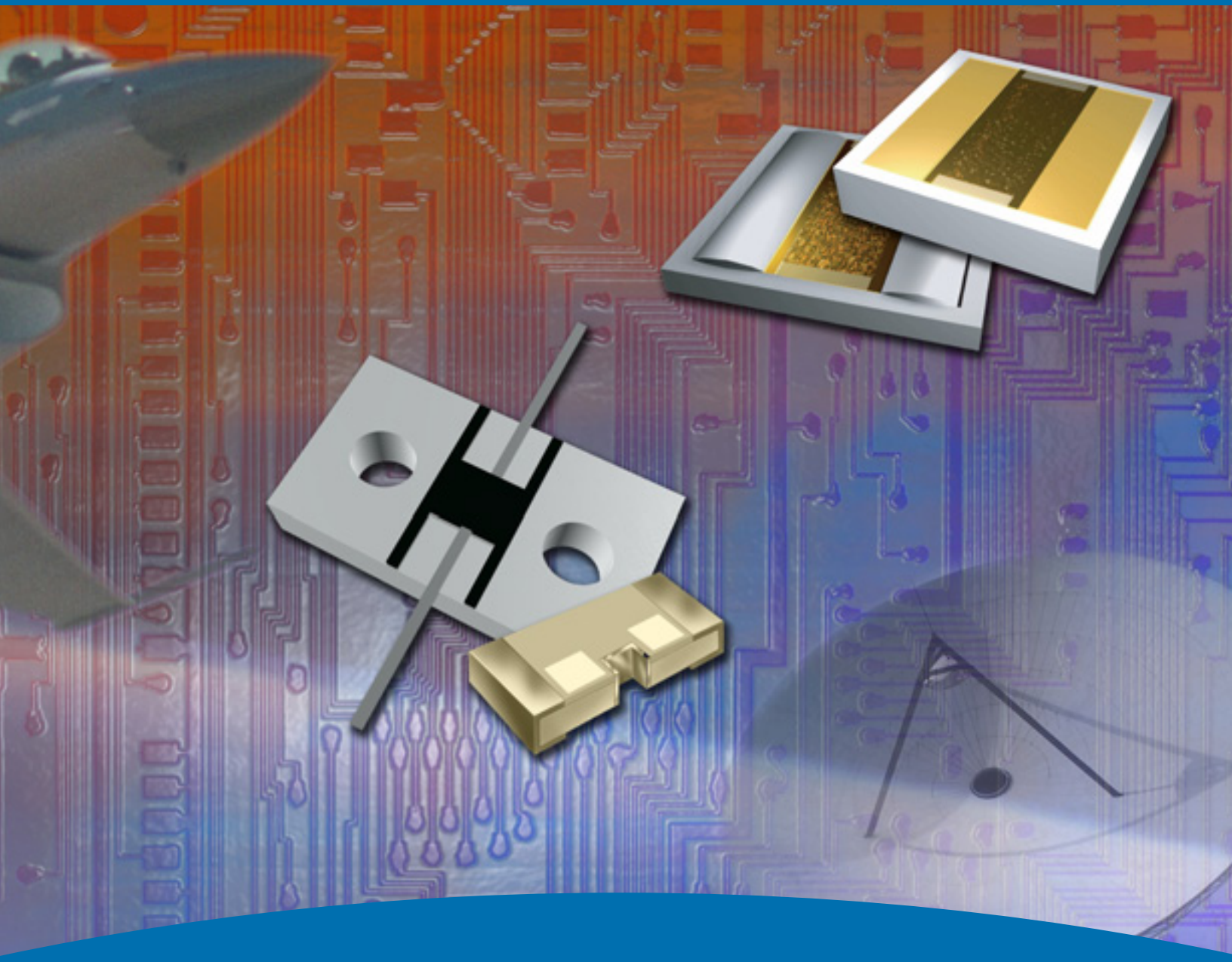


Microwave/High Frequency
Product Catalog

June 2007

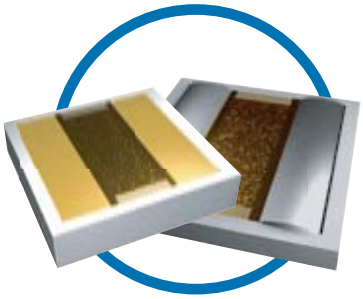
A subsidiary of TT electronics plc

IRC Advanced Film Division

Microwave/High Frequency Chip Product Selection Guide

TT electronics
IRC Advanced Film Division

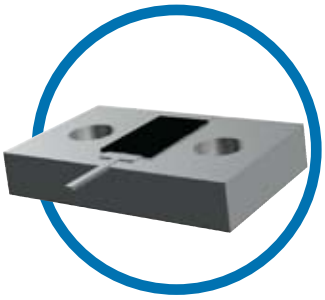
		Leads	Flange	Rated Power	Frequency	Page
TERMINATORS	PFC HF	No	No	333mW	6 GHz	2
	MWR	No	No	250mW	40GHz	6
	CHC	No	No	1.6W	20GHz	8
	PCS-S	No	No	250mW	10GHz	12
	RFX	No	No	20.0W	5GHz	14
	PCS-R	Yes	Yes	12.5W	2.1GHz	17
	PCS-P	Yes	Yes	80.0W	10GHz	19
	RFRF	Yes	Yes	250W	3GHz	21
	RFTL	Yes	No	250W	3GHz	25
	RFTS	No	No	250W	3GHz	27
	RFTF	Yes	Yes	250W	3GHz	30
ATTENUATORS	PFC A1206	No	No	125mW	6GHz	34
	PAT-S	No	No	250mW	10GHz	36
	PAT-W	No	No	500mW	10GHz	40
	PAT-P	Yes	Yes	10.0W	10GHz	42
	RFAXX	No	No	1W	4GHz	44
CONVERTERS	PCH1632	No	No	125mW	1.5GHz	48



Company Overview

IRC Advanced Film Division (AFD) is located in Corpus Christi, Texas, USA. The division opened in 1975 and was acquired by TT Group PLC in 1990. The TT Group PLC changed its name to TT electronics PLC in June 2001, emphasizing its focus on leading-edge specialty electronic products. Within the Group, IRC-AFD specializes in the deposition of various resistor film systems to ceramic and silicon substrate material forming resistors, sensors and other application specific passive devices.

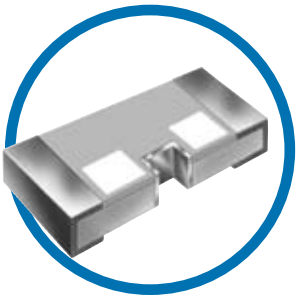
Manufacturing Technology



All product development, process development, and application engineering activities are accomplished in the fully QS9000-certified Corpus Christi, Texas, USA facility.

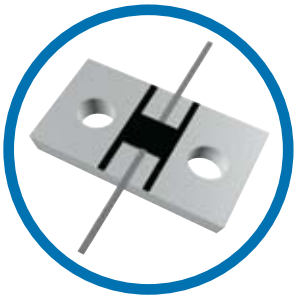
The 100,000 square foot plant houses class 100 and class 1000 clean rooms, modern highly automated processing equipment, large volume thin film deposition, and a semiconductor fab for producing the Company's TaNSil® and TaNCap® tantalum nitride on silicon products. Highly automated world-class equipment keeps IRC-AFD a cost-effective supplier of state-of-the-art products for today's demanding passive electronic applications.

Product Technology



Automotive heating, ventilating, and air conditioning systems utilize the high power, low value and high temperature capabilities of IRC's proprietary thick film inks to control blower fan speed. These same characteristics are desirable for dash-light dimmers. The superior ultra-low resistance performance of IRC-AFD's thick film is a perfect match for current sense resistor applications.

TaNFilm®, TaNSil® and TaNCap® are thin film resistor systems that IRC-AFD has developed into the premier ultra-precision resistor technology used to manufacture a broad range of resistor and resistor/capacitor products. These products are specified worldwide for applications requiring stability, precision, and reliability. IRC-AFD thin film resistor products are an ideal solution for applications in telecommunications, computers, instrumentation, military, medical equipment and industrial process controls.



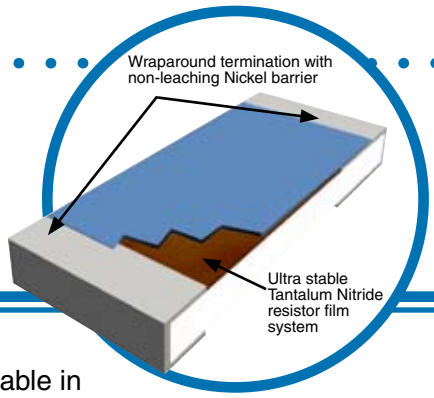
IRC's Microwave product line combines thin film precision with high power and high frequency performance up to 40GHz. These products make an excellent fit for high speed digital line terminations, microwave transmit/receive line terminations and RF test equipment.

High Frequency Chip Resistor Terminators

TT electronics
IRC Advanced Film Division

PFC HF Series

- Long life self-passivating TaNFilm® element
- Frequency performance characterized to 6 GHz
- Available in 0603, 0805 and 1206 chip sizes
- Standard Sn/Pb and Pb-free terminations available



The PFC-HF series of high frequency chip terminators are available in standard chip resistor sizes. Available in 0603, 0805 and 1206 chip sizes, the PFC-HF is a drop-in replacement for poorer performing standard size chips.

