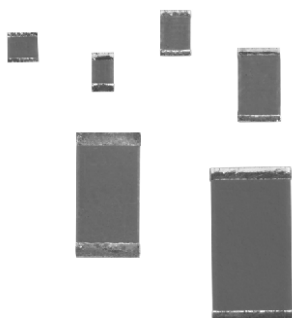


## High Stability Resistor Chips Thick Film Technology



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, reproducibility and quality.

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

ESCC and EN 140 401 802 certifications is in progress.

### FEATURES

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



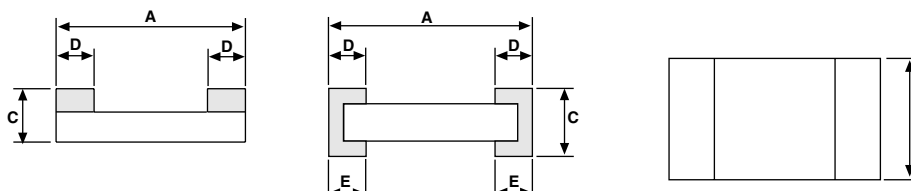
**RoHS\***  
COMPLIANT

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<br>mW<br>Pn | LIMITING ELEMENT VOLTAGE<br>V | MAXIMUM <sup>1)</sup> RESISTANCE<br>M $\Omega$ | UNIT WEIGHT IN<br>mG |
|--------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|--------------------------------------------------------------|--------------------------|-------------------------------|------------------------------------------------|----------------------|
|              | A                                                              | B                                                              | C                                                              | D/E                                                          |                          |                               |                                                |                      |
|              | MAX. TOL.<br>+ 0.152 (0.006)<br>MIN. TOL.<br>- 0.152 (- 0.006) | MAX. TOL.<br>+ 0.127 (0.005)<br>MIN. TOL.<br>- 0.127 (- 0.005) | MAX. TOL.<br>+ 0.127 (0.005)<br>MIN. TOL.<br>- 0.127 (- 0.005) | MAX. TOL.<br>+ 0.13 (0.005)<br>MIN. TOL.<br>- 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<br>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 <sup>2)</sup>       | 200                           | 100                                            | 26                   |
| 1020         | 2.54 (0.100)                                                   | 5.08 (0.200)                                                   | 0.5 (0.02)                                                     | 0.38 (0.015)                                                 | 1000 <sup>2)</sup>       | 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 <sup>2)</sup>       | 250                           | 100                                            | 42                   |
| 1010         | 2.54 (0.100)                                                   | 2.54 (0.100)                                                   | 0.5 (0.02)                                                     | 0.38 (0.015)                                                 | 500                      | 100                           | 25                                             | 12                   |

<sup>1)</sup> Shall be read in conjunction with other tables

<sup>2)</sup> 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 oxyde)  
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 VALUE<sup>1)</sup>

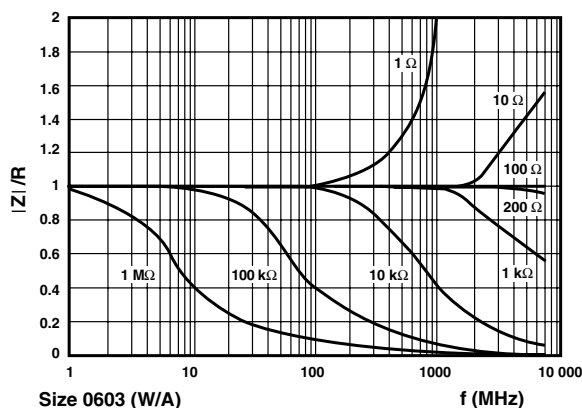
| TIGHTEST TOLERANCE | OHMIC VALUES      | BEST TCR ppm/°C |
|--------------------|-------------------|-----------------|
| 0.5 % (D)          | 10 Ω < R < 5M     | 100 (K)         |
| 1 % (F)            | 5 Ω < R < 10M     | 100 (K)         |
| 2 % (G)            | 1 Ω < R < R max   | 200 (L)      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

<sup>1)</sup> Improved performance on request

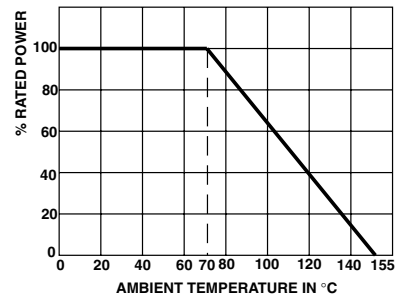
## CHIPS FOR HIGH FREQUENCY APPLICATIONS

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

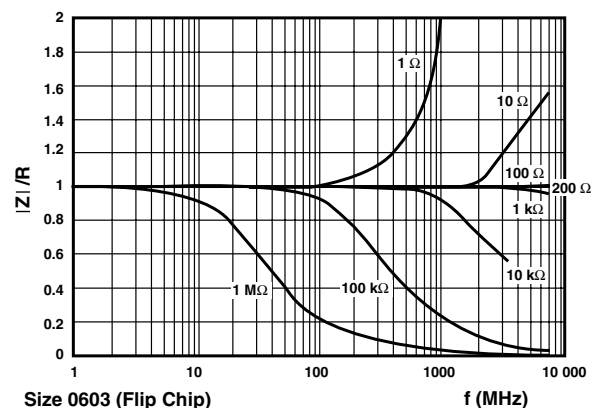
| SIZE | NUMBER OF PIECES PER PACKAGE |               | TAPE WIDTH |       |  |  |
|------|------------------------------|---------------|------------|-------|--|--|
|      | WAFFLE PACK<br>2" x 2"       | TAPE AND REEL |            |       |  |  |
|      |                              | MIN.          |            | MAX.  |  |  |
| 0502 | 100                          | 100           | 4000       | 8 mm  |  |  |
| 0505 |                              |               |            |       |  |  |
| 0603 |                              |               |            |       |  |  |
| 0805 |                              |               |            |       |  |  |
| 1005 | 140                          |               |            |       |  |  |
| 1206 |                              |               |            |       |  |  |
| 1505 | 60                           |               |            |       |  |  |
| 2010 |                              |               |            |       |  |  |
| 1010 | 100                          |               | 1000       | 8 mm* |  |  |
| 2208 | 60                           |               | 4000       | 8 mm* |  |  |
| 1020 | 60                           | 1000          | 8 mm*      |       |  |  |
| 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





# High Stability Resistor Chips Thick Film Technology

**CHP, HCHP**

Vishay Sfernice

| 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<br>in Sn/Pb 60/40<br>at + 260 °C                                        | $\pm (0.25 \% + 0.05 \Omega)$        | $< \pm 0.1 \%$            |                      |                      |
| Rapid Temperature Change  | 5 cycles<br>- 55 °C + 155 °C                                                                 | $\pm (0.25 \% + 0.05 \Omega)$        | $< \pm 0.1 \%$            |                      |                      |
| Climatic Sequence         | Phase A dry heat<br>Phase B damp heat<br>Phase C cold - 55 °C<br>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<br>for 2 seconds                                                                     | $\pm (0.25 \% + 0.05 \Omega)$        | $< \pm 0.1 \%$            |                      |                      |
| Load Life                 | 1000 h at rated power<br>90°/30° at + 70 °C                                                  | 1000 h<br>$\pm (1 \% + 0.05 \Omega)$ | 1000 h<br>$< 0.25 \%$     | 2000 h<br>$< 0.5 \%$ | 10 000 h<br>$< 1 \%$ |

| 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<br>HCHP<br>(3 or 4 digits)                                                                    | 0502<br>0505<br>0603<br>0805<br>0705<br>1005<br>1206<br>1505<br>2010<br>1020<br>1010<br>2208<br>2512 |          |          | K = 100 ppm<br>L = 200 ppm<br>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<br><br>10R0 = 10 Ω<br>3901 = 3900 Ω<br>1004 = 1 MΩ |                          |                                           | D = ± 0.5 %<br>F = ± 1 %<br>G = ± 2 %<br>J = ± 5 % |   |   | B: SnPb over nickel barrier<br>N: SnAg over nickel barrier<br>G: Gold over nickel barrier |   |      | Leave blank if no option |   |   |
| B: Lead bearing version<br>N and G: Lead (Pb)-free/RoHSversion                                    |                                                                                                      |          |          |                                           |                                                                                                                                                                   |                                                                                                                                                                                                                                  |                          |                                           |                                                    |   |   |                                                                                           |   |      |                          |   |   |
| 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<br>HCHP<br>(3 or 4 digits)                                                                    | 0502<br>0505<br>0603<br>0805<br>0705<br>1005<br>1206<br>1505<br>2010<br>1020<br>1010<br>2208<br>2512 | in clear | in clear | in clear                                  | B: SnPb over nickel barrier<br>N: SnAg over nickel barrier<br>G: Gold over nickel barrier<br><br>B: Lead bearing version<br>N and G: Lead (Pb)-free/ RoHS version |                                                                                                                                                                                                                                  | Leave blank if no option | e2: tin/silver<br>e4: gold<br>blank: SnPb |                                                    |   |   |                                                                                           |   |      |                          |   |   |



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