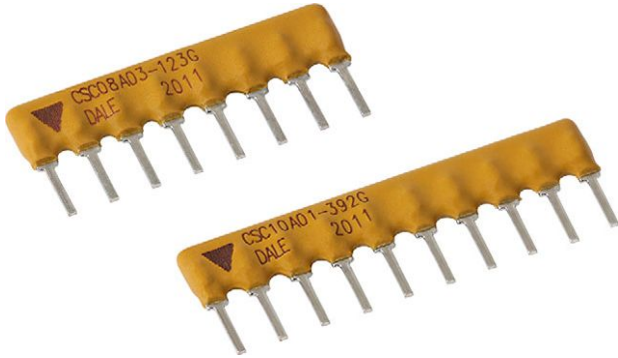


## Thick Film Resistor Networks, Single-In-Line, Conformal Coated SIP



### FEATURES

- Isolated, bussed, and dual terminator schematics available
- Body height: "A" profile = 0.195" (4.95 mm) and "B" profile = 0.295" (7.50 mm) standard; custom "C" profile = 0.350" (8.89 mm) also available
- "A" profile standard in 4 thru 12 pins
- Thick film resistive elements
- Reduces total assembly costs
- Resistor elements protected by tough epoxy conformal coating
- Wide resistance range (10 Ω to 2.2 MΩ)
- Available in bulk pack as standard; optional tube pack is also available
- Meets EIA/ECA-CB23 rev. G whisker test requirements for class 1A products
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
Available

### Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

STANDARD ELECTRICAL SPECIFICATIONS							
GLOBAL MODEL / SCHEMATIC	PACKAGE HEIGHT	POWER RATING ELEMENT (1) $P_{70^{\circ}\text{C}}$ W	RESISTANCE RANGE Ω	TEMPERATURE COEFFICIENT (-55 °C to +125 °C) ± ppm/°C	TOLERANCE (2) ± %	TCR TRACKING (1) (-55 °C to +125 °C) ± ppm/°C	MAX. WORKING VOLTAGE (3) $V_{\text{DC}}$
CSCxxx01	A	0.20	10 to 50	250	1, 2, 5	50	100
			50.1 to 2.2M	100			
CSCxxx03	B	0.25	10 to 50	250	1, 2, 5	50	100
			50.1 to 2.2M	100			
CSCxxx05	A	0.30	10 to 50	250	1, 2, 5	50	100
			50.1 to 2.2M	100			
CSCxxx05	B	0.40	10 to 50	250	1, 2, 5	150	100
			50.1 to 2.2M	100			

### Notes

- See derating curves for package power rating
- (1) For resistor power ratings at +25 °C see derating curves
- (2) ± 2 % standard, ± 1 % and ± 5 % available
- (3) Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less

**GLOBAL PART NUMBER INFORMATION**
**New Global Part Numbering: CSC08A03100RGEK (preferred part number format)**

C	S	C	0	8	A	0	3	1	0	0	R	G	E	K			
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--

GLOBAL MODEL	PIN COUNT	PACKAGE HEIGHT	SCHEMATIC	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING	SPECIAL
CSC	04 to 12 pin available 04 = 4 pin 08 = 8 pin 12 = 12 pin	A = "A" profile B = "B" profile	01 = bussed 03 = isolated 00 = special	R = $\Omega$ K = $k\Omega$ M = $M\Omega$ 10R0 = 10 $\Omega$ 680K = 680 $k\Omega$ 1M00 = 1.0 $M\Omega$ 0000 = 0 $\Omega$ Jumper	F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ S = special Z = 0 $\Omega$ Jumper	EK = lead (Pb)-free, bulk PA = tin / lead, bulk	Blank = standard (dash number) (up to 3 digits) From 1 to 999 as applicable

**Historical Part Number example: CSC08A03101GEK (will continue to be accepted)**

CSC	08	A	03	101	G	EK
HISTORICAL MODEL	PIN COUNT	PACKAGE HEIGHT	SCHEMATIC	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING

**New Global Part Numbering: CSC08A05131AGEK (preferred part number format)**

C	S	C	0	8	A	0	5	1	3	1	A	G	E	K			
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--

GLOBAL MODEL	PIN COUNT	PACKAGE HEIGHT	SCHEMATIC	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING	SPECIAL
CSC	04 to 12 pin available 04 = 4 pin 08 = 8 pin 12 = 12 pin	A = "A" profile B = "B" profile	05 = dual terminator	3 digit impedance code, followed by alpha modifier (see impedance table)	F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$	EK = lead (Pb)-free, bulk PA = tin / lead, bulk	Blank = standard (dash number) (up to 3 digits) From 1 to 999 as applicable

