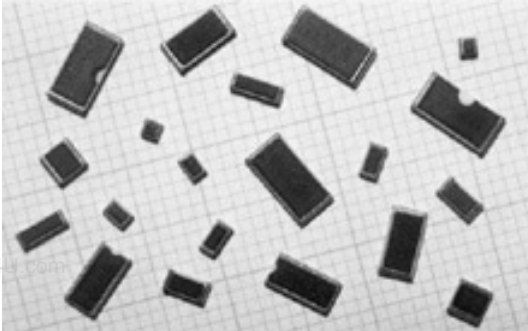


High Stability Resistor Chips Thick Film Technology



FEATURES

- ESA SCC 4001
- CECC approvals in progress
- **CHP**: standard passivated version for industrial, professional and military applications
- **CHPHR**: Hi-Rel version for space and medical applications
- **HCHP**: for high frequency applications
- **CHPCC**: short-circuit chips

VISHAY SFERNICE thick film resistor chips are specially designed to meet very stringent specifications in terms of reliability, stability, homogeneity, reproductibility and quality.

They conform to specifications NFC 83-240, CECC 40 401 and MIL-R-55342 D. CECC140 401 80 certification 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.

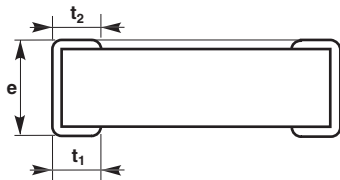
B and BF types are for solder reflow assembly.

G and W types are for wire bonding, gluing and ever high temperature solder reflow.

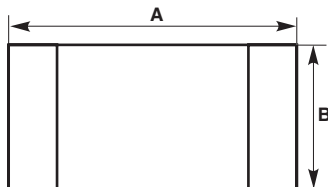
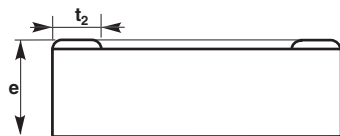
These resistor chips can be used in automatic, semi-automatic or manual assembly techniques and are suitable for reflow soldering, wave soldering, ball bonding and wedge.

DIMENSIONS in millimeters

WRAP-AROUND TERMINATION



ONE SURFACE TERMINATION



CHP STYLE	DIMENSIONS IN MM					UNIT WEIGHT IN mg
	A	B	$e - 0.25 + 0.1$	$t_1 \pm 0.1$	$t_2 \pm 0.1$	
0502	1.27 ± 0.15	0.63 ± 0.15	0.51			1
0505		1.27 ± 0.15	0.64	0.3	0.2	2
0603	1.60 ± 0.15	0.8 ± 0.15	0.51			1.5
0705	1.91 ± 0.20	1.27 ± 0.15				4
0805	2.03 ± 0.20					
1005	2.54 ± 0.20					7
1206	3.20 ± 0.25	1.60 ± 0.15				9
1505	3.81 ± 0.25	1.27 ± 0.15	0.64	0.5	0.3	10
1010	2.54 ± 0.20	2.54 ± 0.20				
2208	5.72 ± 0.25	1.91 ± 0.20				20
1020	2.54 ± 0.20	5.08 ± 0.25				
2010	5.08 ± 0.25	2.54 ± 0.20				
2512	6.35 ± 0.25	3.18 ± 0.25				30



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CHP, HCHP

Vishay Sfernice

MECHANICAL SPECIFICATIONS

Substrate	alumina
Size	from 0502 to 2512 other sizes on request
Resistive Element	ruthenium oxide
Terminations	precious metal with or without nickel barrier <ul style="list-style-type: none"> • untinned • solder dipped • electrolytic Sn Pb • thin film terminations B, BF, G, W types
Protection	mineral passivation epoxy coating on B, BF, G, W types
Weight	1 to 30mg

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	- 55°C to + 155°C
Climatic Category	55/155/156

ELECTRICAL SPECIFICATIONS

Resistance Range	0.5Ω to 100MΩ				
Tolerances	± 0.5% to ± 10%				
Power Rating	0.05 W to 2 W at + 70°C				
Temperature Coefficient	<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">Standard</td> <td>K: ± 100ppm/°C L: ± 200ppm/°C M: ± 300ppm/°C</td> </tr> <tr> <td style="text-align: center;">On request</td> <td>± 50ppm/°C</td> </tr> </table>	Standard	K: ± 100ppm/°C L: ± 200ppm/°C M: ± 300ppm/°C	On request	± 50ppm/°C
Standard	K: ± 100ppm/°C L: ± 200ppm/°C M: ± 300ppm/°C				
On request	± 50ppm/°C				
Limiting Element Voltage	50V to 250V				
Insulation Resistance	10 ⁹ Ω				

