

High Precision Wraparound - Wide Ohmic Value Range Thin Film Chip Resistors



For low noise and precision applications, superior stability, low temperature coefficient of resistance, and low voltage coefficient, VISHAY SFERNICE's proven precision thin film wraparound resistors exceed requirements of MIL-PRF-55342G characteristics $Y \pm 10 \text{ ppm}/^\circ\text{C}$ (- 55 °C; + 155 °C) down to $\pm 5 \text{ ppm}/^\circ\text{C}$ (- 25 °C; + 85 °C).

FEATURES

- Load life stability at $\pm 70 \text{ }^\circ\text{C}$ for 2000 h:
0.1 % under P_n /0.05 % under P_d
- Low temperature coefficient down to **5 ppm/°C**
(- 25 °C; + 85 °C)
- Very low noise < 35 dB and voltage coefficient
< 0.01 ppm/V
- Wide resistance range: 10 Ω to 50 M Ω depending on size
- Tolerances to **$\pm 0.01 \%$**
- In lot tracking $\leq 5 \text{ ppm}/^\circ\text{C}$
- Termination: thin film technology
- Gold plated or pre-tinned terminations over nickel barrier
- Short circuits (jumpers) $r < 50 \text{ m}\Omega$, $I < 2 \text{ A}$



RoHS*
COMPLIANT

GREEN
(5-2008)**
Available

DIMENSIONS in millimeters [inches]



CASE SIZE	DIMENSION				POWER RATING mW		LIMITING ELEMENT VOLTAGE V	RESISTANCE RANGE (2)
	A	B	C	D/E	P_n (1)	P_d (1)		
	MAX. TOL. + 0.152 [+ 0.006] MIN. TOL. - 0.152 [- 0.006]	MAX. TOL. + 0.127 [+ 0.005] MIN. TOL. - 0.127 [- 0.005]	MAX. TOL. + 0.127 [+ 0.005] MIN. TOL. - 0.127 [- 0.005]	MAX. TOL. + 0.13 [+ 0.005] MIN. TOL. - 0.13 [- 0.005]				
0302	0.75 [0.029]	0.60 [0.023]	0.5 [0.02]	0.38 [0.015]	40	30	25	10 Ω - 500 k Ω
0402	1.00 [0.040]	0.60 [0.023]	0.5 [0.02]	0.38 [0.015]	63	40	50	10 Ω - 1 M Ω
0505	1.35 [0.053]	1.27 [0.050]	0.5 [0.02]	0.38 [0.015]	125	50	50	10 Ω - 2.5 M Ω
0603	1.52 [0.060]	0.75 [0.030]	0.5 [0.02]	0.38 [0.015]	125	100	75	10 Ω - 2.5 M Ω
0705/0805	1.91 [0.075]	1.27 [0.050]	0.5 [0.02]	0.38 [0.015]	200	125	150	10 Ω - 5 M Ω
1005	2.54 [0.100]	1.27 [0.050]	0.5 [0.02]	0.38 [0.015]	250	125	75	10 Ω - 5 M Ω
1206	3.06 [0.120]	1.60 [0.063]	0.5 [0.02]	0.38 [0.015]	330	250	200	10 Ω - 15 M Ω
1505	3.81 [0.150]	1.32 [0.054]	0.5 [0.02]	0.38 [0.015]	350	175	75	10 Ω - 10 M Ω
2010	5.08 [0.200]	2.54 [0.100]	0.5 [0.02]	0.38 [0.015]	1000	500	300	10 Ω - 50 M Ω

Notes

(1) P_n = nominal power - P_d = derated power intended to improve stability

(2) For ohmic range versus tolerance and TCR see detailed table page 2

* Pb containing terminations are not RoHS compliant, exemptions may apply

** Please see document "Vishay Green and Halogen-Free Definitions (5-2008)": <http://www.vishay.com/doc?99902>



High Precision Wraparound - Wide Ohmic Value Range Vishay Sfernice Thin Film Chip Resistors

ELECTRICAL SPECIFICATIONS

Resistance Range: 10 Ω to 50 MΩ

Resistance Tolerance: ± 0.1 % to ± 1 %
± 0.01 % to ± 0.05 % on Y type

Power Dissipation: **Pn:** 40 mW to 1 W
Pd: 40 mW to 500 mW
on tolerance tighter than ± 0.05 %

Temperature Coefficient: 5 ppm (0 °C; 70 °C);
10 ppm (- 55 °C; + 155 °C)

CLIMATIC SPECIFICATIONS

Operating Temp. Range: - 55 °C to + 155 °C
For temperature up to 200 °C, please consult factory

