

## Metal Film Resistors, Industrial, $\pm 1\%$ Tolerance



### FEATURES

- Power ratings: 1/2 W, 3/4 W and 1 W at + 70 °C
- $\pm 100$  ppm/°C temperature coefficient
- Superior electrical performance
- Flame retardant epoxy conformal coating
- Standard 5 band color code marking for ease of identification after mounting
- Tape and reel packaging for automatic insertion (52.4 mm inside tape spacing per EIA-296-E)
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS\***  
COMPLIANT

### Note

- \* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

### STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	HISTORICAL MODEL	POWER RATING $P_{70^{\circ}\text{C}}$ W	MAXIMUM WORKING VOLTAGE (1) V	TEMPERATURE COEFFICIENT $\pm$ ppm/°C	TOLERANCE $\pm$ %	RESISTANCE RANGE $\Omega$	E-SERIES
CCF60	CCF-60	1.0	500	100	1	10 to 1M	96

### Note

- Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less.

### TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CCF60
Rated Dissipation at 70 °C	W	1.0
Maximum Working Voltage	V	$\leq 500$
Insulation Voltage (1 Min)	$V_{\text{eff}}$	500
Dielectric Strength	$V_{\text{AC}}$	450
Insulation Resistance	$\Omega$	$\geq 10^{11}$
Operating Temperature Range	°C	- 65 to + 165
Terminal Strength (Pull Test)	lb	2
Weight	g	0.75 max.

### GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: CCF60301RFKR36 (preferred part numbering format)

C C F 6 0 3 0 1 R F K R 3 6

GLOBAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	TEMPERATURE COEFFICIENT	PACKAGING
CCF60	R = $\Omega$ K = k $\Omega$ M = M $\Omega$ 10R0 = 10 $\Omega$ 680K = 680 k $\Omega$ 1M00 = 1.0 M $\Omega$	F = $\pm 1\%$	K = 100 ppm	E36 = Lead (Pb)-free, T/R (2500 pieces)  R36 = Tin/lead, T/R (2500 pieces)

Historical Part Number example: CCF-603010F R36 (will continue to be accepted)

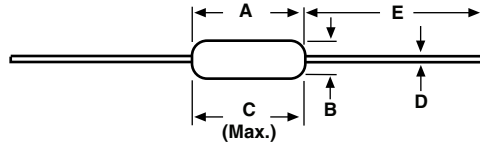
HISTORICAL MODEL	RESISTANCE VALUE	TOLERANCE CODE	PACKAGING
CCF-60	3010	F	R36

### Note

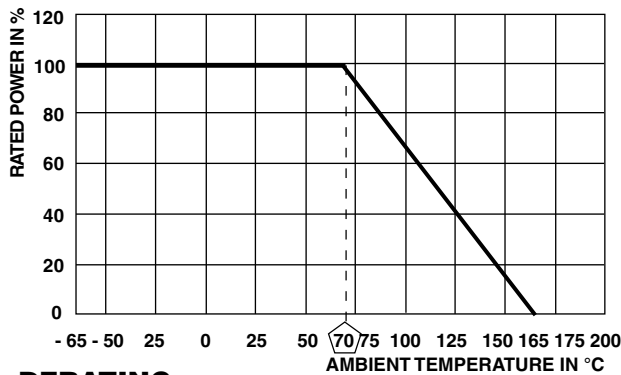
- For additional information on packaging, refer to the Through-Hole Resistor Packaging document ([www.vishay.com/doc?31544](http://www.vishay.com/doc?31544)).



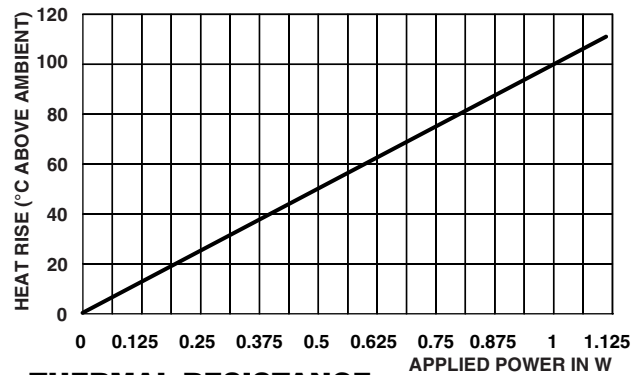
**DIMENSIONS** in inches (millimeters)



GLOBAL MODEL	A	B	C (Max.)	D	E
CCF60	0.344 ± 0.031 (8.74 ± 0.79)	0.139 ± 0.009 (3.53 ± 0.23)	0.400 (10.16)	0.025 ± 0.002 (0.64 ± 0.05)	1.000 ± 0.040 (25.40 ± 1.02)



**DERATING**



**THERMAL RESISTANCE**

RESISTANCE VALUES					
Vishay Dale model CCF60 is available in the standard 96 resistance values per decade. Values are obtained from the following decade table by multiplying by powers of 10. As an example: 30.1 can represent 30.1 Ω, 301 Ω, 3.01 kΩ, 30.1 kΩ or 301 kΩ.					
10.0	14.7	21.5	31.6	46.4	68.1
10.2	15.0	22.1	32.4	47.5	69.8
10.5	15.4	22.6	33.2	48.7	71.5
10.7	15.8	23.2	34.0	49.9	73.2
11.0	16.2	23.7	34.8	51.1	75.0
11.3	16.5	24.3	35.7	52.3	76.8
11.5	16.9	24.9	36.5	53.6	78.7
11.8	17.4	25.5	37.4	54.9	80.6
12.1	17.8	26.1	38.3	56.2	82.5
12.4	18.2	26.7	39.2	57.6	84.5
12.7	18.7	27.4	40.2	59.0	86.6
13.0	19.1	28.0	41.2	60.4	88.7
13.3	19.6	28.7	42.2	61.9	90.9
13.7	20.0	29.4	43.2	63.4	93.1
14.0	20.5	30.1	44.2	64.9	95.3
14.3	21.0	30.9	45.3	66.5	97.6

MARKING
Color code marking with 5 color bands

PERFORMANCE		
POWER RATING AT + 70 °C	MAXIMUM ΔR (TYPICAL TEST LOTS)	
CCF60	1/2 W	3/4 W and 1 W
<b>TEST (1)</b>		
Thermal Shock	± 0.5 %	-
Short Time Overload	± 0.5 %	-
Low Temperature Operation	± 0.5 %	-
Moisture Resistance	± 1.5 %	-
Resistance to Soldering Heat	± 0.5 %	-
Shock	± 0.5 %	-
Vibration	± 0.5 %	-
Life	± 0.5 %	± 1.0 %
Terminal Strength	± 0.2 %	-
Dielectric Withstanding Voltage	± 0.5 %	-

**Note**

(1) Test methods per MIL-STD-202



## 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.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**