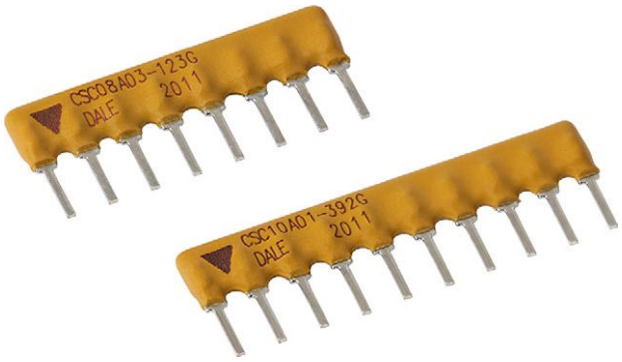
Thick Film Resistor Networks, Single-In-Line, Conformal Coated SIP



FEATURES

Pb Available

e3 RoHS* Available

- 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

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) $P_{70\,°C}$ 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_{DC}
CSCxxx01	A	0.20	10 to 50	250	1, 2, 5	50	100
			50.1 to 2.2M	100			
	B	0.25	10 to 50	250			
			50.1 to 2.2M	100			
CSCxxx03	A	0.30	10 to 50	250	1, 2, 5	50	100
			50.1 to 2.2M	100			
	B	0.40	10 to 50	250			
			50.1 to 2.2M	100			
CSCxxx05	A	0.20	10 to 50	250	1, 2, 5	150	100
			50.1 to 2.2M	100			
	B	0.25	10 to 50	250			
			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** = Ω **K** = kΩ **M** = MΩ **10R0** = 10 Ω **680K** = 680 kΩ **1M00** = 1.0 MΩ **0000** = 0 Ω Jumper	**F** = ± 1 % **G** = ± 2 % **J** = ± 5 % **S** = special **Z** = 0 Ω 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** = ± 1 % **G** = ± 2 % **J** = ± 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

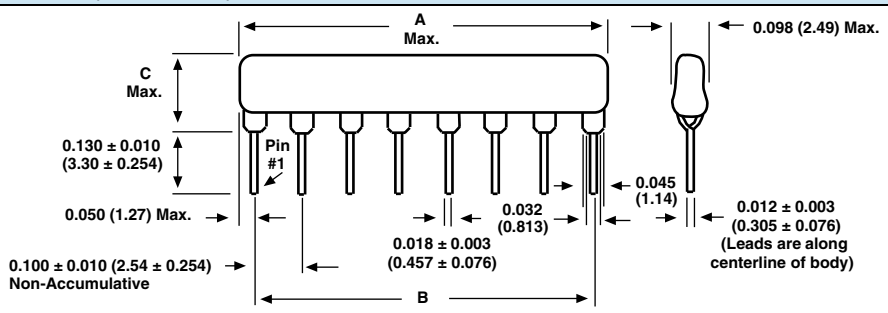
Note

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

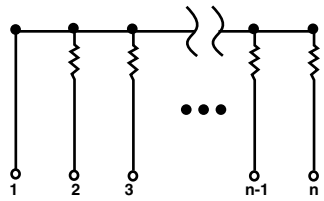
TECHNICAL SPECIFICATIONS

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

DIMENSIONS in inches (millimeters)

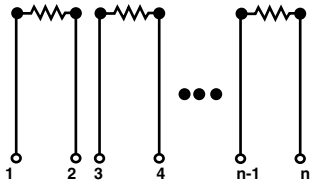


01 SCHEMATIC



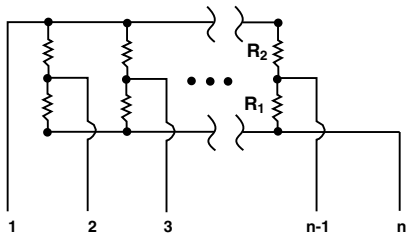
GLOBAL MODEL	NUMBER OF RESISTORS	A (MAX.)	B	C (MAX.)
CSC04	3	0.390 (9.91)	0.300 (7.62)	"A" profile = 0.195 (4.95) "B" profile = 0.295 (7.50)
CSC05	4	0.490 (12.45)	0.400 (10.16)	
CSC06	5	0.590 (14.99)	0.500 (12.70)	
CSC07	6	0.690 (17.53)	0.600 (15.24)	
CSC08	7	0.790 (20.07)	0.700 (17.78)	
CSC09	8	0.890 (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)	

03 SCHEMATIC



GLOBAL MODEL	NUMBER OF RESISTORS	A (MAX.)	B	C (MAX.)
CSC04	2	0.390 (9.91)	0.300 (7.62)	"A" profile = 0.195 (4.95) "B" profile = 0.295 (7.50)
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)	

05 SCHEMATIC



GLOBAL MODEL	NUMBER OF RESISTORS	A (MAX.)	B	C (MAX.)
CSC04	4	0.390 (9.91)	0.300 (7.62)	"A" profile = 0.195 (4.95) "B" profile = 0.295 (7.50)
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 (1)	Solder plated leads

Note

(1) Coating meniscus meets class 2 requirements of IPC-A-610

STOCKED RESISTANCE VALUES IN Ω ("G" TOLERANCE)

Standard E-24 resistance values stocked; consult factory.

