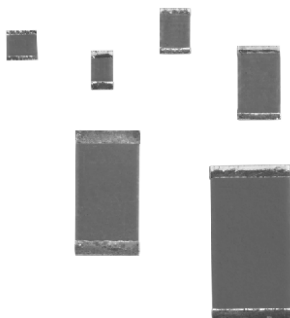


ESA High Stability Thick Film Resistor Chips



Vishay Sfernice thick film chip resistors CHPHR are specially designed to meet the requirements of the ESA 4001/026 specification. They have undergone the CNES evaluation (Space French National Agency). They are in level 1 of the ESA EPPL (European Preferred Part List) and ESA qualification is on-going.

FEATURES

**HALOGEN
FREE**

- SMD wraparound chip resistor
- Generic specification ESCC 4001
- Detailed specification ESCC 4001/026
- Robust terminations
- Large ohmic value range 1 Ω to 10 M Ω
- HCHP option 0.55: for high frequency applications (up to 10 GHz)
- Halogen-free according to IEC 61249-2-21

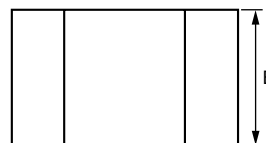
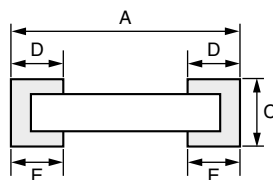
Evaluated to ESCC 4001/026.

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

B (W/A) type is for solder reflow assembly (variant 01 to 05)

G (W/A) type is for gluing (variant 06 to 10)

DIMENSIONS in millimeters



VARIANT NUMBER	STYLE	DIMENSIONS (mm)							
		A		B		C		D, E	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
01, 06	0603	1.36	1.68	0.72	0.98	0.38	0.53	0.25	0.51
02, 07	0805	1.75	2.07	1.14	1.4	0.38	0.53	0.25	0.51
03, 08	1206	2.89	3.21	1.47	1.73	0.38	0.53	0.25	0.51
04, 09	2010	4.92	5.24	2.41	2.67	0.5	0.63	0.25	0.64
05, 10	2512	6.19	6.51	2.93	3.32	0.5	0.63	0.25	0.64

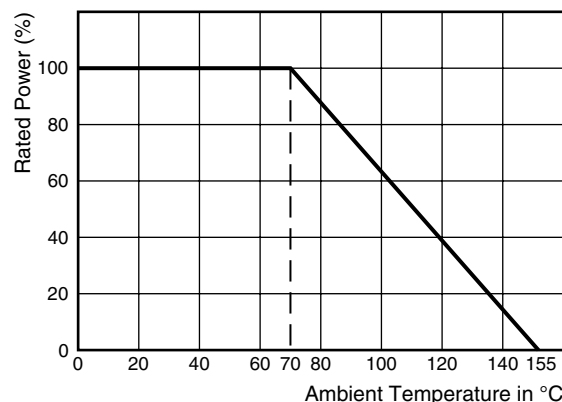
MECHANICAL SPECIFICATIONS

Substrate: Alumina
Technology: Thick film (Ruthenium oxyde)
Protection: Epoxy coating
Terminations: **B (W/A):** SnPb over nickel barrier for solder reflow
G (W/A) type: gold over nickel barrier for gluing

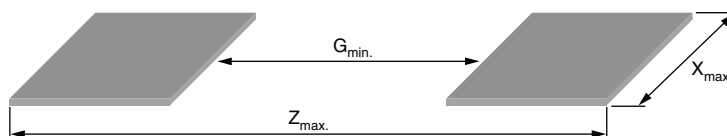
CHIPS FOR HIGH FREQUENCY APPLICATIONS

High frequency option available up to 10 GHz
 3 sizes: 0603, 0805, 1206

POWER DERATING CURVE



SUGGESTED LAND PATTERN (please refer to IPC-7351A)



CHIP SIZE	$Z_{max.}$	$G_{min.}$	$X_{max.}$
0603	2.38	0.34	0.98
0805	2.77	0.73	1.40
1206	3.91	1.87	1.73
2010	5.94	3.64	2.67
2512	7.21	4.91	3.32

