

High Stability Resistor Chips Thick Film Technology



FEATURES

- Robust terminations
- Large ohmic value range 0.1 Ω to 100 M Ω
- Tight tolerance to 0.5 %
- CHP: standard passivated version for industrial, professional and military applications
- HCHP: for high frequency applications
- ESCC approvals in progress



VISHAY SFERNICE thick film resistor chips are specially designed to meet very stringent specifications in terms of reliability, stability 0.5 % at Pn at 70 °C during 2000 hrs., homogeneity, reproductibility and quality.

They conform to specifications NFC 83-240 and MIL-R-55342 D.

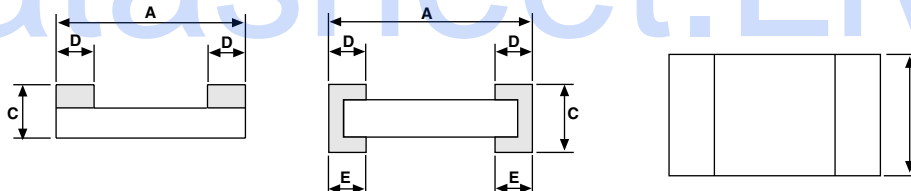
ESCC and EN 140 401 802 certifications is in progress.

Sputtered Thin Film terminations, with nickel barrier, are very convenient for high temperature operating conditions. They can withstand thousands of very severe thermal shocks.

B (W/A), N (W/A) and F (one face) types are for solder reflow assembly.

G (W/A) and W (one face) types are for wire bonding, gluing and even high temperature solder reflow.

DIMENSIONS in millimeters (inches)



| CASE SIZE | DIMENSIONS | | | | POWER RATING mW Pn | LIMITING ELEMENT VOLTAGE V | MAXIMUM ¹⁾ RESISTANCE M Ω | UNIT WEIGHT IN mG |
|--------------|--|--|--|--|--------------------------|-------------------------------|--|-------------------------|
| | A | B | C | D/E | | | | |
| | MAX. TOL. + 0.152 (0.006) MIN. TOL. - 0.152 (- 0.006) | MAX. TOL. + 0.127 (0.005) MIN. TOL. - 0.127 (- 0.005) | MAX. TOL. + 0.127 (0.005) MIN. TOL. - 0.127 (- 0.005) | MAX. TOL. + 0.13 (0.005) MIN. TOL. - 0.13 (- 0.005) | | | | |
| 0502 | 1.27 (0.05) | 0.6 (0.023) | 0.5 (0.02) | 0.38 (0.015) | 50 | 50 | 25 | 1 |
| 0505 | 1.27 (0.05) | 1.27 (0.050) | 0.5 (0.02) | 0.38 (0.015) | 125 | 50 | 10 | 3 |
| 0603 | 1.52 (0.080) | 0.85 (0.033) | 0.5 (0.02) | 0.38 (0.015) | 125 | 50 | 25 | 2 |
| 0705 0805 | 1.91 (0.075) | 1.27 (0.050) | 0.5 (0.02) | 0.38 (0.015) | 200 | 75 | 25 | 4 |
| 1005 | 2.54 (0.100) | 1.27 (0.050) | 0.5 (0.02) | 0.38 (0.015) | 250 | 100 | 50 | 5 |
| 1206 | 3.05 (0.120) | 1.60 (0.063) | 0.5 (0.02) | 0.38 (0.015) | 250 | 150 | 50 | 8 |
| 1505 | 3.81 (0.150) | 1.32 (0.054) | 0.5 (0.02) | 0.38 (0.015) | 500 | 150 | 75 | 8 |
| 2010 | 5.08 (0.200) | 2.54 (0.100) | 0.5 (0.02) | 0.38 (0.015) | 1000 ²⁾ | 200 | 100 | 26 |
| 1020 | 2.54 (0.100) | 5.08 (0.200) | 0.5 (0.02) | 0.38 (0.015) | 1000 ²⁾ | 100 | 10 | 25 |
| 2208 | 5.58 (0.22) | 1.91 (0.075) | 0.5 (0.02) | 0.38 (0.015) | 750 | 200 | 100 | 21 |
| 2512 | 6.35 (0.250) | 3.06 (0.120) | 0.5 (0.02) | 0.38 (0.015) | 2000 ²⁾ | 250 | 100 | 42 |
| 1010 | 2.54 (0.100) | 2.54 (0.100) | 0.5 (0.02) | 0.38 (0.015) | 500 | 100 | 25 | 12 |