MECHANICAL SPECIFICATIONS

Substrate: Alumina

Technology: Thin film

Film: **Nickel chromium** with mineral passivation or **CrSi**

Protection: Silicone

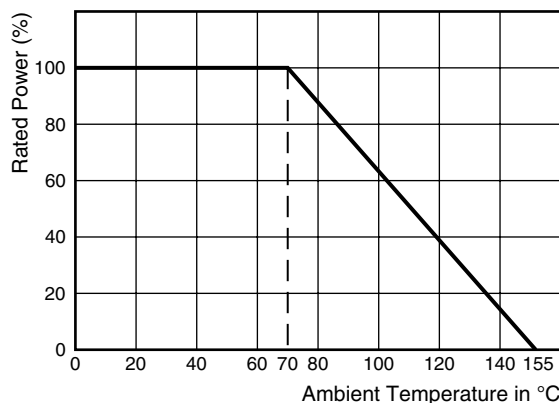
Terminations: **B type:** SnPb over nickel barrier for solder reflow
N type: SnAg over nickel barrier
G type: gold over nickel barrier for other applications

TEMPERATURE COEFFICIENT		
TCR	CODE	FILM
± 5 ppm/°C ⁽¹⁾	Z	NiCr
± 10 ppm/°C ⁽²⁾	Y	NiCr
± 25 ppm/°C	E	NiCr
± 50 ppm/°C	H	NiCr or CrSi
± 100 ppm/°C	K	NiCr or CrSi

Notes

- ⁽¹⁾ Reduced operating range: 0 °C; + 70 °C option available for (- 25 °C; + 85 °C)
- ⁽²⁾ R > 50 Ω on request for lower values

POWER DERATING CURVE



TOLERANCE AND TCR VERSUS OHMIC VALUE

SIZE	VALUE RANGE	TIGHTEST TOLERANCE %	BEST TCR (ppm/°C)
P0302	10R - 500K	0.1	50
	10R - 75K	0.1	25
	39R - 75K	0.05	25
	39R - 50K	0.05	10 (5) ⁽³⁾
	100R - 50K	0.02	10 (5) ⁽³⁾
250R - 50K	0.01	10 (5) ⁽³⁾	
P0402	10R - 1M	0.1	50
	10R - 150K	0.1	25
	39R - 150K	0.05	25
	39R - 100K	0.05	10 (5) ⁽³⁾
	100R - 100K	0.02	10 (5) ⁽³⁾
250R - 100K	0.01	10 (5) ⁽³⁾	
P0505	10R - 2M5	0.1	50
	10R - 300K	0.1	25
	39R - 300K	0.05	25
	39R - 260K	0.05	10 (5) ⁽³⁾
	100R - 260K	0.02	10 (5) ⁽³⁾
250R - 260K	0.01	10 (5) ⁽³⁾	
P0603	10R - 2M5	0.1	50
	10R - 500K	0.1	25
	39R - 500K	0.05	25
	39R - 332K	0.05	10 (5) ⁽³⁾
	100R - 332K	0.02	10 (5) ⁽³⁾
250R - 332K	0.01	10 (5) ⁽³⁾	
P0705/0805	10R - 5M	0.1	50
	10R - 750K	0.1	25
	39R - 750K	0.05	25
	39R - 511K	0.05	10 (5) ⁽³⁾
	100R - 511K	0.02	10 (5) ⁽³⁾
250R - 511K	0.01	10 (5) ⁽³⁾	
P1005	10R - 5M	0.1	50
	10R - 750K	0.1	25
	39R - 750K	0.05	25
	39R - 500K	0.05	10 (5) ⁽³⁾
	100R - 500K	0.02	10 (5) ⁽³⁾
250R - 500K	0.01	10 (5) ⁽³⁾	
P1206	10R - 15M	0.1	50
	10R - 2M	0.1	25
	39R - 2M	0.05	25
	39R - 1M5	0.05	10 (5) ⁽³⁾
	100R - 1M5	0.02	10 (5) ⁽³⁾
250R - 1M5	0.01	10 (5) ⁽³⁾	
P1505	10R - 10M	0.1	50
	10R - 1M	0.1	25
	39R - 1M	0.05	25
	39R - 750K	0.05	10 (5) ⁽³⁾
	100R - 750K	0.02	10 (5) ⁽³⁾
250R - 750K	0.01	10 (5) ⁽³⁾	
P2010	10R - 50M	0.1	50
	10R - 6M	0.1	25
	39R - 6M	0.05	25
	39R - 3M	0.05	10 (5) ⁽³⁾
	100R - 3M	0.02	10 (5) ⁽³⁾
250R - 3M	0.01	10 (5) ⁽³⁾	

Note

⁽³⁾ 5 ppm/°C in a reduced operating range (0 °C; + 70 °C). Option available for operating range (- 25 °C; + 85 °C) upon request with price adder

Vishay Sfernice High Precision Wraparound - Wide Ohmic Value Range Thin Film Chip Resistors

PACKAGING

ESD packaging available: waffle-pack, and plastic tape and reel (low conductivity).

