

High Precision (0.01 % / 10 ppm/°C) Through Hole Thin Film Conformal Coating Sil Resistor



FEATURES

- Tight TCR to 5 ppm/°C (in 0 °C; +70 °C)
- Incorporates high stability thin film element (0.1 % at + 70 °C at Pn during 1000 h)
- Through hole (Sil)
- 100 Ω to 10 MΩ
- Tight tolerance down to 0.01 %
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

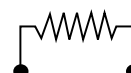

**RoHS
COMPLIANT**

LINKS TO ADDITIONAL RESOURCES



3D Models

SCHEMATIC



STANDARD ELECTRICAL SPECIFICATIONS

MODEL	RESISTANCE RANGE Ω	RATED POWER $P_{70\text{ °C}}$ W	LIMITING ELEMENT VOLTAGE (U_L) V	TOLERANCE ± %	TEMPERATURE COEFFICIENT ⁽¹⁾ ± ppm/°C
CNS 020	100 to 10M	0.5	300	0.01, 0.02, 0.05, 0.1, 0.25, 0.5, 1	5, 10

Note

⁽¹⁾ 15 ppm/°C for R ≥ 1.5M

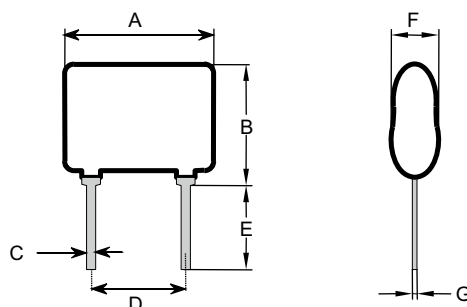
CLIMATIC SPECIFICATIONS

Operating temperature range	-55 °C; +155 °C
-----------------------------	-----------------

MECHANICAL SPECIFICATIONS

Resistive material	Nichrome
Substrate material	Alumina
Terminals	Tin / silver on Cu alloy
Protection	Conformal epoxy coating

DIMENSIONS AND IMPRINTING CNS 020



On front side: Vishay logo and ohmic value (in Ω). On back side: manufacturing code and tolerance (in %)

DIMENSION	INCHES	MILLIMETERS
A	0.330	8.38 max.
B	0.261	6.62 max.
C	0.020	0.51
D	0.200	5.08
E	0.125	3.17 min.
F	0.100	2.54 max.
G	0.010	0.25

**TECHNICAL SPECIFICATIONS**

TEST	SPECIFICATIONS	CONDITIONS
MATERIAL	PASSIVATED NICHROME	
Absolute TCR	Standard ⁽¹⁾	$\pm 10 \text{ ppm}/^{\circ}\text{C}$
	On request	$\pm 5 \text{ ppm}/^{\circ}\text{C}$
Power rating	0.5 W	at +70 °C
	0.3 W	at +125 °C
Dissipation factor (in air) $1/R_{TH}$ ⁽²⁾		6.7 mW/°C

Notes⁽¹⁾ 15 ppm/°C for $R \geq 1.5M$ ⁽²⁾ For information only**ENVIRONMENTAL TEST**

TEST	REQUIREMENTS			CONDITIONS
	NFC 83220 CECC40300	MIL-PRF 55182E	DRIFTS (MAX.)	
Overload	$\pm 0.01 \%$	$\pm 0.05 \%$	0.01 %	$2.5 U_L/5 \text{ s}$ $U_{max} < 2 U_n$
Temperature cycling	$\pm 0.01 \%$	$\pm 0.05 \%$	0.01 %	-55 °C / +155 °C 5 cycles CEI 68-2-14 Test No
Terminal strength	$\pm 0.01 \%$	$\pm 0.02 \%$	0.01 %	CEI 68-2-21 Test Ua (pulling), Ub (bending), Uc (twisting)
Resistance to solder heat	$\pm 0.01 \%$	$\pm 0.02 \%$	0.01 %	+260 °C / 10 s, CEI 68-2-20A Test T6 (Met 1A)
Vibration	$\pm 0.01 \%$	$\pm 0.02 \%$	0.01 %	10 Hz to 500 Hz 10 g, 6 h Met B4; CEI 68-2-6 Test Fc
Climatic sequence	$\pm 0.05 \%$ insulation resistance > $10^2 \text{ M}\Omega$	-	0.05 %	-55 °C / +155 °C 6 cycles 95 % RH RH 85 mbar CEI68-1
Moisture	$\pm 0.05 \%$ insulation resistance > $10^2 \text{ M}\Omega$	-	0.02 %	56 days 95 % RH +40 °C CEI 68-2-3
High temperature storage	$\pm 0.05 \%$	-	0.05 %	1000 h / +155 °C CEI 68-2-20A; Test B

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: CNS020-301KF (preferred part number format)

C	N	S	0	2	0	-	3	0	1	K	F
GLOBAL MODEL						VALUE			TOLERANCE		
CNS 020						Decimal: R, K, or M			L = $\pm 0.01 \%$ C = $\pm 0.25 \%$ P = $\pm 0.02 \%$ D = $\pm 0.5 \%$ W = $\pm 0.05 \%$ F = $\pm 1.0 \%$ B = $\pm 0.1 \%$		

Historical Part Number Example: CNS 020 301K 1 % (will continue to be accepted)

CNS 020	301K	1 %
HISTORICAL MODEL	VALUE	TOLERANCE



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.