With operation characterized to 6 GHz, the PFC-HF series is suitable for RF and microwave transmission line termination as well as high speed digital line termination. Applications include SCSI bus termination, DDR memory termination, RF and microwave transmit and receive line terminations and general high speed transmission line termination.

Electrical Data

	W0603HF	W0805HF	W1206HF
Impedance	50Ω and 75Ω		
Power Rating @70°C	100mW	250mW	333mW
Available Tolerances	±10%, ±5%, ±2%, ±1%		
Operating Temperature Range	-55°C to ±125°C		
Noise	<-25dB		
Termination	60/40 Sn/Pb Plate or Matte Tin Finish		
Substrate	99.5% Alumina		

Environmental Data

Test Per MIL-PRF-55342	Performance	
	Typical	Max
Thermal Shock	±0.02%	±0.10%
Low Temperature Operation	±0.01%	±0.05%
Short-time Overload	±0.01%	±0.05%
High Temperature Exposure	±0.03%	±0.10%
Effects of Solder	±0.01%	±0.10%
Moisture Resistance	±0.03%	±0.10%
Life	±0.03%	±0.10%

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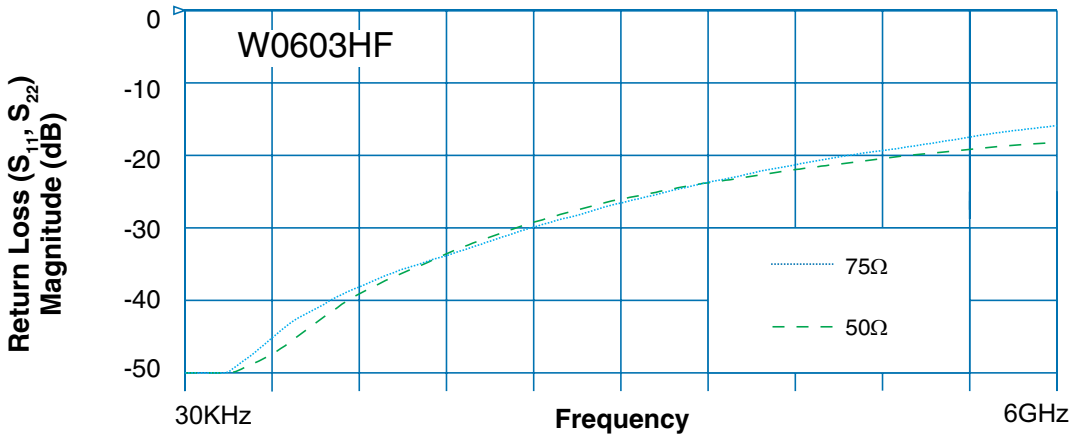
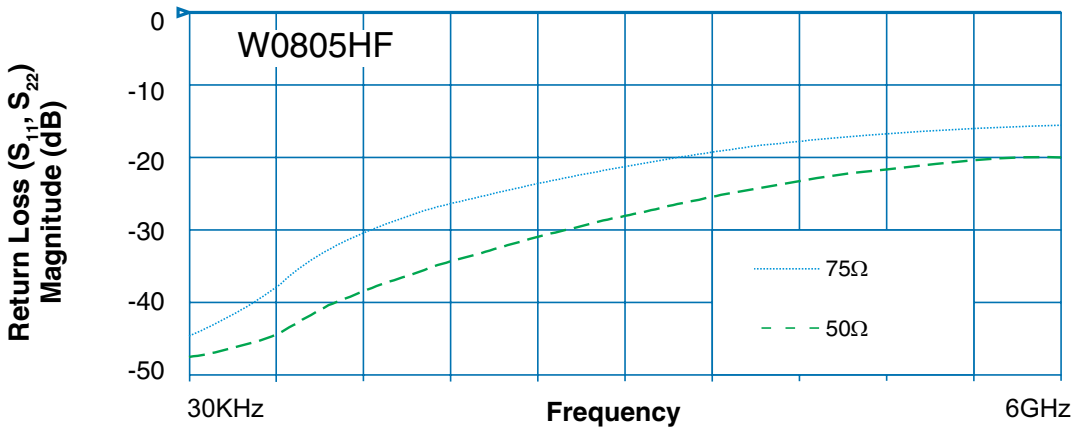
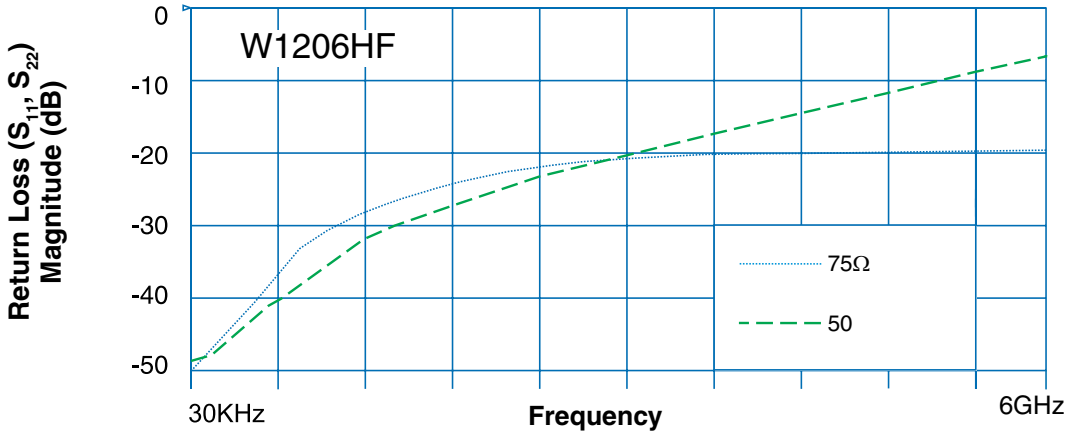
Frequency Data





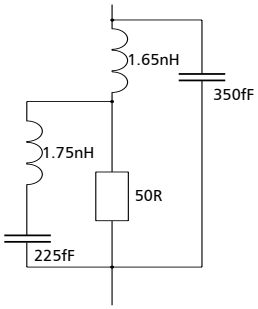


High Frequency Chip Resistor Terminators

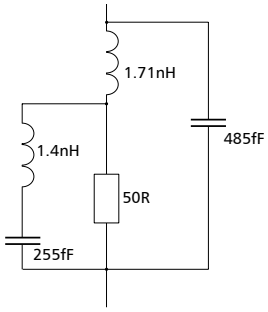
IRC Advanced Film Division

Modeling Data for 50Ω Terminator

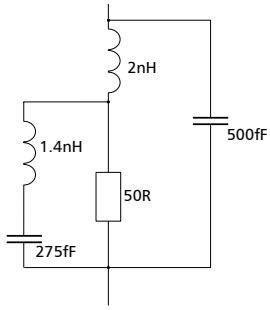
W0603HF



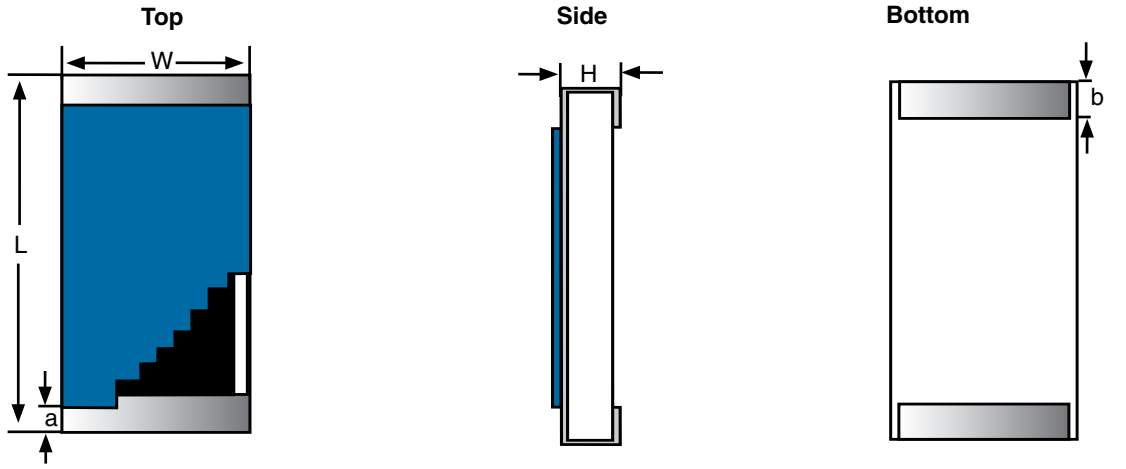
W0805HF



W1206HF



Physical Data

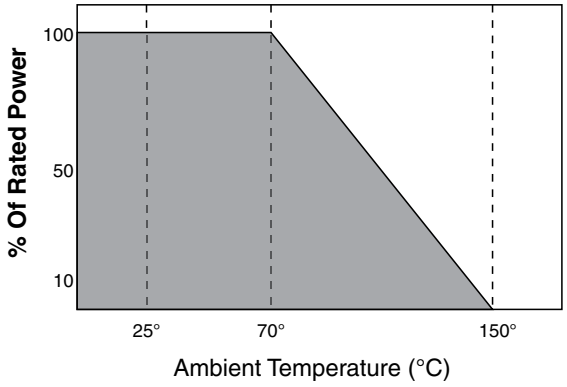


	L	W	H	a	b
W0603	0.063″ ± 0.004	0.031″ ± 0.004	0.020″ ± 0.004	0.012″ ± 0.005	0.015″ ± 0.005
W0805	0.081″ ± 0.005	0.050″ ± 0.005	0.020″ ± 0.006	0.016″ ± 0.008	0.016″ ± 0.008
W1206	0.126″ ± 0.006	0.063″ ± 0.005	0.024″ ± 0.004	0.025″ ± 0.010	0.025″ ± 0.010

