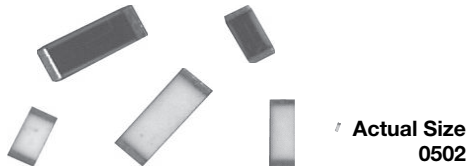
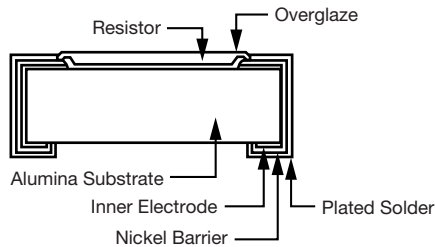


## High Reliability Thick Film Resistor, Surface-Mount Chip


 Actual Size  
0502

Utilizing proven expertise in thick and thin film resistors to satisfy your manufacturing needs, Vishay provides a high rel chip with the same reliability and stability found in military grade resistors. These chips are available in the widest range of sizes, values, and performance characteristics. And manufactured on the MIL-PRF-55342 qualified controlled production line. All product is 100 % electrical tested for tolerance and after thermal shock testing and typically meet the requirements of group A in MIL-PRF-55342 performance.

### CONSTRUCTION



### FEATURES

- High purity alumina substrate for high power dissipation (2 W max.)
- Wraparound terminations featuring a thin film adhesion layer covered with a leach resistant nickel barrier layer for +150 °C operating conditions
- High speed laser trimming for high volume requirements
- Ruthenium based cermet thick film for dependable performance
- Fired-on glass passivation
- Tape and reel packaging standard; static-free waffle pack available
- Active trim and 0 Ω chips
- Sulfur resistant (per ASTM B809-95 humid vapor test)
- 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	100
TOL.	1

### STANDARD ELECTRICAL SPECIFICATIONS

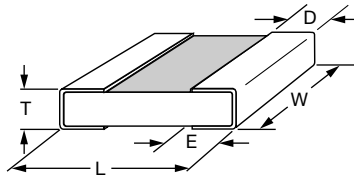
TEST	SPECIFICATIONS	CONDITIONS
Material	Ruthenium	-
Resistance Range	1 Ω to 25 MΩ	-
TCR: Absolute	± 100 ppm/°C to ± 300 ppm/°C	-55 °C to +125 °C
Tolerance: Absolute	± 0.5 % to ± 10 %	-
Stability: Absolute	ΔR ± 0.15 %	-
Stability: Ratio	-	-
Voltage Coefficient	-	-
Working Voltage	30 V to 200 V	-
Operating Temperature Range	-65 °C to +155 °C	-
Storage Temperature Range	-65 °C to +155 °C	-
Noise	< -35 dB (typical)	-
Shelf Life Stability: Absolute	-	-



COMPONENT RATINGS					
CASE SIZE <sup>(1)</sup>	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE (Ω)	TOLERANCE (± %)	TCR (± ppm/°C)
0402	100	30	1 to 10	2, 5, 10	200, 300
			10 to 25M	1, 2, 5, 10	100, 200, 300
			10 to 10M	0.5	100, 200, 300
0502	100	40	1 to 10	2, 5, 10	200, 300
			10 to 25M	1, 2, 5, 10	100, 200, 300
			10 to 10M	0.5	100, 200, 300
0504	125	40	1 to 10	2, 5, 10	200, 300
			10 to 25M	1, 2, 5, 10	100, 200, 300
			10 to 10M	0.5	100, 200, 300
0505	125	50	1 to 10	2, 5, 10	200, 300
			10 to 25M	1, 2, 5, 10	100, 200, 300
			10 to 10M	0.5	100, 200, 300
0603	150	50	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
0705	200	70	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
0805	200	70	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
1005	250	100	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
1010	500	100	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
1206	330	100	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
1505	350	125	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
2010	1000	200	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
2208	750	200	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300
2512	2000	200	1 to 6	2, 5, 10	200, 300
			6 to 25M	1, 2, 5, 10	100, 200, 300
			5.62 to 10M	0.5	100, 200, 300

Notes

- Consult factory for nominals above 25 MΩ
- (1) 0705 and 0805 are the same (only use 0805 when ordering)

