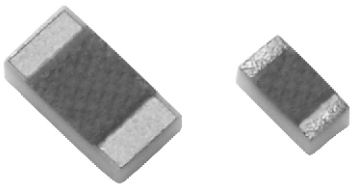
High Frequency (up to 20 GHz) Resistor, Thin Film Surface Mount Chip



FC series chip resistors are designed with low internal reactance. They function as almost pure resistors on a very high range of frequencies. The specialized laser edge trimming allows for precision tolerances to 0.1 %.

FEATURES

- Small standard size 0402 case size
- Edge trimmed block resistors
- Alumina substrate high purity (99.6 %)
- Ohmic range (10 Ω to 1000 Ω)
- Small internal reactance (< 10 mΩ)
- Low TCR (down to ± 25 ppm/°C)
- Epoxy bondable termination available
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* COMPLIANT

GREEN (5-2008) Available

Note

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

APPLICATIONS

- Low noise amplifiers
- Attenuation
- Line termination

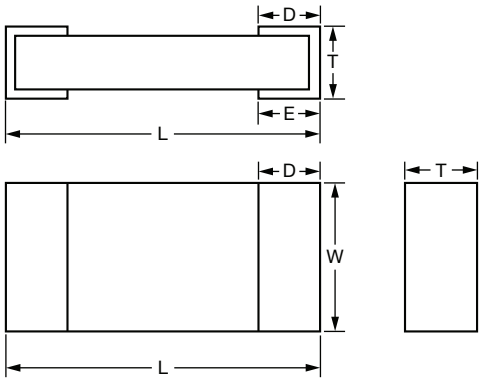
STANDARD ELECTRICAL SPECIFICATIONS

TEST	SPECIFICATIONS	CONDITIONS
Material	Passivated nichrome	-
Resistance Range	10 Ω to 1000 Ω	Case size dependent
TCR: Absolute	± 25 ppm/°C (standard) (≥ 50 Ω) to ± 100 ppm/°C	- 55 °C to + 125 °C
Tolerance: Absolute	± 0.1 % to ± 5.0 %	+ 25 °C
Stability: Absolute	Δ*R* ± 0.02 %	2000 h at 70 °C
Stability: Ratio	-	-
Voltage Coefficient	0.1 ppm/V	-
Working Voltage	30 V to 75 V	-
Operating Temperature Range	- 55 °C to + 125 °C	-
Storage Temperature Range	- 55 °C to + 150 °C	-
Noise	< - 35 dB	-
Shelf Life Stability: Absolute	Δ*R* ± 0.01 %	1 year at + 25 °C

COMPONENT RATINGS

CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE (Ω)
0402	50	30	10 to 1000
0505	125	37	20 to 1000
0603	125	50	10 to 1000
0805	200	50	10 to 1000
1005	250	75	10 to 1000
1206	330	75	10 to 1000

DIMENSIONS in inches (millimeters)



CASE SIZE	LENGTH	WIDTH W (± 0.005)	THICKNESS TYPICAL	TOP PAD D (± 0.005)	BOTTOM PAD E (± 0.005)
0402	0.042 ± 0.008 (1.067 ± 0.203)	0.022 (0.559)	0.015 (0.381)	0.010 (0.254)	0.010 (0.254)
0505	0.055 ± 0.006 (1.397 ± 0.152)	0.050 (1.270)	0.015 (0.381)	0.010 (0.254)	0.015 (0.381)
0603	0.064 ± 0.006 (1.626 ± 0.152)	0.032 (0.813)	0.015 (0.381)	0.012 (0.305)	0.015 (0.381)
0805	0.080 ± 0.006 (2.032 ± 0.152)	0.050 (1.270)	0.015 (0.381)	0.016 ± 0.008 (0.406 ± 0.203)	0.015 (0.381)
1005	0.105 ± 0.008 (2.667 ± 0.203)	0.050 (1.270)	0.015 (0.381)	0.015 (0.381)	0.015 (0.381)
1206	0.126 ± 0.008 (3.200 ± 0.203)	0.063 (1.600)	0.015 (0.381)	0.020 + 0.005/- 0.010 (0.508 + 0.127/- 0.254)	

