

High Reliability Surface Mount Outrigger Resistors and Terminations



Smiths Interconnect's SpaceNXT™ HC Series is specifically designed and tested to meet the space orbit environmental criteria. It is offered in a high-volume solution that leverages the Smiths Interconnect's space heritage to improve reliability and performance over a QPL or COTS product. Available from a standard part list that eliminates the need for time-consuming drawings and specifications, the SpaceNXT™ HC Series provides an easy-to-use and cost-effective solution with proven mission assurance. This series is supplied with all the necessary test and qualification data to ensure space flight compliance.

The new SpaceNXT™ HC-CXH Outrigger Resistors and Terminations use a patented layout to offer improved power handling over conventional surface mount solutions without compromising broadband performance. This makes the HC-CXH products suited for a wide array of RF applications, particularly in the Space and Defence markets.

The power increase from the patented design (US 8, 994, 490), with added solderable outrigger pads on the sides of the chip, allows to dissipate significantly more power through the extra thermal paths (approximately 50% more than conventional flip chip solutions).

The HC-Series Outriggers Resistors and Terminations are designed for surface mount (SMT) applications, manufactured using robust thick film process technology, are lead free and RoHS compliant.

Outrigger Resistors and Terminations Screened for High Reliability Applications

Features and Benefits

- 100% Flight test data for mission assurance
- Totally passive DC-27 GHz solution for broadband applications
- Available lot qualification for higher reliability
- Small footprint for space and weight savings
- Solderable surface mount for ease of installation

Applications

- Amplifier Circuits
- Transmit/Receive Modules
- Up/Down Converters
- Instrumentation
- Radar
- Broadcast

The products are screened based on MIL-PRF-55342 to ensure long term reliability. Flight units come with 100% group A screening with optional Group B and C qualification.

Smiths Interconnect offers multiple footprints, power handling and material options, resulting in design flexibility and adaptability.

Technical Characteristics

Electrical

Resistance Range	10-500 Ohms
Resistance Tolerance	±5% Standard, ±2% Available
Nominal Impedance	50 ohms
VSWR (Termination Configuration)	DC-6 GHz 1.25:1 6-12 GHz 1.60:1

Environmental

Operating Temperature	-55°C to +150°C
Storage Temperature	-65°C to +150°C
Temperature Coefficient	± 200 PPM/°C Max
Moisture Sensitivity Level	MSL 1 - Unlimited

Mechanical

Substrate Material	Alumina 96% or Aluminum Nitride
Resistive Film	Thick Film
Terminal Material	Thick Film, Silver Plated
Protective Coating	Polymer

Marking

Unit Marking	Ohm Value and Orientation Dot
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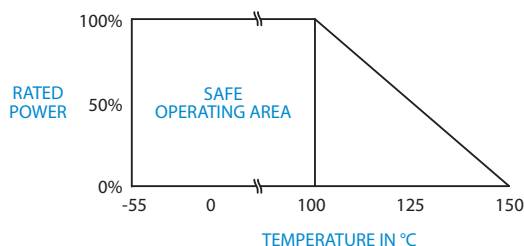
Quality Assurance

	<p>Sample visual and mechanical inspection - 1.0 AQL per mechanical drawing requirements.</p> <p>Periodic electrical inspection performed for commercial grade products.</p> <p>High reliability tested products are available per MIL-PRF-55342.</p>
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Packaging

Standard Packaging	Tape and Reel
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Power Derating Curve