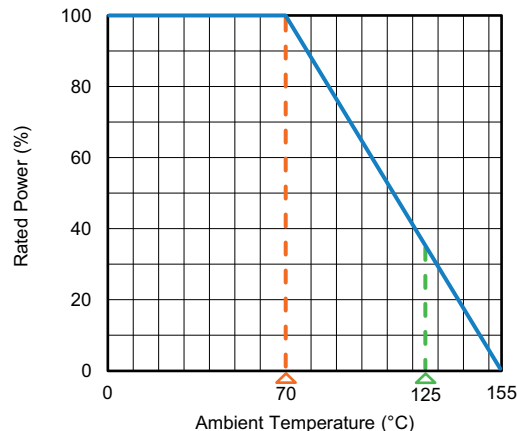
**DIMENSIONS** in inches


CASE SIZE	L	W	T	D	E
0402	0.042 ± 0.006	0.022 ± 0.005	0.010 to 0.033	0.010 ± 0.005	0.010 ± 0.005
0502	0.055 ± 0.005	0.025 ± 0.005	0.020 max.	0.010 ± 0.005	0.015 ± 0.005
0504	0.055 ± 0.005	0.040 ± 0.005	0.020 ± 0.005	0.010 ± 0.005	0.010 ± 0.005
0505	0.055 ± 0.006	0.050 ± 0.005	0.012 to 0.033	0.010 ± 0.005	0.015 ± 0.005
0603	0.064 ± 0.006	0.032 ± 0.005	0.010 to 0.033	0.012 ± 0.005	0.015 ± 0.005
0705, 0805 <sup>(1)</sup>	0.080 ± 0.006	0.050 ± 0.005	0.015 to 0.033	0.015 ± 0.005	0.015 ± 0.005
1005	0.105 ± 0.007	0.050 ± 0.005	0.015 to 0.033	0.020 ± 0.005	0.020 ± 0.005
1010	0.105 ± 0.007	0.100 ± 0.005	0.015 to 0.033	0.015 ± 0.005	0.015 ± 0.005
1206	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	0.155 ± 0.007	0.050 ± 0.005	0.015 to 0.033	0.020 ± 0.005	0.020 ± 0.005
2010	0.197 ± 0.006	0.098 ± 0.005	0.015 to 0.033	0.015 ± 0.005	0.015 ± 0.005
2208	0.230 ± 0.007	0.075 ± 0.005	0.015 to 0.033	0.015 ± 0.005	0.015 ± 0.005
2512	0.250 ± 0.006	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 Ω ΔR ± (%)	100 kΩ ΔR ± (%)
Thermal Shock	0.02	0.03
Short Term Overload	0.02	0.02
Low Temperature Operation	0.03	0.04
Resistance to Solder Heat	0.06	0.02
Moisture Resistance	0.10	0.08
High Temperature Exposure	0.02	0.02

**DERATING CURVE**




GLOBAL PART NUMBER INFORMATION														
New Global Part Numbering: M-1206K5001GBT1														
M	-	1	2	0	6	K	5	0	0	1	G	B	T	1
GLOBAL MODEL	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION	PACKAGING								
M- = high rel cermet thick film wraparound	0402 0502 0504 0505 0603 0805 1005 1010 1206 1505 2010 2208 2512	K = 100 ppm/°C L = 200 ppm/°C M = 300 ppm/°C X = 0 Ω jumper	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 1002 = 10 kΩ	D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 %  N = not trimmed	B = wraparound nickel barrier with plated tin / lead solder S = wraparound nickel barrier with plated matte tin lead (Pb)-free solder G = epoxy bondable P = wraparound palladium silver	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>(1)</sup> T3 = 300 min., 300 mult. T5 = 500 min., 500 mult. TF = full reel TP = 100 min., 1 mult. (package unit single lot date code) TS = 100 min., 1 mult. TI = 100 min., 1 mult. (sales order item single lot date code)								
Historical Part Number Example: M0505K1003JBT (for reference purposes only)														
M	0505	K	1003	J	B	T								
STYLE	CASE SIZE	TCR CHARACTERISTIC	OHMIC VALUE	TOLERANCE	TERMINATION	PACKAGING								

**Note**

<sup>(1)</sup> 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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

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.