

## 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 ( $\pm 10$  ppm/ $^{\circ}$ C).

### FEATURES

- Load Life Stability at  $\pm 70$   $^{\circ}$ C For 2000 hours: 0.1% under Pn/0.05% under Pd
- Low Temperature Coefficient down to  $\pm 10$  ppm/ $^{\circ}$ C
- Very Low Noise < 35 dB and Voltage Coefficient < 0.01 ppm/V
- Resistance Range : 10  $\Omega$  to 3 M $\Omega$  depending on size
- Extended Ohmic Value Range (see table)
- Tolerances to  $\pm 0.01$  %
- In Lot Tracking  $\leq 5$  ppm/ $^{\circ}$ C
- Termination: Thin Film Technology
- Gold Plated or Pre-tinned Terminations over Nickel Barrier
- Short Circuits (Jumpers)  $r < 50$  mR,  $I < 2$  A



**RoHS\***  
COMPLIANT

### DIMENSIONS in millimeters (inches)



CASE SIZE	DIMENSION				POWER RATING mW		LIMITING ELEMENT VOLTAGE V	RESISTANCE RANGE (SEE BELOW FOR EXTENDED $\Omega$ RANGE)
	A	B	C	D/E	Pn	Pd		
	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)				
0402	1.00 (0.040)	0.6 (0.023)	0.5 (0.02)	0.38 (0.015)	50	37	37	10 $\Omega$ to 50 k $\Omega$
0505	1.35 (0.053)	1.27 (0.050)	0.5 (0.02)	0.38 (0.015)	125	50	50	10 $\Omega$ to 260 k $\Omega$
0603	1.52 (0.060)	0.75 (0.030)	0.5 (0.02)	0.38 (0.015)	125	75	50	10 $\Omega$ to 260 k $\Omega$
0705 0805	1.91 (0.075)	1.27 (0.050)	0.5 (0.02)	0.38 (0.015)	200	100	50	10 $\Omega$ to 300 k $\Omega$
1005	2.54 (0.100)	1.27 (0.050)	0.5 (0.02)	0.38 (0.015)	250	125	75	10 $\Omega$ to 500 k $\Omega$
1206	3.06 (0.120)	1.60 (0.063)	0.5 (0.02)	0.38 (0.015)	330	150	75	10 $\Omega$ to 1 M $\Omega$
1505	3.81 (0.150)	1.32 (0.054)	0.5 (0.02)	0.38 (0.015)	350	175	75	10 $\Omega$ to 500 k $\Omega$
2010	5.08 (0.200)	2.54 (0.100)	0.5 (0.02)	0.38 (0.015)	1000	500	100	10 $\Omega$ to 3 M $\Omega$

EXTENDED OHMIC VALUE RANGE FOR HIGH PRECISION WRAPAROUND THIN FILM CHIP RESISTORS			
SIZE	TIGHTEST TOLERANCE %	EXTENDED OHMIC VALUE RANGE	BEST TCR (PPM/ $^{\circ}$ C)
0402	0.05	50 k - 100 k	25
	0.1	100 k - 1 M	50
0505	0.05	250 k - 300 k	25
	0.1	300 k - 2 M5	50
0705 0805	0.05	300 k - 500 k	25
	0.1	500 k - 5 M	50
1206	0.05	1 M - 2 M	25
	0.1	2 M - 15 M	50
2010	0.05	3 M - 6 M	25
	0.25	6 M - 50 M	50

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

## High Precision Wraparound, Thin Film Chip Resistors

**ELECTRICAL SPECIFICATIONS**

**Resistance Range:** 10  $\Omega$  to 3 M $\Omega$   
**Resistance Tolerance:**  $\pm 0.1\%$  to  $\pm 5\%$   
 $\pm 0.01\%$  to  $\pm 0.05\%$  on Y type  
**Power Dissipation:** **Pn:** 50 mW to 1 W  
**Pd:** 37 mW to 500 mW  
 on tolerance tighter than  $\pm 0.05\%$   
**Temperature Coefficient:** see table below

**MECHANICAL SPECIFICATIONS**

**Substrate:** Alumina  
**Technology:** Thin Film  
**Film:** **Nickel Chromium** with mineral passivation or **Ta<sub>2</sub>N**  
**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**