SPECIAL FEATURES

RATING AT + 70°C W	DESIGNATION VISHAY SFERNICE UTE 83-240	QUALIFIED LIST		OHMIC RANGE	LIMITING ELEMENT VOLTAGE
		GAM T-1	LNZ		
0.05	CHP 0502	K		1Ω 10MΩ	50V
	RR 0502	L		0.5Ω 25MΩ	
0.125	CHP 0505	K	•	1 Ω 10MΩ	50V
	RR 0505	L	•	0.5Ω 10MΩ	
0.125	CHP 0603	K		1Ω 10MΩ	50V
	RR 0603	L		0.5 Ω 25MΩ	
0.2	CHP 0705	K		1Ω 10MΩ	75V
	RR 0705	L		0.5Ω 25MΩ	
0.2	CHP 0805	K	•	1Ω 10MΩ	75V
	RR 0805	L		0.5Ω 25MΩ	
0.25	CHP 1005	K		1Ω 10MΩ	100V
	RR 1005	L		0.5Ω 50MΩ	
0.25	CHP 1206	K	•	1Ω 10MΩ	150V
	RR 1206	L	•	0.5Ω 50MΩ	
0.5	CHP 1505	K	•	1Ω 10MΩ	150V
	RR 1505	L		0.5Ω 75MΩ	
0.5	CHP 1010	K	•	1Ω 10MΩ	100V
	RR 1010	L		0.5Ω 25MΩ	
0.75	CHP 2208	K		1Ω 10MΩ	200V
	RR 2208	L		0.5Ω 100MΩ	
1	CHP 1020	K		1Ω 10MΩ	100V
	RR 1020	L		0.5Ω 10MΩ	
1	CHP 2010	K	•	1Ω 10MΩ	200V
	RR 2010	L		0.5Ω 100MΩ	
2	CHP 2512	K	•	1Ω 10MΩ	250V
	RR 2512	L		0.5Ω 100MΩ	

SHORT-CIRCUIT CHIPS

Short-circuit chips are available for each series, maximum resistance being 50mΩ, maximum current 2 A.

Terminations : only AE available (silver + nickel barrier + electro plating).

CHIPS FOR HIGH FREQUENCY APPLICATIONS

CHP resistors can be delivered in high frequency versions. (F > 5 GHz).

Their commercial designation becomes HCHP.

TERMINATION PLATING

Various coatings are available :

No plating: precious metal termination for ball bonding applications.

Plating by immersion Sn Pb Ag (with or without: nickel barrier) : surface mount.

Electroplating Sn Pb (with : nickel barrier) :

surface mount

– reflow or wave soldering (+ 260°C)