PACKAGING

Waffle-pack or tape and reel when specified

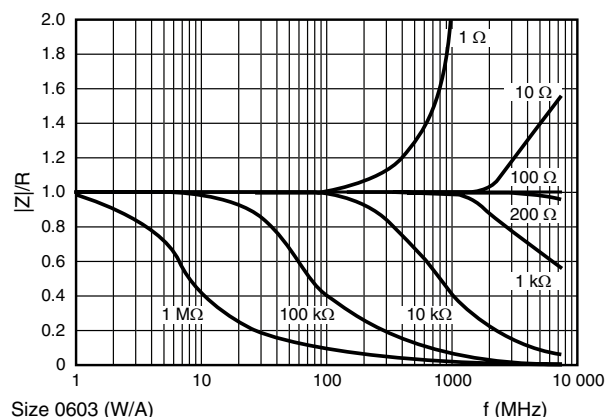
SIZE	NUMBER OF PIECES PER PACKAGE		TAPE WIDTH
	WAFFLE PACK 2" x 2"	TAPE AND REEL (1) MIN. MAX.	
0603	100	100 4000	8 mm
0805			
0705			
1206	140	1000	8 mm (2)
2010	60		
2512	45		

Notes

(1) MOQ for tape and reel: 50 pieces

(2) 12 mm on request

TYPICAL HF PERFORMANCE OF HCHP



Size 0603 (W/A)

ELECTRICAL SPECIFICATIONS

VARIANT NUMBER	STYLE (1)	RESISTANCE RANGE R_n (2)		TOLERANCE (\pm %) (2)	TEMPERATURE COEFFICIENT TC ($\pm 10^{-6}/^{\circ}\text{C}$) (2)	CRITICAL RESISTANCE ($k\Omega$)	TERMINAL MATERIAL AND FINISH	WEIGHT MAX. (g)
		MIN. (Ω)	MAX. ($M\Omega$)					
01	0603	1	10	1, 2, 5	100, 200	25	E4	0.002
02	0805	1	10	1, 2, 5	100, 200	50	E4	0.004
03	1206	1	10	1, 2, 5	100, 200	160	E4	0.008
04	2010	1	10	1, 2, 5	100, 200	180	E4	0.026
05	2512	1	10	1, 2, 5	100, 200	112.5	E4	0.042
06	0603	1	10	1, 2, 5	100, 200	25	E2	0.002
07	0805	1	10	1, 2, 5	100, 200	50	E2	0.004
08	1206	1	10	1, 2, 5	100, 200	160	E2	0.008
09	2010	1	10	1, 2, 5	100, 200	180	E2	0.026
10	2512	1	10	1, 2, 5	100, 200	112.5	E2	0.042

Notes

(1) See physical dimensions

(2) Restrictions might apply depending on ohmic value please refer to Table 1

Table 1

RESISTANCE (Ω)	VALUE SERIES	AVAILABLE TOLERANCE (\pm %)	AVAILABLE TEMPERATURE COEFFICIENT ($\pm 10^{-6}/^{\circ}\text{C}$)
$1 \leq R_n < 10$	Any value in the resistance range to 3 significant figures	2, 5	200
$10 \leq R_n < 1 \text{ M}$		1, 2, 5	100, 200
$R_n \geq 1 \text{ M}$		2, 5	200

MAXIMUM RATINGS

CHARACTERISTICS	VARIANT NUMBER	STYLE	SYMBOLS	LIMITS	UNITS	REMARKS
Rated dissipation	01, 06	0603	P_n	100	mW	(1)
	02, 07	0805		200		
	03, 08	1206		250		
	04, 09	2010		500		
	05, 10	2512		800		
Limiting element voltage	01, 06	0603	U_L	50	V	-
	02, 07	0805		100		
	03, 08	1206		250		
	04, 09	2010		300		
	05, 10	2512		300		
Rated voltage	All	All	U_R	$\sqrt{(P_n \times R_n)}$	V	(2)
Isolation voltage	01, 06	0603	U_I	100	V	-
	02, 07	0805		200		
	03, 08	1206		300		
	04, 09	2010		300		
	05, 10	2512		300		
Operating temperature range	All	All	T_{op}	- 55 to + 155	$^{\circ}\text{C}$	T_{amb}
Storage temperature range	All	All	T_{stg}	- 55 to + 155	$^{\circ}\text{C}$	-
Soldering temperature	All	All	T_{sol}	+ 260	$^{\circ}\text{C}$	(3)

Notes(1) At $T_{amb} \leq + 70^{\circ}\text{C}$. For $T_{amb} > + 70^{\circ}\text{C}$ derate linearly to 0 W at $T_{amb} = + 155^{\circ}\text{C}$ (2) Shall never exceed limiting element voltage. R_n = Rated resistance

