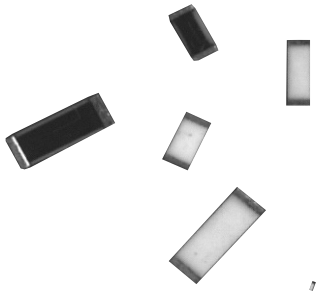
Commercial Thick Film Chip Resistors



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. High value, high stability chips are available up to 200 MΩ; consult factory.

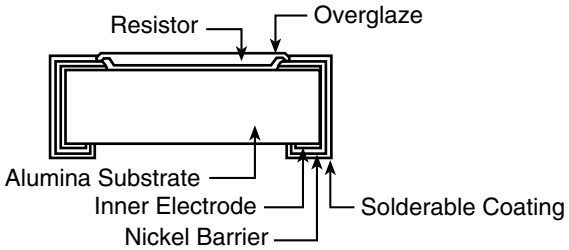
FEATURES

- Lead (Pb)-free or Sn/Pb terminations available
- 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

Pb-free Available

RoHS* COMPLIANT

CONSTRUCTION



TYPICAL PERFORMANCE

◆	ABS
TCR	100
TOL	1

STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Ruthenium	
Resistance Range	10 Ω to 25 MΩ	
Absolute TCR	± 100 ppm/°C	- 55 °C to + 125 °C
Tolerance	± 1 %, ± 2 %, ± 5 %, ± 10 %	
Stability: ΔR Ratio	0.15 %	2000 h at + 70 °C
Operating Temperature Range	- 55 °C to + 150 °C	

CASE SIZE	RATING (mW)	WORKING VOLTAGE	MINIMUM RESISTANCE (Ω)
0402	100	25	10 - 10M
0502	100	25	10 - 25M
0504	125	40	10 - 25M
0505	125	40	10 - 25M
0603	150	40	10 - 25M
0705/0805	200	50	10 - 25M
1005	250	75	10 - 25M

CASE SIZE	RATING (mW)	WORKING VOLTAGE	MINIMUM RESISTANCE (Ω)
1010	500	75	10 - 25M
1206	330	100	10 - 25M
1505	350	100	10 - 25M
2010	1000	175	10 - 25M
2208	750	150	10 - 25M
2512	2000	200	10 - 25M

Consult factory for nominals above 25 MΩ

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

For technical questions, contact: thin-film@vishay.com

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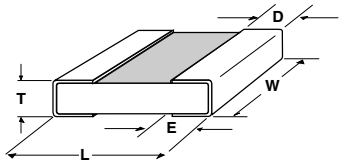
DIMENSIONS in inches

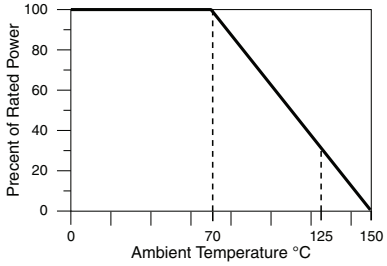


CASE SIZE	TERM	L	W	T	D	E
0402	B	0.042 ± 0.006	0.022 ± 0.005	0.010 to 0.033	0.010 ± 0.005	0.010 ± 0.005
0502	B	0.050 ± 0.006	0.025 ± 0.005	0.020 Max.	0.010 ± 0.005	0.010 ± 0.005
0504	B	0.050 ± 0.006	0.040 ± 0.005	0.020 Max.	0.010 ± 0.005	0.010 ± 0.005
0505	B	0.055 ± 0.006	0.050 ± 0.005	0.012 to 0.033	0.010 ± 0.005	0.015 ± 0.005
0603	B	0.064 ± 0.006	0.032 ± 0.005	0.010 to 0.033	0.010 ± 0.005	0.010 ± 0.005
0805[1)], 0705[1)]	B	0.080 ± 0.006	0.050 ± 0.005	0.015 to 0.033	0.015 ± 0.005	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

ENVIRONMENTAL TESTS

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 (preferred part number format)

M	-	1	2	0	6	K	5	0	0	1	G	B	T	1

GLOBAL MODEL

M- = High Rel Cermet Thick Film Wrap-around
T- = Topside > 10 Ω

CASE SIZE

0402
0502
0504
0505
0603
0805
1005
1010
1206
1505
2010
2208
2512

TCR CHARACTERISTIC

K = 100 ppm/°C
L = 200 ppm/°C
S = 250 ppm/°C
M = 300 ppm/°C
N = 500 ppm/°C
P = + 0 ppm/°C
- 350 ppm/°C
X = 0 Ω Jumper

RESISTANCE

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

TOLERANCE

F = 1 %
G = 2 %
J = 5 %
K = 10 %

N = not trimmed

TERMINATION

B = Wraparound Sn/Pb Solder
63 % Sn/37 % Pb with Nickel Barrier
E = Wraparound Electroplated Au (Gold)
Wrap around
RoHS compliant - e4
G = Wraparound Au over Ni
Gold Termination
Epoxy Solderable
RoHS compliant - e4
W = Top Side Wire Bondable
Au (Gold)
RoHS compliant - e4
S = Wraparound Lead (Pb)-free Solder
96.5 % Sn/3.0 % Ag /0.5 % Cu
RoHS compliant - e1

PACKAGING

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
T3 = 300 Min 300 Mult
T5 = 500 Min 500 Mult
TF = Full Reel
TS = 100 Min 1 Mult

Historical Part Number example: M0505K1003JBT (will continue to be accepted)

M	0505	K	1003	J	B	T
STYLE	CASE SIZE	TCR CHARACTERISTIC	OHMIC VALUE	TOLERANCE	TERMINATION	PACKAGING

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

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