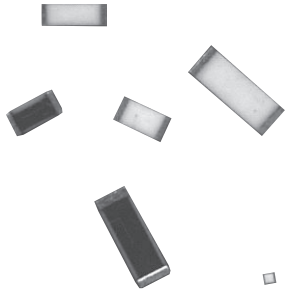
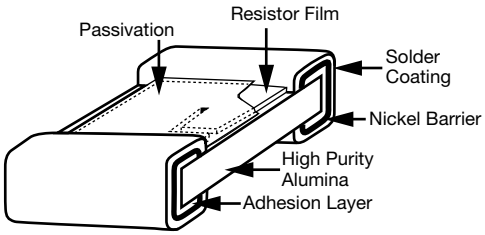
# Low Value (0.03 Ω to 10 Ω)
# Thin Film Resistor, Surface Mount Chip



Actual Size
0805

With extremely low resistances and high power capabilities, Vishay's proven and unique ultra-low value resistors can be used in your hybrid or surface-mount applications. These resistors are available with solderable or weldable terminations.

## CONSTRUCTION




## FEATURES

- Homogeneous **nickel alloy film**
- No inductance for high-frequency applications
- Alumina substrates for high power handling capability (2 W maximum power rating)
- Pre-soldered or gold terminations
- Epoxy bondable termination available
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* Available

HALOGEN FREE 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 | 300 |
| TOL. | 1.0 |

## VALUE AND MINIMUM TOLERANCE

| VALUE (Ω) | MINIMUM TOLERANCE |
|---|---|
| 0.1 | ± 2.0 % |
| 0.25 | ± 1.0 % |
| 0.5 | ± 1.0 % |
| 1.0 | ± 1.0 % |
| 2.0 | ± 1.0 % |
| 10.0 | ± 1.0 % |
| < 0.1 | 20 % |

## STANDARD ELECTRICAL SPECIFICATIONS

| TEST | SPECIFICATIONS | CONDITIONS |
|---|---|---|
| **Material** | Nickel alloy | - |
| **Resistance Range** | 0.03 Ω to 10 Ω | - |
| **TCR: Absolute** | ± 300 ppm/°C | -55 °C to +125 °C |
| **Tolerance: Absolute** | 1 % to 20 % (value dependent) | - |
| **Stability: Absolute** | - | - |
| **Stability: Ratio** | - | - |
| **Voltage Coefficient** | - | - |
| **Working Voltage** | $\sqrt{P \times R}$ | - |
| **Operating Temperature Range** | -55 °C to +155 °C | - |
| **Storage Temperature Range** | -55 °C to +155 °C | - |
| **Noise** | < -35 dB (typical) | - |
| **Shelf Life Stability: Absolute** | - | - |

## COMPONENT RATINGS

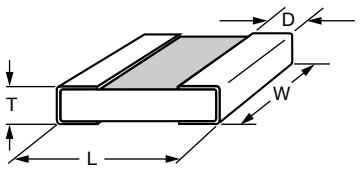
| CASE SIZE (1) | POWER RATING (mW) | RESISTANCE RANGE (Ω) |
|---|---|---|
| 0505 | 125 | 0.05 to 5.0 |
| 0508 | 400 | 0.03 to 2.0 |
| 0603 | 125 | 0.10 to 5.0 |
| 0612 | 500 | 0.05 to 2.5 |
| 0705 | 200 | 0.10 to 6.0 |
| 0805 | 200 | 0.10 to 6.0 |
| 1005 | 250 | 0.15 to 10.0 |
| 1020 | 1000 | 0.03 to 3.0 |
| 1206 | 330 | 0.10 to 10.0 |
| 1225 | 2000 | 0.03 to 2.6 |
| 1505 | 500 | 0.25 to 10.0 |
| 2010 | 1000 | 0.17 to 10.0 |
| 2512 | 2000 | 0.18 to 10.0 |

**Notes**

- Resistor values beyond ranges shall be reviewed by the factory

(1) 0705 and 0805 are the same (only use 0805 when ordering)

## DIMENSIONS in inches and millimeters




| CASE SIZE | SIZE | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | L | | W | | T | | D | |
| | INCHES | MILLIMETERS | INCHES | MILLIMETERS | INCHES | MILLIMETERS | INCHES | MILLIMETERS |
| | + 0.010/- 0.005 | + 0.25/- 0.13 | ± 0.005 | ± 0.13 | MAX. | | + 0.010/- 0.005 | + 0.25/- 0.13 |
| 0505 | 0.050 | 1.27 | 0.050 | 1.27 | 0.020 | 0.51 | 0.016 | 0.41 |
| 0508 | 0.047 | 1.19 | 0.081 | 2.06 | 0.020 | 0.51 | 0.015 | 0.38 |
| 0603 | 0.064 | 1.65 | 0.032 | 0.81 | 0.020 | 0.51 | 0.012 | 0.30 |
| 0612 | 0.063 | 1.60 | 0.126 | 3.20 | 0.020 | 0.51 | 0.015 | 0.38 |
| 0705 (1) | 0.075 | 1.91 | 0.050 | 1.27 | 0.020 | 0.51 | 0.021 | 0.53 |
| 0805 (1) | 0.075 | 1.91 | 0.050 | 1.27 | 0.020 | 0.51 | 0.021 | 0.53 |
| 1005 | 0.100 | 2.54 | 0.050 | 1.27 | 0.030 | 0.76 | 0.021 | 0.53 |
| 1020 | 0.100 | 2.54 | 0.200 | 5.08 | 0.030 | 0.76 | 0.015 | 0.38 |
| 1206 | 0.126 | 3.20 | 0.063 | 1.60 | 0.030 | 0.76 | 0.020 | 0.51 |
| 1225 | 0.126 | 3.20 | 0.252 | 5.59 | 0.020 | 0.51 | 0.020 | 0.51 |
| 1505 | 0.150 | 3.81 | 0.050 | 1.27 | 0.030 | 0.76 | 0.021 | 0.53 |
| 2010 | 0.200 | 5.08 | 0.100 | 2.54 | 0.030 | 0.76 | 0.019 | 0.48 |
| 2512 | 0.250 | 6.35 | 0.125 | 3.18 | 0.030 | 0.76 | 0.019 | 0.48 |