**Historical Part Number example: CSC08A05131AGEK (will continue to be accepted)**

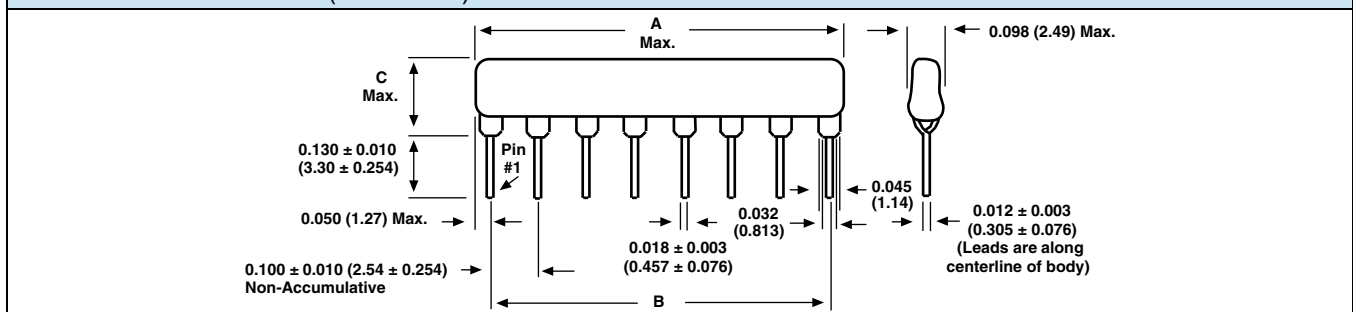
CSC	08	A	05	221	331	G	EK
HISTORICAL MODEL	PIN COUNT	PACKAGE HEIGHT	SCHEMATIC	RESISTANCE VALUE 1	RESISTANCE VALUE 2	TOLERANCE CODE	PACKAGING

**Note**

- For additional information on packaging, refer to the Through-Hole Network Packaging document ([www.vishay.com/doc?31542](http://www.vishay.com/doc?31542))

**TECHNICAL SPECIFICATIONS**

PARAMETER	UNIT	CSC SERIES
Voltage coefficient of resistance	$V_{eff}$	< 50 ppm typical
Dielectric strength	$V_{AC}$	200
Isolation resistance (03 schematic)	$\Omega$	> 100M
Operating temperature range	$^{\circ}C$	-55 to +125

**DIMENSIONS** in inches (millimeters)


01 SCHEMATIC	GLOBAL MODEL	NUMBER OF RESISTORS	A (MAX.)	B	C (MAX.)
	CSC04	3	0.390 (9.91)	0.300 (7.62)	"A" profile = 0.195 (4.95) "B" profile = 0.295 (7.50)
	CSC05	4	0.490 (12.45)	0.400 (10.16)	
	CSC06	5	0.590 (14.99)	0.500 (12.70)	
	CSC07	6	0.690 (17.53)	0.600 (15.24)	
	CSC08	7	0.790 (20.07)	0.700 (17.78)	
	CSC09	8	0.890 (22.61)	0.800 (20.32)	
	CSC10	9	0.990 (25.15)	0.900 (22.86)	
	CSC11	10	1.09 (27.69)	1.00 (25.40)	
	CSC12	11	1.19 (30.23)	1.100 (27.94)	
		CSC04	2	0.390 (9.91)	
CSC06		3	0.590 (14.99)	0.500 (12.70)	
CSC08		4	0.790 (20.07)	0.700 (17.78)	
CSC10		5	0.990 (25.15)	0.900 (22.86)	
CSC12		6	1.19 (30.23)	1.100 (27.94)	
		CSC04	4	0.390 (9.91)	0.300 (7.62)
	CSC05	6	0.490 (12.45)	0.400 (10.16)	
	CSC06	8	0.590 (14.99)	0.500 (12.70)	
	CSC07	10	0.690 (17.53)	0.600 (15.24)	
	CSC08	12	0.790 (20.07)	0.700 (17.78)	
	CSC09	14	0.890 (22.61)	0.800 (20.32)	
	CSC10	16	0.990 (25.15)	0.900 (22.86)	
	CSC11	18	1.09 (27.69)	1.00 (25.40)	
	CSC12	20	1.19 (30.23)	1.100 (27.94)	

MECHANICAL SPECIFICATIONS	
Marking resistance to solvents	Permanency testing per MIL-STD-202, method 215
Solderability	Per MIL-STD-202, method 208E, RMA flux
Body	High alumina, epoxy coated
Terminals <sup>(1)</sup>	Solder plated leads

**Note**

<sup>(1)</sup> Coating meniscus meets class 2 requirements of IPC-A-610

**STOCKED RESISTANCE VALUES IN  $\Omega$  ("G" TOLERANCE)**

Standard E-24 resistance values stocked; consult factory.

Many dual terminator resistance values stocked; consult factory.

