IEC60115-1 4.17	Dip into solder at T = 245±5°C, t = 3±1sec.	Coverage of >95%
Resistance To Solder Heat IEC60115-1 4.18	Through Reflow. Parts are subjected to 3 reflow cycles	±1.0%
Mechanical Shock IEC60115-1 4.21	a =100G, t =6ms	±1.0%
Substrate Bending IEC60115-1 4.33	Span between fulcrums: 90mm Bend Width: 2mm Test Board: Glass-Epoxy Board Thickness: 1.6mm	±1.0%

Paper Tape Dimensions:

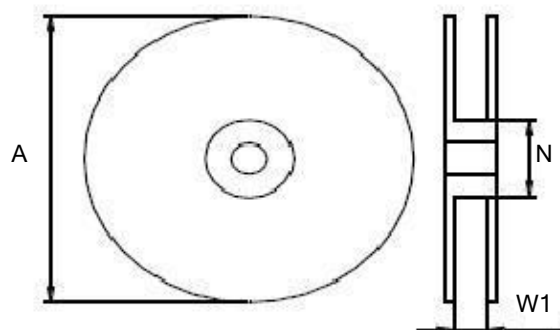
All dimensions in mm.

Type	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:

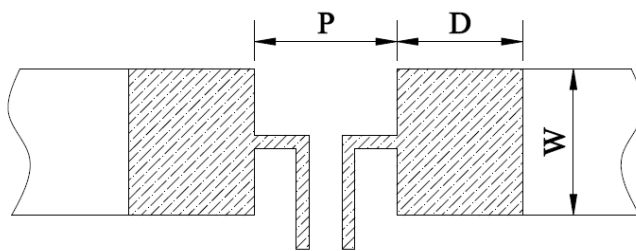
All dimensions in mm.

Type	W	P0	P	P2	A0	B0	D0	F	E	T	T1	K0
0815	12.0 ±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	12.0 ±0.30				2.85 ±0.20	5.45 ±0.20						0.80 ±0.20
1225					3.40 ±0.20	6.75 ±0.20						1.00 ±0.20
0830	16.0 ±0.30				8.00 ±0.10	2.80 ±0.20						8.00 ±0.20
1530			4.15 ±0.20	7.95 ±0.20		0.30 ±0.10		0.90 ±0.20				
1836			4.85 ±0.20	9.35 ±0.20								
2043			24.0 ±0.30	5.50 ±0.20						11.5 ±0.20		11.5 ±0.10

Reel Dimensions:

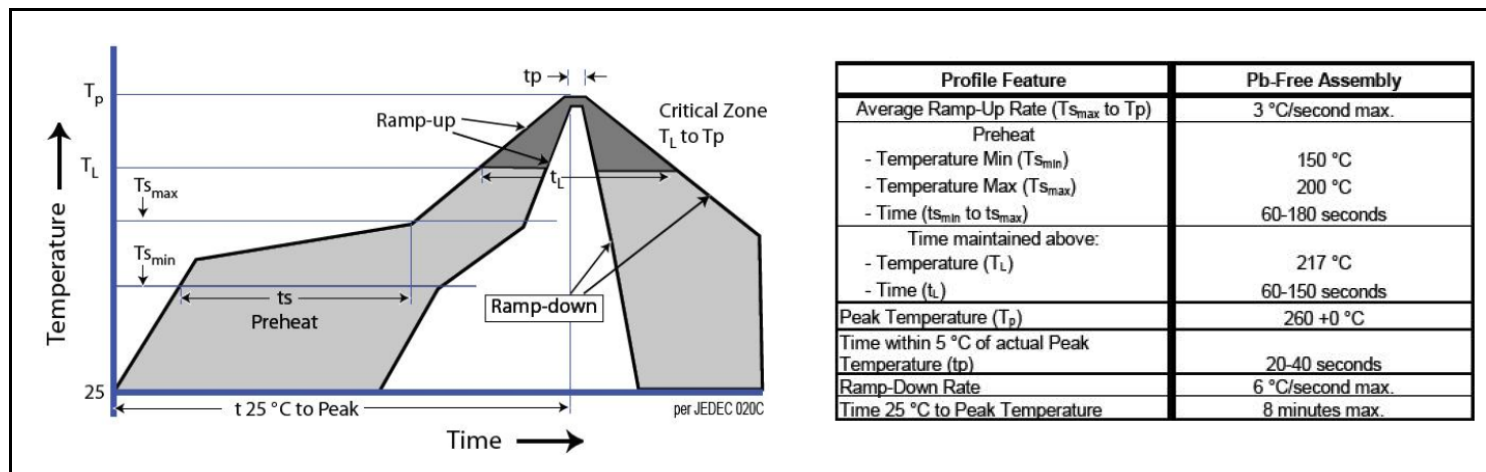
All dimensions in mm

Type	A	N	W1
0508	178 ±5.0	60 ±2.0	9.0 ±1.0
0612	178 ±5.0	60 ±2.0	9.0 ±1.0
0518	178 ±5.0	60 ±2.0	13 ±1.0
1020	178 ±5.0	60 ±2.0	13 ±1.0
1225	178 ±5.0	60 ±2.0	13 ±1.0
0830	178 ±5.0	60 ±2.0	17 ±1.0
1530	178 ±5.0	60 ±2.0	17 ±1.0
1836	178 ±5.0	60 ±2.0	17 ±1.0
2043	178 ±5.0	60 ±2.0	24.5 ±1.0

Recommended Land Pattern:

All dimensions in mm.

Size	Resistance Range	P	W	D
0508	1mΩ~100mΩ	0.60	2.30	1.10
0612	1mΩ	0.50	3.68	1.35
	2mΩ~100mΩ	0.60	3.68	1.30
0815	1mΩ~100mΩ	0.70	4.26	1.45
1020	0.50mΩ	0.55	5.75	2.48
	1mΩ~100mΩ	1.00	5.75	2.25
1225	1mΩ~100mΩ	1.40	7.25	2.35
0830	1mΩ~100mΩ	0.95	8.63	2.28
1530	1mΩ~100mΩ	1.70	8.74	2.55
1836	1mΩ~100mΩ	2.10	10.35	2.70
2043	1mΩ~100mΩ	2.40	12.65	2.80

Soldering Profile:**Storage Conditions:****Environment Conditions:**

Products should be stored under the following environmental conditions.

- Temperature: +5 to +35°C
- Humidity: 45 to 85% relative humidity
- 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.