MECHANICAL SPECIFICATIONS

Resistive Element	Passivated nichrome
Substrate Material	Alumina
Terminations	Pre-soldered or gold
Lead (Pb)-free Option	96.5 % Sn, 3.0 % Ag, 0.5 % Cu
Tin/Lead Option	Sn63
Lead (Pb)-free Finish and Tin/Lead	Hot solder dip

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: FC1206E1001BBTS

F	C	1	2	0	6	E	1	0	0	1	B		B		T	S
F	C	1	2	0	6	K	1	0	0	0	B	T	B	S	T	S

GLOBAL MODEL	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION (1, 2 or 3 digits)	PACKAGING
FC	**0402** **0505** **0603** **0805** **1005** **1206**	**E** = 25 ppm/°C **H** = 50 ppm/°C **K** = 100 ppm/°C	The first 3 digits are significant figures and the last digit specifies the number of zeros to follow. "R" designates the decimal point. Example: 10R0 = 10 Ω 1000 = 100 Ω 1001 = 1 kΩ	**B** = 0.1 % **D** = 0.5 % **F** = 1 % **G** = 2 % **J** = 5 %	**T** = Top sided Au (gold) term Au over Ni epoxy bondable RoHS compliant - e4 **B** = Wraparound Sn/Pb solder 63 % Sn/37 % Pb w/nickel barrier **G** = Wraparound Au over Ni (gold) termination epoxy bondable RoHS compliant - e4 **TB** = Top sided Sn/Pb solder 63 % Sn/37 % Pb w/nickel barrier **TBS** = Top sided lead (Pb)-free solder w/nickel barrier RoHS compliant - e1 **S** = Wraparound lead (Pb)-free solder 96.5 % Sn/3.0 % Ag/0.5 %Cu RoHS compliant - e1	**BS** = BULK 100 min., 1 mult **WS** = WAFFLE 100 min., 1 mult TAPE AND REEL **T0** = 100 min., 100 mult **T1** = 1000 min., 1000 mult (1) **T3** = 300 min., 300 mult **T5** = 500 min., 500 mult **TF** = Full reel **TS** = 100 min., 1 mult

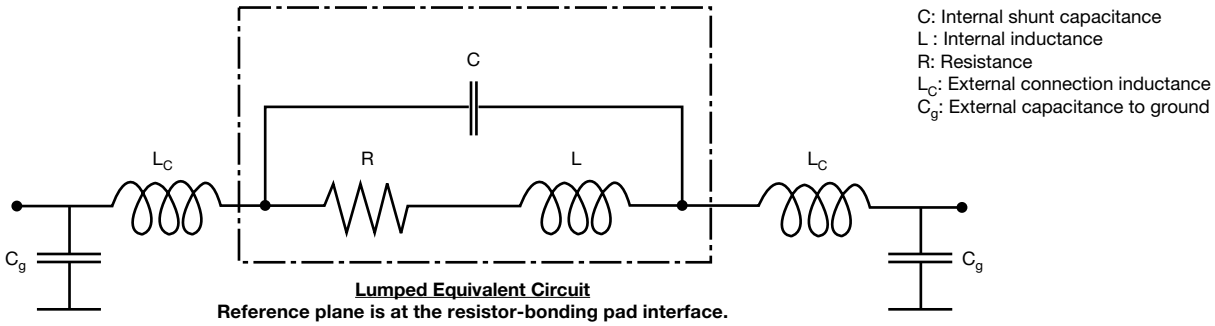
Historical Part Number example: FC1206E1001BBT (for reference purposes only)

FC	1206	E	1001	B	B	T
SERIES	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION	PACKAGING

Note

(1) Preferred packaging code

TYPICAL HIGH FREQUENCY PERFORMANCE ELECTRICAL MODEL AND TESTING

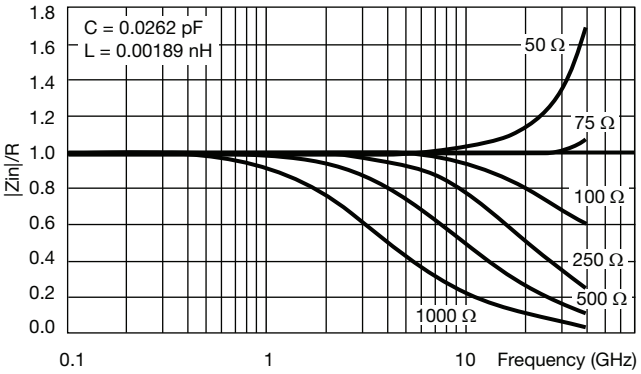


Lumped Equivalent Circuit
Reference plane is at the resistor-bonding pad interface.

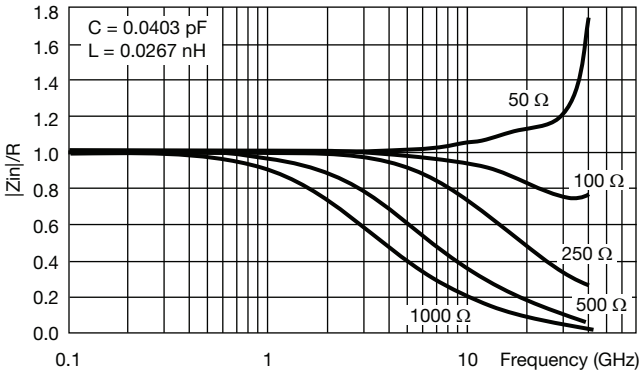
The lumped circuit above was used to model the data at the bonding pad-resistor reference plane. High frequency testing was performed by Modelithics, Inc. on parts mounted to quartz test boards. Quartz test boards were chosen to minimize the contribution of the board effects at high frequencies. Future testing will be performed on various industry standard board types. Vishay in partnership with Modelithics, Inc. will develop substrate scalable models for the FC series resistors. These models will be available for industry standard design software packages and will allow the designer to accurately model their wireless and microwave printed boards.

INTERNAL IMPEDANCE

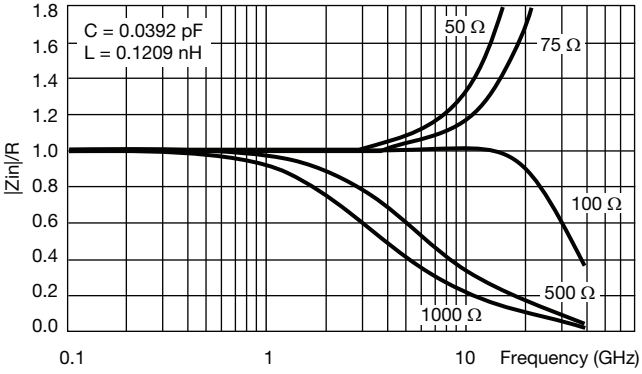
0402 Flip chip



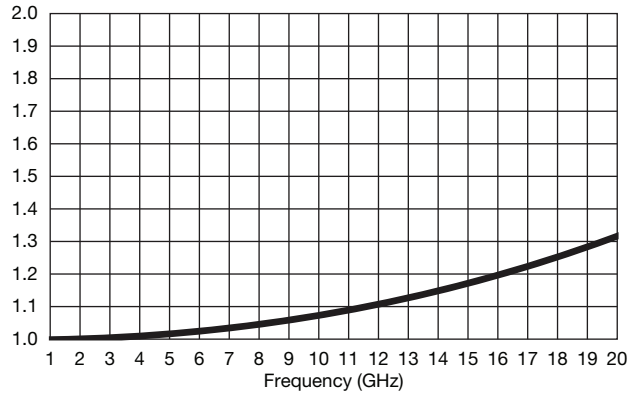
0603 Flip chip



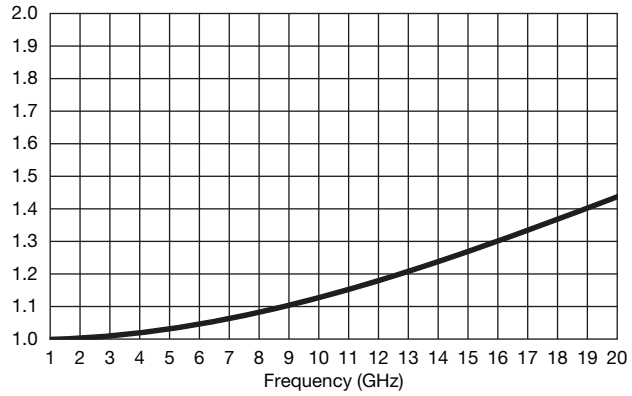
0402 Wraparound



VSWR FC Series 0402 size 50 Ω



VSWR FC Series 0402 size 100 Ω



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.