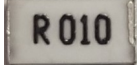





Product Family: [Low Ohm Current Sense Resistor](#)
Part Number Series: [WEL Series \(wrapped electrodes\)](#)



 	Construction: <ul style="list-style-type: none"> • High Purity Alumina Substrate • Metal film resistive element • Epoxy-resin overcoat • Wrap around electrodes • Sn100 terminations • AEC-Q200 Qualified • Anti-Sulfur 	Features: <ul style="list-style-type: none"> • 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
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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, motor control circuits and automotive applications. This series varies from the WKL series as this series has wrap-around electrodes.

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	10~100	3~9	10~500	3~9	10~700	2~9	10~700	2~9	10~700	2~9	10~100	2~9	10~100
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 (see dimensional table for temperature specific resistance offerings)													
Rated Voltage	$\sqrt{\text{Power} \times \text{Resistance}}$													
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)	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100	1~9	10~100
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 (see dimensional table for temperature specific resistance offerings)																	
Rated Voltage	$\sqrt{\text{Power} \times \text{Resistance}}$																	
Packaging	5,000 pcs/reel				4,000 pcs/reel				2,000 pcs/reel									

Part Numbering: Ex: WEL0508MR010F-T5

Product Designator	English Size	Operating Temp Range	Resistance Value	Resistance Tolerance	Automotive Grade	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)	A= Automotive AEC-Q200 Leave Blank for Non AEC-Q200	-T1 = 1,000 -T2 = 2,000 -T4 = 4,000 -T5 = 5,000 (refer to tables)

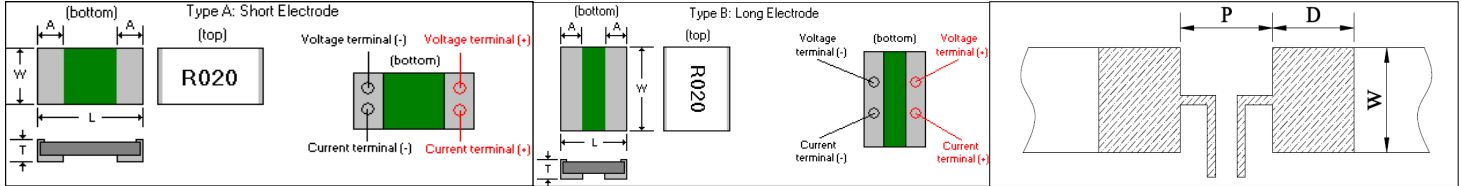
Product Dimensions:

Part Number	Electrode Type	Resistance Range	Component Dimensions (inches)			
			L	W	A	T
					(C) Operating Temp	
WEL0603	A	8mΩ~9mΩ	0.067±0.008	0.035±0.008	0.024±0.008	0.026±0.008
		10mΩ~12mΩ			0.020±0.008	
		13mΩ~100mΩ			0.016±0.008	
WEL0805	A	4mΩ	0.083±0.008	0.053±0.008	0.031±0.008	0.026±0.008
		5mΩ~6mΩ			0.029±0.008	
		7mΩ			0.024±0.008	
		8mΩ~500mΩ			0.020±0.008	
WEL1206	A	3mΩ	0.130±0.008	0.067±0.008	0.055±0.012	0.026±0.008
		4mΩ			0.051±0.012	
		5mΩ~8mΩ			0.049±0.012	
		9mΩ			0.035±0.012	
		10mΩ~700mΩ			0.027±0.012	
WEL2010	A	2mΩ	0.201±0.008	0.102±0.008	0.091±0.012	0.026±0.008
		3mΩ			0.083±0.012	
		4mΩ			0.075±0.012	
		5mΩ~6mΩ			0.067±0.012	
		7mΩ~9mΩ			0.063±0.012	
		10mΩ~700mΩ			0.028±0.012	
WEL2512	A	2mΩ	0.252±0.012	0.126±0.012	0.110±0.012	0.026±0.008
		3mΩ			0.102±0.012	
		4mΩ			0.093±0.012	
		5mΩ			0.081±0.012	
		6mΩ~8mΩ			0.079±0.012	
		9mΩ			0.047±0.012	
		10mΩ~700mΩ			0.041±0.012	
WEL4320	A	2mΩ	0.437±0.012	0.201±0.012	0.193±0.012	0.026±0.008
		3mΩ			0.179±0.012	
		4mΩ			0.161±0.012	
		5mΩ~6mΩ			0.142±0.012	
		7mΩ~8mΩ			0.118±0.012	
		9mΩ~100mΩ			0.093±0.012	
WEL4527	A	2mΩ	0.457±0.039	0.279±0.039	0.197±0.016	0.026±0.012
		3mΩ			0.177±0.012	
		4mΩ			0.144±0.016	
		5mΩ			0.118±0.016	
		6mΩ~100mΩ			0.106±0.016	

Product Dimensions (continued):