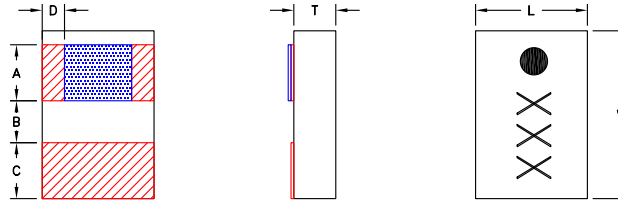


HC Series

Test Parameters per Test Plan TP-9313

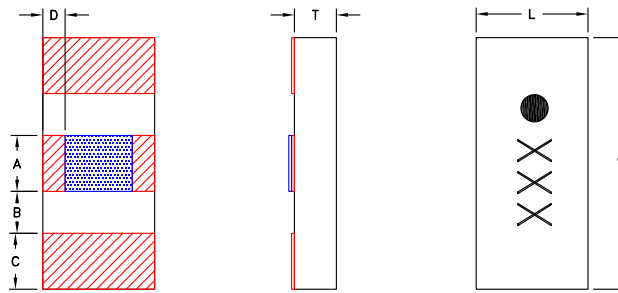
Test	Sample Qty	Test Standard and Method	Test Condition
Group A Inspection		100%	
Visual / Mechanical	100%	MIL-PRF-55342	10X Magnification
Initial Electrical (DC/RF) Inspection	100%	MIL-PRF-55342, MIL-STD 202, Method 303	DC Resistance
Thermal Shock	100%	MIL-PRF-55342, MIL-STD-202, Method 107	10 Cycles -55 to +125°C
Burn In/Bake	100%	MIL-PRF-55342, MIL-STD-202, Method 108	Stabilization Bake @ 150°C for 168 Hours
Final Electrical (RF) Inspection	100%	MIL-PRF-55342, MIL-STD-202, Method 303	DC Resistance
Percent Defective Allowable (PDA)	100%	Per Smiths Interconnect TP-9313	10% allowable
Group B Inspection		6	
Subgroup 1		3	
Electrical (RF) Inspection	3	MIL-PRF-55342, MIL-STD-202, Method 303	RF - Limits per datasheet
Resistance to Temperature Characteristics	3	MIL-PRF-55342, MIL-STD 202, Method 304	Perform the DCR electrical test per sections at room temperature and at temperature extremes -55°C and +125°C.
Electrical (RF) Inspection	3	MIL-PRF-55342, MIL-STD-202, Method 303	RF - Limits per datasheet
Thermal Shock	3	MIL-PRF-55342, MIL-STD 202, Method 107 Condition B-1	25 Cycles -55 to +125°C and cycle of 15 minutes each temperature
Electrical (RF) Inspection	3	MIL-PRF-55342, MIL-STD-202, Method 303	RF - Limits per datasheet
Subgroup 2		3	
Termination Solderability (Resistance to Soldering Heat)	3	MIL-PRF-55342, MIL-STD-202, Method 210	Test Condition B - Solder Dip - Sn/Pb 220°C for 5 seconds
Solder Mounting Integrity	3	MIL-PRF-55342, Method 4.8.13	Devices shall be soldered to a suitable substrate. A 2-kilogram force shall be applied chip edge for 30 seconds. Devices shall show no signs of mechanical damage
Group C Inspection		3	
Initial Electrical (RF) Inspection	3	MIL-PRF-55342, MIL-STD-202, Method 303	RF - Limits per datasheet
Load Life Test	3	MIL-PRF-55342, MIL-STD-202, Method 108	Test Condition D - Maximum Rated Input Power @ 100°C for 250 Hours, Electrical measurements made @ 0, 125, 250 hours
Electrical (RF) Inspection	3	MIL-PRF-55342, MIL-STD-202, Method 303	RF - Limits per datasheet

