Thin Film Technology Corp.

Product Family: Low Ohm Current Sense Resistor

Part Number Series: WEL Series (wrapped electrodes)

RoHS 2011/65/EU

Halogen Free

Construction:

- High Purity Alumina Substrate
- Metal film resistive element
- Epoxy-resin overcoat
- Wrap around electrodes
- Sn100 terminations
- Anti-Sulfur

Features:

- TCR's down to ±50 ppm/°C
- Resistance down to 1mΩ available
- High power handling in a small package
- Optimal linearity in I/V conversion
- High volume production suitable for commercial and special applications
- Competitive pricing

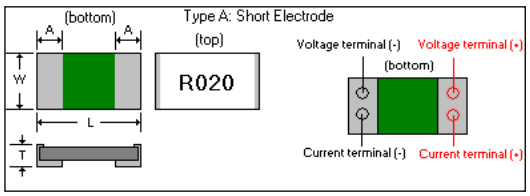
Description:

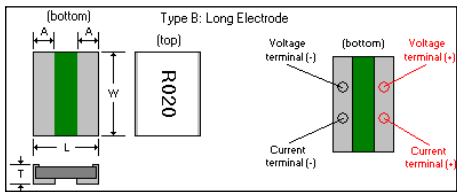
These low ohm current sense resistors are designed for tight resistance tolerance, low noise, long-term stability and high heat dissipation capability in a small package. This series is ideal for use in power management modules, motor control circuits and automotive applications. This series varies from the WKL series as this series has wrap-around electrodes.

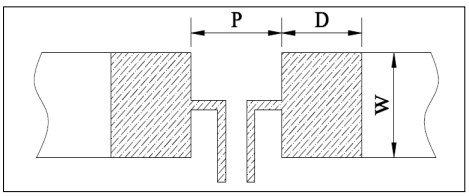
Product Dimensions and Recommended Land Patterns:

Part Number	Electrode Type	Resistance Range	Component Dimensions (inches)				Land Pattern Dimensions (inches)		
			L	W	A	T	P	W	D
WEL0603	A	5mΩ	0.066±0.008	0.035±0.008	0.019±0.008	0.026±0.008	0.019	0.036	0.053
		6mΩ~75mΩ			0.016±0.008		0.024		0.051
WEL0805	A	4mΩ~100mΩ	0.083±0.008	0.053±0.008	0.019±0.008	0.026±0.008	0.031	0.057	0.055
WEL1206	A	3mΩ~4mΩ	0.129±0.008	0.067±0.008	0.047±0.012	0.026±0.008	0.024	0.0724	0.083
		5mΩ~200mΩ			0.026±0.012		0.047		0.071
WEL2010	A	5mΩ~250mΩ	0.201±0.008	0.102±0.008	0.027±0.012	0.026±0.008	0.106	0.113	0.104
WEL2512	A	5mΩ~300mΩ	0.252±0.012	0.126±0.012	0.041±0.012	0.026±0.008	0.122	0.141	0.122
WEL4320	A	5mΩ~100mΩ	0.437±0.012	0.200±0.012	0.093±0.012	0.026±0.008	0.197	0.226	0.177
WEL4527	A	5mΩ~30mΩ	0.457±0.039	0.279±0.039	0.106±0.016	0.026±0.012	0.205	0.317	0.184
WEL0508	B	2mΩ~50mΩ	0.053 ± 0.008	0.083 ± 0.008	0.018 ± 0.008	0.025 ± 0.008	0.024	0.091	0.043
WEL0612	B	1mΩ	0.067 ± 0.008	0.129 ± 0.008	0.021 ± 0.012	0.020 ± 0.008	0.019	0.145	0.053
		2mΩ~50mΩ			0.016 ± 0.008		0.024		0.051
WEL0815	B	1mΩ~50mΩ	0.102 ± 0.008	0.149 ± 0.008	0.027 ± 0.008	0.0.025 ± 0.008	0.033	0.167	0.092
WEL1020	B	1mΩ~50mΩ	0.102 ± 0.008	0.201 ± 0.008	0.025 ± 0.008	0.025 ± 0.008	0.039	0.226	0.089
WEL1225	B	1mΩ~50mΩ	0.126± 0.012	0.252± 0.012	0.024 ± 0.008	0.025 ± 0.008	0.055	0.285	0.093
WEL0830	B	1mΩ~10mΩ	0.102± 0.012	0.299± 0.012	0.027 ± 0.012	0.025 ± 0.008	0.037	0.339	0.089
WEL1530	B	1mΩ~50mΩ	0.154± 0.012	0.303 ± 0.012	0.027 ± 0.012	0.025 ± 0.008	0.067	0.344	0.100
WEL1836	B	1mΩ~50mΩ	0.181 ± 0.012	0.358 ± 0.012	0.031 ± 0.012	0.026 ± 0.008	0.083	0.407	0.106
WEL2043	B	1mΩ~50mΩ	0.201 ± 0.012	0.437 ± 0.016	0.035 ± 0.012	0.026 ± 0.008	0.094	0.498	0.110

Product Dimensions and Recommended Land Patterns:







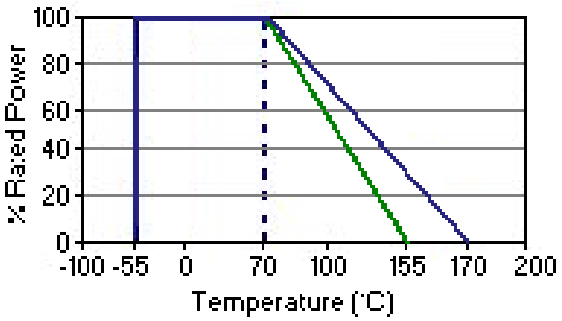
Electrical Specifications:

