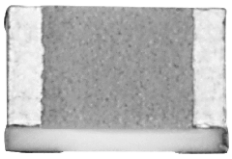
High Precision Wraparound Thin Film Chip Resistors



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).

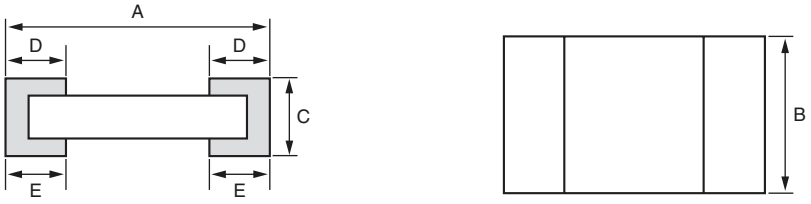
FEATURES

Pb-free Available

RoHS* COMPLIANT

- 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
- Resistance range: 10 Ω to 3 MΩ depending on size
- Extended ohmic value range (see table)
- 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

DIMENSIONS in millimeters [inches]



CASE SIZE	DIMENSION				POWER RATING mW		LIMITING ELEMENT VOLTAGE V	RESISTANCE RANGE (see below for extended Ω range)
	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)		
0402	1.00 [0.040]	0.60 [0.023]	0.5 [0.02]	0.38 [0.015]	63	40	50	10 Ω to 100 kΩ
0505	1.35 [0.053]	1.27 [0.050]	0.5 [0.02]	0.38 [0.015]	125	50	50	10 Ω to 260 kΩ
0603	1.52 [0.060]	0.75 [0.030]	0.5 [0.02]	0.38 [0.015]	125	100	75	10 Ω to 332 kΩ
0705/ 0805	1.91 [0.075]	1.27 [0.050]	0.5 [0.02]	0.38 [0.015]	200	125	150	10 Ω to 511 kΩ
1005	2.54 [0.100]	1.27 [0.050]	0.5 [0.02]	0.38 [0.015]	250	125	75	10 Ω to 500 kΩ
1206	3.06 [0.120]	1.60 [0.063]	0.5 [0.02]	0.38 [0.015]	330	250	200	10 Ω to 1.5 MΩ
1505	3.81 [0.150]	1.32 [0.054]	0.5 [0.02]	0.38 [0.015]	350	175	75	10 Ω to 500 kΩ
2010	5.08 [0.200]	2.54 [0.100]	0.5 [0.02]	0.38 [0.015]	1000	500	300	10 Ω to 3 MΩ

Note:

(1) Pn = nominal power - Pd = derated power intended to improve stability

EXTENDED OHMIC VALUE RANGE FOR HIGH PRECISION WRAPAROUND THIN FILM CHIP RESISTORS			
SIZE	TIGHTEST TOLERANCE %	EXTENDED OHMIC VALUE RANGE	BEST TCR (ppm/°C)
0402	0.1	> 100K - 1M	50
0505	0.05	260K/300K	25
	0.1	300K/2.5M	50
0603	0.05	332K/500K	25
	0.1	500K/2.5M	50
0705/ 0805	0.05	511K - 750K	25
	0.1	750K - 5M	50
1206	0.05	1.5M - 2M	25
	0.1	2M - 15M	50
2010	0.05	3M - 6M	25
	0.25	6M - 50M	50

Note:

• Using special NiCr and CrSi alloys we are able to extend the ohmic value range as indicated above.

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

ELECTRICAL SPECIFICATIONS

Resistance range: 10 Ω to 3 MΩ

Resistance tolerance: ± 0.1 % to ± 5 %
± 0.01 % to ± 0.05 % on Y type

Power dissipation: **Pn:** 50 mW to 1 W
Pd: 37 mW to 500 mW
on tolerance tighter than ± 0.05 %

Temperature coefficient: see table below

MECHANICAL SPECIFICATIONS

Substrate: Alumina

Technology: Thin film

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

Protection: Silicon

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

CLIMATIC SPECIFICATIONS

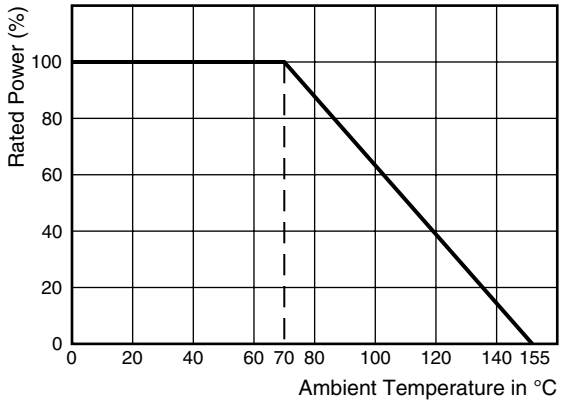
Operating temp. range: - 55 °C to + 155 °C

For temperature up to 200 °C, please consult factory

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



PACKAGING

Several types of packaging are available: tube, waffle-pack, and tape and reel.

SIZE	NUMBER OF PIECES PER PACKAGE			TAPE WIDTH
	WAFFLE PACK 2" × 2"	TAPE AND REEL		
		MIN.	MAX.	
0402	100	100	4000	8 mm
0505				
0603				
0805 0705				
1005	140			
1206				
1505	60			
2010		100	2000	8 mm (3)

Note:
(3) 12 mm on request

BEST TOL. AND TCR V RESISTANCE VALUE			
TIGHTEST TOLERANCE	**CODE**	**OHMIC VALUES**	**TCR ppm/°C**
± 0.25 %	C	R > 10 Ω	± 25
± 0.10 %	B	R > 25 Ω	± 20
± 0.05 %	W	R > 39 Ω	± 10 ± 5 (4)
± 0.02 %	P	R > 100 Ω	
± 0.01 %	L	R > 250 Ω	

Note:
(4) Reduced operating range: 0 °C; + 70 °C option available for (- 25 °C; + 85 °C)

PERFORMANCE

TESTS	CONDITIONS	DRIFTS 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 % (1)

Note:
(1) 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	**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	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	**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	Leave blank if no option	e2: tin/silver e4: gold blank: SnPb

Note:
• Chips ready to be trimmed available. (P_{trim}) - Please consult Sfernice.

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