High Frequency Chip Resistor Terminators

TT electronics
IRC Advanced Film Division

Power Derating Curve



Ordering Data

Prefix PFC - W0603 HF - 01 - 50R0 - F

Model
W0603; W0805; W1206

Termination
HF = 60/40 Sn/Pb plated solder
HFLF = 100% tin plated (Pb-free)

TCR Code
01 = ±100ppm/°C; 02 = ±50ppm/°C; 03 = ±25ppm/°C

Resistance Code
50R0 = 50Ω; 75R0 = 75Ω

Tolerance Code
K = ±10%; J = ±5%; G = ±2%; F = ±1%

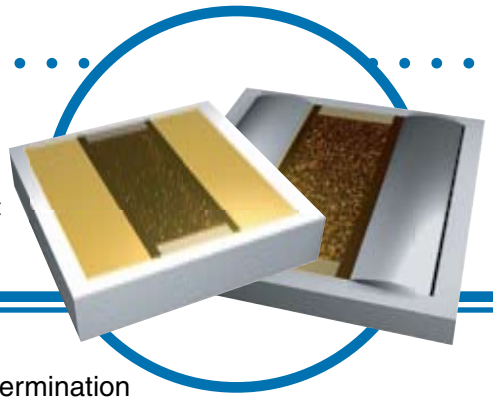
For additional information or to discuss your specific requirements, please contact our Applications Team using the contact details below.

TaNFilm® Microwave Chip Resistor

TT electronics
IRC Advanced Film Division

MWR Series

- Performance characterized to 40 GHz
- Wire-bonded, ribbon-bonded or solder mounted
- Flip chip mounting – keeps resistor element in the same plane as circuit
- Low absolute TCR to ±25ppm/°C



The MWR series is specifically designed for transmission line termination at high frequencies. Characterized for high frequency performance to 40GHz, the MWR series provides superior terminator performance to generic “off-the-shelf” chip resistors.

Constructed with IRC’s proprietary TaNFilm® self passivating thin film resistive element, the MWR series chips possess the rugged environmental characteristics proven through decades of the most demanding military, space, telecommunications, computer, medical and networking applications.

Available with a choice of solderable or bondable termination finishes, the MWR series termination chips are suitable for solder attachment as well as chip and wire or ribbon attached hybrid circuits. Back side mounting is facilitated by an optional gold finish.

For demanding microwave/RF transmission line termination applications in harsh environments, select the IRC MWR series of high frequency termination chips.

Electrical Data

		MWC01
Power Rating	40°C	250mW
	70°C	125mW
Ohmic Value		50Ω, 75Ω, 100Ω
Available Tolerances		±10%, ±5%, ±2%, ±1%
Operating Temperature Range		-55°C to 100°C
Noise		<-20dB
Termination		60/40 Sn/Pb or Gold
Substrate		0.015″ 99.6% Alumina
Maximum Operating Voltage (not to exceed $\sqrt{P \times R}$)		50V
Stray Distributed Capacitance		<0.05pF

Environmental Data

Test Per MIL-PRF-55342	Performance	
	Typical	Max
Thermal Shock	±0.02%	±0.10%
Low Temperature Operation	±0.01%	±0.05%
Short-time Overload	±0.01%	±0.05%
High Temperature Exposure	±0.03%	±0.10%
Effects of Solder	±0.01%	±0.10%
Moisture Resistance	±0.03%	±0.10%
Life	±0.03%	±0.10%

General Note
IRC reserves the right to make changes in product specification without notice or liability.
All information is subject to IRC’s own data and is considered accurate at time of going to print.

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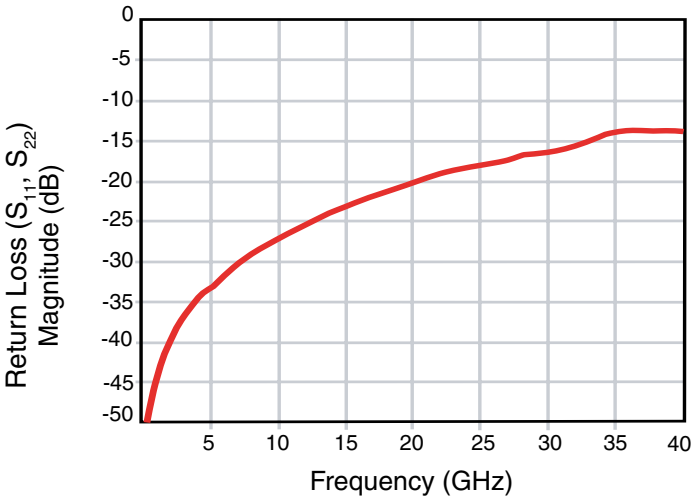
TaNFilm® Microwave Chip Resistor

IRC Advanced Film Division

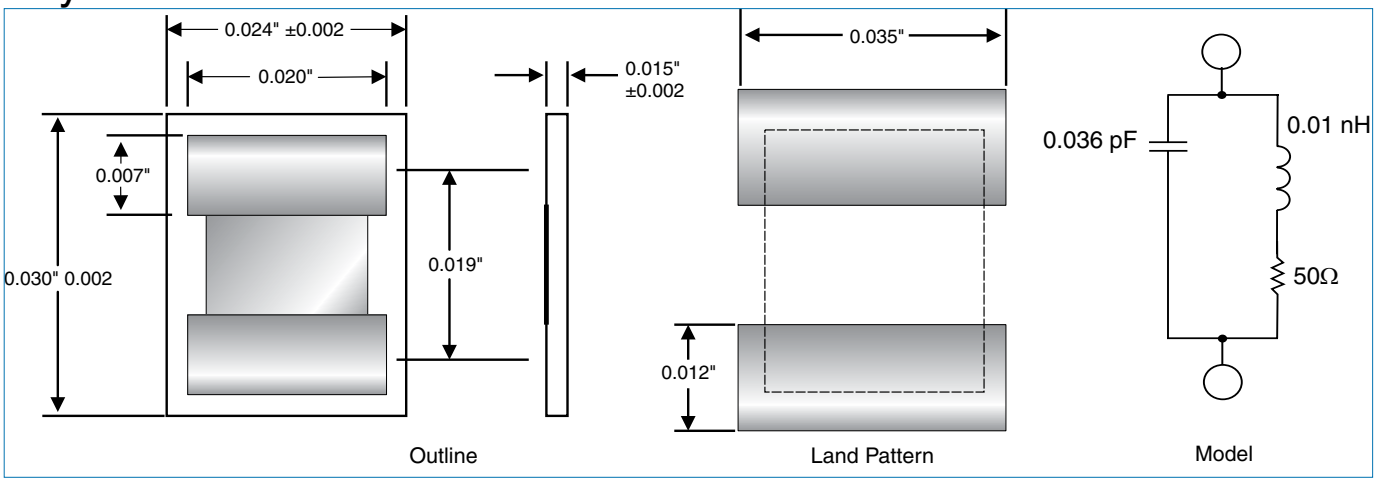
Frequency Performance Data



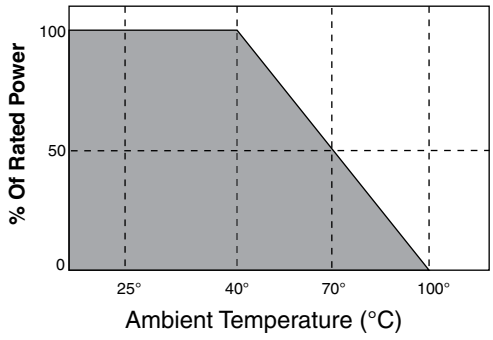
VSWR Data

Frequency	VSWR
1 Ghz	<1.02
5 Ghz	<1.05
10 Ghz	<1.10
20 Ghz	<1.20
30 Ghz	<1.50
40 Ghz	<1.60

Physical Data



Power Derating Curve



Ordering Data

Prefix MWR - MWC01 S C - 01 - 50R0 - F

Model
MWC01

Topside Termination
S = 60/40 Sn/Pb solder; G = Gold

Backside
C = Bare ceramic; G = Gold

TCR Code
01 = ±100ppm/°C; 02 = ±50ppm/°C; 03 = ±25ppm/°C

Resistance Code
50R0 = 50Ω; 75R0 = 75Ω; 1000 = 100Ω

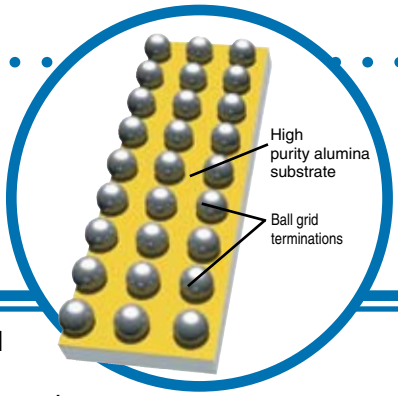
Tolerance Code
K = ±10%; J = ±5%; G = ±2%; F = ±1%

Ceramic Ball Grid Termination Arrays

TT electronics
IRC Advanced Film Division

CHC Series

- Superior TaNFilm® resistors on ceramic substrate
- High density networks on a reduced footprint
- Excellent high frequency performance
- Standard tolerances to ±1%
- RoHS compliant terminations available



IRC's Chipscale on ceramic CHC offers high performance terminal solutions in a small surface mount package. Sn/Pb solder balls placed on a ceramic substrate permit very low parasitic inductance and capacitance. This improves speeds, lowers propagation delays, and reduces ground bounce. IRC's proven tantalum nitride thin film technology can handle the most demanding applications.

