

## 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
- High purity alumina substrate
- Ohmic range (10  $\Omega$  to 1000  $\Omega$ )
- Small internal reactance (< 10 m $\Omega$ )
- Low TCR (down to  $\pm$  25 ppm/ $^{\circ}$ C)
- Epoxy bondable termination available
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available

**HALOGEN  
FREE**  
Available

**GREEN  
(5-2008)**  
Available

### Note

\* This datasheet provides information about parts that are RoHS-compliant and/or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information/tables in this datasheet for details.

### APPLICATIONS

- Low noise amplifiers
- Attenuation
- Line termination

STANDARD ELECTRICAL SPECIFICATIONS		
TEST	SPECIFICATIONS	CONDITIONS
Material	Passivated nichrome	-
Resistance Range	10 $\Omega$ to 1000 $\Omega$	Case size dependent
TCR: Absolute	$\pm$ 25 ppm/ $^{\circ}$ C to $\pm$ 100 ppm/ $^{\circ}$ C	-55 $^{\circ}$ C to +125 $^{\circ}$ C
Tolerance: Absolute	$\pm$ 0.1 % to $\pm$ 5.0 %	+25 $^{\circ}$ C
Stability: Absolute	$\Delta R \pm$ 0.02 %	2000 h at 70 $^{\circ}$ C
Stability: Ratio	-	-
Voltage Coefficient	0.1 ppm/V	-
Working Voltage	30 V to 75 V	-
Operating Temperature Range	-55 $^{\circ}$ C to +155 $^{\circ}$ C	-
Storage Temperature Range	-55 $^{\circ}$ C to +155 $^{\circ}$ C	-
Noise	< -35 dB	-
Shelf Life Stability: Absolute	$\Delta R \pm$ 0.01 %	1 year at +25 $^{\circ}$ C

COMPONENT RATINGS			
CASE SIZE	POWER RATING (mW)	WORKING VOLTAGE (V)	RESISTANCE RANGE ( $\Omega$ )
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 ( $\pm 0.005$ )	THICKNESS	TOP PAD D ( $\pm 0.005$ )	BOTTOM PAD E ( $\pm 0.005$ )
	0402	0.042 $\pm$ 0.008 (1.067 $\pm$ 0.203)	0.022 (0.559)	0.015 to 0.0015 (0.381 to 0.0381)	0.010 (0.254)	0.010 (0.254)
	0505	0.055 $\pm$ 0.006 (1.397 $\pm$ 0.152)	0.050 (1.270)	0.015 to 0.0015 (0.381 to 0.0381)	0.010 (0.254)	0.015 (0.381)
	0603	0.064 $\pm$ 0.006 (1.626 $\pm$ 0.152)	0.032 (0.813)	0.015 to 0.0015 (0.381 to 0.0381)	0.012 (0.305)	0.015 (0.381)
	0805	0.080 $\pm$ 0.006 (2.032 $\pm$ 0.152)	0.050 (1.270)	0.015 to 0.0015 (0.381 to 0.0381)	0.016 $\pm$ 0.008 (0.406 $\pm$ 0.203)	0.015 (0.381)
	1005	0.105 $\pm$ 0.008 (2.667 $\pm$ 0.203)	0.050 (1.270)	0.015 to 0.0015 (0.381 to 0.0381)	0.015 (0.381)	0.015 (0.381)
	1206	0.126 $\pm$ 0.008 (3.200 $\pm$ 0.203)	0.063 (1.600)	0.015 to 0.0015 (0.381 to 0.0381)	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/ $^{\circ}$ C H = 50 ppm/ $^{\circ}$ C K = 100 ppm/ $^{\circ}$ 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 $\Omega$ 1000 = 100 $\Omega$ 1001 = 1 k $\Omega$	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 with nickel barrier G = Wraparound Au over Ni (gold) termination epoxy bondable RoHS-compliant - e4 TB = Top sided Sn/Pb solder 63 % Sn/37 % Pb with nickel barrier TBS = Top sided lead (Pb)-free solder with 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 <sup>(1)</sup> 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**



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.





**DERATING CURVE**



**VSWR FC Series 0402 size 50 Ω**



**VSWR FC Series 0402 size 100 Ω**





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