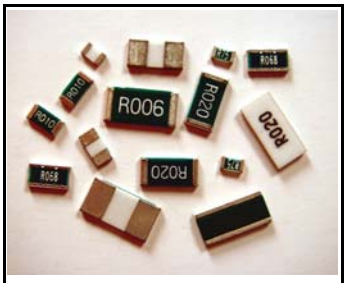
Thin Film Technology Corp.

Product Family: Low Ohm Current Sense Resistor

Part Number Series: EL Series (wrapped electrodes)



Construction:

- High Purity Alumina Substrate
- Ni alloy metal film resistive element
- Epoxy-resin overcoat
- Wrap around electrodes
- Sn100 terminations

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

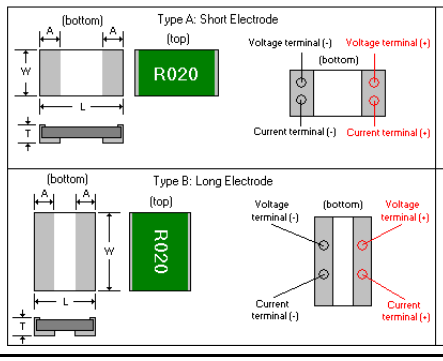
Description:

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 KL series as this series has wrap-around electrodes.

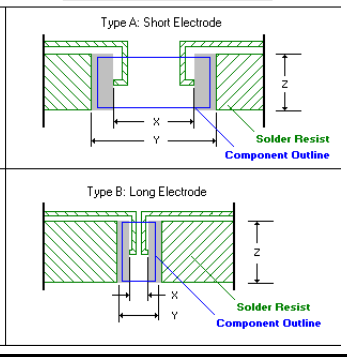
Product Dimensions and Recommended Land Patterns:

Part Number	Electrode Type	Resistance Range	Component Dimensions (inches)				Land Pattern Dimensions (inches)		
			L	W	A	T	X	Y	Z
EL0805	A	10mΩ~100mΩ	0.079 ± 0.008	0.049 ± 0.008	0.016 ± 0.008	0.020 ± 0.008	0.047	0.106	0.059
EL1206	A	5mΩ~7mΩ	0.126 ± 0.008	0.063 ± 0.008	0.043 ± 0.008	0.020 ± 0.008	0.039	0.157	0.075
		8mΩ~100mΩ			0.016 ± 0.008		0.095		
EL2512	A	5mΩ~7mΩ	0.248 ± 0.008	0.122 ± 0.008	0.075 ± 0.008	0.020 ± 0.008	0.114	0.291	0.138
		8mΩ~100mΩ			0.039 ± 0.008		0.173		
EL0508	B	1mΩ	0.049 ± 0.008	0.079 ± 0.008	0.022 ± 0.008	0.020 ± 0.008	0.004	0.079	0.087
		2mΩ			0.016 ± 0.008		0.016		
		3mΩ~50mΩ			0.012 ± 0.008		0.024		
EL0612	B	1mΩ	0.063 ± 0.008	0.126 ± 0.008	0.024 ± 0.008	0.020 ± 0.008	0.016	0.095	0.134
		2mΩ			0.016 ± 0.008		0.032		
		3mΩ~50mΩ			0.012 ± 0.008		0.039		
EL1225	B	1mΩ	0.122 ± 0.008	0.248 ± 0.008	0.047 ± 0.008	0.020 ± 0.008	0.032	0.165	0.260
		2mΩ~100mΩ			0.020 ± 0.008		0.087		
EL1530	B	1mΩ	0.150 ± 0.008	0.299 ± 0.008	0.053 ± 0.008	0.020 ± 0.008	0.043	0.181	0.307
		2mΩ~100mΩ			0.024 ± 0.008		0.102		
EL1836	B	1mΩ	0.177 ± 0.008	0.350 ± 0.008	0.024 ± 0.008	0.020 ± 0.008	0.051	0.201	0.362
		2mΩ~100mΩ			0.028 ± 0.008		0.122		
EL2043	B	1mΩ	0.197 ± 0.008	0.433 ± 0.008	0.071 ± 0.008	0.020 ± 0.008	0.059	0.220	0.441
		2mΩ~100mΩ			0.032 ± 0.008		0.142		

Product Dimensions and Measurement Locations:



Recommended Land Pattern Dimensions:



Electrical Specifications:

Type	EL0805	EL1206		EL2512	
Electrode Style	Type "A" - Short Side Electrodes				
Metric Size	2012	3216		6432	
Power	1/3 Watts	1/2 Watt		1 Watt	
Resistance Offering	10~100mΩ	5~9mΩ	10~100mΩ	5~9mΩ	10~100mΩ
Tolerance% (code)	±1.0(F)	±1.0(F), ±2.0(G)	±1.0(F)	±1.0(F), ±2.0(G)	±1.0(F)
Resistance Offering (mΩ)	E-12 Values*	1mΩ steps	E-12 Values*	1mΩ steps	E-12 Values*
TCR ± ppm/°C	50	100	50	100	50
Operating Temp. Range	Type M: -55°C ~ 155°C ; Type C: -55°C ~ 170°C				
Rated Voltage	√Power x Resistance				
Packaging	1,000 pcs/reel or 5,000 pcs/reel				

