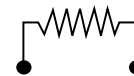


## High Precision (0.01 % / 10 ppm/°C) Through Hole Thin Film Conformal Coating Sil Resistor


**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](http://www.vishay.com/doc?99912)


**RoHS  
COMPLIANT**
**LINKS TO ADDITIONAL RESOURCES**

**SCHEMATIC**


STANDARD ELECTRICAL SPECIFICATIONS					
MODEL	RESISTANCE RANGE Ω	RATED POWER $P_{70\text{ }^\circ\text{C}}$ W	LIMITING ELEMENT VOLTAGE ( $U_L$ ) V	TOLERANCE ± %	TEMPERATURE COEFFICIENT <sup>(1)</sup> ± 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**
<sup>(1)</sup> 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
<b>MATERIAL</b>		<b>PASSIVATED NICHROME</b>	
Absolute TCR	Standard <sup>(1)</sup>	± 10 ppm/°C	-40 °C to +125 °C
	On request	± 5 ppm/°C	0 °C to +70 °C
Power rating		0.5 W	at +70 °C
		0.3 W	at +125 °C
Dissipation factor (in air) 1/R <sub>TH</sub> <sup>(2)</sup>			6.7 mW/°C

**Notes**

- (1) 15 ppm/°C for R ≥ 1.5M
- (2) For information only

ENVIRONMENTAL TEST				
TEST	REQUIREMENTS			CONDITIONS
	NFC 83220 CECC40300	MIL-PRF 55182E	DRIFTS (MAX.)	
Overload	± 0.01 %	± 0.05 %	0.01 %	2.5 U <sub>L</sub> /5 s U <sub>max</sub> < 2 U <sub>n</sub>
Temperature cycling	± 0.01 %	± 0.05 %	0.01 %	-55 °C / +155 °C 5 cycles CEI 63-2-14 Test No
Terminal strength	± 0.01 %	± 0.02 %	0.01 %	CEI 68-2-21 Test Ua (pulling), Ub (bending), Uc (twisting)
Resistance to solder heat	± 0.01 %	± 0.02 %	0.01 %	+260 °C / 10 s, CEI 68-2-20A Test T6 (Met 1A)
Vibration	± 0.01 %	± 0.02 %	0.01 %	10 Hz to 500 Hz 10 g, 6 h Met B4; CEI 68-2-6 Test Fc
Climatic sequence	± 0.05 % insulation resistance > 10 <sup>2</sup> MΩ	-	0.05 %	-55 °C / +155 °C 6 cycles 95 % RH RH 85 mbar CEI68-1
Moisture	± 0.05 % insulation resistance > 10 <sup>2</sup> MΩ	-	0.02 %	56 days 95 % RH +40 °C CEI 68-2-3
High temperature storage	± 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 = ± 0.01 %    C = ± 0.25 % P = ± 0.02 %    D = ± 0.5 % W = ± 0.05 %    F = ± 1.0 % B = ± 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.

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.