For all of your high density, small footprint termination needs, use IRC's CHC Termination arrays.

Electrical Data

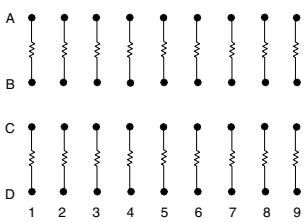
Package	Resistance Range (Ω)	Absolute Tolerances	Absolute TCR	Package Power Rating 70°C*	Element Power Rating 70°C*	Operating Temperature
CB0565A	10R to 4.7K	±1%, ±2%	±100ppm/°C	0.6W	0.1W	-40°C to +85°C
	10R to 10.0K	±5%				
CB0565B	10R to 2.2K	±1%, ±2%				
	10R to 4.7K	±5%				
CD0865A	10R to 4.7K	±1%, ±2%	±100ppm/°C	1.2W		
	10R to 10.0K	±5%				
CD0865B	10R to 2.2K	±1%, ±2%				
	10R to 4.7K	±5%				
CD1065A	10R to 4.7K	±1%, ±2%	±100ppm/°C	1.6W		
	10R to 10.0K	±5%				
CD1065B	10R to 2.2K	±1%, ±2%				
	10R to 4.7K	±5%				
CC0910A	10R to 4.7K	±1%, ±2%	±100ppm/°C	1.2W		
	10R to 10.0K	±5%				
CC0910B	10R to 2.2K	±1%, ±2%				
	10R to 4.7K	±5%				
CD0910A	10R to 4.7K	±1%, ±2%	±100ppm/°C	1.2W		
	10R to 10.0K	±5%				
CD0910B	10R to 2.2K	±1%, ±2%				
	10R to 4.7K	±5%				

*Rated power is from 0°C to 70°C derated linearly to 0W at 85°C.

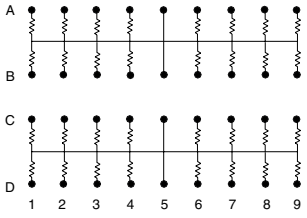
Ceramic Ball Grid Termination Arrays

TT electronics
IRC Advanced Film Division

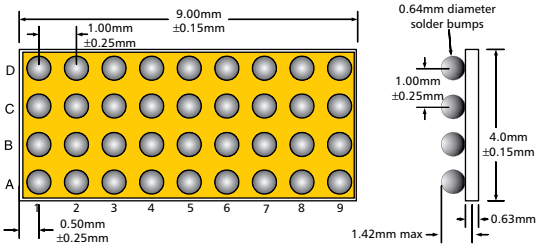
Physical Data and Schematic Diagrams for 1.0mm Pitch Series

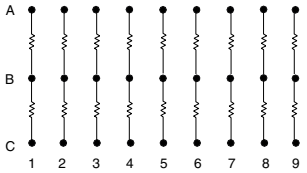


CD0910A isolated schematic
(view from top)

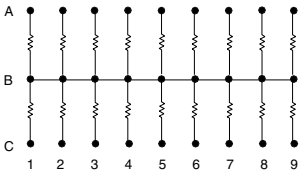


CD0910B bussed schematic
(view from top)

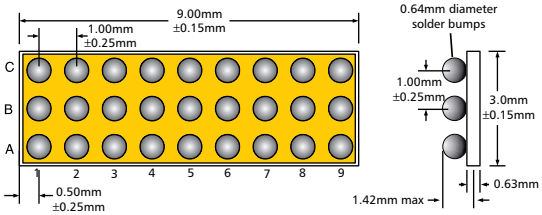




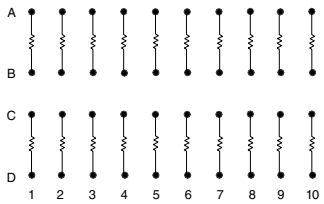
CC0910A isolated schematic
(view from top)



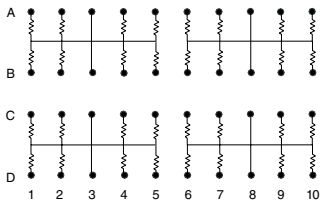
CC0910B bussed schematic
(view from top)



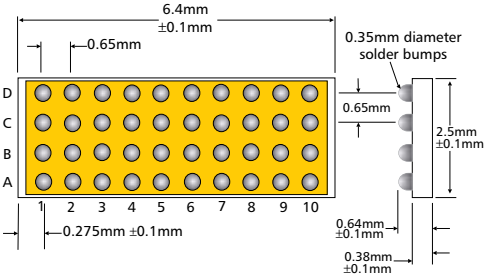
Physical Data and Schematic Diagrams for 0.65mm Pitch Series

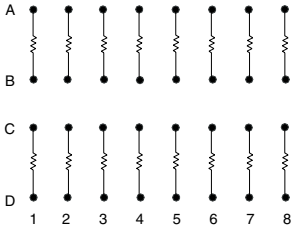


CD1065A isolated schematic
(view from top)

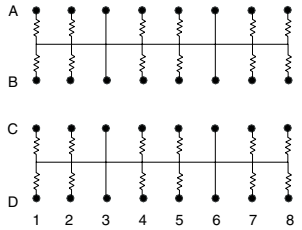


CD1065B bussed schematic
(view from top)

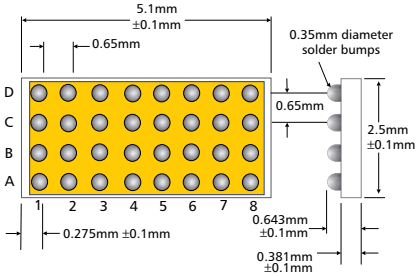


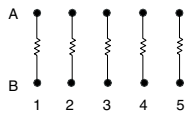


CD0865A isolated schematic
(view from top)

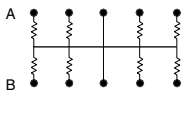


CD0865B bussed schematic
(view from top)

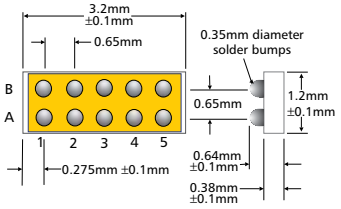




CB0565A isolated schematic
(view from top)



CB0565B bussed schematic
(view from top)



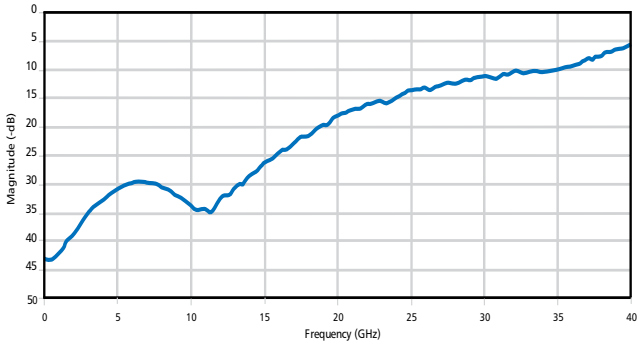
Telephone: 361 992 7900 • Facsimile: 361 992 3377 • Email: afdsales@irctt.com • Website: www.irctt.com

Ceramic Ball Grid Termination Arrays

IRC Advanced Film Division

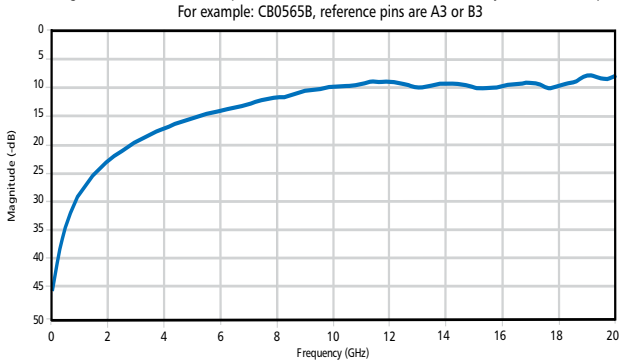
Return Loss Data (50Ω Nominal)

Average return loss for 1mm pitched bussed schematic respect to reference pin.
Where reference pins are B1 to B9 referring to CC0910B schematic.