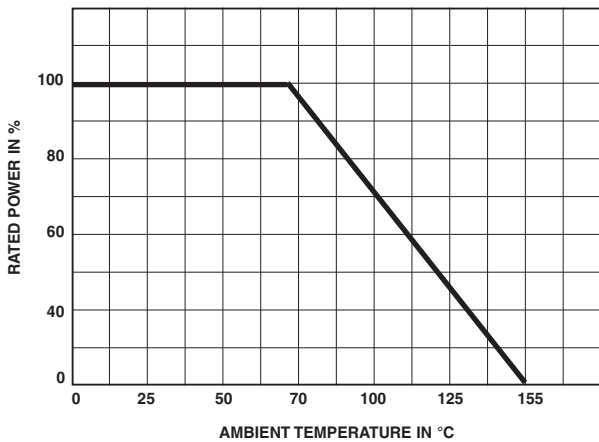
– allows less space between components



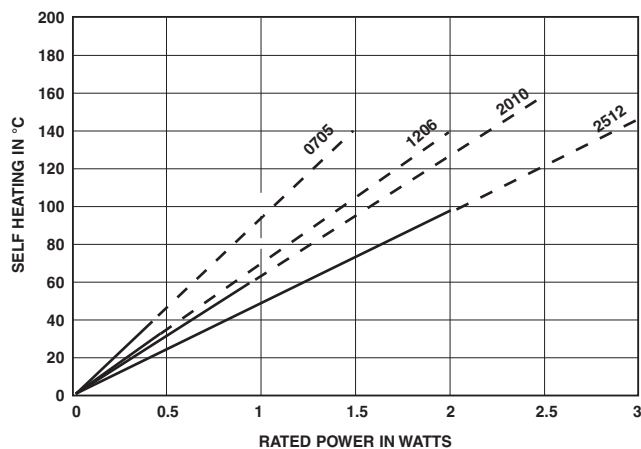
PERFORMANCE			
TESTS	CONDITIONS	REQUIREMENTS	TYPICAL VALUES AND DRIFTS*
Termination Adhesion	5 N for 10 seconds	$\pm (0.25\% + 0.05\Omega)$	$< \pm 0.1\%$
Resistance to Solder Heat	immersion 10 seconds in Sn/Pb 60/40 at + 260°C	$\pm (0.25\% + 0.05\Omega)$	$< \pm 0.1\%$
Rapid Temperature Change	5 cycles - 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 heat 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 5 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 $< \pm 0.1\%$ 2000 h $< \pm 0.25\%$ 10 000 h $< \pm 0.5\%$

*Chips with terminations R (Platinum - Gold tinned).

POWER RATING CHART



SELF HEATING CURVES



TERMINATIONS

Terminations are dependent on application. Various materials and final treatments can be used according to the tables below.

RECOMMENDED THIN FILM TERMINATIONS	TERMINATION TYPES	
	ONE FACE	WRAPAROUND
Solder Dipping over Nickel Barrier ⁽¹⁾	BF	B
Gold over Nickel Barrier	W	G

PREVIOUS TERMINATIONS ⁽²⁾	TERMINATIONS TYPE	
	ONE FACE	WRAPAROUND
Gold	W	G
Platinum Gold		G (U)
Platinum Gold Solder Dipped		B (R)
Platinum Gold and Electroplated Nickel and Electroplate Sn Pb		B (BE)
Platinum Gold and Electroplated Nickel and Dipped Sn Pb		B (BT)
Palladium Silver		G (E)

⁽¹⁾ Standard Sn/Pb/Ag alloy (62/36/2) (will be lead free as soon as requested).

⁽²⁾ Previous Termination type between brackets.



High Stability Resistor Chips Thick Film Technology

CHP, HCHP

Vishay Sfernice

PACKAGING				
SIZE	MAX. UNITS PER PACKAGE		REEL DIA 178mm	WIDTH REEL
	BAG	WAFFLE PACK		
0502	-----	400	-	-----
0505	-----	100	3000	-----
0603	-----	100	3000	-----
0705	-----	100	3000	8mm
0805	100	140		
1005	-----			
1206	-----	60		
1505	-----	100		
1010	-----	60	2000	12mm
2208	50	60	1500	8mm
1020			2000	12mm
2010			-----	45
2512	-----	45	-----	-----

HIGH RELIABILITY RESISTORS

CHP resistors can be delivered in high reliability versions.

Their commercial designation becomes CHP HR.

The main characteristics are:

SERIES AND MODEL	DISSIPATION AT +70°C	T.C.R. ppm/°C	OHMIC VALUE	TOL. ± %	TERMINATION MATERIALS
CHP HR 0505	0.125W	± 200	1Ω at < 10Ω	± 1%	BE : Platinum - Gold + nickel barrier + electro plating Sn Pb R : Platinum - Gold tinned
CHP HR 0705	0.2W				
CHP HR 0805	0.2W				
CHP HR 1206	0.25W	± 100	10Ω at 1MΩ	± 2 %	
CHP HR 1010	0.5W				

PACKAGING
<p>Various packaging options are available:</p> <ul style="list-style-type: none"> • bag: for manual assembly or prototyping • waffle pack: for microelectronic applications • tape and reel: for automatic assembly, minimum quantity 250 pieces per ohmic value.

MARKING

On request : print marking of ohmic value (4 digit code).

For sizes ≥ 0705 : First 3 digits are significant figures, 4th digit indicates the number of zeros to follow the when ohmic value is smaller than

100, R is used as a separator. eg: 0R51 = 0.51Ω
 97R6 = 97.6Ω
 4992 = 49900Ω

ORDERING INFORMATION					
CHP	1206	±100 ppm/°C	10kΩ	± 1%	R
SERIES	SIZE	TEMPERATURE COEFFICIENT	OHMIC VALUE	TOLERANCE	TERMINATIONS
CHP	standard passivated chips	± 100 ppm/°C		± 0.5 %	See termination table
CHPHR	HI-REL version	± 200 ppm/°C		± 1 %	
HCHP	high frequency applications	± 300 ppm/°C		± 2 %	
CHPCC	short-circuit chips			± 5 %	
				± 10 %	
				± 20 %	