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Product Change Notification

Product Group: DR/Thu Jun 22, 2023/PCN-DR-00005-2023-REV-0



Addition of Manufacturing Site (Las Torres)

For further information, please contact your regional Vishay office.

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Description of Change: Juarez Mexico (Las Torres facility) is being added as an additional manufacturing location. Production will continue in the existing locations in Columbus NE USA, Juarez Mexico (Bermudez #1 facility), and Beer-Sheva Israel. This will increase total production capacity to reduce lead time and support greater production flexibility.

Classification of Change: Due to anticipated market expansion and increasing sales volume, manufacturing is being expanded in Juarez, Mexico. The Las Torres location is ISO9001 and IATF16949 certified and is comparable to the Bermudez #1 location currently producing Automotive grade products, such as WSLx2512, WSLx2010, and WSLx1206.

Expected Influence on Quality/Reliability/Performance: Not Applicable

Part Numbers/Series/Families Affected: Please see materials list on the succeeding page.

Vishay Brand(S): Vishay Dale

Time Schedule:

Start Shipment Date: Mon Aug 28, 2023

Sample Availability: Samples available upon request.

Product Identification: Manufacturing location is traceable to the unique production number that is found on the reel label information using Lot Code #1 and/or Lot Code #2. Location is available upon request.

Qualification Data: lification data available by request.

This PCN is considered approved, without further notification, unless we receive specific customer concerns before Wed Aug 23, 2023 or as specified by contract.

Issued By: Bryan Yarborough, bryan.yarborough@vishay.com



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WSL25121L000FEA	WSL25121L000FEA18	WSL25121L000FEA81	WSL25121L000FEB	WSL25121L000FEK
WSL25121L000FEK18	WSL25121L000JEA	WSL25121L000JEAS	WSL25121L000JEK	WSL25121L100FEA18
WSL25121L200FEA	WSL25121L200FEA18	WSL25121L300FEA	WSL25121L400FEA18	WSL25121L500FEA
WSL25121L500FEA18	WSL25121L500FEB	WSL25121L600FEA	WSL25121L700FEA	WSL25121L700FEA18
WSL25121L900FEA	WSL25122L000FEA	WSL25122L000FEA18	WSL25122L000FEB	WSL25122L000FEB18
WSL25122L000FEB80	WSL25122L000FED	WSL25122L000JEA	WSL25122L200FEA	WSL25122L400FEA
WSL25122L500FEA	WSL25122L500FEA18	WSL25122L500FEA80	WSL25122L800FEA	WSL25122L800FEA18
WSL25123L000DEA	WSL25123L000FEA	WSL25123L000FEA18	WSL25123L000FEA62	WSL25123L000FEAS
WSL25123L000FEB	WSL25123L000FEB18	WSL25123L000FEK	WSL25123L000JEA	WSL25123L200FEA
WSL25123L300FEA	WSL25123L300FEA18	WSL25123L300JEA	WSL25123L400FEA	WSL25123L500FEA
WSL25123L500FEA18	WSL25123L600FEA	WSL25123L600FEA18	WSL25123L800FEA	WSL25124L000DEA
WSL25124L000FEA	WSL25124L000FEA18	WSL25124L000FEB	WSL25124L000FED	WSL25124L000FEK
WSL25124L200FEA	WSL25124L300FEA	WSL25124L600FEA	WSL25124L600FEA18	WSL25124L800FEA
WSL25124L800FEA18	WSL25125L000DEA	WSL25125L000DEA18	WSL25125L000FEA	WSL25125L000FEA18
WSL25125L000FEA80	WSL25125L000FEA81	WSL25125L000FEB	WSL25125L000FEK	WSL25125L000FEK18
WSL25125L000JEA	WSL25125L500FEA	WSL25126L000DEA	WSL25126L000FEA	WSL25126L000FEA18
WSL25126L000FEB	WSL25126L000FEK	WSL25126L000FEK18	WSL25126L000JEA	WSL25126L200FEA
WSL25126L500FEA	WSL25126L500FEA18	WSL25126L600FEA	WSL25126L800DEA18	WSL25126L800FEA
WSL25126L800FEA18	WSL25127L000FEA	WSL25127L000FEA18	WSL25127L000FEB	WSL25127L200FEA18
WSL25127L500DEA	WSL25127L500DEK	WSL25127L500FEA	WSL25127L500FEA18	WSL25127L500FEB
WSL25128L000FEA	WSL25128L000FEA18	WSL25128L000FEK	WSL25128L000FEK18	WSL25128L000JEA
WSL25128L200FEA	WSL25128L200FEA18	WSL25128L200JEA18	WSL25128L300FEA	WSL25128L500FEA
WSL25129L000FEA	WSL25129L000FEA18	WSL25129L000FEB	WSL25129L000FEK	WSL25129L100FEA
WSL2512E10D0EEA	WSL2512E1D00EEA	WSL2512E1D00XEA	WSL2512E200DEEA	WSL2512E4D02EEA
WSL2512E9X53EEA	WSL2512ED820EEA	WSL2512L5000FEA	WSL2512L5000FEA18	WSL2512L6000FEA18
WSL2512L7000FEA	WSL2512L7000FEA18	WSL2512L7500FEA	WSL2512L7500FEA18	WSL2512L8000FEA18
WSL2512R0100DEA	WSL2512R0100DEA18	WSL2512R0100FEA	WSL2512R0100FEA18	WSL2512R0100FEA8
WSL2512R0100FEAS	WSL2512R0100FEB	WSL2512R0100FEB18	WSL2512R0100FEC	WSL2512R0100FEK
WSL2512R0100FEK18	WSL2512R0100JEA	WSL2512R0110FEA	WSL2512R0110FEA18	WSL2512R0120DEA
WSL2512R0120FEA	WSL2512R0120FEA18	WSL2512R0120FEB	WSL2512R0120FED	WSL2512R0120FEK
WSL2512R0125FEA	WSL2512R0125FEB	WSL2512R0130FEA	WSL2512R0130FEA18	WSL2512R0130FEK
WSL2512R0140DEA18	WSL2512R0140FEA	WSL2512R0140FEA18	WSL2512R0150DEA	WSL2512R0150DEA18
WSL2512R0150FEA	WSL2512R0150FEA18	WSL2512R0150FEA8	WSL2512R0150FEB	WSL2512R0150FEK
WSL2512R0150FEK18	WSL2512R0150JEA	WSL2512R0160FEA	WSL2512R0160FEA18	WSL2512R0160FEB
WSL2512R0165FEA	WSL2512R0170FEA	WSL2512R0170FEA18	WSL2512R0180DEA18	WSL2512R0180FEA
WSL2512R0180FEA18	WSL2512R0180FEAS	WSL2512R0180FEB	WSL2512R0180FEK	WSL2512R0190FEA
WSL2512R0190FEA18	WSL2512R0200DEA	WSL2512R0200FEA	WSL2512R0200FEA18	WSL2512R0200FEAS
WSL2512R0200FEB	WSL2512R0200FED	WSL2512R0200FEK	WSL2512R0200JEA	WSL2512R0210FEA
WSL2512R0220FEA	WSL2512R0220FEA18	WSL2512R0220FEA80	WSL2512R0220FEAS	WSL2512R0220FEB
WSL2512R0220FEK	WSL2512R0220JEA	WSL2512R0230FEA	WSL2512R0230FEB	WSL2512R0240FEA
WSL2512R0240FEA18	WSL2512R0240FEB	WSL2512R0249FEA	WSL2512R0250DEA	WSL2512R0250DEA18
WSL2512R0250FEA	WSL2512R0250FEA18	WSL2512R0250FEA8	WSL2512R0250FEA80	WSL2512R0250FEB
WSL2512R0250FED	WSL2512R0250FEK	WSL2512R0255FEA	WSL2512R0260FEA18	WSL2512R0270FEA
WSL2512R0270FEA18	WSL2512R0270FEB	WSL2512R0270FEK18	WSL2512R0280FEA	WSL2512R0280FEA18
WSL2512R0300DEA	WSL2512R0300FEA	WSL2512R0300FEA18	WSL2512R0300FEB	WSL2512R0300FEC18
WSL2512R0300FED18	WSL2512R0300FEK	WSL2512R0300JEA	WSL2512R0320FEA	WSL2512R0320FEA18
WSL2512R0330DEA	WSL2512R0330FEA	WSL2512R0330FEA18	WSL2512R0330FEA8	WSL2512R0330FEB
WSL2512R0330FED	WSL2512R0330FEK	WSL2512R0330JEA	WSL2512R0332FEA	WSL2512R0350FEA
WSL2512R0350FEB	WSL2512R0360FEA	WSL2512R0390FEA	WSL2512R0390FEA18	WSL2512R0390FEB
WSL2512R0400DEA	WSL2512R0400FEA	WSL2512R0400FEA18	WSL2512R0400FEA80	WSL2512R0400FEA81
WSL2512R0400FEB	WSL2512R0400FEB18	WSL2512R0400FEB81	WSL2512R0400FEK	WSL2512R0430FEA
WSL2512R0440FEA	WSL2512R0450FEA	WSL2512R0470FEA	WSL2512R0470FEAS	WSL2512R0470FEB
WSL2512R0470JEA	WSL2512R0480FEA	WSL2512R0490FEA	WSL2512R0499FEA	WSL2512R0500DEA
WSL2512R0500FEA	WSL2512R0500FEA68	WSL2512R0500FEB	WSL2512R0500FEC	WSL2512R0500FEK
WSL2512R0500JEA	WSL2512R0510FEA	WSL2512R0510FEB	WSL2512R0560FEA	WSL2512R0560FEB
WSL2512R0580FEA80	WSL2512R0590FEA	WSL2512R0600FEA	WSL2512R0620FEA	WSL2512R0620FEB