Available Configurations and Mechanical Drawings



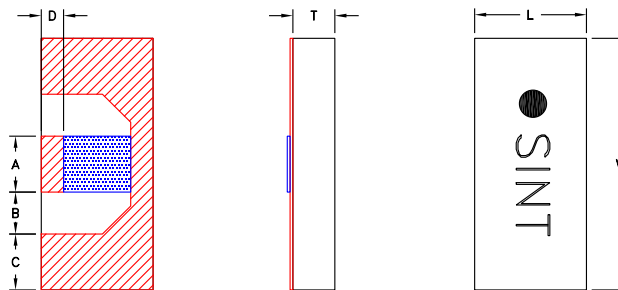
Single Outrigger Configuration

Part Number	Inches							Millimeters						
	L	W	T	A	B	C	D	L	W	T	A	B	C	D
HC-CRH0406XXXXF	0.040	0.060	0.015	0.020	0.015	0.020	0.008	1.016	1.524	0.381	0.508	0.381	0.508	.2032
HC-CRH0607XXXXF	0.060	0.070	0.015	0.030	0.015	0.020	0.012	1.524	1.778	0.381	0.762	0.381	0.508	.3048
HC-CRH0808XXXXF	0.080	0.085	0.015	0.040	0.020	0.020	0.012	2.032	2.159	0.381	1.016	0.508	0.508	.3048
HC-CRHA0808XXXXF	0.080	0.085	0.040	0.040	0.020	0.020	0.012	2.032	2.159	1.016	1.016	0.508	0.508	.3048
HC-CRH1211XXXXF	0.120	0.115	0.020	0.060	0.030	0.020	0.016	3.048	2.921	0.508	1.524	0.762	0.508	.4064
HC-CRHA1211XXXXF	0.120	0.115	0.040	0.060	0.030	0.020	0.016	3.048	2.921	1.016	1.524	0.762	0.508	.4064



Dual Outrigger Configuration

Part Number	Inches							Millimeters						
	L	W	T	A(2X)	B(2X)	C(2X)	D	L	W	T	A	B	C	D
HC-CRH0409XXXXF	0.040	0.090	0.015	0.020	0.015	0.020	0.008	1.016	2.286	0.381	0.508	0.381	0.508	.2032
HC-CRH0610XXXXF	0.060	0.100	0.015	0.030	0.015	0.020	0.012	1.524	2.540	0.381	0.762	0.381	0.508	.3048
HC-CRH0811XXXXF	0.080	0.115	0.015	0.040	0.018	0.020	0.012	2.032	2.921	0.381	1.016	.4572	0.508	.3048
HC-CRHA0811XXXXF	0.080	0.115	0.040	0.040	0.018	0.020	0.012	2.032	2.921	1.016	1.016	.4572	0.508	.3048
HC-CRH1216XXXXF	0.120	0.160	0.020	0.060	0.030	0.020	0.012	3.048	4.064	0.508	1.524	0.762	0.508	.3048
HC-CRHA1216XXXXF	0.120	0.160	0.040	0.060	0.030	0.020	0.012	3.048	4.064	1.016	1.524	0.762	0.508	.3048

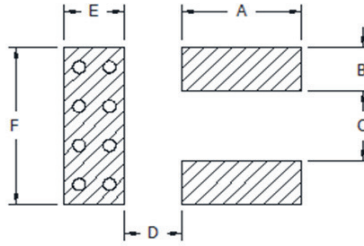


Outrigger Termination

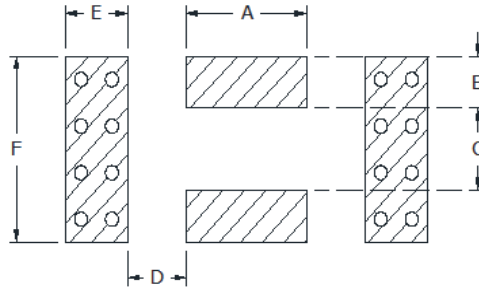
Part Number	Inches							Millimeters						
	L	W	T	A	B	C	D	L	W	T	A	B	C	D
HC-CTH0610F	0.060	0.100	0.015	0.030	0.015	0.020	0.012	1.524	2.540	0.381	0.762	0.381	0.508	.3048

Unless otherwise specified, tolerance: X.XX = ±0.010" X.XXX = ±0.005"

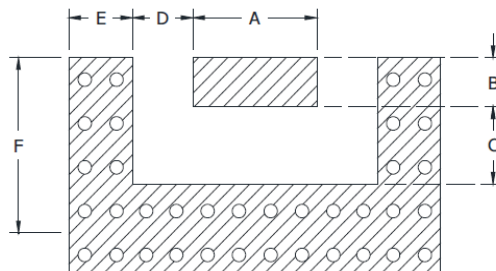
Suggested Mounting Footprint



Part Number	Inches						Millimeters					
	A	B	C	D	E	F	A	B	C	D	E	F
HC-CRH0406XXXXF	0.025	0.010	0.024	0.015	0.025	0.045	0.635	0.25	0.61	0.38	0.64	1.14
HC-CRH0607XXXXF	0.035	0.014	0.036	0.015	0.025	0.065	0.889	0.36	0.91	0.38	0.64	1.65
HC-CRH0808XXXXF	0.045	0.014	0.056	0.018	0.025	0.085	1.143	0.36	1.42	0.44	0.64	2.16
HC-CRHA0808XXXXF	0.045	0.014	0.056	0.018	0.025	0.085	1.143	0.36	1.42	0.44	0.64	2.16
HC-CRH1211XXXXF	0.065	0.016	0.088	0.039	0.025	0.125	1.651	0.41	2.24	0.99	0.64	3.18
HC-CRHA1211XXXXF	0.065	0.016	0.088	0.039	0.025	0.125	1.651	0.41	2.24	0.99	0.64	3.18