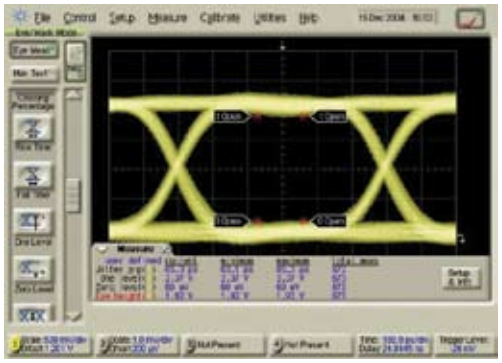
Typical Return Loss For CC0910B-01-50R0-F

Average return loss for 0.65mm pitched bussed schematic for elements away from reference pins.
For example: CB0565B, reference pins are A3 or B3



Typical Return Loss For CD1065B-01-50R0-F

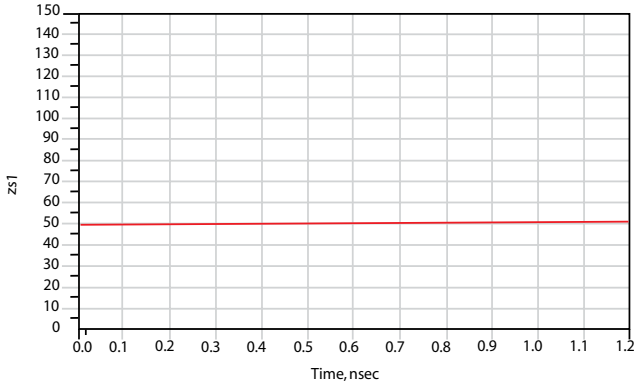
Eye Diagram Data



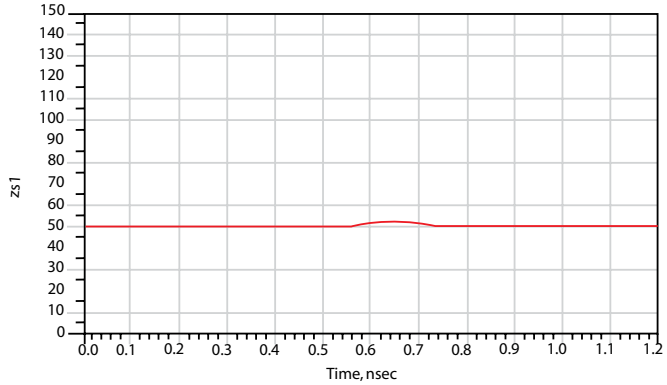
Ideal Terminator

IRC CHC-CC0910B-01-50R0-F Terminator

Impedance Response Data



Ideal 50Ω Terminator
Impedance response to 100psec rising edge



IRC CHC-CC0910B-01-50R0-F Terminator
Impedance response to 100psec rising edge

Ceramic Ball Grid Termination Arrays

TT electronics
IRC Advanced Film Division

Performance Data

Environmental Test	Specification	Typical	Maximum
Thermal shock	MIL-PRF-83401	±0.01%	±0.02%
Low temperature operation	MIL-PRF-83401	±0.01%	±0.05%
Short time overload	MIL-PRF-83401	±0.01%	±0.05%
High temperature exposure	MIL-PRF-83401	±0.03%	±0.05%
Effects of solder	MIL-PRF-83401	±0.01%	±0.05%
Moisture resistance	MIL-STD-202, Method 206 65°C, 45% RH, with bias	±0.02%	±0.01%
Life	MIL-PRF-83401	±0.01%	±0.02%

Ordering Data

Prefix ..... CHC - CD0865 A - 01 - 51R1 - J

Model
CB0565 = 2 × 5, 0.65mm pitch array
CD0865 = 4 × 8, 0.65mm pitch array
CD1065 = 4 × 10, 0.65mm pitch array;
CC0910 = 3 × 9, 1.0mm pitch array;
CD0910 = 4 × 9, 1.0mm pitch array

Schematic
A = Isolated; B = Bussed

Absolute TCR Code
01 = ±100ppm/°C

Four Digit Resistance Code
Standard resistance values
10R0 = 10Ω; 15R0 = 15Ω; 22R0 = 22Ω; 33R0 = 33Ω; 47R0 = 47Ω; 50R0 = 50Ω; 51R1 = 51.1Ω;
75R0 = 75Ω; 1000 = 100Ω; 1001 = 1.00KΩ; 1002 = 10.0KΩ; 2201 = 2.20KΩ; 4701 = 4.70KΩ

Absolute Tolerance Code
J = ±5%; G = ±2%; F = ±1%

Note: LF = Pb-free, RoHS compliant terminations.

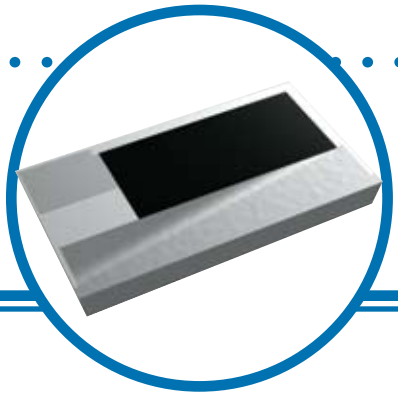
For additional information or to discuss your specific requirements, please contact our Applications Team using the contact details below.

Fixed Surface Mount Microwave Line Terminators

TT electronics
IRC Advanced Film Division

PCS-S Series

- RoHS Compliant
- Up to 10 GHz Operation
- 0603, 0805, 1206 and 1216 chip sizes
- VSWR < 1.2 @ 3GHz (50Ω)



The PCS-S series fixed surface mount microwave terminators are designed with a terminal configuration that permits a reduced land pattern. This series exhibits excellent high frequency characteristics, and utilizes thin film technology to provide stable characteristics over temperature and time. Typical applications include RF test equipment and loads in base stations. The thin film construction with wrap-around terminations insure long term operational stability.

Electrical Data

	PCS0816S	PCS1220S	PCS1632S	PCS3042S
Frequency Range	DC to 10GHz	DC to 10GHz	DC to 6GHz	DC to 3GHz
Power Rating (70°C)	63mW	100mW	125mW	250mW
Absolute TCR	±50ppm/°C			
Operating Temperature Range	-40°C to +125°C			
Termination	Matte Tin Finish 100% Sn			

Environmental Data

	Test Condition	To Meet
Short Time Overload	2.5 x rated voltage, 5 sec	±0.2% +0.05Ω
Load Life	1000 Hours, 70°C	±0.2% +0.05Ω
Moisture Resistance	1000 Hours, 40°C 95% RH	±0.2% +0.05Ω
Temperature Cycle	5 Cycles 125°C High, -55°C Low	±0.2% +0.05Ω
Resistance to Soldering Heat	260°C, 10 sec.	±0.2% +0.05Ω
Insulation Resistance	500V, 1 minute	>1,000MΩ

VSWR Data

Frequency	0816S	1220S	1632S	3042S
	50Ω	50Ω	50Ω	50Ω
DC to 2GHz	1.2	1.2	1.2	1.2
2.1 to 3 GHz	1.2	1.3	1.3	1.4
3.1 to 6 GHz	1.3	1.3	1.4	--
6.1 to 10 GHz	1.3	1.4	--	--

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IRC
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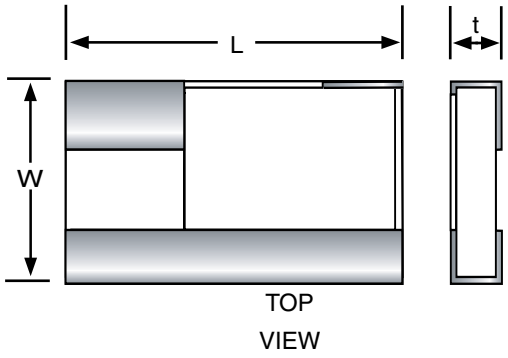
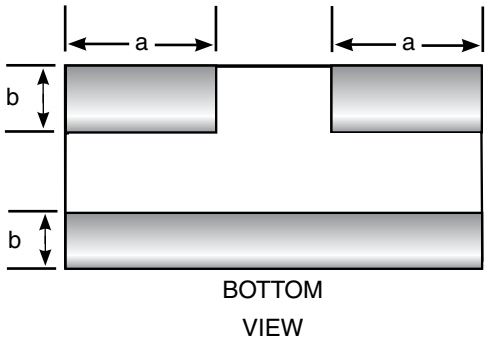
TT electronics plc
PCS-S Series Issue June 2007 Sheet 1 of 2

Fixed Surface Mount Microwave Line Terminators

IRC Advanced Film Division

Physical Data





Dimensions (mm)				
	PCS0816S	**PCS1220S**	**PCS1632S**	**PCS3042S**
L	1.6 ± 0.15	2.0 ± 0.15	3.20 ± 0.20	4.20 ± 0.20
W	0.8 ± 0.15	1.25 ± 0.15	1.60 ± 0.20	3.00 ± 0.20
a	0.4 ± 0.15	0.4 ± 0.15	0.60 ± 0.20	0.80 ± 0.20
b	0.2 ± 0.15	0.3 ± 0.15	0.30 ± 0.15	0.40 ± 0.15
t	0.4 ± 0.15	0.4 ± 0.15	0.40 ± 0.15	0.40 ± 0.15

Ordering Data

Prefix ..... **HFR** - **PCS3042S** - **50R0**

Model

PCS0816SLF = 0603 size chip terminator with 100% Sn terminations
PCS1220SLF = 0805 size chip terminator with 100% Sn terminations
PCS1632SLF = 1206 size chip terminator with 100% Sn terminations
PCS3042SLF = 1216 size chip terminator with 100% Sn Terminations

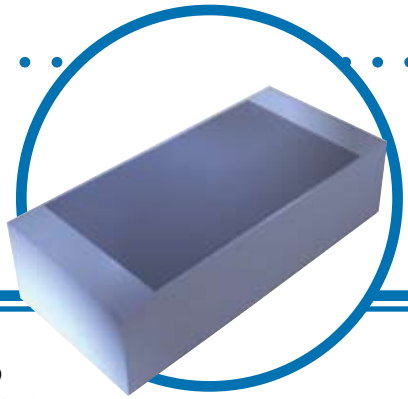
Impedance
50R0 = 50Ω

High Frequency Surface Mount Terminators

TT electronics
IRC Advanced Film Division

RFX Series

- RoHS compliant
- 1% tolerance and 50ppm/°C
- Small size 10 and 20W power chip resistors
- Two-beam lead and surface mount options available



The RFX series of high frequency line terminators provide superb high frequency performance at power ratings to 20 watts in a surface mount chip. Both leadless and leaded versions of the device are available providing maximum flexibility for mechanical circuit attachment and circuit configuration.