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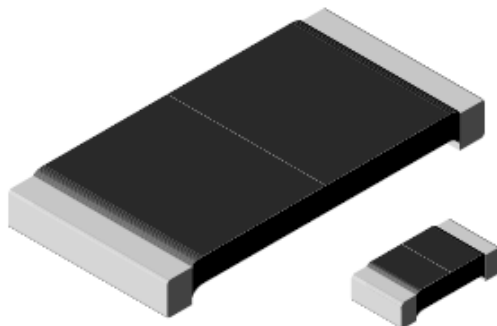
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WSL2512R0650FEA	WSL2512R0650FEK	WSL2512R0660FEA	WSL2512R0680FEA	WSL2512R0680FEB
WSL2512R0680FEK	WSL2512R0700FEA	WSL2512R0700FEAS	WSL2512R0700FEB	WSL2512R0700FEK
WSL2512R0750FEA	WSL2512R0750FEB	WSL2512R0750JEA	WSL2512R0800DEA	WSL2512R0800FEA
WSL2512R0800FEK	WSL2512R0820FEA	WSL2512R0820FEB	WSL2512R0820FEK	WSL2512R0820JEA
WSL2512R0860FEA	WSL2512R0900FEA	WSL2512R1000DEA	WSL2512R1000FEA	WSL2512R1000FEA8
WSL2512R1000FEA80	WSL2512R1000FEAS	WSL2512R1000FEB	WSL2512R1000FEB12	WSL2512R1000FED
WSL2512R1000FEK	WSL2512R1000JEA	WSL2512R1050FEB	WSL2512R1100FEA	WSL2512R1200FEA
WSL2512R1200FEA80	WSL2512R1200FEB	WSL2512R1210FEA	WSL2512R1250FEA	WSL2512R1300FEA
WSL2512R1300FEB	WSL2512R1360FEA	WSL2512R1370FEA	WSL2512R1400FEA	WSL2512R1400FEA18
WSL2512R1400FEA80	WSL2512R1400FEB	WSL2512R1500FEA	WSL2512R1500FEAS	WSL2512R1500FEB
WSL2512R1500FEK	WSL2512R1500JEA	WSL2512R1510FEA	WSL2512R1600FEA	WSL2512R1600FEK
WSL2512R1650FEA	WSL2512R1700DEA	WSL2512R1800FEA	WSL2512R1800FEB	WSL2512R2000DEA
WSL2512R2000FEA	WSL2512R2000FEA7	WSL2512R2000FEA80	WSL2512R2000FEB	WSL2512R2000FEK
WSL2512R2100FEA	WSL2512R2150FEA	WSL2512R2200DEA	WSL2512R2200FEA	WSL2512R2200FEB
WSL2512R2200FED	WSL2512R2200FEK	WSL2512R2200JEA	WSL2512R2210FEA	WSL2512R2210FEK
WSL2512R2300DEA	WSL2512R2320FEA	WSL2512R2370FEA	WSL2512R2400FEA	WSL2512R2490FEA
WSL2512R2500DEA	WSL2512R2500FEA	WSL2512R2500FEB	WSL2512R2500FEK	WSL2512R2700FEA
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WSLP25126L000DEA	WSLP25126L000FEA	WSLP25126L000FEB	WSLP25126L800FEA	WSLP25127L000DEA
WSLP25127L000FEA	WSLP25127L500FEA	WSLP25128L000FEA	WSLP25129L000FEA	WSLP2512L5000FEA
WSLP2512L6000FEA	WSLP2512L7500FEA	WSLP2512L8000FEA	WSLP2512R0100DEA	WSLP2512R0100FEA
WSLP2512R0100FEC	WSLP2512R0100FED			



Qualification Package **WSL2512**

Power Metal Strip Resistor, Low Value, Surface mount



Use the Control Buttons below to scroll through the pages

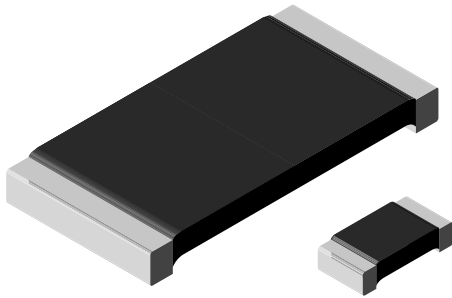
Vishay Dale Electronics

1122 23rd St. Columbus, NE, 68601, U.S.A. Phone (402) 563-3131 www.vishay.com

ONE OF THE WORLD'S LARGEST MANUFACTURERS OF PASSIVE COMPONENTS



Power Metal Strip® Resistors, Low Value (Down to 0.0005 Ω), Surface-Mount



LINKS TO ADDITIONAL RESOURCES



FEATURES

- All welded construction of the Power Metal Strip® resistors are ideal for all types of current sensing, voltage division and pulse applications
- Proprietary processing technique produces extremely low resistance values (down to 0.0005 Ω)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified ⁽¹⁾
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



Available



RoHS*

Available

HALOGEN

FREE

Available

GREEN

[5-2008]

Available

Notes

- * This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details
- Follow link to Overview of Automotive Grade Products for more details: www.vishay.com/doc?49924
- “SMD Current Sense: AEC-Q200 vs. Vishay Qualification” technical note: www.vishay.com/doc?30416
- ⁽¹⁾ Flame retardance test may not be applicable to some resistor technologies

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING $P_{70\text{ }^{\circ}\text{C}}$ W	RESISTANCE VALUE RANGE Ω ⁽²⁾		WEIGHT (typical) g/1000 pieces
			TOL. ± 0.5 %	TOL. ± 1.0 %	
WSL0603	0603	0.1	0.01 to 0.1	0.01 to 0.1	1.9
WSL0805	0805	0.125	0.005 to 0.2	0.005 to 0.2	4.8
WSL1206	1206	0.25	0.005 to 0.2	0.0005 to 0.2	16.2
WSL2010	2010	0.5	0.004 to 0.5	0.001 to 0.5	38.9
WSL2512	2512	1.0 ⁽¹⁾	0.003 to 0.5	0.0005 to 0.5	63.6
WSL2816	2816	2.0	0.003 to 0.1	0.002 to 0.1	118

