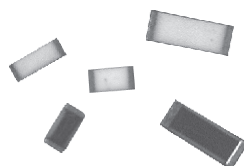


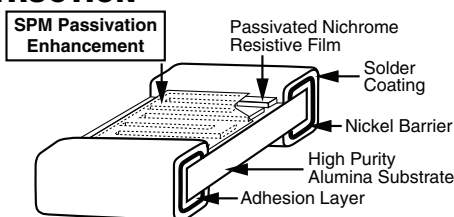
# Commercial Thin Film Resistor, Surface Mount Chip



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
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Flame resistant UL 94 V-0
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available

**HALOGEN  
FREE**  
Available

**GREEN**  
(5-2008)  
Available

## Note

\* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information/tables in this datasheet for details.

## TYPICAL PERFORMANCE

|      | ABSOLUTE |
|------|----------|
| TCR  | 25       |
| TOL. | 0.1      |

## STANDARD ELECTRICAL SPECIFICATIONS

| TEST                           | SPECIFICATIONS            | CONDITIONS        |
|--------------------------------|---------------------------|-------------------|
| Material                       | Passivated nichrome       | -                 |
| Resistance Range               | 10 Ω to 6.19 MΩ           | -                 |
| TCR: Absolute                  | ± 10 ppm/°C to 100 ppm/°C | -55 °C to +125 °C |
| Tolerance: Absolute            | ± 0.02 % to ± 5 %         | +25 °C            |
| Stability: Absolute            | ΔR ± 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 +155 °C         | -                 |
| Storage Temperature Range      | -55 °C to +155 °C         | -                 |
| Noise                          | < -35 dB (typical)        | -                 |
| Shelf Life Stability: Absolute | ΔR ± 0.01 %               | 1 year at +25 °C  |

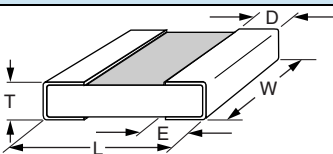
## COMPONENT RATINGS

| CASE SIZE <sup>(1)</sup> | POWER RATING<br>(mW) | WORKING VOLTAGE<br>(V) | RESISTANCE RANGE (Ω)       |             |
|--------------------------|----------------------|------------------------|----------------------------|-------------|
|                          |                      |                        | ≥ 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 > 1M best TCR ± 25 ppm/°C

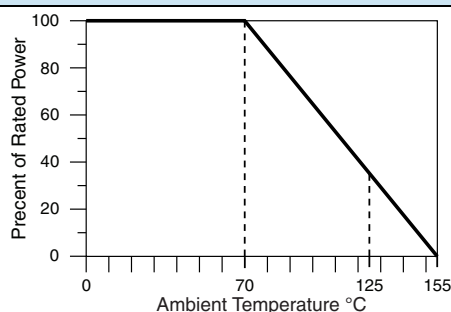
**DIMENSIONS** in inches


| 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-1206E1002BBTS

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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<br>0502<br>0505<br>0603<br>0805<br>1005<br>1010<br>1206<br>1505<br>2208<br>2010<br>2512 | Y = ± 10 ppm/°C <sup>(2)</sup><br>D = ± 15 ppm/°C<br>E = ± 25 ppm/°C<br>H = ± 50 ppm/°C<br>K = ± 100 ppm/°C<br><br><b>Note</b><br><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.<br>Example:<br>10R0 = 10 Ω<br>1001 = 1 kΩ<br>1002 = 10 kΩ | Q = ± 0.02 % <sup>(3)</sup><br>A = ± 0.05 % <sup>(3)</sup><br>B = ± 0.1 %<br>D = ± 0.5 %<br>F = ± 1 %<br>G = ± 2 %<br>J = ± 5 %<br><br><b>Note</b><br><sup>(3)</sup> For values ≥ 250 Ω | B = Wraparound Sn/Pb solder<br>63 % Sn/37 % Pb w/ nickel barrier<br>G = Wraparound Au over Ni (gold) termination<br>epoxy bondable<br>RoHS-compliant - e4<br>S = Wraparound electroplated 100 % pure matte tin<br>RoHS-compliant e3 | BULK<br>BS = 100 min., 1 mult<br>WAFFLE<br>WS = 100 min., 1 mult<br>WO = 100 min., 100 mult<br>WI = 100 min., 1 mult <sup>(4)</sup><br>WP = 100 min., 1 mult <sup>(5)</sup><br>TAPE AND REEL<br>T0 = 100 min., 100 mult<br>T1 = 1000 min., 1000 mult <sup>(6)</sup><br>T3 = 300 min., 300 mult<br>T5 = 500 min., 500 mult<br>TF = Full reel<br>TS = 100 min., 1 mult<br>TI = 100 min., 1 mult <sup>(4)</sup><br>TP = 100 min., 1 mult <sup>(5)</sup> |

**Notes**
<sup>(4)</sup> Item single lot date code

<sup>(5)</sup> Package unit single lot date code

<sup>(6)</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 |



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