The RFX is available in a wide range of ohmic values from 50 ohms to 800 ohms affording maximum flexibility in controlled impedance transmission line design and termination. Applications include RF/microwave power amplifiers, power splitters, cell base stations and circulators/isolators.

Electrical Data

	RFH	RFJ	RFK
Power Rating	10W	20W	20W
Resistance	50Ω, 100Ω, 150Ω, 200Ω, 250Ω, 300Ω, 400Ω, 600Ω, 800Ω,		
Tolerance	±1%		
Capacitance	<0.05pF		
Operating Temperature Range	-55°C to 155°C		
Absolute TCR	±50ppm/°C		

Note: RFJ52 and RFJ72 are not RoHS compliant.

Environmental Data

	Test Condition	To Meet
Short TimeOverload	2.5 x Rated Voltage 5 sec.	±0.2% +0.05Ω
Load Life	1000 Hours, 70°C	±0.2% +0.05Ω
Moisture Resistance	1000 Hours, 40°C 95% RH	±0.2% +0.05Ω
Temperature Cycle	5 Cycles +125°C high, -55°C Low	±0.2% +0.05Ω
Resistance to Soldering Heat	260°C, 10 sec.	±0.2% +0.05Ω
Insulation Resistance	500V, 1 minute	>1,000MΩ

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High Frequency
Surface Mount Terminators

TT electronics
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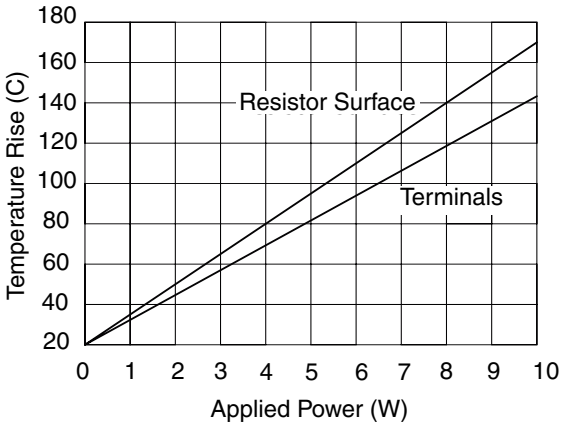
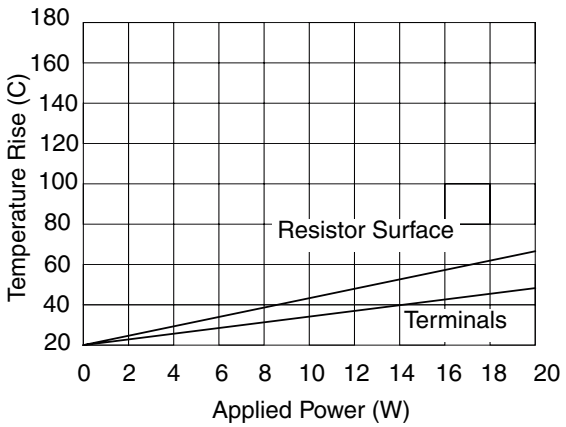
Flange Power Terminations

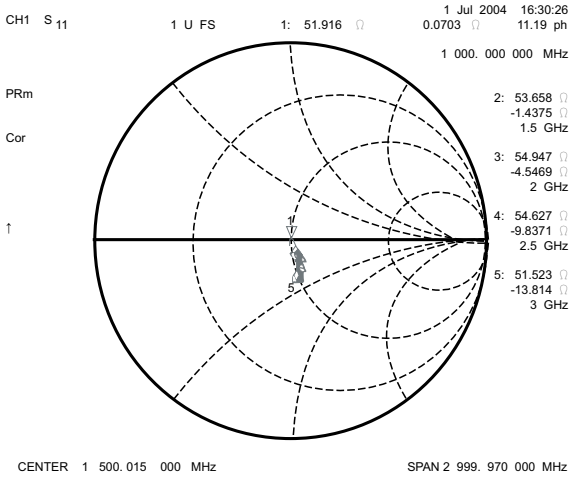
Temperature Rise
RFH72C101F on 0.8mm Glass Teflon PWB



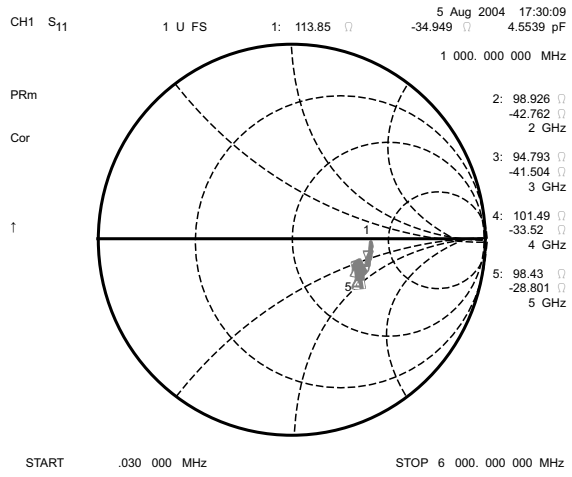
Temperature Rise
RFH72C101F on attached heat sink



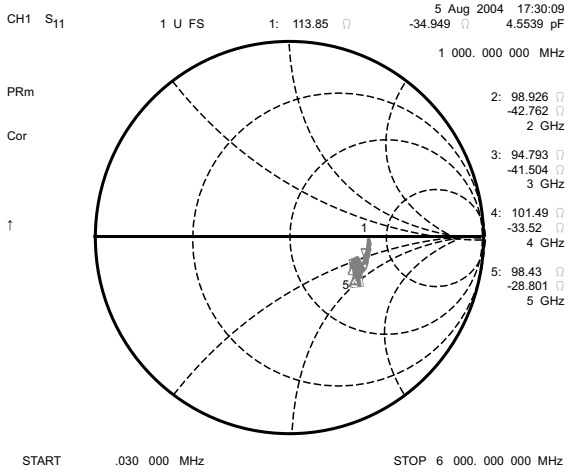
S11, RFH72C500F



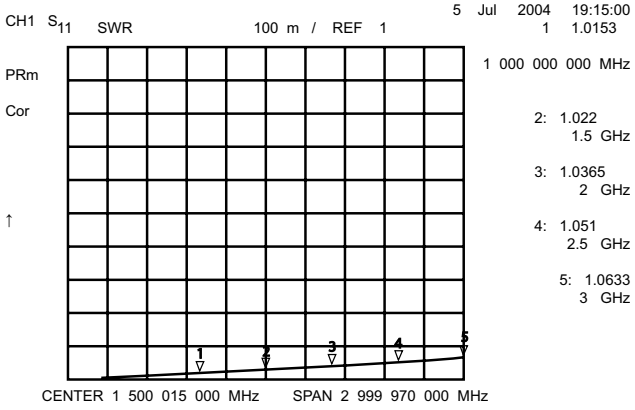
S11, RFH72C101F



S11, RFH72C151F



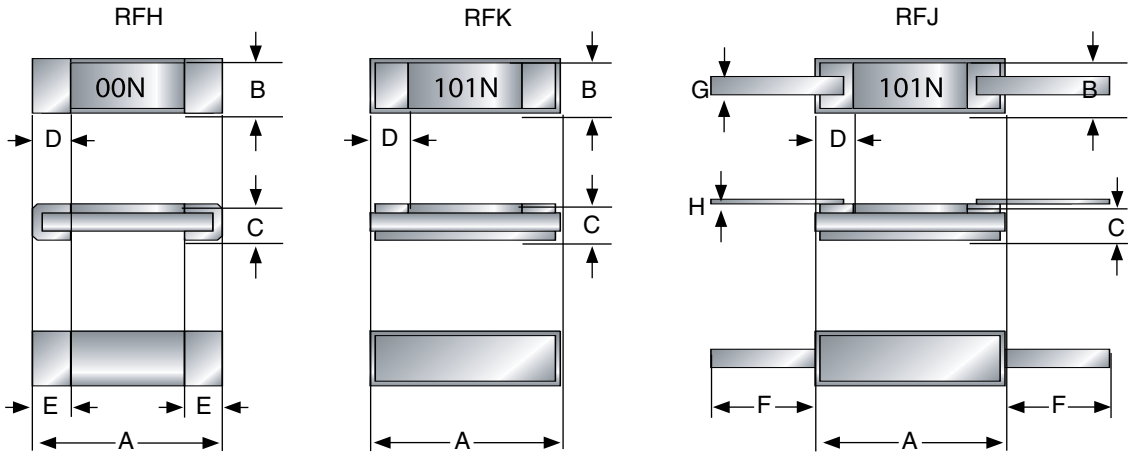
VSWR, RFH72C500F



High Frequency Surface Mount Terminators

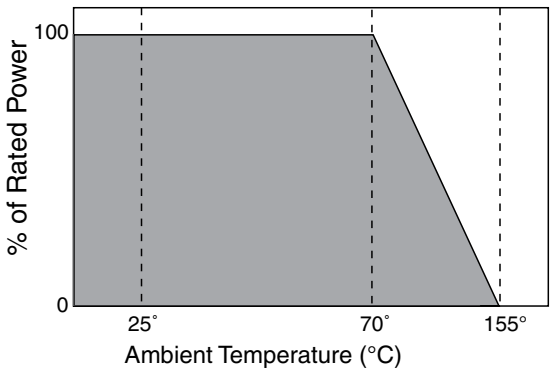
IRC Advanced Film Division

Physical Data



Dimensions (mm)								
Type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
RFH52	5.0	2.5	1.2 max	0.8	0.8	—	—	—
RFH72	7.0	2.0	1.2 max	0.8	0.8	—	—	—
RFK52	5.0	2.5	1.2 max	0.8	–	—	—	—
RFK72	7.0	2.0	1.2 max	0.8	–	—	—	—
RFJ52	5.0	2.5	1.2 max	—	–	5.0	1.0	1.0
RFJ72	7.0	2.0	1.2 max	—	–	5.0	1.0	1.0

Power Derating Curve



Ordering Data

Prefix HFR - RFH72LF - C50 OHM F 000

Model
RFH52LF; RFH72LF; RFK52LF
RFK72; RFJ52; RFJ72

Note: RFJ52 and RFJ72 are not RoHS compliant.