**Note**

(1) 0705 and 0805 are the same (only use 0805 when ordering)

## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Resistive Element** | Nickel alloy |
| **Substrate Material** | Alumina |
| **Terminals** | Pre-soldered or gold |
| **Lead (Pb)-free Option** | 96.5 % Sn, 3.0 % Ag, 0.5 % Cu |
| **Tin/Lead Option** | Sn63 |
| **Lead (Pb)-free Finish and Tin/Lead** | Hot solder dip |

## ENVIRONMENTAL TESTS

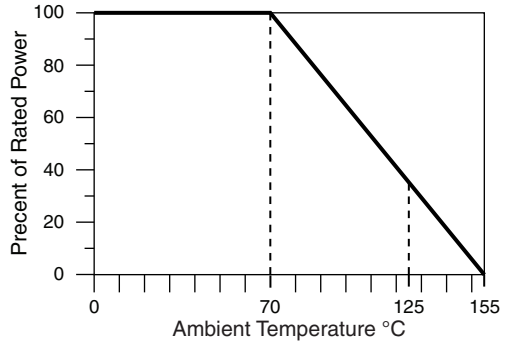
| ENVIRONMENTAL TEST | LIMITS (1) $\Delta R$ ± % | TYPICAL 1 Ω $\Delta R$ ± % |
|---|---|---|
| **STO** (2) | 0.5 | - 0.19 |
| **LTO** | 0.1 | - 0.03 |
| **RSH** | 0.5 | - 0.14 |
| **Moisture** | 0.5 | 0.07 |
| **HTE** | 1.0 | 0.02 |
| **Load Life (2000 h at +70 °C)** | 0.5 | 0.20 |
| **TCR (ppm)** | ± 300 | + 150 |

**Notes**

(1) 0.01 Ω additional allowed for measurement error

(2) Testing conducted at 2.0 x working voltage on 2512 case size all other 2.5 x

## DERATING CURVE



## GLOBAL PART NUMBER INFORMATION

**New Global Part Numbering: L-1206M1R00GBT1**

| L | - | 1 | 2 | 0 | 6 | M | 1 | R | 0 | 0 | G | B | T | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| GLOBAL MODEL | CASE SIZE | TCR CHARACTERISTICS | OHMIC VALUE | TOLERANCE | TERMINATION | PACKAGING |
|---|---|---|---|---|---|---|
| **L-** = Low value wraparound chip resistor | **0505**<br>**0508**<br>**0603**<br>**0612**<br>**0805** (1)<br>**1005**<br>**1020**<br>**1206**<br>**1225**<br>**1505**<br>**2010**<br>**2512** | **M** = 300 ppm/°C<br>**N** = 350 ppm/°C<br>**O** = 400 ppm/°C<br>**P** = 500 ppm/°C | First 3 digits are significant figures and the last digit specifies the number of zeros to follow. "R" designates the decimal point.<br><br>Example:<br>R100 = 0.1 Ω<br>1R60 = 1.6 Ω | **F** = 1 %<br>**G** = 2 %<br>**H** = 3 %<br>**J** = 5 %<br>**K** = 10 %<br>**L** = 20 % | **B** = Wraparound Sn/Pb solder 63 % Sn/37 % Pb w/ nickel barrier<br>**G** = Wraparound Au over Ni (gold) termination epoxy bondable RoHS compliant - e4<br>**W** = Top side wire bondable Au (gold) RoHS compliant - e4<br>**S** = Wraparound lead (Pb)-free solder 96.5 % Sn/3.0 % Ag/ 0.5 % Cu RoHS compliant - e1 | BULK<br>**BS** = 100 min., 1 mult<br><br>WAFFLE<br>**WS** =100 min., 1 mult<br>**WI** = 100 min., 1 mult (item single lot date code)<br><br>TAPE AND REEL<br>**T0** = 100 min., 100 mult<br>**T1** = 1000 min., 1000 mult (1)<br>**T3** = 300 min., 300 mult<br>**T5** = 500 min., 500 mult<br>**TF** = Full reel<br>**TI** = 100 min., 1 mult (item single lot date code)<br>**TP** = 100 min., 1 mult (package unit single lot date code)<br>**TS** = 100 min., 1 mult |

**Historical Part Number Example: L1206M1R00HBT (for reference purposes only)**

| L | 1206 | M | 1R00 | H | B | T |
|---|---|---|---|---|---|---|
| STYLE | CASE SIZE | TCR CHARACTERISTICS | OHMIC VALUE | TOLERANCE | TERMINATION | PACKAGING |

**Note**

(1) Preferred packaging code

# 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. 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.