Notes

- Part marking: value; tolerance; due to resistor size limitations some resistors will be marked with only the resistance value
- “Thermal Management for Surface-Mount Devices” white paper: www.vishay.com/doc?30380
- ⁽¹⁾ For values above 0.1 Ω derate linearly to 80 % rated power at 0.5 Ω
- ⁽²⁾ WSL1206 0.0005 Ω to 0.00099 Ω is only available with 2 % tolerance (G tolerance code)

GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WSL25124L000FEA (visit www.vishay.net Vishay Dale parts numbering manual for all options)

W S L 2 5 1 2 4 L 0 0 0 F E A

GLOBAL MODEL (7 digits)	RESISTANCE VALUE ⁽¹⁾ (5 digits)	TOLERANCE CODE (1 digit)	PACKAGING CODE ⁽²⁾ (2 digits)	SPECIAL ⁽³⁾ (up to 2 digits)
WSL0603 WSL0805 WSL1206 WSL2010 WSL2512 WSL2816	L = mΩ* R = decimal 5L000 = 0.005 Ω R0100 = 0.01 Ω * Use “L” for resistance values < 0.01 Ω	D = ± 0.5 % F = ± 1.0 % J = ± 5.0 %	EA = lead (Pb)-free, tape / reel EH = lead (Pb)-free, tape / reel (WSL2816) TA = tin / lead, tape / reel (R86) TG = tin / lead, tape / reel (RT1, for WSL0603 and WSL0805) TH = tin / lead, tape / reel (RJ9, WSL2816) SB = tin / lead, tape / reel for DLA drawings	(dash number) from 1 to 99 as applicable

Notes

- Per PCN-DR-00009-2022-REV-0, WSL marking will be removed effective March 1st, 2023
- ⁽¹⁾ WSL marking (www.vishay.com/doc?30327); WSL decade values (www.vishay.com/doc?30117)
- ⁽²⁾ Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes designating 1000 piece reels. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free) and TA (tin / lead), except that they have a package quantity of 1000 pieces
- ⁽³⁾ Follow link for customization capabilities: www.vishay.com/doc?48163

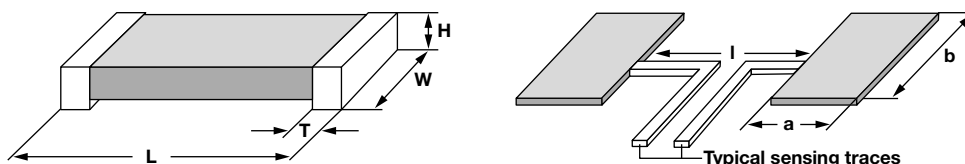


TECHNICAL SPECIFICATIONS							
PARAMETER	UNIT	WSL RESISTOR CHARACTERISTICS					
		WSL0603 ⁽¹⁾	WSL0805	WSL1206	WSL2010	WSL2512	WSL2816
Component temperature coefficient (including terminal) ⁽²⁾ TCR measured from -55 °C to +155 °C	ppm/°C	± 75 for 50 mΩ to 100 mΩ	± 75 for 7 mΩ to 500 mΩ				
		± 110 for 10 mΩ to 49 mΩ	± 110 for 5 mΩ to 6.9 mΩ				
		-	± 150 for 3 mΩ to 4.9 mΩ				
		-	± 275 for 1 mΩ to 2.9 mΩ				
		-	± 400 for 0.5 mΩ to 0.99 mΩ				
Element TCR ⁽³⁾	ppm/°C	< 20					
Operating temperature range	°C	-65 to +170					
Maximum working voltage ⁽⁴⁾	V	$(P \times R)^{1/2}$					

Notes

- "Temperature Coefficient of Resistance for Current Sensing" white paper: www.vishay.com/doc?30405
- (1) Consult factory for detailed TCR performance across temperature range associated with PCN-DR-00003-2020 for WSL0603. TCR performance is improved for +25 °C to +155 °C
- (2) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal
- (3) Element TCR - only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page
- (4) Maximum working voltage - the WSL is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive

DIMENSIONS in inches (millimeters)



Notes

- 3D models available: www.vishay.com/doc?30306
- Surface mount solder profile recommendations: www.vishay.com/doc?31052

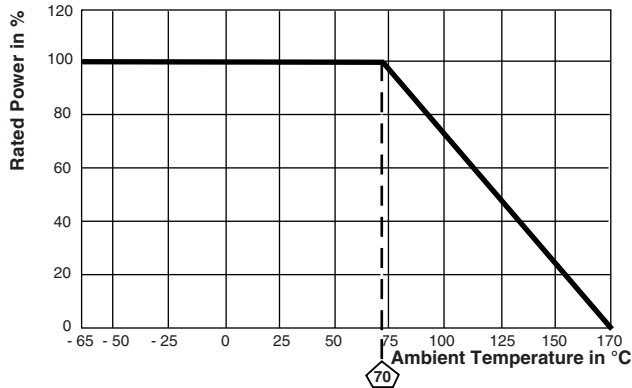
MODEL	RESISTANCE RANGE (Ω)	DIMENSIONS				SOLDER PAD DIMENSIONS		
		L	W	H	T	a	b	I
WSL0603 ⁽¹⁾	0.01 to 0.1	0.060 ± 0.010 (1.52 ± 0.254)	0.030 ± 0.010 (0.76 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.010 (0.381 ± 0.254)	0.040 (1.01)	0.040 (1.01)	0.020 (0.50)
WSL0805 ⁽²⁾	0.005 to 0.2	0.080 ± 0.010 (2.03 ± 0.254)	0.050 ± 0.010 (1.27 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.010 (0.381 ± 0.254)	0.040 (1.02)	0.050 (1.27)	0.020 (0.50)
WSL1206	0.0005 to 0.00099	0.126 ± 0.010 (3.20 ± 0.254)	0.063 ± 0.010 (1.60 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.041 ± 0.010 (1.04 ± 0.254)	0.089 (2.26)	0.076 (1.93)	0.023 (0.58)
	0.001 to 0.0019				0.025 ± 0.010 (0.635 ± 0.254)	0.086 (2.18)	0.076 (1.93)	0.029 (0.74)
	0.002 to 0.0059					0.070 (1.78)	0.076 (1.93)	0.061 (1.55)
	0.006 to 0.20					0.020 ± 0.010 (0.508 ± 0.254)	0.065 (1.65)	0.076 (1.93)
WSL2010	0.001 to 0.0069	0.200 ± 0.010 (5.08 ± 0.254)	0.100 ± 0.010 (2.54 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.058 ± 0.010 (1.47 ± 0.254)	0.093 (2.36)	0.120 (3.05)	0.055 (1.40)
	0.007 to 0.5				0.020 ± 0.010 (0.508 ± 0.254)	0.055 (1.40)	0.120 (3.05)	0.130 (3.30)
WSL2512	0.0005 to 0.00099	0.250 ± 0.010 (6.35 ± 0.254)	0.125 ± 0.010 (3.18 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.107 ± 0.010 (2.72 ± 0.254)	0.120 (3.05)	0.145 (3.68)	0.050 (1.27)
	0.001 to 0.0049				0.087 ± 0.010 (2.21 ± 0.254)			0.125 (3.18)
	0.005 to 0.0069				0.047 ± 0.010 (1.19 ± 0.254)	0.083 (2.11)		
	0.007 to 0.5				0.030 ± 0.010 (0.762 ± 0.254)	0.065 (1.65)		0.160 (4.06)
WSL2816	0.002 to 0.00399	0.280 ± 0.010 (7.1 ± 0.254)	0.165 ± 0.010 (4.2 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.098 ± 0.010 (2.49 ± 0.254)	0.135 (3.43)	0.185 (4.7)	0.060 (1.52)
	0.004 to 0.1				0.062 ± 0.010 (1.57 ± 0.254)	0.096 (2.45)		0.125 (3.20)