Part Number	Inches						Millimeters					
	A	B	C	D	E	F	A	B	C	D	E	F
HC-CRH0409XXXXF	0.025	0.010	0.024	0.015	0.025	0.045	0.635	0.25	0.61	0.38	0.64	1.14
HC-CRH0610XXXXF	0.035	0.014	0.036	0.015	0.025	0.065	0.889	0.36	0.91	0.38	0.64	1.65
HC-CRH0811XXXXF	0.045	0.014	0.056	0.018	0.025	0.085	1.143	0.36	1.42	0.44	0.64	2.16
HC-CRHA0811XXXXF	0.045	0.014	0.056	0.018	0.025	0.085	1.143	0.36	1.42	0.44	0.64	2.16
HC-CRH1216XXXXF	0.065	0.017	0.090	0.030	0.025	0.125	1.651	0.43	2.29	0.76	0.64	3.18
HC-CRHA1216XXXXF	0.065	0.017	0.090	0.030	0.025	0.125	1.651	0.43	2.29	0.76	0.64	3.18



Part Number	Inches						Millimeters					
	A	B	C	D	E	F	A	B	C	D	E	F
HC-CTH0610F	0.035	0.014	0.039	0.007	0.030	0.065	0.889	0.36	0.99	0.18	0.76	1.65

How To Order

Specify Model Number for Resistor: **HC X CRH A XXXX XXX, X F**

	H C		C R H					F
	1	2	3	4	5	6	7	8
1 Series Name	H C	HC Series						
2 Test Code		Test Code A, B, C testing						
3 Series Name		C R H	Chip Resistor Heatsink					
4 Substrate		Alumina	A	ALN				
5 Dimensions						Length x Width (ie 0409 = 0.040" x 0.90")		
6 Resistance Range					(in ohms)			
7 Resistance Tolerance		5% Standard, 2% available						
8 Terminal Finish	F	RoHS Compliant						

Specify Model Number for Termination: **HC X CTH XXXX F**

	H C		C T H			F
	1	2	3	4	5	
1 Series Name	H C	HC Series				
2 Test Code		Test Code A, B, C testing				
3 Series Name		C T H	Chip Termination Heatsink			
4 Dimensions					Length x Width (ie 0409 = 0.040" x 0.90")	
5 Terminal Finish	F	RoHS Compliant				

Worldwide Support

Connectors

Americas

Sales

connectors.uscsr@smithsinterconnect.com

Technical Support

connectors.ustechsupport@smithsinterconnect.com

Europe

Sales

connectors.emeacsr@smithsinterconnect.com

Technical Support

connectors.emeatechsupport@smithsinterconnect.com

Asia

Sales

asiacsr@smithsinterconnect.com

Technical Support

asiatechsupport@smithsinterconnect.com

Fibre Optics & RF Components

Americas

Sales

focom.uscsr@smithsinterconnect.com

Technical Support

focom.techsupport@smithsinterconnect.com

Europe

Sales

focom.emeacsr@smithsinterconnect.com

Technical Support

focom.techsupport@smithsinterconnect.com

Asia

Sales

focom.asiacsr@smithsinterconnect.com

Technical Support

focom.techsupport@smithsinterconnect.com

Semiconductor Test

Americas

Sales

semi.uscsr@smithsinterconnect.com

Technical Support

semi.techsupport@smithsinterconnect.com

Europe

Sales

semi.emeacsr@smithsinterconnect.com

Technical Support

semi.techsupport@smithsinterconnect.com

Asia

Sales

semi.asiacsr@smithsinterconnect.com

Technical Support

semi.techsupport@smithsinterconnect.com

RF/MW Subsystems

Americas, Europe & Asia

Sales

subsystems.csr@smithsinterconnect.com

Technical Support

subsystems.techsupport@smithsinterconnect.com

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