Many dual terminator resistance values stocked; consult factory.

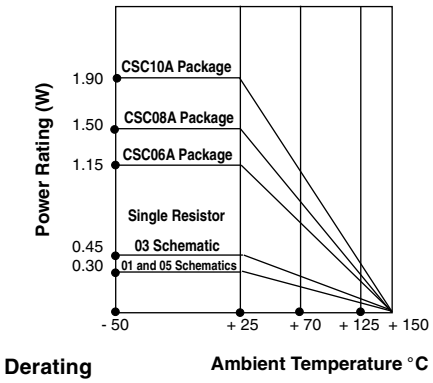
IMPEDANCE CODES

CODE	R_1 (Ω)	R_2 (Ω)	CODE	R_1 (Ω)	R_2 (Ω)
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

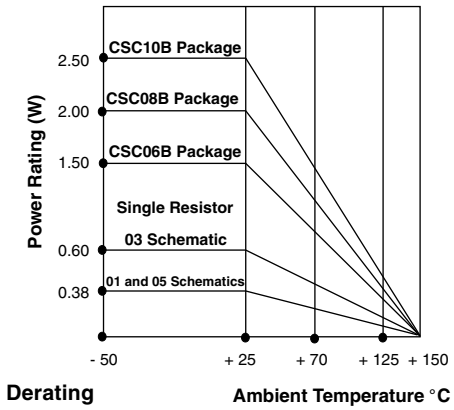
- For additional impedance codes, refer to the Dual Terminator Impedance Code Table document (www.vishay.com/doc?31530)

”A“ Profile



“A” PROFILE +70 °C PACKAGE RATINGS	
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

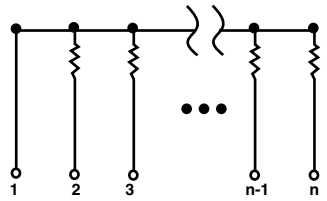


“B” PROFILE +70 °C PACKAGE RATINGS	
CSC12B	1.90 W
CSC11B	1.75 W
CSC10B	1.60 W
CSC09B	1.45 W
CSC08B	1.30 W
CSC07B	1.15 W
CSC06B	1.00 W
CSC05B	0.80 W
CSC04B	0.60 W

CIRCUIT APPLICATIONS

01 Schematic

Bussed



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:

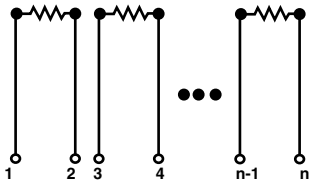
- "Wired OR" pull-up
- Power gate pull-up
- MOS/ROM pull-up/pull-down
- Open collector pull-up
- TTL input pull-down
- TTL unused gate pull-up

Note

- "A" profile standard, "B" profile available

03 Schematic

Isolated



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:

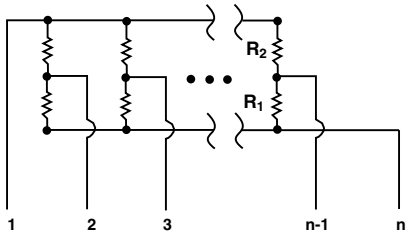
- "Wired OR" pull-up
- Power driven pull-up
- Power gate pull-up
- Line termination
- Long-line impedance balancing
- LED current limiting
- ECL output pull-down
- TTL input pull-down

Note

- "A" profile standard, "B" profile available

05 Schematic

Dual Terminator



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.

Note

- "A" profile standard, "B" profile available

PERFORMANCE

TEST	CONDITIONS	MAX. ΔR (TYPICAL TEST LOTS)
Thermal shock	5 cycles between -65 °C and +125 °C	± 0.50 % ΔR
Short time overload	2.5 x rated working voltage, 5 s	± 0.25 % ΔR
Low temperature operation	45 min at full rated working voltage at -65 °C	± 0.25 % ΔR
Moisture resistance	240 h with humidity ranging from 80 % RH to 98 % RH	± 1.00 % ΔR
Resistance to soldering heat	Leads immersed in +350 °C solder to within 1/16" of body for 3 s	± 0.25 % ΔR
Shock	Total of 18 shocks at 100 *g*'s	± 0.25 % ΔR
Vibration	12 h at maximum of 20 *g*'s between 10 Hz and 2000 Hz	± 0.25 % ΔR
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	± 1.00 % ΔR
Terminal strength	4.5 pound pull for 30 s	± 0.25 % ΔR
Insulation resistance	10 000 MΩ (minimum)	-
Dielectric withstanding voltage	No evidence of arcing or damage (200 V_{RMS} 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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.