Notes

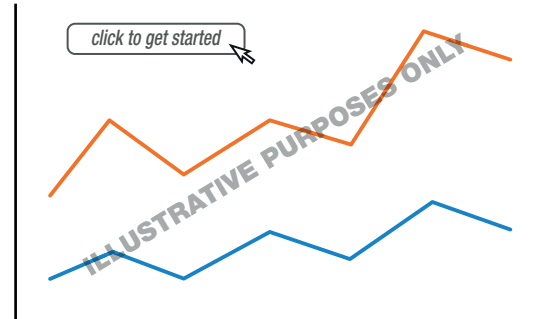
- (1) PCN-DR-00003-2020 changed terminal height for WSL0603 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction
- (2) PCN-DR-00021-2021-REV-1 changed terminal height for WSLP0805 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction



DERATING

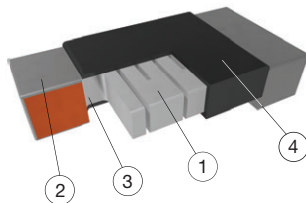


PULSE CAPABILITY



www.vishay.com/resistors/power-metal-strip-calculator

WELDED CONSTRUCTION



- 1 Resistive element: solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- 2 Plated terminal: solid copper, 100 % Sn (100 μ" min.) with 100 % Ni (20 μ" min.) under layer finish
- 3 Terminal / element weld
- 4 Silicone coating with ink print

PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	± (0.5 % + 0.0005 Ω)
Short time overload	Refer to link for short time overload performance and pulse capability; www.vishay.com/resistors/power-metal-strip-calculator/	± (0.5 % + 0.0005 Ω)
Low temperature operation	-65 °C for 24 h	± (0.5 % + 0.0005 Ω)
High temperature exposure	1000 h at + 170 °C	± (1.0 % + 0.0005 Ω)
Bias humidity	+85 °C, 85 % RH, 10 % bias, 1000 h	± (0.5 % + 0.0005 Ω)
Mechanical shock	100 g's for 6 ms, 5 pulses	± (0.5 % + 0.0005 Ω)
Vibration	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	± (0.5 % + 0.0005 Ω)
Load life	1000 h at rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.0005 Ω)
Resistance to solder heat	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± (0.5 % + 0.0005 Ω)
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± (0.5 % + 0.0005 Ω)

PACKAGING ⁽¹⁾				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSL0603	8 mm / punched paper	178 mm / 7"	5000	EA
WSL0805	8 mm / punched paper	178 mm / 7"	5000	EA
WSL1206	8 mm / embossed plastic	178 mm / 7"	4000	EA
WSL2010	12 mm / embossed plastic	178 mm / 7"	4000	EA
WSL2512	12 mm / embossed plastic	178 mm / 7"	2000	EA
WSL2816	12 mm / embossed plastic	178 mm / 7"	2000	EH

Notes

- Embossed carrier tape per EIA-481
- (1) Additional packaging details at www.vishay.com/doc?220051



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SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSL-2512 0.0005 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	-0.508	TO	-0.3
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	0.031	TO	0.1
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.224	TO	-0.1
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	-0.302	TO	0.1
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	-0.041	TO	0.0
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	-0.062	TO	0.1
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSL-2512 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.146	TO	-0.1
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		0.062	TO	0.1
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.009	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.023	TO	0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±400 ppm/°C		30	-65°C	212.40	TO	278
						170°C	124.70	TO	196
Flammability	20	UL-94	V-0		NA				
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.0760	TO	0.1
						Reading 3	-0.0560	TO	0.0
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30		-0.034	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A				

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.

SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSL-2512 0.01 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	0.02	TO	0.0
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	-0.004	TO	0.0
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.012	TO	0.0
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	-0.015	TO	0.0
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	0.004	TO	0.0
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	0.012	TO	0.0
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSL-2512 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.017	TO	0.0
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		0.002	TO	0.0
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.009	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.023	TO	0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±75 ppm/°C		30	-65°C	37.00	TO	56
Flammability	20	UL-94	V-0		NA	170°C	31.30	TO	42
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.0760	TO	0.1
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30	Reading 3	-0.0560	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A		-0.034	TO	0.0

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.

SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSL-2512 0.5 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	0.002	TO	0.0
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	-0.002	TO	0.0
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.01	TO	0.0
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	-0.022	TO	-0.0
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	0.072	TO	0.2
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	0.024	TO	0.0
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSL-2512 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.012	TO	0.0
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		-0.004	TO	0.0
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.009	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.023	TO	0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±75 ppm/°C		30	-65°C	45.10	TO	47
Flammability	20	UL-94	V-0		NA	170°C	39.40	TO	42
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.0760	TO	0.1
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30	Reading 3	-0.0560	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A		-0.034	TO	0.0

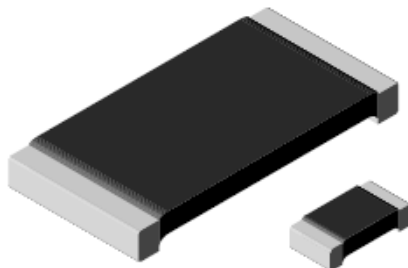
Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.



Qualification Package

WSL2512-18

Power Metal Strip Resistor, High Power, Low Value, Surface mount



Use the Control Buttons below to scroll through the pages

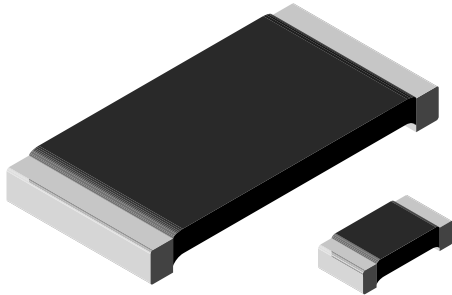
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Power Metal Strip® Resistors, High Power (2 x Standard WSL), Low Value (Down to 0.0005 Ω), Surface-Mount



LINKS TO ADDITIONAL RESOURCES



FEATURES

- All welded construction of the Power Metal Strip® resistors are ideal for all types of current sensing, voltage division and pulse applications
- Proprietary processing technique produces extremely low resistance values (down to 0.0005 Ω)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified ⁽¹⁾
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



Available



RoHS* Available



Notes

- This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details
- Follow link to Overview of Automotive Grade Products for more details: www.vishay.com/doc?49924
- "SMD Current Sense: AEC-Q200 vs. Vishay Qualification" technical note: www.vishay.com/doc?30416
- ⁽¹⁾ Flame retardance test may not be applicable to some resistor technologies

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING $P_{70^{\circ}\text{C}}$ W	RESISTANCE VALUE RANGE ⁽¹⁾ Ω		WEIGHT (typical) g/1000 pieces
			TOL. ± 0.5 %	TOL. ± 1.0 %	
WSL0603...18	0603	0.20	0.01 to 0.1	0.01 to 0.1	1.9
WSL0805...18	0805	0.25	0.005 to 0.2	0.005 to 0.2	4.8
WSL1206...18	1206	0.5	0.005 to 0.2	0.0005 to 0.2	16.2
WSL2010...18	2010	1.0	0.004 to 0.5	0.001 to 0.5	38.9
WSL2512...18	2512	2.0	0.003 to 0.04	0.0005 to 0.04	63.6

