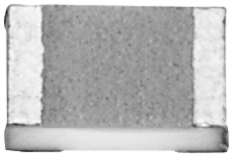
High Precision Wraparound - Wide Ohmic Value Range Thin Film Chip Resistors



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 ± 10 ppm/°C (- 55 °C; + 155 °C) down to ± 5 ppm/°C (- 25 °C; + 85 °C).

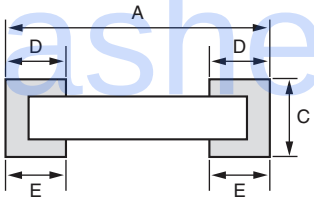
FEATURES

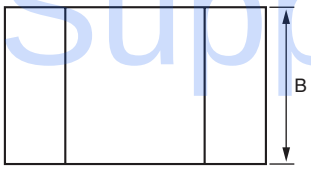
- Load life stability at ± 70 °C for 2000 h: 0.1 % under Pn/0.05 % under Pd
- Low temperature coefficient down to **5 ppm/°C** (- 25 °C; + 85 °C)
- Very low noise < 35 dB and voltage coefficient < 0.01 ppm/V
- Wide resistance range: 10 Ω to 50 MΩ depending on size
- Tolerances to **± 0.01 %**
- In lot tracking ≤ 5 ppm/°C
- Termination: thin film technology
- Gold plated or pre-tinned terminations over nickel barrier
- Short circuits (jumpers) r < 50 mR, I < 2 A

Pb-free Available
RoHS* COMPLIANT
GREEN (5-2008)** Available

DIMENSIONS in millimeters [inches]

Datasheet.Support





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

Notes

(1) P_n = nominal power - Pd = 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

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

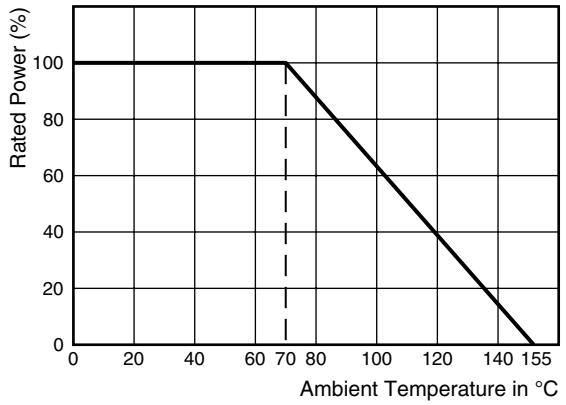
TEMPERATURE COEFFICIENT		
TCR	**CODE**	**FILM**
± 5 ppm/°C (1)	Z	NiCr
± 10 ppm/°C (2)	Y	NiCr
± 25 ppm/°C	E	NiCr
± 50 ppm/°C	H	NiCr or CrSi
± 100 ppm/°C	K	NiCr or CrSi

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

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" × 2"	TAPE AND REEL		
			MIN.	MAX.	
0302	100	100	100	4000	8 mm
0402					
0505					
0603					
0805 0705					
1005		221			
1206		140			
1505		60			
2010			100	2000	8 mm [1]

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_2N 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

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	**blank** = Waffle pack **T** = Tape (1)	Leave blank if no option

B: Lead bearing version
N and G: Lead (Pb)-free/ RoHS version

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	**blank** = Waffle pack **TR** = Tape (1)	Leave blank if no option	e2: Tin/silver e4: Gold blank: SnPb

B: Lead bearing version
N and G: Lead (Pb)-free/ RoHS version

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.

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