SIZE	MOQ	NUMBER OF PIECES PER PACKAGE			TAPE WIDTH	
		WAFFLE PACK 2" x 2"	TAPE AND REEL			
			MIN.	MAX.		
0302	100	100	100	4000	8 mm	
0402						
0505						
0603						
0805						
0705						
1005						221
1206						140
1505		60	100	2000	8 mm ⁽¹⁾	
2010						

Note

⁽¹⁾ 12 mm on request

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	Ta ₂ N	DRIFTS	NiCr	
		MIL-PRF-55342G requirements	Typical performances	MIL-PRF-55342G	Typical performances
Thermal Shock	MIL-PRF-55342G MIL-STD-202 F-Method 107 F	± 0.25 %	± 0.02 %	± 0.05 %	± 0.02 %
Short Time Overload	MIL-PRF-55342G PARA 3.10.4.7.5	± 0.10 %	± 0.01 %	± 0.05 %	± 0.01 %
Low Temperature Operation	MIL-PRF-55342G PARA 3.9 and 4.7.4	± 0.25 %	± 0.01 %	± 0.05 %	± 0.01 %
Resistance to Solder Heat	MIL-PRF-55342G PARA 3.12, 4.7.7, 4.7.1.2	± 0.25 %	± 0.04 %	± 0.05 %	± 0.03 %
Moisture Resistance	MIL-PRF-55342G PARA 3.13 and 4.7.8 MIL-STD-202 F-Method 106 E	± 0.40 %	± 0.01 %	± 0.10 %	± 0.01 %
High Temperature	MIL-PRF-55342G PARA 3.11 and 4.7.6	± 0.20 %	± 0.075 %	± 0.05 %	± 0.05 %
Load Life	MIL-PRF-55342G 2000 h Pn at 70 °C MIL-STD-202 F-Method 108 A	± 0.50 %	± 0.15 %	± 0.5 %	± 0.10 % ⁽²⁾

Note

⁽²⁾ 0.05 % under Pd



High Precision Wraparound - Wide Ohmic Value Range Vishay Sfernice Thin Film Chip Resistors

GLOBAL PART NUMBER INFORMATION																
New Global Part Numbering: P0505Y1003BBT0933																
P	0	5	0	5	Y	1	0	0	3	B	B	T	0	9	3	3
GLOBAL MODEL	SIZE	TCR		VALUE		TOLERANCE		TERMINATION	PACKAGING	OPTION						
P	0302 0402 0505 0603 0705 0805 1005 1206 1505 2010	K = ± 100 ppm/°C H = ± 50 ppm/°C E = ± 25 ppm/°C Y = ± 10 ppm/°C X = Jumper Z = ± 5 ppm (0.70 °C)	The first three digits (2 digits are enough for tolerance G and J) are significant figures and the last digit specifies the number of zeros to follow, R designates decimal point 10R0 = 10 Ω 3901 = 3900 Ω 1004 = 1 MΩ 0R00 = Jumper		L = ± 0.01 % P = ± 0.02 % W = ± 0.05 % B = ± 0.1 % C = ± 0.25 % D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 % S = Special X = Jumper	B : SnPb over nickel barrier N : SnAg over nickel barrier G : Gold over nickel barrier B : Lead bearing version N and G : Lead (Pb)-free/ RoHS version	blank = Waffle pack T = Tape ⁽¹⁾	Leave blank if no option								
Historical Part Number example: P 0505 Y 1003 B B TR R0933 e2																
P	0505	Y	1003	B	B	TR	R0933	e2								
HISTORICAL MODEL	SIZE	TCR		VALUE		TOLERANCE		TERMINATION	PACKAGING	OPTION	RoHS					
P	0302 0402 0505 0603 0705 0805 1005 1206 1505 2010	K = ± 100 ppm/°C H = ± 50 ppm/°C E = ± 25 ppm/°C Y = ± 10 ppm/°C X = Jumper Z = ± 5 ppm (0.70 °C)	The first three digits (2 digits are enough for tolerance G and J) are significant figures and the last digit specifies the number of zeros to follow, R designates decimal point 10R0 = 10 Ω 3901 = 3900 Ω 1004 = 1 MΩ 0R00 = Jumper		L = ± 0.01 % P = ± 0.02 % W = ± 0.05 % B = ± 0.1 % C = ± 0.25 % D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 % S = Special X = Jumper	B : SnPb over nickel barrier N : SnAg over nickel barrier G : Gold over nickel barrier B : Lead bearing version N and G : Lead (Pb)-free/ RoHS version	blank = Waffle pack TR = Tape ⁽¹⁾	Leave blank if no option	e2: Tin/silver e4: Gold blank: SnPb							

Note

- Chips ready to be trimmed available. (P_{trim}) - Please consult Sfernice.
- (1) For specific quantity of parts per packaging please consult Sfernice



Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.