Notes

- Part marking: value; tolerance: due to resistor size limitations some resistors will be marked with only the resistance value
- "Thermal Management for Surface-Mount Devices" white paper: www.vishay.com/doc?30380
- ⁽¹⁾ WSL1206...18 0.0005 Ω to 0.00099 Ω is only available with 2 % tolerance (G tolerance code)

GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WSL25124L000FEA18 (visit www.vishay.net Vishay Dale parts numbering manual for all options)

W S L 2 5 1 2 4 L 0 0 0 F E A 1 8

GLOBAL MODEL	RESISTANCE VALUE ⁽¹⁾	TOLERANCE CODE	PACKAGING CODE ⁽²⁾	SPECIAL
WSL0603 WSL0805 WSL1206 WSL2010 WSL2512	L = mΩ * R = decimal 5L000 = 0.005 Ω R0100 = 0.01 Ω * Use "L" for resistance values < 0.01 Ω	D = ± 0.5 % F = ± 1.0 % J = ± 5.0 %	EA = lead (Pb)-free, tape / reel TA = tin / lead, tape / reel (R86) TG = tin / lead, tape / reel (RT1, for WSL0603 and WSL0805) BA = tin / lead, bulk (B43)	18 = "High power" option

Notes

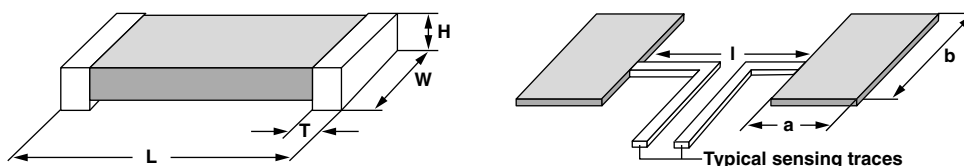
- Per PCN-DR-00009-2022-REV-0, WSL marking will be removed effective March 1st, 2023
- ⁽¹⁾ WSL marking (www.vishay.com/doc?30327); WSL decade values (www.vishay.com/doc?30117)
- ⁽²⁾ Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes that designate 1000 piece reel quantities. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free) and TA (tin / lead), except that they have a package quantity of 1000 pieces



TECHNICAL SPECIFICATIONS							
PARAMETER	UNIT	RESISTOR CHARACTERISTICS					
		WSL0603...18 ⁽¹⁾	WSL0805 ...18	WSL1206 ...18	WSL2010 ...18	WSL2512 ...18	WSL2816 ...18
Component temperature coefficient (including terminal) ⁽²⁾ TCR measured from -55 °C to +155 °C	ppm/°C	± 75 for 50 mΩ to 100 mΩ	± 75 for 7 mΩ to 500 mΩ				
		± 110 for 10 mΩ to 49 mΩ	± 110 for 5 mΩ to 6.9 mΩ				
		-	± 150 for 3 mΩ to 4.9 mΩ				
		-	± 275 for 1 mΩ to 2.9 mΩ				
		-	± 400 for 0.5 mΩ to 0.99 mΩ				
Element TCR ⁽³⁾	ppm/°C	< 20					
Operating temperature range	°C	-65 to +170					
Maximum working voltage ⁽⁴⁾	V	$(P \times R)^{1/2}$					

Notes

- "Temperature Coefficient of Resistance for Current Sensing" white paper: www.vishay.com/doc?30405
- (1) Consult factory for detailed TCR performance across temperature range associated with PCN-DR-00003-2020 for WSL0603...18. TCR performance is improved for +25 °C to +155 °C
- (2) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal
- (3) Element TCR - only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page
- (4) Maximum working voltage - the WSL is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive

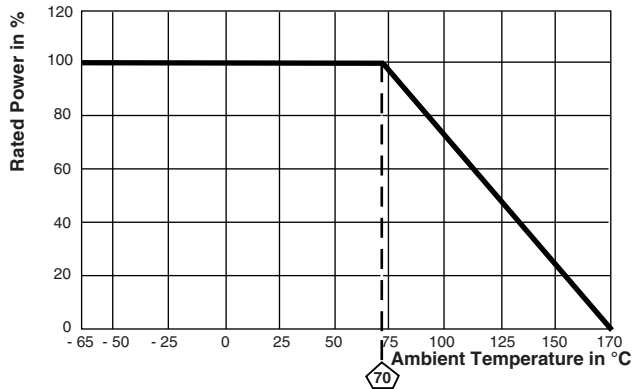
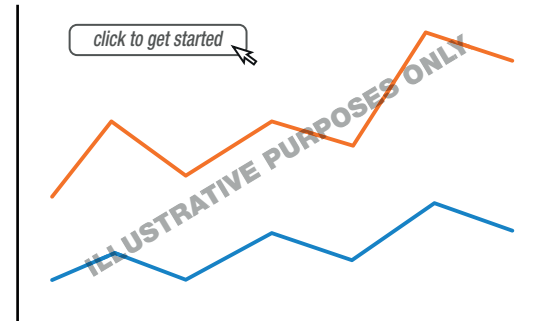
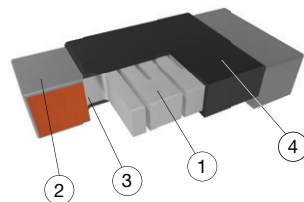
DIMENSIONS in inches (millimeters)**Notes**

- 3D models available: www.vishay.com/doc?30307
- Surface mount solder profile recommendations: www.vishay.com/doc?31052

MODEL	RESISTANCE RANGE (Ω)	DIMENSIONS				SOLDER PAD DIMENSIONS		
		L	W	H	T	a	b	I
WSL0603...18 ⁽¹⁾	0.01 to 0.1	0.060 ± 0.010 (1.52 ± 0.254)	0.030 ± 0.010 (0.76 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.005 (0.381 ± 0.127)	0.040 (1.01)	0.040 (1.01)	0.020 (0.50)
WSL0805...18	0.005 to 0.2	0.080 ± 0.010 (2.03 ± 0.254)	0.050 ± 0.010 (1.27 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.005 (0.381 ± 0.127)	0.040 (1.02)	0.050 (1.27)	0.020 (0.50)
WSL1206...18	0.0005 to 0.00099	0.126 ± 0.010 (3.20 ± 0.254)	0.063 ± 0.010 (1.60 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.041 ± 0.010 (1.04 ± 0.254)	0.089 (2.26)	0.076 (1.93)	0.023 (0.58)
	0.001 to 0.0019				0.025 ± 0.010 (0.635 ± 0.254)	0.086 (2.18)	0.076 (1.93)	0.029 (0.74)
	0.002 to 0.0059					0.070 (1.78)	0.076 (1.93)	0.061 (1.55)
	0.006 to 0.20					0.020 ± 0.010 (0.508 ± 0.254)	0.065 (1.65)	0.071 (1.80)
WSL2010...18	0.001 to 0.0069	0.200 ± 0.010 (5.08 ± 0.254)	0.100 ± 0.010 (2.54 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.058 ± 0.010 (1.47 ± 0.254)	0.093 (2.36)	0.120 (3.05)	0.055 (1.40)
	0.007 to 0.5				0.020 ± 0.010 (0.508 ± 0.254)	0.055 (1.40)	0.120 (3.05)	0.130 (3.30)
WSL2512...18	0.0005 to 0.00099	0.250 ± 0.010 (6.35 ± 0.254)	0.125 ± 0.010 (3.18 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.107 ± 0.010 (2.72 ± 0.254)	0.120 (3.05)	0.145 (3.68)	0.050 (1.27)
	0.001 to 0.0049				0.087 ± 0.010 (2.21 ± 0.254)			
	0.005 to 0.0069				0.047 ± 0.010 (1.19 ± 0.254)	0.083 (2.11)		0.125 (3.18)
	0.007 to 0.04				0.030 ± 0.010 (0.762 ± 0.254)	0.065 (1.65)		0.160 (4.06)