Type	EL0508				EL0612				EL1225				EL1530				EL1836				EL2043			
Electrode Style	Type "B" - Long Side Electrodes																							
Metric Size	1220				1632				3264				3876				4590				05110			
Power	1/2 Watts				1 Watt				2 Watts				3 Watts				4 Watts				5 Watts			
Resistance Offering (mΩ)	1	2	3~9	10~50	1	2	3~9	10~50	1	2	3~9	10~100	1	2	3~9	10~100	1	2	3~9	10~100	1	2	3~9	10~100
Tolerance% (code)	±5.0 (J)	±2.0 (G)	±1.0(F)		±5.0 (J)	±2.0 (G)	±1.0(F)		±5.0 (J)	±2.0 (G)	±1.0(F)		±5.0 (J)	±2.0 (G)	±1.0(F)		±5.0 (J)	±2.0 (G)	±1.0(F)		±5.0 (J)	±2.0 (G)	±1.0(F)	
Resistance Offering	1mΩ steps			E-6*	1mΩ steps			E-6*	1mΩ steps			E-6*	1mΩ steps			E-6*	1mΩ steps			E-6*	1mΩ steps			E-6*
TCR ± ppm/°C	150	100	50		150	100	50		150	100	50		150	100	50		150	100	50		150	100	50	
Operating Temp. Range	Type M: -55°C ~ 155°C ; Type C: -55°C ~ 170°C																							
Rated Voltage	√Power x Resistance																							
Packaging	1,000 pcs/reel or 5,000 pcs/reel																							

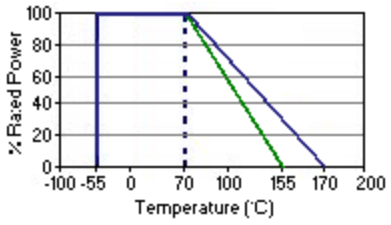
*** Resistance Values:**

- Resistance values of 10mΩ and greater are offered in standard E-6 or E-12 values as stated as well as 20mΩ, 30mΩ and 50mΩ.

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~170°C

Derating



Part Numbering: Ex: EL0508CR010F-T5

Product Designator	English Size	Operating Temp Range	Resistance Value	Resistance Tolerance	T&R Packaging Quantity
EL	(refer to "type" in electrical tables)	**C** = -55~170°C **M** = -55~155°C	Ex. **R010**=10mΩ **R100**=100mΩ (refer to tables)	**F** = ±1% **G** = ±2% **J** = ±5% (refer to tables)	**-T1** = 1,000 **-T5** = 5,000

Reliability Testing:

Test	Conditions of Test	Requirement
Maximum Over Current	Rush current applied for 10ms, repeated 10 times with 60s pause Rush current (I) = √(P/R) P = Maximum dissipation in watts (refer to tables below) R = Resistance value in ohms	± 1.0% + 0.0005Ω
Load Life	Rated voltage for 90 min followed by a 30 min pause at a temp of 70 ± 3°C. Cycle repeated for 1000 hours	± 1.0% + 0.0005Ω
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% + 0.0005Ω
Temperature Cycle	-55°C 30min R.T. 3min +155°C 30min R.T. 3min (5 cycles)	± 1.0% + 0.0005Ω
Soldering Heating	Dipped in solder for 10 ± 1sec at 260 ± 5°C	± 0.5% + 0.0005Ω
Substrate Bending	Span between fulcrums = 90mm Bend width = 2mm Test board = glass epoxy t=1.6mm	± 1.0% + 0.0005Ω
Solderability	Dipped in solder for 3 ± 0.5sec at 245 ± 5ºC	Min 90% coverage of critical area

Maximum Power Dissipation:

Type A: Short Electrode

Part Number	Power	Maximum Dissipation	Maximum Current	Test Condition
EL0805	0.3W	6.5W	25A	Duration = 10msec Interval = 60 sec Repeat = 10 times
EL1206	0.5W	12W	35A	
EL2512	1.0W	56W	70A	

Type B: Long Electrode

Part Number	Power	R = 10mΩ or less		R = 12mΩ or greater		Test Condition
		Maximum Dissipation	Maximum Current	Maximum Dissipation	Maximum Current	
EL0508	0.5W	20W	45A	14W	20A	Duration = 10msec Interval = 60 sec Repeat = 10 times
EL0612	1.0W	56W	64A	36W	35A	
EL1225	2.0W	225W	125A	150W	70A	
EL1530	3.0W	325W	150A	210W	80A	
EL1836	4.0W	440W	180A	300W	100A	
EL2043	5.0W	600W	240A	440W	120A	

Maximum Over Current Calculation:

Maximum Over Current = The lesser of

$\sqrt{(\text{Maximum Dissipation} \div \text{Resistance Value})}$

OR

The tested maximum current listed in the tables

Examples: EL1836, 30mΩ

Maximum Over Current = $\sqrt{(300W \div 0.03\Omega)}$ = 100A

EL0612, 1mΩ

Maximum Over Current = $\sqrt{(56W \div 0.001\Omega)}$ = 237A–since the calculated maximum current is greater than the table listing of 64A, 64A should be considered the maximum over current for this product.