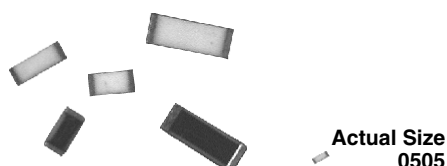


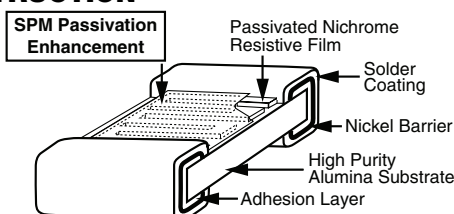
## Commercial Thin Film Resistor, Surface Mount Chip



Actual Size  
0505

For applications requiring low noise, stability, low temperature coefficient of resistance, and low voltage coefficient, all Vishay's proven precision thin film wraparound resistors will meet your exact requirements. Manufactured with the same material and processes as QPL and manufactured in a QPL facility.

### CONSTRUCTION



### FEATURES

- Moisture resistant (SPM) special passivation method
- Non-standard values available
- Pre-tinned terminations over nickel barrier (gold available)
- Very low noise and voltage coefficient ( $< -35$  dB, 0.1 ppm/V)
- Non-inductive
- Laser-trimmed tolerances to 0.02 %
- In-lot tracking less than 5 ppm/°C
- Epoxy bondable termination available
- Compliant to RoHS directive 2002/95/EC



**RoHS\***  
COMPLIANT

### TYPICAL PERFORMANCE

	ABSOLUTE
TCR	25
TOL.	0.1

### STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Passivated nichrome	-
Resistance Range	10 $\Omega$ to 6.19 M $\Omega$	-
TCR: Absolute	$\pm 10$ ppm/°C to 100 ppm/°C	-55 °C to +125 °C
Tolerance: Absolute	$\pm 0.02$ % to $\pm 5$ %	+25 °C
Stability: Absolute	$\Delta R \pm 0.02$ %	2000 h at 70 °C
Stability: Ratio	-	-
Voltage Coefficient	0.1 ppm/V (typical)	-
Working Voltage	75 V to 200 V	-
Operating Temperature Range	-55 °C to +125 °C	-
Storage Temperature Range	-55 °C to +150 °C	-
Noise	$< -35$ dB (typical)	-
Shelf Life Stability: Absolute	$\Delta R \pm 0.01$ %	1 year at +25 °C

### COMPONENT RATINGS

CASE SIZE <sup>(1)</sup>	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE ( $\Omega$ )	
			$\geq 0.1$ %	$< 0.1$ %
0402	50	75	25 to 100K	250 to 100K
0502	100	75	20 to 150K	250 to 150K
0505	150	75	20 to 301K	250 to 301K
0603	150	75	10 to 261K	250 to 261K
0705	250	100	10 to 475K	250 to 475K
0805	250	100	10 to 475K	250 to 475K
1005	250	100	10 to 649K	250 to 649K
1010	500	150	50 to 1M	250 to 1M
1206	400	200	10 to 1.5M <sup>(2)</sup>	250 to 1M
1505	400	150	10 to 1M	250 to 1M
2208	800	150	10 to 3.16M <sup>(2)</sup>	250 to 1M
2010	800	200	10 to 4.02M <sup>(2)</sup>	250 to 1M
2512	1000	200	10 to 6.19M <sup>(2)</sup>	250 to 1M

#### Notes

<sup>(1)</sup> 0705 and 0805 are the same (only use 0805 when ordering)

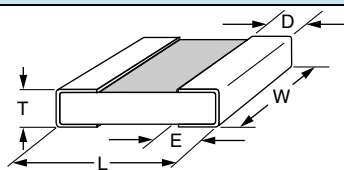
<sup>(2)</sup> Values  $> 1$  M best TCR  $\pm 25$  ppm/°C