Note

- (1) PCN-DR-00003-2020 changed terminal height for WSL0603...18 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction

**DERATING****PULSE CAPABILITY**
www.vishay.com/resistors/power-metal-strip-calculator
WELDED CONSTRUCTION

- ① Resistive element: solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- ② Plated terminal
- ③ Terminal / element weld
- ④ Silicone coating with ink print

PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	± 0.5 % + 0.0005 Ω
Short time overload	Refer to link for short time overload performance and pulse capability; www.vishay.com/resistors/power-metal-strip-calculator/	± 0.5 % + 0.0005 Ω
Low temperature storage	-65 °C for 24 h	± 0.5 % + 0.0005 Ω
High temperature exposure	1000 h at + 170 °C	± 1.0 % + 0.0005 Ω
Bias humidity	+85 °C, 85 % RH, 10 % bias, 1000 h	± 0.5 % + 0.0005 Ω
Mechanical shock	100 g's for 6 ms, 5 pulses	± 0.5 % + 0.0005 Ω
Vibration	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	± 0.5 % + 0.0005 Ω
Load life	1000 h at rated power, + 70 °C, 1.5 h "ON", 0.5 h "OFF"	± 1.0 % + 0.0005 Ω
Resistance to solder heat	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± 0.5 % + 0.0005 Ω
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± 0.5 % + 0.0005 Ω

PACKAGING ⁽¹⁾				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES/REEL	CODE
WSL0603...18	8 mm / punched paper	178 mm / 7"	5000	EA
WSL0805...18	8 mm / punched paper	178 mm / 7"	5000	EA
WSL1206...18	8 mm / embossed plastic	178 mm / 7"	4000	EA
WSL2010...18	12 mm / embossed plastic	178 mm / 7"	4000	EA
WSL2512...18	12 mm / embossed plastic	178 mm / 7"	2000	EA

Notes

- Embossed carrier tape per EIA-481

⁽¹⁾ Additional packaging details at www.vishay.com/doc?20051



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SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSL-2512-18 0.0005 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	-0.508	TO	-0.3
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	0.031	TO	0.1
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.224	TO	-0.1
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	0.031	TO	0.1
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	-0.05	TO	0.0
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	-0.018	TO	0.2
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSL-2512-18 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.146	TO	-0.1
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		0.062	TO	0.1
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.009	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.023	TO	0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±400 ppm/°C		30	-65°C	212.40	TO	278
Flammability	20	UL-94	V-0		NA	170°C	124.70	TO	196
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.0760	TO	0.1
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30	Reading 3	-0.0560	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A		-0.034	TO	0.0

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.

SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSL-2512-18 0.01 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	0.02	TO	0.0
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	-0.004	TO	0.0
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.012	TO	0.0
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	0.027	TO	0.0
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	0.072	TO	0.1
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	0.043	TO	0
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSL-2512-18 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.017	TO	0.0
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		0.002	TO	0.0
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.009	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.023	TO	0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±75 ppm/°C		30	-65°C 170°C	37.00 31.30	TO	56 42
Flammability	20	UL-94	V-0		NA				
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2 Reading 3	0.0760 -0.0560	TO	0.1 0.0
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30		-0.034	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A				

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.

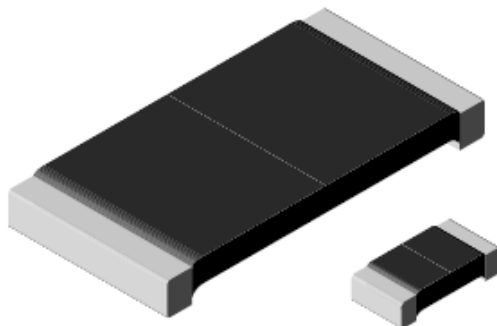
SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSL-2512-18 0.04 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	0.025	TO	0.1
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	-0.005	TO	0.2
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.005	TO	0.0
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	0.017	TO	0.0
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	0.419	TO	1.2
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	0.108	TO	0.2
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSL-2512-18 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.01	TO	0.0
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		-0.01	TO	0.0
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.009	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.023	TO	0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±75 ppm/°C		30	-65°C	43.90	TO	48
Flammability	20	UL-94	V-0		NA	170°C	37.30	TO	43
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.0760	TO	0.1
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30	Reading 3	-0.0560	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A		-0.034	TO	0.0

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.



Qualification Package **WSLP2512**

Power Metal Strip Resistor, High Power, Low Value, Surface mount



Use the Control Buttons below to scroll through the pages

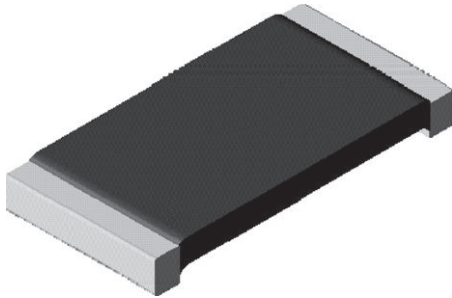
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ONE OF THE WORLD'S LARGEST MANUFACTURERS OF PASSIVE COMPONENTS



Power Metal Strip® Resistors, Very High Power (to 3 W), Low Value (Down to 0.0005 Ω), Surface-Mount



FEATURES

- Very high power to foot print size ratio (3 W in 2512, 2 W in 2010, 1 W in 1206, 0.5 W in 0805, and 0.4 W in 0603 package)
- All welded construction of the Power Metal Strip® resistors are ideal for all types of current sensing, voltage division and pulse applications
- Proprietary processing technique produces extremely low resistance values (down to 0.0005 Ω)
- Sulfur resistance by construction that is unaffected by high sulfur environments
- Very low inductance 0.5 nH to 5 nH
- Low thermal EMF (< 3 μV/°C)
- AEC-Q200 qualified ⁽¹⁾
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



LINKS TO ADDITIONAL RESOURCES



Notes

- This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details
- Follow link to Overview of Automotive Grade Products for more details: www.vishay.com/doc?49924
- "SMD Current Sense: AEC-Q200 vs. Vishay Qualification" technical note: www.vishay.com/doc?30416
- (1) Flame retardance test may not be applicable to some resistor technologies

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	SIZE	POWER RATING $P_{70^{\circ}\text{C}}$ W	RESISTANCE VALUE RANGE ⁽¹⁾		WEIGHT (typical) g/1000 pieces
			TOL. $\pm 0.5\%$	TOL. $\pm 1.0\%$	
WSLP0603	0603	0.4	0.015 to 0.1	0.01 to 0.1	1.9
WSLP0805	0805	0.5	0.005 to 0.1	0.005 to 0.1	4.8
WSLP1206	1206	1.0	0.005 to 0.05	0.0005 to 0.05	16.2
WSLP2010	2010	2.0	0.004 to 0.03	0.001 to 0.03	38.9
WSLP2512	2512	3.0	0.003 to 0.01	0.0005 to 0.01	63.6

Notes

- Part marking: value; tolerance: due to resistor size limitations some resistors will be marked with only the resistance value
- "Thermal Management for Surface-Mount Devices" white paper: www.vishay.com/doc?30380
- (1) WSLP1206 0.0005 Ω to 0.0009 Ω is only available with 2 % tolerance (G tolerance code)

GLOBAL PART NUMBER INFORMATION

Global Part Numbering Example: WSLP1206R0100FEA (visit www.vishay.net Vishay Dale parts numbering manual for all options)

W	S	L	P	1	2	0	6	R	0	1	0	0	F	E	A			
GLOBAL MODEL (8 digits)								RESISTANCE VALUE ⁽¹⁾ (5 digits)					TOLERANCE CODE (1 digit)		PACKAGING CODE ⁽²⁾ (2 digits)		SPECIAL ⁽³⁾ (up to 2 digits)	
WSLP0603 WSLP0805 WSLP1206 WSLP2010 WSLP2512								L = mΩ* R = decimal 4L000 = 0.004 Ω R0100 = 0.01 Ω					D = ± 0.5 % F = ± 1.0 % G = ± 2.0 %		EA = lead (Pb)-free, tape / reel		Reserved for future specials	
* Use "L" for resistance values < 0.01 Ω																		