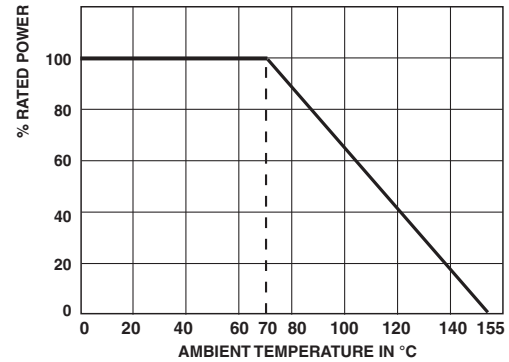
**Operating Temp. Range:** - 55  $^{\circ}$ C to + 155  $^{\circ}$ C

For temperature up to 200  $^{\circ}$ C, please consult factory

**TEMPERATURE COEFFICIENT**

TCR	CODE	FILM
$\pm 10$ ppm/ $^{\circ}$ C*	Y	Ni Cr
$\pm 25$ ppm/ $^{\circ}$ C	E	Ni Cr
$\pm 50$ ppm/ $^{\circ}$ C	H	Ni Cr or Ta <sub>2</sub> N
$\pm 100$ ppm/ $^{\circ}$ C	K	Ni Cr or Ta <sub>2</sub> N

\* R > 50  $\Omega$  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
	TUBE	WAFFLE PACK 2" X 2"	TAPE AND REEL MIN.   MAX.	
0402	500	100	100   4000	8 mm
0505				
0603				
0805				
0705				
1005	500	140	100   4000	8 mm
1206				
1505				
2010	100	60	100   2000	8 mm*

\* 12 mm on request

**BEST TOL. AND TCR V RESISTANCE VALUE**

TIGHTEST TOLERANCE	CODE	OHMIC VALUES	TCR ppm/ $^{\circ}$ C
$\pm 0.25\%$	C	R > 10 $\Omega$	$\pm 25$
$\pm 0.10\%$	B	R > 25 $\Omega$	$\pm 20$
$\pm 0.05\%$	W	R > 50 $\Omega$	$\pm 10$
$\pm 0.02\%$	P	R > 100 $\Omega$	
$\pm 0.01\%$	L	R > 250 $\Omega$	

PERFORMANCE					
TESTS	CONDITIONS	Ta <sub>2</sub> N		Ni Cr	
		MIL-PRF-55342G Requirements	Typical performances	MIL-PRF-55342G	Typical performances
Thermal Shock	MIL - PRF - 55342G MIL-Std-202 F -Method 107 F	$\pm 0.25\%$	$\pm 0.02\%$	$\pm 0.05\%$	$\pm 0.02\%$
Short Time Overload	MIL - PRF - 55342G Para 3.10.4.7.5	$\pm 0.10\%$	$\pm 0.01\%$	$\pm 0.05\%$	$\pm 0.01\%$
Low Temperature Operation	MIL - PRF - 55342G Para 3.9 & 4.7.4	$\pm 0.25\%$	$\pm 0.01\%$	$\pm 0.05\%$	$\pm 0.01\%$
Resistance To Solder Heat	MIL - PRF - 55342G Para 3.12, 4.7.7, 4.7.1.2	$\pm 0.25\%$	$\pm 0.04\%$	$\pm 0.05\%$	$\pm 0.03\%$
Moisture Resistance	MIL - PRF - 55342G Para 3.13 & 4.7.8 MIL-Std-202 F-Method 106 E	$\pm 0.40\%$	$\pm 0.01\%$	$\pm 0.10\%$	$\pm 0.01\%$
High Temperature	MIL - PRF - 55342G Para 3.11 & 4.7.6	$\pm 0.20\%$	$\pm 0.075\%$	$\pm 0.05\%$	$\pm 0.05\%$
Load Life	MIL - PRF - 55342G 2000 hours Pn at 70 $^{\circ}$ C MIL-Std-202 F -Method 108 A	$\pm 0.50\%$	$\pm 0.15\%$	$\pm 0.5\%$	$\pm 0.10\%$ *

\* 0.05 % under Pd



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**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			TOL	TERMINATION	Tape	SPECIAL							
	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 zero to follow, R designates decimal point 10 R0 = 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								

Historical Part Number example: P 0505 Y 1003 B B TR R0933

Chips ready to be trimmed available. (P<sub>trim</sub>) - Please consult Sfernice.



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