

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

### FEATURES

- Load Life Stability at  $\pm 70^\circ\text{C}$  For 2000 hours: 0.1% under  $P_n$ /0.05% under  $P_d$
- Low Temperature Coefficient down to  $\pm 10\text{ppm}/^\circ\text{C}$
- Very Low Noise and Voltage Coefficient
- Resistance Range :  $10\Omega$  to  $3\text{M}\Omega$  depending on size
- Extended Ohmic Value Range (see table)
- 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)  $r < 50\text{m}\Omega$ ,  $I < 2\text{A}$

### DIMENSIONS in millimeters (inches)



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

### EXTENDED OHMIC VALUE RANGE FOR HIGH PRECISION WRAPAROUND THIN FILM CHIP RESISTORS

SIZE	TIGHTEST TOLERANCE %	EXTENDED OHMIC VALUE RANGE	BEST TCR (PPM/ $^\circ\text{C}$ )
0402	0.05	50k - 100k	25
	0.1	100k - 1M	50
0505	0.05	250k - 300k	25
	0.1	300k - 2M5	50
0603	0.05	300k - 500k	25
	0.1	500k - 5M	50
0705	0.05	1M - 2M	25
	0.1	2M - 15M	50
0805	0.05	3M - 6M	25
	0.1	6M - 50M	50
1206	0.05		25
	0.1		50
2010	0.05		25
	0.25		50

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

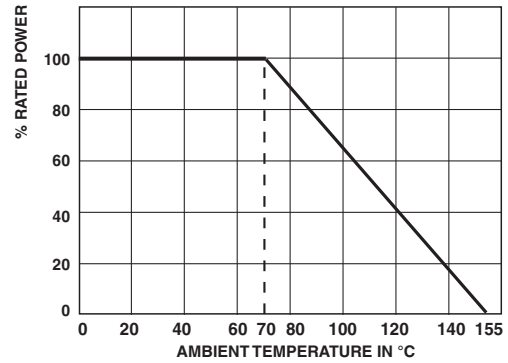
### ORDERING INFORMATION

P SERIES	0505 CASE STYLE	Y TCR	1003 OHMIC VALUE	E TOLERANCE	B TERMINATION
P = standard chip	0402	K = $\pm 100\text{ppm}/^\circ\text{C}$	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	L = $\pm 0.01\%$	B: SnPb over nickel barrier
	0505	H = $\pm 50\text{ppm}/^\circ\text{C}$	10 R0 = $10\Omega$	P = $\pm 0.02\%$	N: SnAg over nickel barrier
	0603	E = $\pm 25\text{ppm}/^\circ\text{C}$	3901 = $3900\Omega$	W = $\pm 0.05\%$	G: gold over nickel barrier
	0705	Y = $\pm 10\text{ppm}/^\circ\text{C}$	1004 = $1\text{M}\Omega$	B = $\pm 0.1\%$	
	0805	X = Jumper	0R00 = Jumper	C = $\pm 0.25\%$	
	1005			D = $\pm 0.5\%$	
	1206			F = $\pm 1\%$	
	1505			G = $\pm 2\%$	
	2010			J = $\pm 5\%$	
				S Special	
				X = Jumper	



**ELECTRICAL SPECIFICATIONS**

**Resistance Range:** 10Ω to 3MΩ  
**Resistance Tolerance:** ± 0.1% to ± 5%  
 ± 0.01% to ± 0.05% on Y type  
**Power Dissipation:** Pn: 50mW to 1W  
 Pd: 37mW to 500mW  
 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 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

**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	250 4000	8mm
0505				
0603				
0805				
0705				
1005	500	140		
1206		60		
1505	100			8mm*
2010				

\*12mm on request

**CLIMATIC SPECIFICATIONS**

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

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

**TEMPERATURE COEFFICIENT**

T.C.	CODE	FILM
± 10ppm/°C*	Y	Ni Cr
± 25ppm/°C	E	Ni Cr
± 50ppm/°C (standard)	H	Ni Cr or Ta <sub>2</sub> N
± 100ppm/°C	K	Ni Cr or Ta <sub>2</sub> N

\* R > 50Ω on request for lower values

TIGHTEST TOLERANCE	CODE	OHMIC VALUES	TCR ppm/°C
± 0.25%	C	R > 10Ω	± 25
± 0.10%	B	R > 25Ω	± 20
± 0.05%	W	R > 50Ω	± 10
± 0.02%	P	R > 100Ω	
± 0.01%	L	R > 250Ω	

PERFORMANCE					
TESTS	CONDITIONS	Ta <sub>2</sub> N		Ni Cr	
		MIL-PRF-55342G Requirements	Typical performances	MIL-PRF-55342G Requirements	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 & 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 & 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 & 4.7.6	± 0.20%	± 0.075%	± 0.05%	± 0.05%
Load Life	MIL - PRF - 55342G 2000 hours Pn at 70°C MIL-Std-202 F -Method 108 A	± 0.50%	± 0.15%	± 0.5%	± 0.10%*

\*0.05 % under Pd



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