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

# Commercial Thin Film Resistor, Surface Mount Chip

Vishay Thin Film

## DIMENSIONS in inches



CASE SIZE	TERM	L	W	T	D	E
0402	B	0.042 ± 0.008	0.022 ± 0.005	0.012 to 0.033	0.010 ± 0.005	0.010 ± 0.005
0502	B	0.055 ± 0.006	0.025 ± 0.005	0.012 to 0.033	0.010 ± 0.005	0.015 ± 0.005
0505	B	0.055 ± 0.006	0.050 ± 0.005	0.012 to 0.033	0.010 ± 0.005	0.015 ± 0.005
0603	B	0.064 ± 0.006	0.032 ± 0.005	0.020 max.	0.012 ± 0.005	0.015 ± 0.005
0705, 0805 <sup>(1)</sup>	B	0.080 ± 0.006	0.050 ± 0.005	0.015 to 0.033	0.016 ± 0.008	0.015 ± 0.005
1005	B	0.105 ± 0.007	0.050 ± 0.005	0.015 to 0.033	0.015 ± 0.005	0.015 ± 0.005
1010	B	0.105 ± 0.007	0.100 ± 0.005	0.015 to 0.033	0.015 ± 0.005	0.015 ± 0.005
1206	B	0.126 ± 0.008	0.063 ± 0.005	0.015 to 0.033	0.020 ± 0.005/- 0.010	0.020 ± 0.005/- 0.010
1505	B	0.155 ± 0.007	0.050 ± 0.005	0.015 to 0.033	0.015 ± 0.005	0.015 ± 0.005
2010	B	0.209 ± 0.009	0.098 ± 0.005	0.015 to 0.033	0.020 ± 0.005	0.020 ± 0.005
2208	B	0.230 ± 0.007	0.075 ± 0.005	0.015 to 0.033	0.020 ± 0.005	0.020 ± 0.005
2512	B	0.259 ± 0.009	0.124 ± 0.005	0.015 to 0.033	0.020 ± 0.005	0.020 ± 0.005

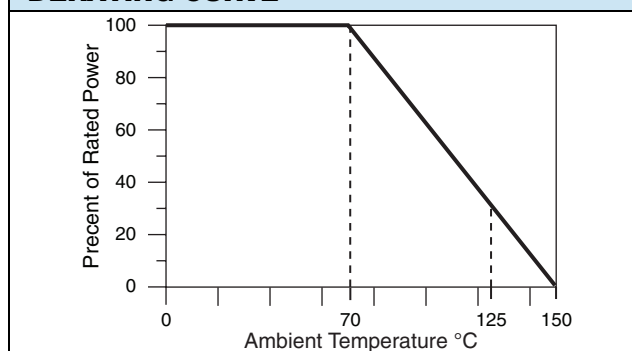
### Note

<sup>(1)</sup> 0705 and 0805 are the same (only use 0805 when ordering)

## ENVIRONMENTAL TESTS

ENVIRONMENTAL TEST	10 kΩ ΔR ± (%)	100 kΩ ΔR ± (%)
Thermal Shock	0.02	0.02
Short Time Overload	0.01	0.01
Low Temperature Operation	0.01	0.01
Resistance to Solder Heat	0.04	0.03
Moisture Resistance	0.02	0.01
High Temperature Exposure	0.03	0.06
Load Life (10 000 h, + 70 °C)	0.05	0.05
TCR	± 25 ppm/°C	± 25 ppm/°C

## DERATING CURVE



## GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: P-1206E1002BBT S

P	-	1	2	0	6	E	1	0	0	2	B	B	T	S
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

GLOBAL MODEL	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION	PACKAGING
P-	0402 0502 0505 0603 0805 1005 1010 1206 1505 2208 2010 2512	Y = ± 10 ppm/°C <sup>(2)</sup> D = ± 15 ppm/°C E = ± 25 ppm/°C H = ± 50 ppm/°C K = ± 100 ppm/°C  <b>Note</b> <sup>(2)</sup> > 250 Ω	The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. "R" designates the decimal point.  Example: 10R0 = 10 Ω 1001 = 1 kΩ 1002 = 10 kΩ	Q = ± 0.02 % <sup>(3)</sup> A = ± 0.05 % <sup>(3)</sup> B = ± 0.1 % D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 %  <b>Note</b> <sup>(3)</sup> For values ≥ 250 Ω	B = Wraparound Sn/Pb solder 63 % Sn/37 % Pb w/ nickel barrier G = Wraparound Au over Ni (gold) termination epoxy bondable RoHS compliant - e4 S = Wraparound lead (Pb)-free solder 96.5 % Sn/3.0 % Ag/0.5 % Cu RoHS compliant - e1	BS = BULK 100 min., 1 mult WS = WAFFLE 100 min., 1 mult TAPE AND REEL T0 = 100 min., 100 mult T1 = 1000 min., 1000 mult <sup>(4)</sup> T3 = 300 min., 300 mult T5 = 500 min., 500 mult TF = Full reel TS = 100 min., 1 mult  <b>Note</b> <sup>(4)</sup> Preferred packaging code

Historical Part Number Example: P0805H6801BBT (for reference purposes only)

P	0805	H	6801	B	B	T
STYLE	CASE SIZE	TCR CHARACTERISTIC	OHMIC VALUE	TOLERANCE	TERMINATION	PACKAGING



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

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 in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

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