Type	WEL0603		WEL0805		WEL1206		WEL2010		WEL2512		WEL4320		WEL4527	
Electrode Style	Type "A" - Short Side Electrode													
Metric Size	1608		2012		3216		5025		6432		11050		11470	
Power	0.5 Watts		0.75 Watts		1.0 Watts		1.5 Watts		2.0 Watts		3.0 Watts		4.0 Watts	
Resistance Offering (mΩ)	5~9	10~75	4~9	10~100	3~9	10~200	5~9	10~250	5~9	10~300	5~9	10~100	5~9	10~30
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)	±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)
Resistance Offering	1mΩ steps													
TCR ± ppm/°C	100	50	100	50	100	50	100	50	100	50	100	50	100	50
Operating Temp. Range	**M**= -55°C ~ 155°C , **C**= -55°C~175°C													
Rated Voltage	√Power x Resistance													
Packaging	5,000 pcs/reel						4,000 pcs/reel				2,000 pcs/reel		1,000 pcs/reel	

Type	WEL0508		WEL0612		WEL0815		WEL1020		WEL1225		WEL0830		WEL1530		WEL1836		WEL2043	
Electrode Style	Type "B" - Long Side Electrode																	
Metric Size	1220		1632		2040		2550		3264		2276		3876		4590		05110	
Power	1.0 Watts		1.5 Watts		2.0 Watts		2.0 Watts		3.0 Watts		3.0 Watts		4.0 Watts		4.0 Watts		5.0 Watts	
Resistance Offering (mΩ)	2~9	10~50	1~9	10~50	1~9	10~50	1~9	10~50	1~9	10~50	1~9	10	1~9	10~50	1~9	10~50	1~9	10~50
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)	±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)	±1.0(F)	±0.5(D) ±1.0(F)
Resistance Offering	1mΩ steps																	
TCR ± ppm/°C	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50	100	50
Operating Temp. Range	**M**= -55°C ~ 155°C , **C**= -55°C~175°C																	
Rated Voltage	√Power x Resistance																	
Packaging	5,000 pcs/reel				4,000 pcs/reel								2,000 pcs/reel					

Operating Temperatures and Derating Curves:

Parameter	Specification
Rated Ambient Temp	+70°C
Operating Temp Range	Type M: -55°C~155°C
	Type C: -55°C~175°C



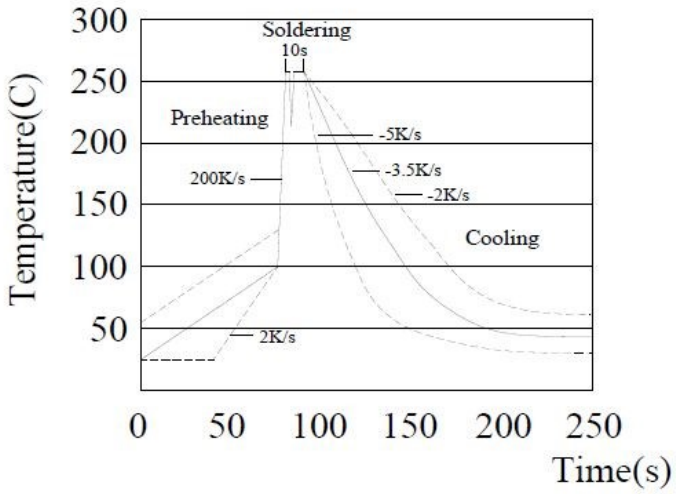
Part Numbering: Ex: WEL0508MR010F-T5

Product Designator	English Size	Operating Temp Range	Resistance Value	Resistance Tolerance	T&R Packaging Quantity
WEL	(refer to "type" in electrical tables)	**M** = -55°C~155°C **C**= -55°C~175°C	Ex. **R010**=10mΩ **R100**=100mΩ (refer to tables)	**D** = ±0.5% **F** = ±1.0% (refer to tables)	**-T1** = 1,000 **-T2** = 2,000 **-T4** = 4,000 **-T5** = 5,000 (refer to tables)

Reliability Testing:

Test	Conditions of Test	Requirement
Load Life	Rated voltage for 90 min followed by a 30 min pause at a temp of 70 ± 2°C. Cycle repeated for 1000 hours	± 2.0% + 0.5mΩ IEC60115-1 4.25
Moisture Load Life	Rated voltage for 90 min followed by a 30 min pause at a temp of 60 ± 2°C. Cycle repeated for 1000 hours	± 2.0% + 0.5mΩ IEC60115-1 4.25
Temperature Cycle	-55°C 30min R.T. 3min +155°C 30min R.T. 3min (100 cycles)	± 1.0% + 0.5mΩ IEC60115-1 4.19
Soldering Heating	Dipped in solder for 20 ± 1sec at 275 ± 5°C	± 1.0% + 0.5mΩ IEC60115-1 4.18
Substrate Bending	Span between fulcrums = 90mm Bend width = 2mm Test board = glass epoxy t=1.6mm	± 1.0% + 0.5mΩ IEC60115-1 4.21
Solderability	Dipped in solder for 3 ± 0.5 sec at 245 ± 5ºC	Min 90% coverage of critical area IEC60115-1 4.17

Wave Solder Temperature:



Solder Reflow Temperature Condition: