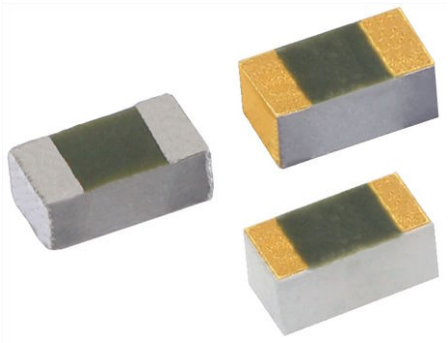
High Frequency 60 GHz High Power 1 W Thin Film Surface Mount Chip Resistor



FEATURES

- Thin film microwave resistors
- Operating frequency to 60 GHz
- Small standard case size (0402)
- High power (1 W)
- Small internal reactance (< 10 mΩ)
- Edge sense trimmed block resistors
- High thermal conductivity aluminum nitride substrate
- Ohmic range (50 Ω and 100 Ω)
- Low TCR (down to ± 25 ppm/°C)
- Epoxy bondable, wire bondable, and solderable termination styles
- Modelithics® library available
- Flame retardant per AEC-Q200-001
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

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

LINKS TO ADDITIONAL RESOURCES

S-Parameters

3D Models

FCHP 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 %.

Aluminum nitride substrate allows for higher power capability versus standard frequency chip resistor.

Modelithics and Vishay have partnered to offer free access of highly accurate, scalable advanced simulation models. Request the Modelithics Vishay model library: www.modelithics.com/mvp/vishay

APPLICATIONS

- 5G base stations and small cells
- RF and microwave test systems
- Connected car
- Internet of things (IoT)

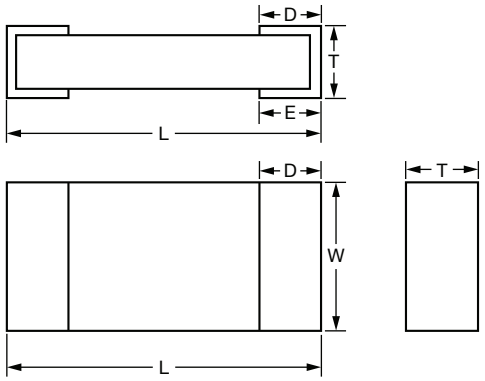
STANDARD ELECTRICAL SPECIFICATIONS		
TEST	**SPECIFICATIONS**	**TEST CONDITIONS**
Material	Passivated nichrome	-
Resistance Range	50 Ω / 100 Ω	-
TCR: Absolute	± 25 ppm/°C to ± 100 ppm/°C	-55 °C to +125 °C
Tolerance: Absolute	± 0.1 % to ± 5.0 %	+25 °C
Stability: Absolute	Δ*R* ± 0.50 %	1000 h at 100 °C
Stability: Ratio	-	-
Voltage Coefficient	0.1 ppm/V	-
Working Voltage	30 V	-
Operating Temperature Range	-55 °C to +155 °C	-
Storage Temperature Range	-55 °C to +155 °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	1000 (1)	30	50 / 100

Note

(1) Dependent on component mounting by user

DIMENSIONS in inches (millimeters)



CASE SIZE	LENGTH	WIDTH W (± 0.005)	THICKNESS T (± 0.0015)	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)

MECHANICAL SPECIFICATIONS	
Resistive Element	Passivated nichrome
Substrate Material	Aluminum nitride
Terminations	Pre-soldered or gold
Lead (Pb)-free Option	100 % matte tin
Tin/Lead Option	Tin lead solder
Lead (Pb)-free Finish and Tin / Lead	Electroplated

GLOBAL PART NUMBER INFORMATION

New Global Part Numbering: FCHP0402E1000BSTS

F	C	H	P	0	4	0	2	E	1	0	0	0	B	S	T	S

GLOBAL MODEL	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION (1, 2, or 3 digits)	PACKAGING
FCHP	**0402**	**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	**B** = 0.1 % **D** = 0.5 % **F** = 1 % **G** = 2 % **J** = 5 %	**T** = top sided Au (gold) term Au over Ni epoxy bond only RoHS-compliant - e4 **B** = wraparound Sn/Pb solder nickel barrier **G** = wraparound Au over Ni (gold) termination epoxy bondable RoHS-compliant - e4 **S** = wraparound lead (Pb)-free solder RoHS-compliant - e3	**BS** = BULK 100 min., 1 mult. **W0** = WAFFLE 100 min., 100 mult. **WS** = WAFFLE 100 min., 1 mult. **WI** = 100 min., 1 mult. (item single lot date code) **WP** = 100 min., 1 mult. (package unit single lot date code) 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. **TI** = 100 min., 1 mult. (item single lot date code) **TP** = 100 min., 1 mult. (package unit single lot date code)

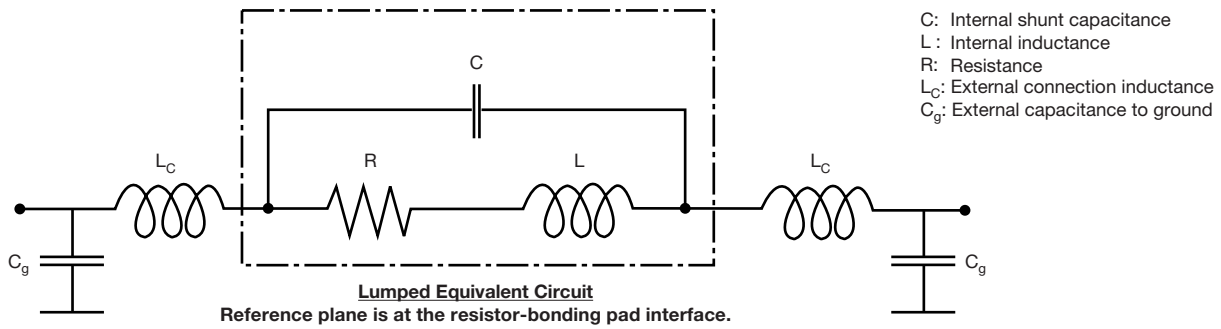
Historical Part Number Example: FCHP0402E1000BST1 (for reference purposes only)

FCHP	0402	E	1000	B	S	T
SERIES	CASE SIZE	TCR CHARACTERISTIC	RESISTANCE	TOLERANCE	TERMINATION	PACKAGING

Note

(1) Preferred packaging code

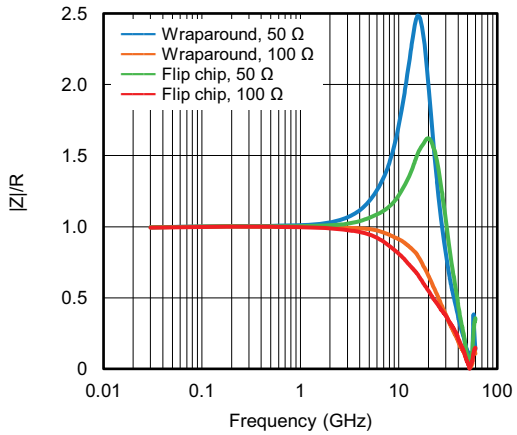
TYPICAL HIGH FREQUENCY PERFORMANCE ELECTRICAL MODEL AND TESTING



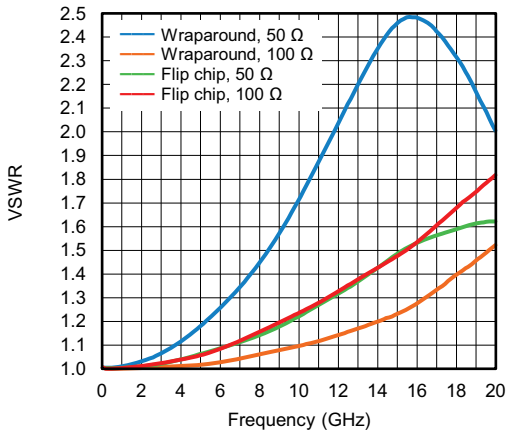
Lumped Equivalent Circuit
Reference plane is at the resistor-bonding pad interface.

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.

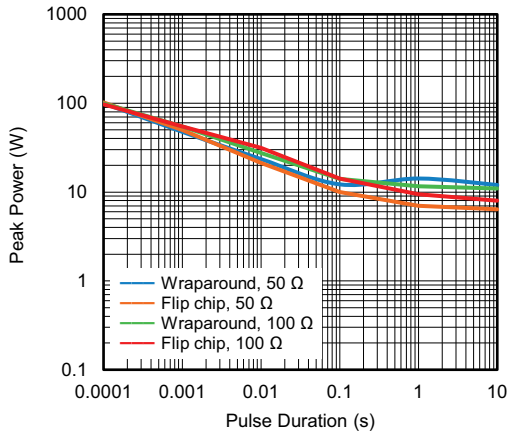
INTERNAL IMPEDANCE



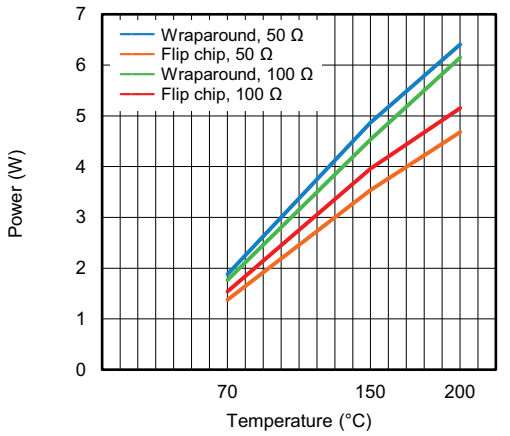
VSWR



SINGLE PULSE LOAD TESTING



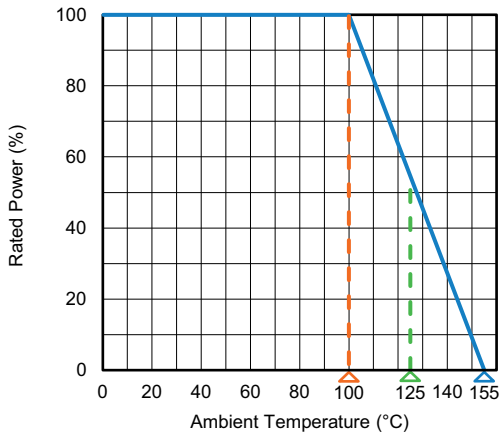
TEMPERATURE VS. APPLIED POWER (1)



Note

(1) Chip surface temperature measured using FLIR SC645 thermal imaging system.
Thermal imaging and load life testing conducted by mounting device to a 1.6" x 3.7" test card with 3.5 mil copper plating on both sides.
Thermal vias on 50 mil centers were utilized for heat transfer between surfaces

DERATING



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