Notes

- Per PCN-DR-00009-2022-REV-0, WSL marking will be removed effective March 1st, 2023
- (1) WSL marking (www.vishay.com/doc?30327); WSL decade values (www.vishay.com/doc?30117)
- (2) Packaging code: EB (lead (Pb)-free) and TB (tin / lead) are non-standard packaging codes that designate 1000 piece reel quantities. These non-standard packaging codes are identical to our standard EA (lead (Pb)-free) and TA (tin / lead), except that they have a package quantity of 1000 pieces
- (3) Follow link for customization capabilities: www.vishay.com/doc?48163

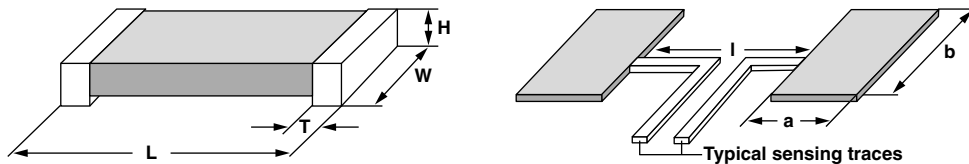


TECHNICAL SPECIFICATIONS						
PARAMETER	UNIT	RESISTOR CHARACTERISTICS				
		WSLP0603 ⁽¹⁾	WSLP0805	WSLP1206	WSLP2010	WSLP2512
Component temperature coefficient (including terminal) ⁽²⁾ TCR measured from -55 °C to +155 °C	ppm/°C	± 75 for 50 mΩ to 100 mΩ	± 75 for 7 mΩ to 500 mΩ			
		± 110 for 10 mΩ to 49 mΩ	± 110 for 5 mΩ to 6.9 mΩ			
		-	± 150 for 3 mΩ to 4.9 mΩ			
		-	± 275 for 1 mΩ to 2.9 mΩ			
		-	± 400 for 0.5 mΩ to 0.99 mΩ			
Element TCR ⁽³⁾	ppm/°C	< 20				
Operating temperature range	°C	-65 to +170				
Maximum working voltage ⁽⁴⁾	V	$(P \times R)^{1/2}$				

Notes

- "Temperature Coefficient of Resistance for Current Sensing" white paper: www.vishay.com/doc?30405
- (1) Consult factory for detailed TCR performance across temperature range associated with PCN-DR-00003-2020 for WSLP0603. TCR performance is improved for +25 °C to +155 °C
- (2) Component TCR - total TCR that includes the TCR effects of the resistor element and the copper terminal
- (3) Element TCR - only applies to the alloy used for the resistor element; refer to item 1 in the construction illustration on the following page
- (4) Maximum working voltage - the WSL is not voltage sensitive, but is limited by power / energy dissipation and is also not ESD sensitive

DIMENSIONS



Notes

- 3D models available. WSLP models: www.vishay.com/doc?30313
- Surface-mount solder profile recommendations: www.vishay.com/doc?31052

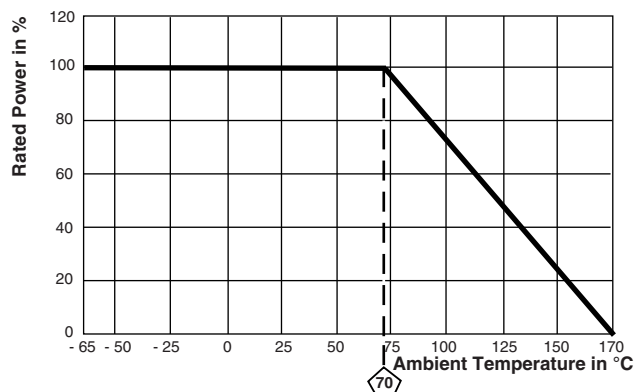
MODEL	RESISTANCE RANGE (Ω)	DIMENSIONS in inches (millimeters)				SOLDER PAD DIMENSIONS in inches (millimeters)		
		L	W	H	T	a	b	l
WSLP0603 ⁽¹⁾	0.01 to 0.1	0.060 ± 0.010 (1.52 ± 0.254)	0.030 ± 0.010 (0.76 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.010 (0.381 ± 0.254)	0.040 (1.02)	0.040 (1.02)	0.020 (0.50)
WSLP0805 ⁽²⁾	0.005 to 0.1	0.080 ± 0.010 (2.03 ± 0.254)	0.050 ± 0.010 (1.27 ± 0.254)	0.016 ± 0.005 (0.406 ± 0.127)	0.015 ± 0.010 (0.381 ± 0.254)	0.040 (1.02)	0.050 (1.27)	0.020 (0.50)
WSLP1206	0.0005 to 0.00099	0.126 ± 0.010 (3.20 ± 0.254)	0.063 ± 0.010 (1.60 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.041 ± 0.010 (1.04 ± 0.254)	0.089 (2.26)	0.076 (1.93)	0.023 (0.58)
	0.001 to 0.0019				0.025 ± 0.010 (0.635 ± 0.254)	0.086 (2.18)	0.076 (1.93)	0.029 (0.74)
	0.002 to 0.0059				0.020 ± 0.010 (0.508 ± 0.254)	0.070 (1.78)	0.076 (1.93)	0.061 (1.55)
	0.006 to 0.050				0.058 ± 0.010 (1.47 ± 0.254)	0.065 (1.65)	0.076 (1.93)	0.071 (1.80)
WSLP2010	0.001 to 0.0069	0.200 ± 0.010 (5.08 ± 0.254)	0.100 ± 0.010 (2.54 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.020 ± 0.010 (0.508 ± 0.254)	0.093 (2.36)	0.120 (3.05)	0.055 (1.40)
	0.007 to 0.03				0.055 (1.40)	0.055 (1.40)		0.130 (3.30)
WSLP2512	0.0005 to 0.00099	0.250 ± 0.010 (6.35 ± 0.254)	0.125 ± 0.010 (3.18 ± 0.254)	0.025 ± 0.010 (0.635 ± 0.254)	0.107 ± 0.010 (2.72 ± 0.254)	0.120 (3.05)	0.145 (3.68)	0.050 (1.27)
	0.001 to 0.0049				0.087 ± 0.010 (2.21 ± 0.254)			0.125 (3.18)
	0.005 to 0.0069				0.047 ± 0.010 (1.19 ± 0.254)	0.083 (2.11)		0.160 (4.06)
	0.007 to 0.01				0.030 ± 0.010 (0.762 ± 0.254)	0.065 (1.65)		

Notes

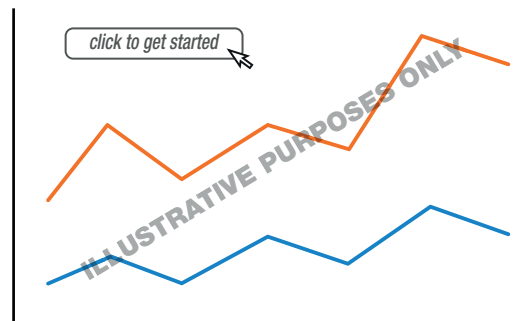
- (1) PCN-DR-00003-2020 changed terminal height for WSLP0603 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction
- (2) PCN-DR-000023-2021-REV-1 changed terminal height for WSLP0805 from 0.013" ± 0.005" for clad construction to 0.016" ± 0.005" for welded construction