¹⁾ Shall be read in conjunction with other tables

²⁾ With special assembly care

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

ELECTRICAL SPECIFICATIONS

Resistance Range: 0.1R to 100M
 Resistance Tolerance: 0.5 % to 10 %
 Power Dissipation: Pn: 50 mW to 2 W
 Temperature Coefficient: K: 100 ppm/°C
 L: 200 ppm/°C
 M: 300 ppm/°C

MECHANICAL SPECIFICATIONS

Substrate: Alumina
 Technology: Thick Film (Ruthenium oxide)
 Protection: Epoxy Coating
 Terminations:
B (W/A) : SnPb over nickel barrier for solder reflow
N (W/A) : SnAg over nickel barrier for solder reflow
F (Flip Chip) : SnAg over nickel barrier for solder reflow
W (one face) and G (W/A) type: gold over nickel barrier for other applications

CLIMATIC SPECIFICATIONS

Operating Temp. Range: - 55 °C to + 155 °C

BEST TOL. AND TCR VERSUS OHMIC VALUE¹⁾

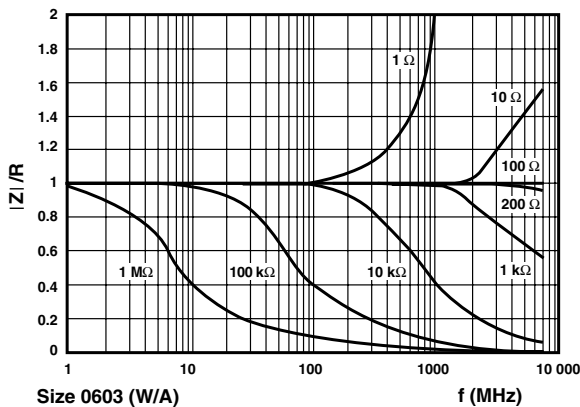
| TIGHTEST TOLERANCE | OHMIC VALUES | BEST TCR ppm/°C |
|--------------------|-------------------|-----------------|
| 0.5 % (D) | 10 Ω < R < 5M | 100 (K) |
| 1 % (F) | 5 Ω < R < 10M | 100 (K) |
| 2 % (G) | 1 Ω < R < R max | 200 (L) |
| 5 % (J) | 0.1 Ω < R < R max | 200 (L) |
| 10 % (K) | 0.1 Ω < R < R max | 300 (M) |

¹⁾ Improved performance on request

CHIPS FOR HIGH FREQUENCY APPLICATIONS

The HF performance of Flip Chip and W/A types can be improved on request.
 Please ask for HCHP or CHP with a dedicated release number (R..)

TYPICAL HF PERFORMANCE OF HCHP



POWER DERATING CURVE



PACKAGING

Waffle-pack or tape and reel when specified

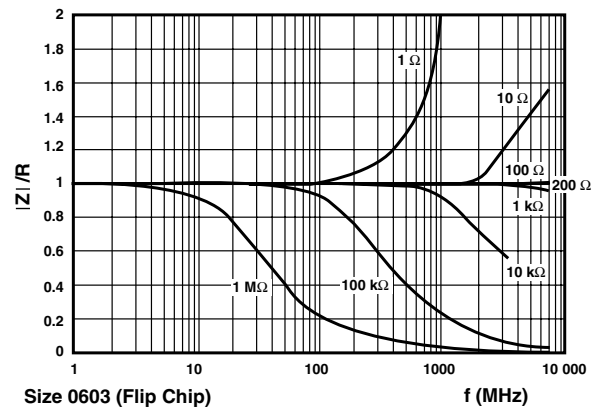
| SIZE | NUMBER OF PIECES PER PACKAGE | | TAPE WIDTH |
|------|------------------------------|---------------|------------|
| | WAFFLE PACK 2" x 2" | TAPE AND REEL | |
| | | MIN. | MAX. |
| 0502 | 100 | 100 | 4000 |
| 0505 | | | |
| 0603 | | | |
| 0805 | | | |
| 1005 | | | |
| 1206 | 60 | 1000 | 8 mm* |
| 1505 | | | |
| 2010 | 100 | 4000 | 8 mm* |
| 1010 | 60 | 1000 | 8 mm* |
| 2208 | | | |
| 1020 | | | |
| 2512 | 45 | | 8 mm* |

* 12 mm on request

MARKING

(On request with premium, for size higher than 1206) (4 digit code,) the first three digits are significant figures and the last digit specifies the number of zero's to follow. R designates decimal point.

10R0 = 10 Ω
 3901 = 3900 Ω
 1004 = 1 MΩ





| PERFORMANCE | | | |
|---------------------------|--|--------------------------------------|---|
| TESTS | CONDITIONS | REQUIREMENTS | TYPICAL VALUES AND DRIFTS |
| Termination Adhesion | 5N for 10 seconds | $\pm (0.25 \% + 0.05 \Omega)$ | $< \pm 0.1 \%$ |
| Resistance to Solder Heat | immersion 10 seconds in Sn/Pb 60/40 at + 260 °C | $\pm (0.25 \% + 0.05 \Omega)$ | $< \pm 0.1 \%$ |
| Rapid Temperature Change | 5 cycles - 55 °C + 155 °C | $\pm (0.25 \% + 0.05 \Omega)$ | $< \pm 0.1 \%$ |
| Climatic Sequence | Phase A dry heat Phase B damp heat Phase C cold - 55 °C Phase D damp gheat 5 cycles | $\pm (1 \% + 0.05 \Omega)$ | $< \pm 0.2 \%$ |
| Humidity (Steady State) | 56 days | $\pm (1 \% + 0.05 \Omega)$ | $< \pm 0.2 \%$ |
| Short Time Overload | 6.25 Pn for 2 seconds | $\pm (0.25 \% + 0.05 \Omega)$ | $< \pm 0.1 \%$ |
| Load Life | 1000 h at rated power 90'/30' at + 70 °C | 1000 h $\pm (1 \% + 0.05 \Omega)$ | 1000 h 2000 h 10 000 h $< 0.25 \%$ $< 0.5 \%$ $< 1 \%$ |

| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | | | |
|--|---|--|--|--|---|------|--------------------------|---|---|---|---|---|---|---|---|---|---|--|
| New Global Part Numbering: CHP0805K1001FBT55 (preferred part number format) | | | | | | | | | | | | | | | | | | |
| C | H | P | | 0 | 8 | 0 | 5 | K | 1 | 0 | 0 | 1 | F | B | T | 5 | 5 | |
| GLOBAL MODEL | SIZE | TCR | VALUE | TOLERANCE | TERMINATION | TAPE | OPTION | | | | | | | | | | | |
| CHP HCHP (3 or 4 digits) | 0502 0505 0603 0805 0705 1005 1206 1505 2010 1020 1010 2208 2512 | K = 100 ppm L = 200 ppm M = 300 ppm | The first 3 digits (2 digits are enough for tolerance G and J) are significant figures and the last digit specifies the number of zeros to follow. R designates decimal point 10R0 = 10 Ω 3901 = 3900 Ω 1004 = 1 MΩ | D = $\pm 0.5 \%$ F = $\pm 1 \%$ G = $\pm 2 \%$ J = $\pm 5 \%$ | B : SnPb over nickel barrier N : SnAg over nickel barrier G : Gold over nickel barrier B : Lead bearing version N and G : Lead (Pb)-free/RoHSversion | | Leave blank if no option | | | | | | | | | | | |
| Historical Part Number example: CHP 0805 100 ppm 1K 1 % B TR R0055 (will continue to be accepted) | | | | | | | | | | | | | | | | | | |
| CHP | 0805 | 100 ppm | 1K | 1 % | B | TR | R0055 | e2 | | | | | | | | | | |
| HISTORICAL MODEL | SIZE | TCR | VALUE | TOLERANCE | TERMINATION | TAPE | OPTION | RoHS | | | | | | | | | | |
| CHP HCHP (3 or 4 digits) | 0502 0505 0603 0805 0705 1005 1206 1505 2010 1020 1010 2208 2512 | in clear | in clear | in clear | B : SnPb over nickel barrier N : SnAg over nickel barrier G : Gold over nickel barrier B : Lead bearing version N and G : Lead (Pb)-free/ RoHS version | | Leave blank if no option | e2: tin/silver e4: gold blank: SnPb | | | | | | | | | | |



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