Resistance
C50 OHM; C100 OHM; C150 OHM; C200 OHM
C250 OHM; C300 OHM; C400 OHM; C600 OHM; C800 OHM

Tolerance
F = ±1%

Packaging
000 = 100 pcs/bulk leadless
001 = 100 pcs/bulk leadless
003 = 100 pcs/tray beam leaded

High Power, High Frequency Terminators

TT electronics
IRC Advanced Film Division

PCS-R Series

- Single sided flange style
- Up to 12.5W power dissipation
- High frequency operation to 2.1GHz

The PCS-R series high power thin film terminator is designed for termination of RF signals as a surface mount coupler load or other RF applications. Typical applications include high power RF amplifiers, and wireless base stations. Higher power dissipation is achieved by attaching a wrap-around flange directly to the heat sink. The thin film construction provides consistent operational stability over temperature and time.

Electrical Data

Impedance	50Ω
VSWR	1.1 Max
Frequency Range	DC to 2.1GHz
Power Rating @70°C	1W (Max 12.5W)
TCR	±50ppm/°C
Max Heat Sink Temperature (@ Max Rated Power)	80°C
Operating Temperature Range	-55° to +80°C
Terminations	Matte Tin Finish 100% Sn

Environmental Data

Test	Test Condition	To Meet
Short Time Overload	Rated Voltage x 2.5, 5 sec.	±0.5% +0.05Ω
Load Life	1000 Hours 40°C, Rated Voltage	±1.0% +0.05Ω
Solderability	235°C, 3 sec.	More than 95%
Moisture Resistance	1000 Hours, 40°C 95% RH	±1.0% +0.05Ω
Temperature Cycle	5 Cycles 70°C High, -10°C Low	±0.5% +0.05Ω
Resistance to Soldering Heat	250°C, 10 sec.	±0.5% +0.05Ω
Insulation Resistance	DC 500V, 1 min.	>1,000MΩ

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High Power,
High Frequency Terminators

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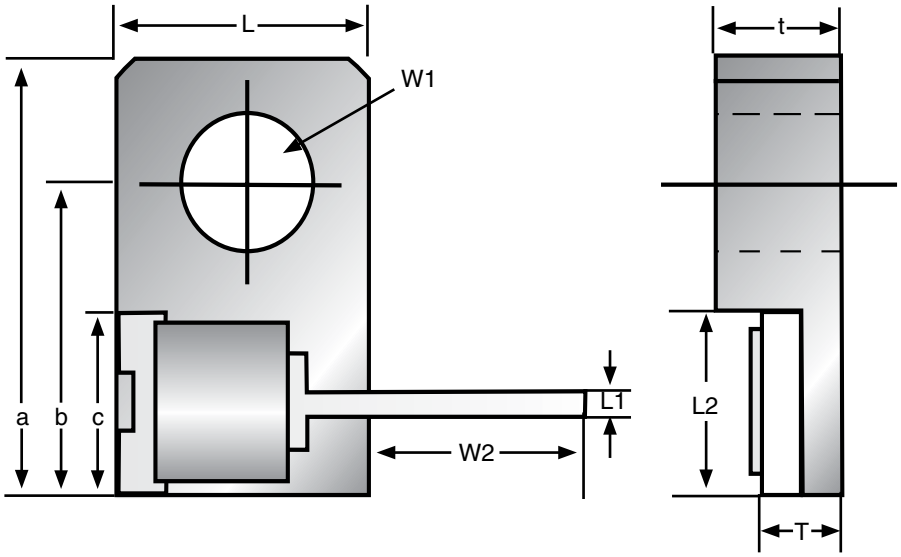
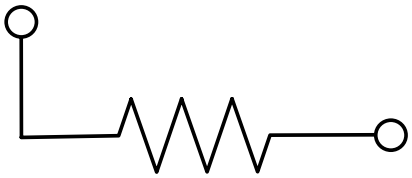
Physical Data



Dimensions (mm)	
L	4.00 ± 0.10
t	2.00 ± 0.10
a	7.00 ± 0.10
b	5.00 ± 0.10
c	3.00 ± 0.10
W1	ø2.40 ± 0.20
W2	3.00 ± 0.20
T	1.40 ± 0.20
L1	0.40 ± 0.10
L2	3.00 ± 0.10

Schematic



Ordering Data

Prefix ..... HFR - PCS3040RLF - 50RO

Model
PCS3040RLF = Split ground thin film terminator with 100 % Sn terminations

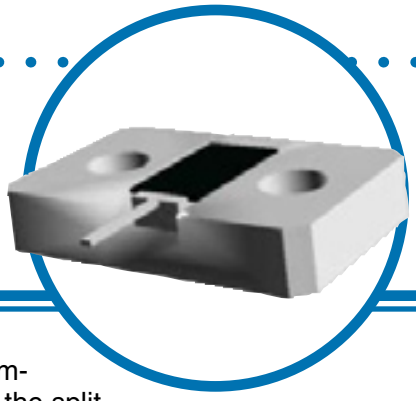
Impedance
50R0 = 50Ω

Split Ground High Power Thin Film Terminators

TT electronics
IRC Advanced Film Division

PCS-P Series

- High power dissipation to 80W
- High frequency operation to 10GHz
- High heat dissipating double-sided flange



The PCS-P series split ground high power thin film terminator combines the improved heat dissipation of a double-sided flange and the split ground to give a power rating of up to 80W, while providing excellent high frequency characteristics from DC to 10 GHz. Attaching the flange directly to a heat sink provides improved heat dissipation at a higher power rating. Typical applications include aerospace, wireless communication, satellites and RF power amplifiers.

Electrical Data

	3042P	3060P	3080P
Impedance	50Ω		
VSWR			
DC to 1.5 GHz	1.1		1.2
1.6 to 3 GHz	1.1		N/A
3.1 to 10 GHz	1.3		N/A
TCR	±50ppm/°C		
Power Rating @70°C	1W	1.5W	
Max Power Rating with Heat Sink @65°C	5W	30W	80W
Operating Temperature Range	-55°C to +125°C		
Termination	Matte Tin Finish 100% Sn		

Environmental Data

	Test Condition	To Meet
Short Time Overload	2.5 x Rated Voltage, 5 sec.	±0.5% +0.05Ω
Load Life	40°C, 1000 Hours	±1.0% +0.05Ω
Moisture Resistence	1000 Hours, 40°C 95% RH	±1.0% +0.05Ω
Temperature Cycle	5 Cycles 70°C High, -10°C Low	±0.5% +0.05Ω
Resistance to Soldering Heat	250°C, 3 sec.	±0.5% +0.05Ω
Insulation Resistance	DC 500V, 1 min.	>1,000MΩ

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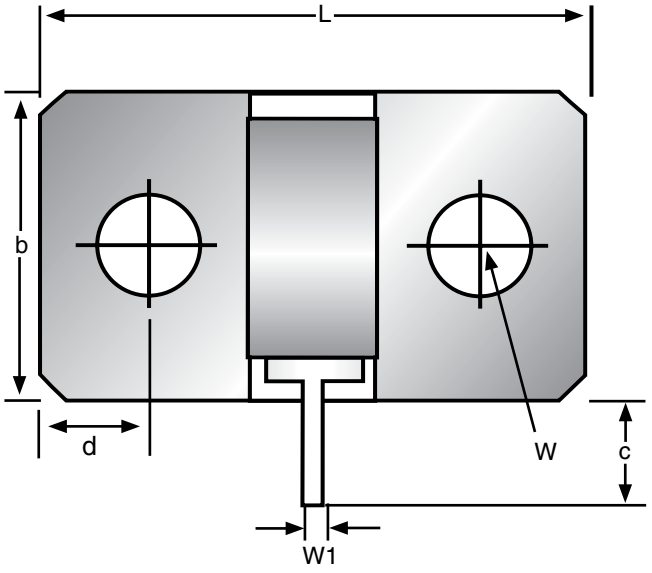
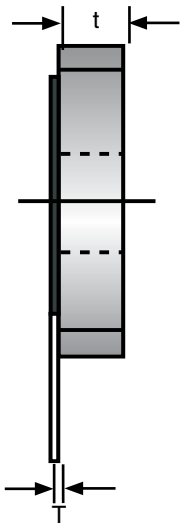
Split Ground High Power Thin Film Terminators

IRC Advanced Film Division

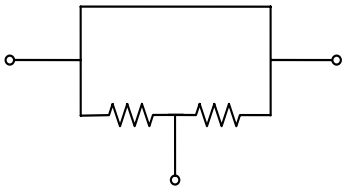
Physical Data





Dimensions (mm)			
Dim.	3042PLF	3060PLF	3080PLF
L	13.0 ± 0.30	13.0 ± 0.30	13.0 ± 0.30
t	2.5 Max	2.5 Max	2.5 Max
b	8.0 ± 0.3	8.0 ± 0.3	8.0 ± 0.3
c	3.0 ± 0.2	5.0 Min	3.0 ± 0.2
d	2.5 ± 0.3	2.5 ± 0.3	2.5 ± 0.3
W	2-ϕ2.5 ± 0.2	2-ϕ2.5 ± 0.2	2-ϕ2.5 ± 0.2
W1	0.4 ± 0.1	0.4 ± 0.1	0.4 ± 0.1
T	0.2 ± 0.1	0.2 ± 0.1	0.2 ± 0.1

Schematic



Ordering Data

Prefix ..... HFR - PCS3080PLF - 50R0

Model .....