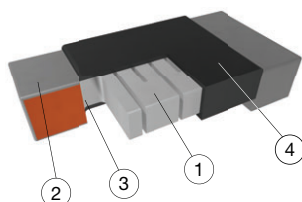
DERATING



PULSE CAPABILITY


www.vishay.com/resistors/power-metal-strip-calculator

WELDED CONSTRUCTION



- ① Resistive element: solid metal nickel-chrome or manganese-copper alloy resistive element with low TCR (< 20 ppm/°C)
- ② Terminal: solid copper, 100 % Sn (200 μ" min.) with 100 % Ni (40 μ" min.) under layer finish
- ③ Terminal / element weld
- ④ Silicone coating with ink print

PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST LIMITS
Thermal shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	± (0.5 % + 0.0005 Ω)
Short time overload	Refer to link for short time overload performance and pulse capability; www.vishay.com/resistors/power-metal-strip-calculator/	± (0.5 % + 0.0005 Ω)
Low temperature operation	-65 °C for 24 h	± (0.5 % + 0.0005 Ω)
High temperature exposure	1000 h at +170 °C	± (1.0 % + 0.0005 Ω)
Bias humidity	+85 °C, 85 % RH, 10 % bias, 1000 h	± (0.5 % + 0.0005 Ω)
Mechanical shock	100 g's for 6 ms, 5 pulses	± (0.5 % + 0.0005 Ω)
Vibration	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	± (0.5 % + 0.0005 Ω)
Load life	1000 h at 70 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.0005 Ω)
Resistance to solder heat	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± (0.5 % + 0.0005 Ω)
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7b not required	± (0.5 % + 0.0005 Ω)

PACKAGING ⁽¹⁾				
MODEL	REEL			
	TAPE WIDTH	DIAMETER	PIECES / REEL	CODE
WSLP0603	8 mm / punched paper	178 mm / 7"	5000	EA
WSLP0805	8 mm / punched paper	178 mm / 7"	5000	EA
WSLP1206	8 mm / embossed plastic	178 mm / 7"	4000	EA
WSLP2010	12 mm / embossed plastic	178 mm / 7"	4000	EA
WSLP2512	12 mm / embossed plastic	178 mm / 7"	2000	EA

Notes

- Embossed carrier tape per EIA-481

⁽¹⁾ Additional packaging details at www.vishay.com/doc?20051



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SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSLP2512 0.0005 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	-0.508	TO	-0.3
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	0.031	TO	0.1
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.224	TO	-0.1
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	-0.386	TO	0.5
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	-0.083	TO	0.0
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	-0.031	TO	0.5
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSLP2512 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.146	TO	-0.1
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		0.062	TO	0.1
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.015	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.032	TO	-0.1
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±400 ppm/°C		30	-65°C	212.40	TO	278
Flammability	20	UL-94	V-0		NA	170°C	124.70	TO	196
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.1410	TO	0.2
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30	Reading 3	-0.0430	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A		-0.012	TO	0.0

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.

SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSLP2512 0.005 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	0.052	TO	0.0
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	0	TO	0.0
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.002	TO	0.0
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	-0.004	TO	0.1
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	0.076	TO	0.4
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	0.042	TO	0.4
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSLP2512 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.014	TO	0.0
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		-0.002	TO	0.0
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.015	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.032	TO	-0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±110 ppm/°C		30	-65°C	34.40	TO	44
Flammability	20	UL-94	V-0		NA	170°C	29.40	TO	36
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.1410	TO	0.2
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30	Reading 3	-0.0430	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A		-0.012	TO	0.0

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.

SUPPLIER - Vishay-Juarez - Las Torres		PART NAME - WSLP2512 0.01 Ω Surface Mount Resistor							
NAME OF LABORATORY - Vishay Dale Electronics Test Lab									
DESCRIPTION	AEC TEST #	TEST CONDITIONS	LIMIT	OHMIC ADDER	QTY. TESTED	HOURS/ CYCLES	RANGE		
High Temperature Exposure (Storage)	3	MIL-STD-202, Method 108, 2000 Hrs @ T=170°C @ 0% power, Measurements at 24± 2 hrs	±(1.0%)	0.0005	77	1000	0.033	TO	0.1
Temperature Cycling	4	MIL-STD-202 Method 107 Condition F, -55°C to 150°C, Dwell time = 15min, 2000 Cycles.	±(0.5%)	0.0005	77	1000	-0.271	TO	0.3
Moisture Resistance	6	MIL-STD-202, Method 106, t=24 hours/cycle. Note: Steps 7a & 7b not required, 0% power, No Polo, 65°C, Measurement at 24± 2 Hrs after test.	±(0.5%)	0.0005	77		-0.003	TO	0.0
Biased Humidity	7	MIL-STD-202, Method 103, 2000 hrs 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24± 2 hrs after test.	±(0.5%)	0.0005	77	1000	0.003	TO	0.0
Operational Life	8.1	MIL-STD 202, Method 108, Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; Ta=70°C @rated power from derating curve. Measurements at 24± 2 hrs after test. Test to 2000hrs.	±(1.0%)	0.0005	24	1000	0.161	TO	0.2
Operational Life	8	MIL-STD 202, Method 108, 2,000 hr test; Condition F; 1.5 hrs "ON", 0.5 hrs "OFF"; +125°C @ rated power. Measurement 24±4 hrs. after test conclusion.	±(1.0%)	0.0005	77	1000	0.103	TO	0.1
External Visual	9	Inspect per ICP document and sections listed in general specifications section. Inspect device construction, marking and workmanship.	Per MIL-STD-883 2009.15		All Qual. Parts				
Physical Dimension	10	JESD22 Method JB-100, Verify physical dimensions to the standard WSLP2512 data sheet.	Per Datasheet		30				
Resistance to Solvents	12	MIL-STD-202, Method 215 Aqueous wash chemical- OKEM Clean or equivalent.	Marking remains legible		5				
Mechanical Shock	13	MIL-STD-202, Method 213	±(0.5%)	0.0005	30		-0.008	TO	0.0
Vibration	14	MIL-STD-202, Method 204, Condition D	±(0.5%)	0.0005	30		-0.33	TO	0.3
Resistance to Solder Heat	15	MIL-STD-202, Method 210, Condition K	±(0.5%)	0.0005	30		-0.015	TO	0.0
Thermal Shock	16	Temperatute Cycling has been substituted as it is a more severe test; refer to test 4.	NA		NA				
ESD	17	AEC-Q200-002	±(1.0%)		15		-0.032	TO	-0.0
Solderability	18.1	J-STD-002, Test B1 , Preconditioning E 4 hours @ 155°C dry heat, Pb-free Solder @ 245°C, Magnification 50X.	>95% coverage		15				
Solderability	18.2	J-STD-002, Test B (Backward Compatibility), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb Solder @ 215°C, Magnification 50X.	>95% coverage		15				
Solderability	18.3	J-STD-002, Test D (Resistance to Dissolution), Preconditioning Category E, 4 hours @ 155°C dry heat, Pb-Free Solder @ 260°C, Magnification 50X.	>95% coverage		15				
Electrical Characterization	19	RTC at -65°C & 170°C	±75 ppm/°C		30	-65°C	30.50	TO	39
Flammability	20	UL-94	V-0		NA	170°C	25.90	TO	31
Board Flex	21	AEC-Q200-005 2mm min	±(0.5%)	0.0005	30	Reading 2	0.1410	TO	0.2
Terminal Strength (SMD)	22	AEC-Q200-006 Force of 1.8 Kg for 60 seconds.	±(0.5%)	0.0005	30	Reading 3	-0.0430	TO	0.0
Flame Retardance	24	AEC-Q200-001			N/A		-0.012	TO	0.0

Note 1) Flame retardance requires the application of 9V for 1 hour on a low resistance value current sense resistor, which causes the device to be substantially overpowered. The Power Metal Strip ® tech under these conditions, resulting in temperatures that exceeds 350 °C for > 10 seconds.