

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



### DESIGN SUPPORT TOOLS AVAILABLE



### 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)

### SCHEMATIC



### STANDARD ELECTRICAL SPECIFICATIONS

MODEL	RESISTANCE RANGE Ω	RATED POWER $P_{70\text{ °C}}$ W	LIMITING ELEMENT VOLTAGE (U <sub>L</sub> ) 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

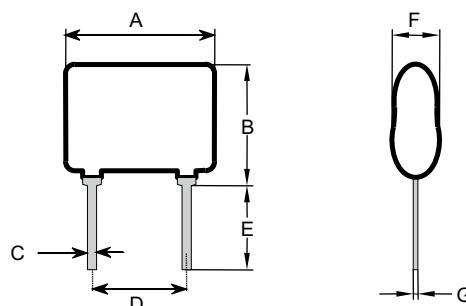
### CLIMATIC SPECIFICATIONS

Operating temperature range	-55 °C; +155 °C
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### MECHANICAL SPECIFICATIONS

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

### DIMENSIONS AND IMPRINTING CNS 020



In clear: model, Vishay logo and manufacturing code. On back: ohmic value (in Ω), 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 <sup>(1)</sup>	$\pm 10 \text{ ppm}/\text{°C}$	-40 °C to +125 °C
	On request	$\pm 5 \text{ ppm}/\text{°C}$	0 °C to +70 °C
Power rating		0.5 W	at +70 °C
		0.3 W	at +125 °C
Dissipation factor (in air) $1/R_{TH}$ <sup>(2)</sup>			6.7 mW/°C

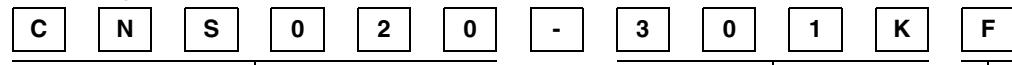
**Notes**
<sup>(1)</sup> 15 ppm/°C for  $R \geq 1.5\text{M}$ 
<sup>(2)</sup> For information only

**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 63-2-14 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)



GLOBAL MODEL

VALUE

TOLERANCE

CNS 020

Decimal: R, K or M

<b>L</b> = $\pm 0.01 \%$	<b>C</b> = $\pm 0.25 \%$
<b>P</b> = $\pm 0.02 \%$	<b>D</b> = $\pm 0.5 \%$
<b>W</b> = $\pm 0.05 \%$	<b>F</b> = $\pm 1.0 \%$
<b>B</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

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