

# SMD Wraparound Ultra Low Value Thin Film Resistors



With extremely low resistance and high power capabilities, these ultra low value resistors are available with solderable or weldable terminations.

## FEATURES

- NiCr + Ta<sub>2</sub>O<sub>5</sub> resistive layer
- Pre-soldered or gold terminations
- No inductance for high frequency applications
- Alumina substrates for high power handling capability
- Resistance range: 0.1 Ω to 9.99 Ω
- TCR down to 50 ppm/°C
- Power rating: Up to 2 W at + 70 °C
- Withstand AEC-Q200 humidity test
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
COMPLIANT  
**GREEN**  
(5-2008)  
Available

## Note

\* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

## STANDARD ELECTRICAL SPECIFICATIONS

MODEL	SIZE	RESISTANCE RANGE Ω	RATED POWER <i>P</i> <sub>70 °C</sub> W	LIMITING ELEMENT VOLTAGE V	TOLERANCE ± %	TEMPERATURE COEFFICIENT ± ppm/°C
L0603	0603	0.1 to 9.99	0.125	50	1, 3, 5	50, 100, 200, 300
L0805	0805	0.1 to 9.99	0.2	50	1, 3, 5	50, 100, 200, 300
L1206	1206	0.1 to 9.99	0.33	50	1, 3, 5	50, 100, 200, 300
L1505	1505	0.1 to 9.99	0.5	50	1, 3, 5	50, 100, 200, 300
L2010	2010	0.1 to 9.99	1.0	50	1, 3, 5	50, 100, 200, 300
L2512	2512	0.1 to 9.99	2.0 <sup>(1)</sup>	50	1, 3, 5	50, 100, 200, 300

## Note

<sup>(1)</sup> With special assembly care

## CLIMATIC SPECIFICATIONS

Operating temperature range	- 55 °C; + 155 °C
-----------------------------	-------------------

## MECHANICAL SPECIFICATIONS

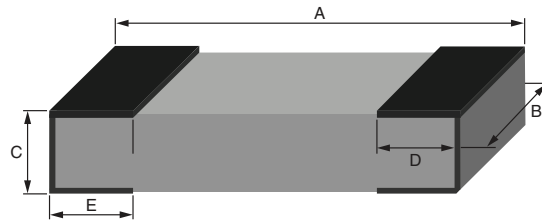
Substrate	Alumina
Technology	NiCr + Ta <sub>2</sub> O <sub>5</sub>
Coating	Silicone
Terminations	Solderable <b>B type:</b> SnPb over nickel barrier <b>N type:</b> SnAg over nickel barrier <b>G type:</b> Gold over nickel barrier

## Note

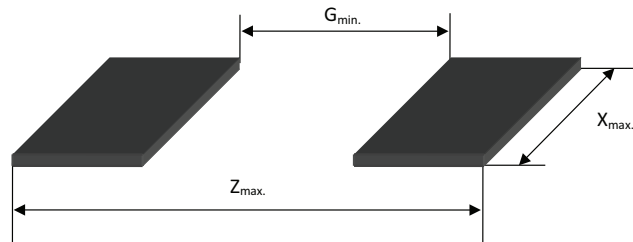
- Refer to Application Note “Guidelines for Vishay Sfernice Resistive and Inductive Components” (document number: 52029) for recommended reflow profile. Profile #3 applies.

## TOLERANCE AND TCR VS. OHMIC VALUE

OHMIC VALUE RANGE in Ω	TIGHTEST TOLERANCE (%)	BEST TCR (ppm/°C)	TERMINATIONS
0R1 < 0R25	1	300	N or B
0R25 < 0R5	1	200	N or B
0R5 < 2R5	1	100	N or B
2R5 < 9R99	1	50	N or B
0R1 < 0R25	5	300	G
0R25 < 0R5	5	200	G
0R < 1R	5	100	G
1R < 2R5	3	100	G
2R5 to 9R99	3	50	G

**DIMENSIONS** in millimeters (inches)


CASE SIZE	A	B	C	D/E
	$\pm 0.152 (\pm 0.006)$	$\pm 0.127 (\pm 0.005)$	$\pm 0.127 (+ 0.005)$	$\pm 0.127 (\pm 0.005)$
0603	1.52 (0.060)	0.85 (0.033)	0.5 (0.020)	0.38 (0.015)
0805	1.91 (0.075)	1.27 (0.050)		0.40 (0.016)
1206	3.06 (0.120)	1.60 (0.063)		0.48 (0.019)
1505	3.81 (0.150)	1.32 (0.052)		
2010	5.08 (0.200)	2.54 (0.100)		
2512	6.30 (0.248)	3.30 (0.129)		