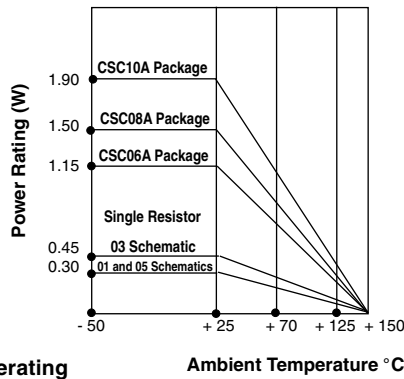
IMPEDANCE CODES					
CODE	$R_1$ ( $\Omega$ )	$R_2$ ( $\Omega$ )	CODE	$R_1$ ( $\Omega$ )	$R_2$ ( $\Omega$ )
500B	82	130	141A	270	270
750B	120	200	181A	330	390
800C	130	210	191A	330	470
990A	160	260	221B	330	680
101C	180	240	281B	560	560
111C	180	270	381B	560	1.2K
121B	180	390	501C	620	2.7K
121C	220	270	102A	1.5K	3.3K
131A	220	330	202B	3K	6.2K

**Note**

- For additional impedance codes, refer to the Dual Terminator Impedance Code Table document ([www.vishay.com/doc?31530](http://www.vishay.com/doc?31530))

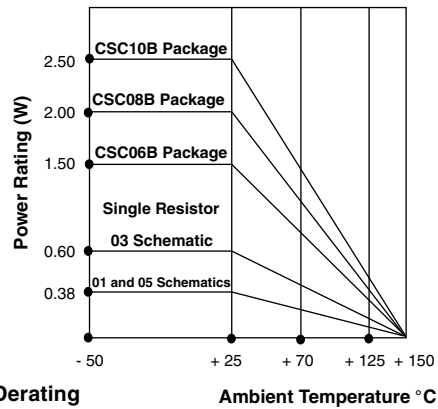


**”A” Profile**



<b>”A” PROFILE +70 °C PACKAGE RATINGS</b>	
CSC12A	1.5 W
CSC11A	1.37 W
CSC10A	1.25 W
CSC09A	1.12 W
CSC08A	1.00 W
CSC07A	0.87 W
CSC06A	0.75 W
CSC05A	0.62 W
CSC04A	0.40 W

**”B” Profile**



<b>”B” PROFILE +70 °C PACKAGE RATINGS</b>	
CSC12B	1.90 W
CSC11B	1.75 W
CSC10B	1.60 W
CSC09B	1.45 W
CSC08B	1.30 W
CSC07B	1.15 W
CSC06B	1.00 W
CSC05B	0.80 W
CSC04B	0.60 W

CIRCUIT APPLICATIONS	
<b>01 Schematic</b> 	<p style="text-align: right;">Bussed</p> <p>The CSCxxx01 single-in-line resistor networks provide the user with nominally equal resistors, each connected to a common pin (pin no. 1). Commonly used in the following applications:</p> <ul style="list-style-type: none"> <li>• “Wired OR” pull-up</li> <li>• Power gate pull-up</li> <li>• MOS/ROM pull-up/pull-down</li> <li>• Open collector pull-up</li> <li>• TTL input pull-down</li> <li>• TTL unused gate pull-up</li> </ul> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• “A” profile standard, “B” profile available</li> </ul>
<b>03 Schematic</b> 	<p style="text-align: right;">Isolated</p> <p>The CSCxxx03 single-in-line resistor networks provide the user with nominally equal resistors. Each resistor is isolated from all others. Commonly used in the following applications:</p> <ul style="list-style-type: none"> <li>• “Wired OR” pull-up</li> <li>• Power driven pull-up</li> <li>• Power gate pull-up</li> <li>• Line termination</li> <li>• Long-line impedance balancing</li> <li>• LED current limiting</li> <li>• ECL output pull-down</li> <li>• TTL input pull-down</li> </ul> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• “A” profile standard, “B” profile available</li> </ul>
<b>05 Schematic</b> 	<p style="text-align: right;">Dual Terminator</p> <p>The CSCxxx05 circuits contain series pairs of resistors. Each series pair is connected between two common lines. The junction of these resistor pairs is connected to the input terminals. The 05 circuits are designed for TTL dual-line termination and pulse squaring.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• “A” profile standard, “B” profile available</li> </ul>

PERFORMANCE		
TEST	CONDITIONS	MAX. $\Delta R$ (TYPICAL TEST LOTS)
Thermal shock	5 cycles between -65 °C and +125 °C	$\pm 0.50 \% \Delta R$
Short time overload	2.5 x rated working voltage, 5 s	$\pm 0.25 \% \Delta R$
Low temperature operation	45 min at full rated working voltage at -65 °C	$\pm 0.25 \% \Delta R$
Moisture resistance	240 h with humidity ranging from 80 % RH to 98 % RH	$\pm 1.00 \% \Delta R$
Resistance to soldering heat	Leads immersed in +350 °C solder to within 1/16" of body for 3 s	$\pm 0.25 \% \Delta R$
Shock	Total of 18 shocks at 100 g's	$\pm 0.25 \% \Delta R$
Vibration	12 h at maximum of 20 g's between 10 Hz and 2000 Hz	$\pm 0.25 \% \Delta R$
Load life	1000 h at +70 °C, rated power applied 1.5 h “ON”, 0.5 h “OFF” for full 1000 h period; derated according to the curve	$\pm 1.00 \% \Delta R$
Terminal strength	4.5 pound pull for 30 s	$\pm 0.25 \% \Delta R$
Insulation resistance	10 000 M $\Omega$ (minimum)	-
Dielectric withstanding voltage	No evidence of arcing or damage (200 V <sub>RMS</sub> for 1 min)	-



## **Disclaimer**

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.