Part Number	Electrode Type	Resistance Range	Component Dimensions (inches)			
			L	W	A	T
					(C) Operating Temp	
WEL0612	B	2mΩ~4mΩ	0.067±0.008	0.129±0.008	0.020±0.008	0.026±0.008
		5mΩ~100mΩ			0.016±0.008	
WEL0815	B	1mΩ	0.087±0.008	0.150±0.008	0.033±0.008	0.026±0.008
		2mΩ~100mΩ			0.024±0.008	
WEL1020	B	1mΩ	0.102±0.008	0.201±0.008	0.037±0.008	0.026±0.008
		2mΩ~100mΩ			0.026±0.008	
WEL1225	B	1mΩ	0.126±0.012	0.252±0.012	0.049±0.008	0.026±0.008
		2mΩ~100mΩ			0.024±0.008	
WEL0830	B	1mΩ	0.102±0.012	0.299±0.012	0.030±0.012	0.026±0.008
		2mΩ~100mΩ			0.027±0.012	
WEL1530	B	1mΩ	0.153±0.012	0.303±0.012	0.057±0.012	0.026±0.008
		2mΩ~100mΩ			0.027±0.012	
WEL1836	B	1mΩ	0.181±0.012	0.358±0.012	0.067±0.012	0.026±0.008
		2mΩ~100mΩ			0.031±0.012	
WEL2043	B	1mΩ	0.201±0.012	0.437±0.016	0.067±0.012	0.026±0.008
		2mΩ~100mΩ			0.035±0.012	
Part Number	Electrode Type	Resistance Range	Component Dimensions (inches)			
			L	W	A	T
					(M) Operating Temp	
WEL0603	A	5mΩ	0.067±0.008	0.035±0.008	0.020±0.008	0.026±0.008
		6mΩ~100mΩ			0.016±0.008	
WEL0805	A	3mΩ	0.083±0.008	0.053±0.008	0.026±0.008	0.026±0.008
		4mΩ~500mΩ			0.020±0.008	
WEL1206	A	3mΩ	0.130±0.008	0.067±0.008	0.047±0.012	0.026±0.008
		4mΩ~700mΩ			0.027±0.012	
WEL2010	A	2mΩ~3mΩ	0.201±0.008	0.102±0.008	0.083±0.012	0.026±0.008
		4mΩ~700mΩ			0.028±0.012	
WEL2512	A	2mΩ	0.252±0.012	0.126±0.012	0.110±0.012	0.026±0.008
		3mΩ			0.102±0.012	
		4mΩ~700mΩ			0.041±0.012	
WEL4320	A	2mΩ	0.437±0.012	0.201±0.012	0.193±0.012	0.026±0.008
		3mΩ			0.179±0.012	
		4mΩ~100mΩ			0.093±0.012	
WEL4527	A	2mΩ	0.457±0.039	0.279±0.039	0.197±0.016	0.026±0.012
		3mΩ~100mΩ			0.106±0.016	
Part Number	Electrode Type	Resistance Range	Component Dimensions (inches)			
			L	W	A	T
					(M) Operating Temp	
WEL0612	B	1mΩ	0.067±0.008	0.129±0.008	0.022±0.012	0.026±0.008
		2mΩ~100mΩ			0.016±0.008	
WEL0815	B	1mΩ~100mΩ	0.087±0.008	0.150±0.008	0.024±0.008	0.026±0.008
WEL1020	B	1mΩ~100mΩ	0.102±0.008	0.201±0.008	0.026±0.008	0.026±0.008
WEL1225	B	1mΩ~100mΩ	0.126±0.012	0.252±0.012	0.024±0.008	0.026±0.008
WEL0830	B	1mΩ~100mΩ	0.102±0.012	0.299±0.012	0.027±0.012	0.026±0.008
WEL1530	B	1mΩ~100mΩ	0.153±0.012	0.303±0.012	0.027±0.012	0.026±0.008
WEL1836	B	1mΩ~100mΩ	0.181±0.012	0.358±0.012	0.031±0.012	0.026±0.008
WEL2043	B	1mΩ~100mΩ	0.201±0.012	0.437±0.016	0.035±0.012	0.026±0.008

Product Dimensions and Recommended Land Patterns:



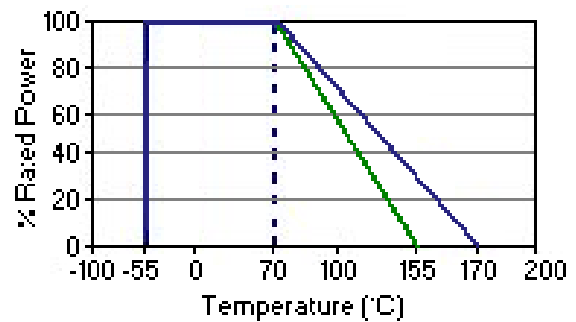
Part Number	Electrode Type	Resistance Range	Dimensions (inches)					
			P		W	D		
			(M) Code	(C) Code		(M) Code	(C) Code	
WEL0603	A	5mΩ	0.020	N/A	0.036	0.053	N/A	
		6mΩ~7mΩ	0.024			0.051		0.053
		8mΩ~12mΩ		0.020				
		13mΩ~100mΩ		0.024				
WEL0805	A	3mΩ	0.020	N/A	0.057	0.061	N/A	
		4mΩ~7mΩ	0.031	0.020		0.061		
		8mΩ~500mΩ		0.031		0.055		
WEL1206	A	3mΩ	0.024	0.024	0.072	0.083	0.083	
		4mΩ~8mΩ	0.047			0.047		0.071
		9mΩ~700mΩ						
WEL2010	A	2mΩ	0.028	0.020	0.113	0.144	0.148	
		3mΩ		0.028			0.144	
		4mΩ	0.106	0.039		0.104	0.138	
		5mΩ~6mΩ		0.055			0.130	
		7mΩ~9mΩ		0.067			0.124	
		10mΩ~700mΩ		0.106			0.104	
WEL2512	A	2mΩ	0.024	0.024	0.141	0.171	0.171	
		3mΩ	0.035	0.035		0.165	0.165	
		4mΩ	0.122	0.051		0.122	0.157	
		5mΩ~8mΩ		0.063			0.152	
		9mΩ		0.114			0.126	
		10mΩ~700mΩ		0.122			0.122	
WEL4320	A	2mΩ	0.043	0.043	0.226	0.253	0.253	
		3mΩ	0.067	0.067			0.242	0.242
		4mΩ	0.197	0.091		0.230		
		5mΩ~6mΩ		0.110		0.220		
		7mΩ~8mΩ		0.142		0.205		
		9mΩ~100mΩ	0.197	0.177		0.177		
WEL4527	A	2mΩ	0.047	0.047	0.317	0.262	0.262	
		3mΩ		0.075			0.248	
		4mΩ		0.118			0.226	
		5mΩ		0.197			0.187	
		6mΩ~100mΩ	0.205	0.205			0.183	0.183

Product Dimensions and Recommended Land Patterns (continued):

Part Number	Electrode Type	Resistance Range	Dimensions (inches)				
			P		W	D	
			(M) Operating Temp	(C) Operating Temp		(M) Operating Temp	(C) Operating Temp
WEL0508	B	1mΩ	0.024	N/A	0.091	0.043	N/A
		2mΩ~100mΩ		0.024			0.043
WEL0612	B	1mΩ	0.020	N/A	0.145	0.053	N/A
		2mΩ~4mΩ	0.024	0.020		0.051	0.053
		5mΩ~100mΩ		0.024			0.051
WEL0815	B	1mΩ	0.028	0.020	0.168	0.094	0.098
		2mΩ~100mΩ		0.028			0.094
WEL1020	B	1mΩ	0.039	0.022	0.226	0.089	0.098
		2mΩ~100mΩ		0.039			0.089
WEL1225	B	1mΩ	0.055	0.024	0.285	0.093	0.108
		2mΩ~100mΩ		0.055			0.093
WEL0830	B	1mΩ	0.037	0.035	0.340	0.090	0.091
		2mΩ~100mΩ		0.037			0.090
WEL1530	B	1mΩ	0.067	0.025	0.344	0.100	0.122
		2mΩ~100mΩ		0.067			0.100
WEL1836	B	1mΩ	0.083	0.036	0.407	0.106	0.130
		2mΩ~100mΩ		0.083			0.106
WEL2043	B	1mΩ	0.094	0.031	0.498	0.110	0.142
		2mΩ~100mΩ		0.094			0.110

Operating Temperatures and Derating Curves:

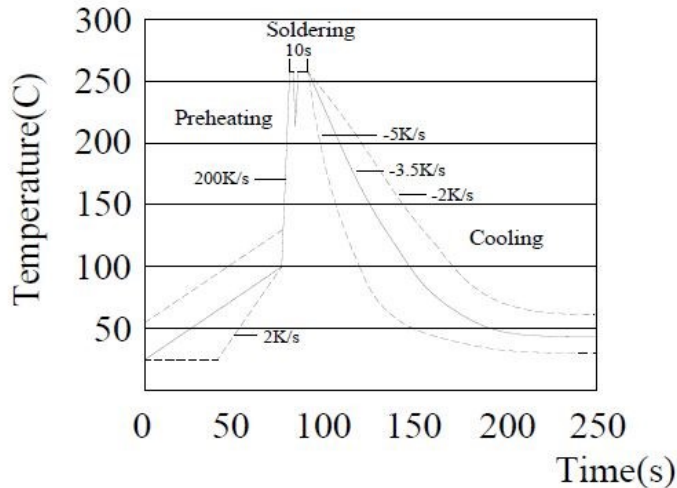
Parameter	Specification
Rated Ambient Temp	+70°C
Operating Temp Range	Type M: -55°C~155°C
	Type C: -55°C~175°C



Reliability Testing:

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

Wave Solder Temperature:



Solder Reflow Temperature Condition:

