

## High Stability Resistor Chips Thick Film Technology



### 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



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.

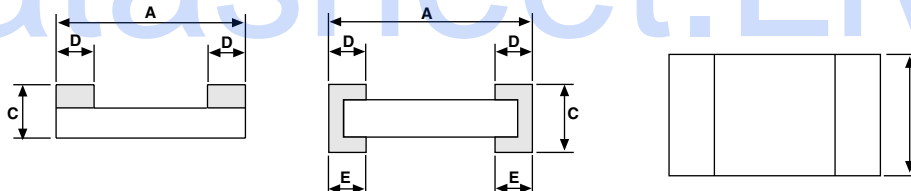
ESCC and EN 140 401 802 certifications is in progress.

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 <sup>1)</sup> RESISTANCE M $\Omega$	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 <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>

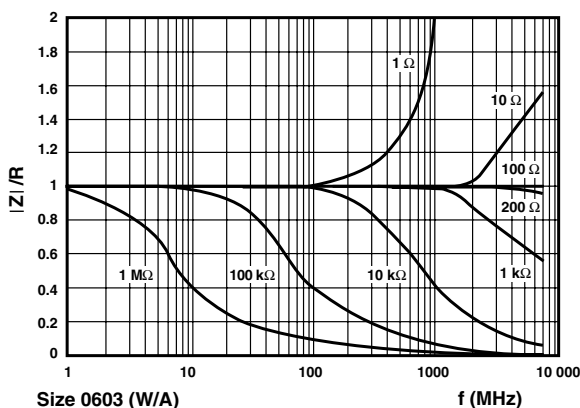
TIGHTEST TOLERANCE	OHMIC VALUES	BEST TCR ppm/°C
0.5 % (D)	10 Ω < R < 5M	100 (K)
1 % (F)	5 Ω < R < 10M	100 (K)
2 % (G)	1 Ω < R < R max	200 (L)
5 % (J)	0.1 Ω < R < R max	200 (L)
10 % (K)	0.1 Ω < R < R max	300 (M)

<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

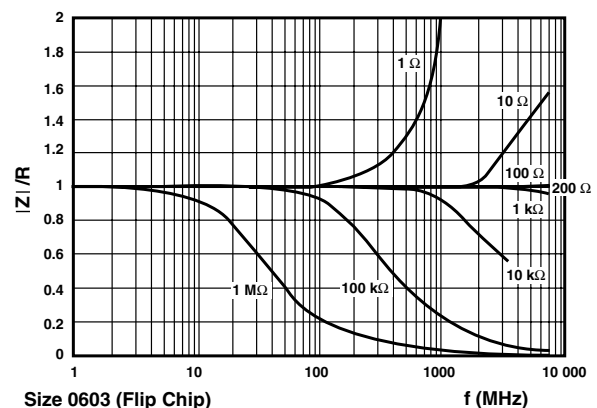
SIZE	NUMBER OF PIECES PER PACKAGE		TAPE WIDTH	
	WAFFLE PACK 2" x 2"	TAPE AND REEL		
		MIN.	MAX.	
0502	100	100	4000	8 mm
0505				
0603				
0805				
1005				
1206	60	1000	4000	8 mm*
1505				
2010	100			8 mm*
1010	60			8 mm*
2208	60			8 mm*
1020	60		1000	8 mm*
2512	45			8 mm*

\* 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





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: <b>CHP0805K1001FBT55</b> (preferred part number format)																
<b>C</b>	<b>H</b>	<b>P</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>5</b>	<b>K</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>F</b>	<b>B</b>	<b>T</b>	<b>5</b>	<b>5</b>
GLOBAL MODEL	SIZE	TCR	VALUE			TOLERANCE	TERMINATION	TAPE	OPTION							
<b>CHP</b> <b>HCHP</b>  (3 or 4 digits)	<b>0502</b> <b>0505</b> <b>0603</b> <b>0805</b> <b>0705</b> <b>1005</b> <b>1206</b> <b>1505</b> <b>2010</b> <b>1020</b> <b>1010</b> <b>2208</b> <b>2512</b>	<b>K</b> = 100 ppm <b>L</b> = 200 ppm <b>M</b> = 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			<b>D</b> = $\pm 0.5 \%$ <b>F</b> = $\pm 1 \%$ <b>G</b> = $\pm 2 \%$ <b>J</b> = $\pm 5 \%$	<b>B</b> : SnPb over nickel barrier <b>N</b> : SnAg over nickel barrier <b>G</b> : Gold over nickel barrier  <b>B</b> : Lead bearing version <b>N and G</b> : Lead (Pb)-free/RoHSversion		Leave blank if no option							
Historical Part Number example: <b>CHP 0805 100 ppm 1K 1 % B TR R0055</b> (will continue to be accepted)																
<b>CHP</b>	<b>0805</b>	<b>100 ppm</b>	<b>1K</b>	<b>1 %</b>	<b>B</b>	<b>TR</b>	<b>R0055</b>	<b>e2</b>								
HISTORICAL MODEL	SIZE	TCR	VALUE	TOLERANCE	TERMINATION	TAPE	OPTION	RoHS								
<b>CHP</b> <b>HCHP</b>  (3 or 4 digits)	<b>0502</b> <b>0505</b> <b>0603</b> <b>0805</b> <b>0705</b> <b>1005</b> <b>1206</b> <b>1505</b> <b>2010</b> <b>1020</b> <b>1010</b> <b>2208</b> <b>2512</b>	in clear	in clear	in clear	<b>B</b> : SnPb over nickel barrier <b>N</b> : SnAg over nickel barrier <b>G</b> : Gold over nickel barrier  <b>B</b> : Lead bearing version <b>N and G</b> : Lead (Pb)-free/ RoHS version		Leave blank if no option	e2: tin/silver e4: gold blank: SnPb								



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