**SUGGESTED LAND PATTERN** in millimeters (inches) (to IPC-7351A)


CASE SIZE	Z <sub>max.</sub>	G <sub>min.</sub>	X <sub>max.</sub>
0603	2.37 (0.093)	0.35 (0.014)	0.98 (0.039)
0805	2.76 (0.109)	0.74 (0.029)	1.40 (0.055)
1206	3.91 (0.154)	1.85 (0.073)	1.73 (0.068)
1505	4.66 (0.183)	2.44 (0.096)	1.45 (0.057)
2010	5.93 (0.233)	3.71 (0.146)	2.67 (0.105)
2512	7.15 (0.281)	4.93 (0.194)	3.43 (0.135)

**Option: Enlarged Terminations: 0063**

For stringent and special power dissipation requirements, the thermal resistance between the resistive layer and the solder joint can be reduced using enlarged terminations chip resistors which are soldered on large and thick copper pads acting as heat sinks (see application note: "Power Dissipation in High Precision Vishay Sfernice Chip Resistors and Arrays (P Thin Film, PRA Arrays, CHP Thick Film)": [www.vishay.com/doc?53048](http://www.vishay.com/doc?53048)).

For enlarged terminations: Please consult Vishay Sfernice.

**Option: AEC-Q200 withstanding**

Please order option 0058.

**POWER DERATING CURVE**

**PACKAGING**

Several types of packaging are proposed: waffle-pack and tape and reel

SIZE	MOQ	NUMBER OF PIECES PER PACKAGE		TAPE WIDTH	
		WAFFLE PACK 2" x 2"	TAPE AND REEL		
			MIN.		MAX.
0603	100	100	100	5000	
0805				4000	
1206					
1505		60	2000		
2010		45			
2512					

**PACKAGING RULES**
**Waffle Pack**

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered exceeds maximum quantity of a single waffle pack, the waffle packs are stacked up on the top of each other and closed by one single cover.

**To get "not stacked up" waffle pack in case of ordered quantity > maximum number of pieces per package: Please consult Vishay/Sfernice for specific ordering code.**

**Tape and Reel**

Can be filled up to maximum quantity indicated in the table here above, taking into account the minimum order quantity. When quantity ordered is between the MOQ and the maximum reel capacity, only one reel is provided.

**When several reels are needed for ordered quantity within MOQ and maximum reel capacity: Please consult Vishay Sfernice for specific ordering code.**

PERFORMANCE			
TESTS	CONDITIONS	VALUES AND DRIFT	
		MIL-R-55342 REQUIREMENTS	TYPICAL PERFORMANCES
Thermal shock	MIL-R-55342 C MIL-STD-702, method 107	± 0.25 %	± 0.02 %
Short time overload	MIL-R-55342 C PARA 3.10.4.7.5	± 0.10 %	± 0.01 %
Low temperature operation	MIL-R-55342 C PARA 3.9 and 4.7.4	± 0.25 %	± 0.01 %
Resistance to solder heat	MIL-R-55342 C PARA 3.12, 4.7.7, 4.7.1.2	± 0.25 %	± 0.04 %
Moisture resistance	MIL-R-55342 C PARA 3.13 and 4.7.8 MIL-STD-202, method 106	± 0.40 %	± 0.01 %
	AEC-Q200 85 °C/85 % RH/0.1 Pn 1000 h	-	Max. < 0.5 % + 0.05 Ω
High temperature	MIL-R-55342 C PARA 3.11 and 4.7.6	± 0.20 %	± 0.075 %
Load life	MIL-R-55342 C 2000 h Pn at 70 °C MIL-STD-202, method 108	± 0.50 %	± 0.15 %



GLOBAL PART NUMBER INFORMATION																
New Global Part Numbering: L0805K1R00FBT0099																
L	0	8	0	5	K	1	R	0	0	F	B	T	0	0	9	9
GLOBAL MODEL	SIZE	TCR	VALUE	TOLERANCE	TERMINATION	PACKAGING <sup>(1)</sup>	OPTION									
L	0603 0805 1206 1505 2010 2512	H = ± 50 ppm K = ± 100 ppm L = ± 200 ppm M = ± 300 ppm	R designated decimal point For values under 1R if 3 significant digits: Rxxx if 2 significant digits: xRxx	F = ± 1 % G = ± 2 % H = ± 3 % J = ± 5 % K = ± 10 %	B: SnPb over nickel barrier N: SnAg over nickel barrier G: Gold over nickel barrier	Blank: Waffle pack T: Tape and reel B: Lead bearing version N and G: Lead (Pb)-free/ RoHS version	Leave blank if no option									
Historical Part Number example: L 0805 K 1R00 1 % B T R0099																
L	0805	K	1R00	1 %	B	T	R0099									
MODEL	SIZE	TCR	VALUE	TOLERANCE	TERMINATION	PACKAGING <sup>(1)</sup>	OPTION									

Note

(1) For specific quantity of parts per packaging please consult Vishay Sfernice



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**