(3) Duration 10 s maximum

PERFORMANCE

TEST	CONDITIONS	LIMITS REQUIRED BY THE ESCC4001/026 SPECIFICATION
Insulation resistance	ESCC4001 § 8.3.1.2 $V = 100 \text{ V}$	1000 M Ω
Low temperature electrical measurement	ESCC4001 § 8.3.1.1 $TC = 100 \text{ ppm}/^{\circ}\text{C}$ $TC = 200 \text{ ppm}/^{\circ}\text{C}$	$\pm 0.8 \%$ $\pm 1.6 \%$
High temperature electrical measurement	ESCC4001 § 8.3.3 $TC = 100 \text{ ppm}/^{\circ}\text{C}$ $TC = 200 \text{ ppm}/^{\circ}\text{C}$	$\pm 1.36 \%$ $\pm 2.72 \%$
Rapid change of temperature	ESCC4001 § 8.8	$\pm 0.25 + (0.05 \Omega \times 100/R_n) \%$
Robustness of terminations	ESCC4001 § 8.11.2	$\pm 0.25 + (0.05 \Omega \times 100/R_n) \%$
Resistance to solder heat	ESCC4001 § 8.12	$\pm 0.5 + (0.05 \Omega \times 100/R_n) \%$
Climatic sequence	ESCC4001 § 8.10	$\pm 1 + (0.05 \Omega \times 100/R_n) \%$
Load life	ESCC4001 § 8.13 1000 h 2000 h	$\pm 1 + (0.05 \Omega \times 100/R_n) \%$ $\pm 1.5 + (0.05 \Omega \times 100/R_n) \%$

**GLOBAL PART NUMBER INFORMATION**

New Global Part Numbering: CHPHR0603K1001FBT

C	H	P	H	R	0	6	0	3	K	1	0	0	1	F	B	T
GLOBAL MODEL		SIZE		TCR		VALUE				TOLERANCE		TERMINATION		PACKAGING		
CHPHR		0603 0705 or 0805 1206 2010 2512		K = 100 ppm L = 200 ppm		The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. Example: 1R50 = 1.5 Ω 22R1 = 22.1 Ω 3901 = 3900 Ω 1004 = 1 M Ω				F = 1 % G = 2 % J = 5 %		B: SnPb over nickel barrier G: Gold		Blank = Waffle pack T = Tape and reel		

GLOBAL PART NUMBER INFORMATION

ESA Part Numbering: 4001026011001F4

4	0	0	1	0	2	6	0	1	1	0	0	1	F	4	
DETAILED SPECIFICATION NUMBER				VARIANT NUMBER				RESISTANCE VALUE				TOLERANCE		TEMPERATURE COEFFICIENT	
				01 to 10				The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. Example: 1R50 = 1.5 Ω 22R1 = 22.1Ω 3901 = 3900 Ω 1004 = 1 M Ω				F = 1 % G = 2 % J = 5 %		4 = 100 ppm 6 = 200 ppm	

Note

- MOQ for tape and reel: 50 pieces

HYPER FREQUENCY OPTION

Hyper Frequency Option Numbering: HCHP0603K1001FBT55

H	C	H	P	0	6	0	3	K	1	0	0	1	F	B	T	5	5
GLOBAL MODEL		SIZE		TCR		VALUE				TOLERANCE		TERMINATION		PACKAGING		OPTION	
HCHP		0603 0705 or 0805 1206		K = 100 ppm L = 200 ppm		The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. Example: 1R50 = 1.5 Ω 22R1 = 22.1 Ω 3901 = 3900 Ω 1004 = 1 M Ω				F = ± 1 % G = ± 2 % J = ± 5 %		B: SnPb over nickel barrier G: Gold		Blank = Waffle pack T = tape and reel		055 = HiRel production	

Note

- MOQ for taping: 50 pieces



NOTION OF SINGLE LOT

The homogeneity of lots is given by the front end lot numbers (primary process lot) and not by the date code.

The date code is applied after completion of end of production testing. Parts coming from different lots might have same date code.

A customer who needs lot homogeneity should mention on his order: SINGLE PRODUCTION LOT

OPTIONS

LOT VALIDATION TESTING

For procurement of qualified components, lot validation testing is not required and shall only be performed if specifically stipulated in the purchase order.

For procurement of unqualified components, lot validation testing shall be performed as stipulated in the purchase order. The need for lot validation testing shall be determined by the orderer.

When lot validation testing is required, it shall consist of the performance of one or more of the tests or subgroup test sequences of chart F4 indicated in the ESA generic Specification ESCC 4001. The testing to be performed and the sample size shall be as stipulated in the purchase order. When procurement of more than one component type is involved from a family, range or series, the selection of representative samples shall also be stipulated in the purchase order.

Lot validation testing will be composed of one LVT charges and LVT samples:

Lot validation test charges has to be ordered separately on purchase order.

Lot validation samples have to be ordered separately on purchase order.

FINAL INSPECTION

If requested by the orderer a final inspection can be performed on site.

Final inspection has to be stipulated separately on purchase order.



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