PCS3042PLF = Split ground thin film terminator with 100 % Sn terminations
PCS3060PLF = Split ground thin film terminator with 100 % Sn terminations
PCS3080PLF = Split ground thin film terminator with 100 % Sn terminations

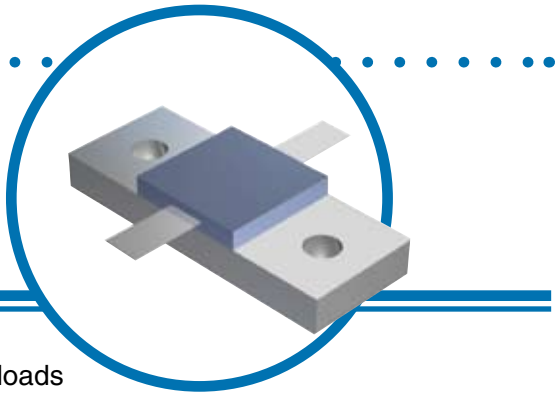
Impedance .....
50R0 = 50Ω

Flanged RF Power Terminators

TT electronics
IRC Advanced Film Division

RFRF Series

- High power dissipation up to 250W
- Flang cooling for stripline circuit terminators
- Long life, temperature stable thin film on ceramic technology



The RFRF series of high power transmission line terminators and loads make use of a flanged heat sink construction producing power ratings up to 250 watts and operation to 3 GHz. Ohmic values are available in 50 ohm, 100 ohm, 150 ohm and 200 ohm nominal values for maximum flexibility in your high frequency layout and design. Ideal for use in industrial RF power sources, RF amplifiers, transmitter systems and mobile RF designs.

Electrical Data

	RFRF10	RFRF40	RFRF50	RFRF100	RFRF150	RFRF250
Power Rating	10W	40W	50W	100W	150W	250W
Capacitance	<0.8pF	<0.8pF	<1.0pF	<1.0pF	<1.0pF	<1.0pF
VSWR	<1.1	<1.2	<1.2	<1.2	<1.2	<1.2
Resistance	50Ω, 100Ω, 150Ω, 200Ω					
Tolerance	±1%, ±2%, ±5%,					
Frequency Range	DC to 3 GHz					
Absolute TCR	±50ppm/°C					
Operating Temperature Range	-55°C to +155°C					
Maximum Voltage	$E = \sqrt{P \times R}$					
Terminations	Gold plated copper					

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Flanged RF Power Terminators

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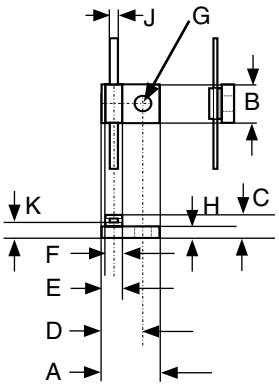
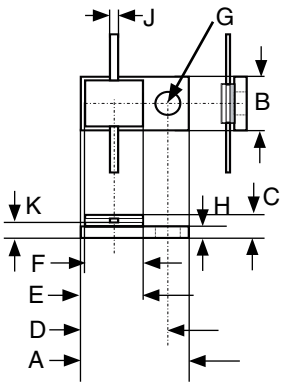
Physical Data

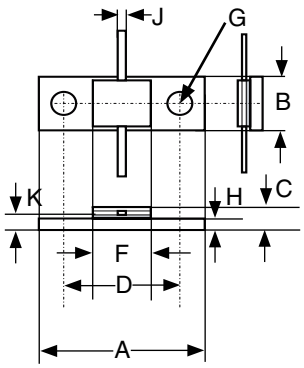
RFRF10



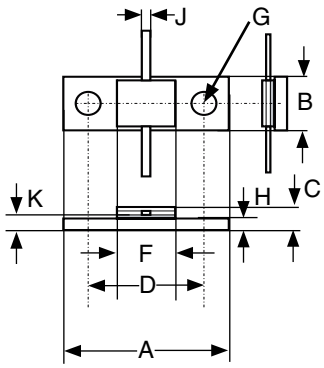
RFRF40



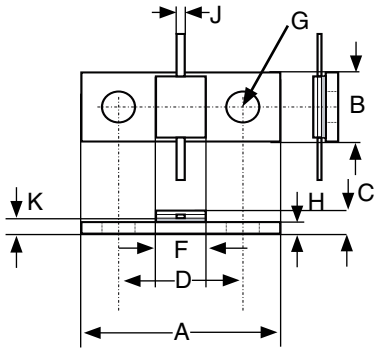
RFRF50



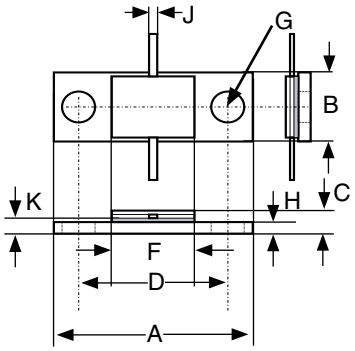
RFRF100



RFRF150



RFRF250



Dimensions (mm)										
Type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
RFRF10	7.6	5.10	3.1	5.0	3.0	3.0	2.9	1.5	0.8	2.2
RFRF40*	13.0	6.35	3.1	9.9	–	6.8	2.9	1.5	0.8	2.2
RFRF50	20.3	5.70	3.1	14.2	–	8.5	3.2	1.5	1.5	2.6
RFRF100	20.3	5.70	3.1	14.2	–	6.3	3.2	1.5	1.5	2.6
RFRF150*	20.3	5.70	3.1	14.2	–	8.5	3.2	1.5	1.5	2.6
RFRF250	25.0	9.53	4.6	18.42	–	9.6	3.2	3.0	3.0	4.1

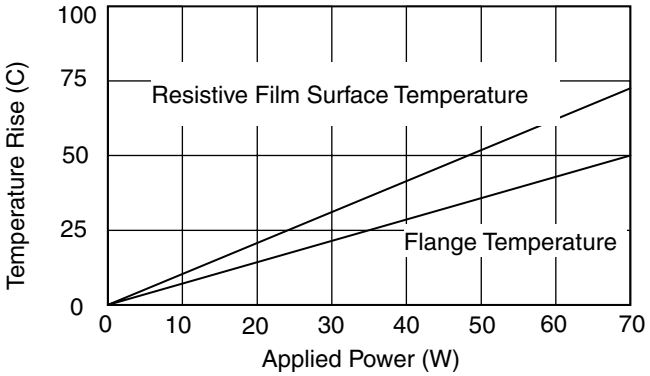
All lead length: 6.35mm and lead thickness: 0.1mm

Flanged RF Power Terminators

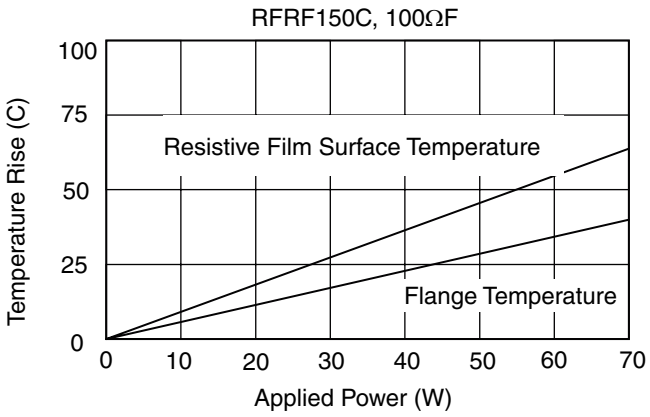
IRC Advanced Film Division

Thermal Data

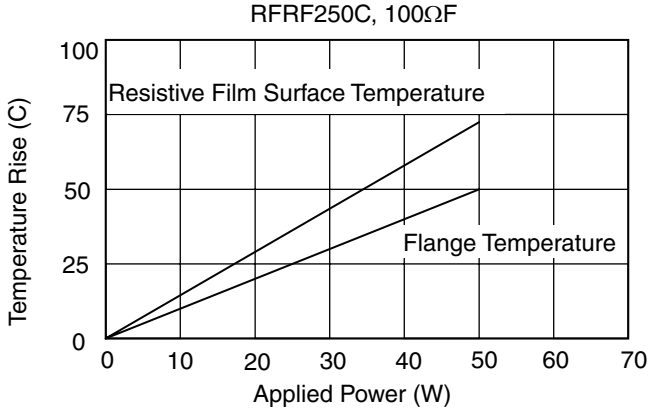
RFRF50C, 100ΩF



RFRF150C, 100ΩF

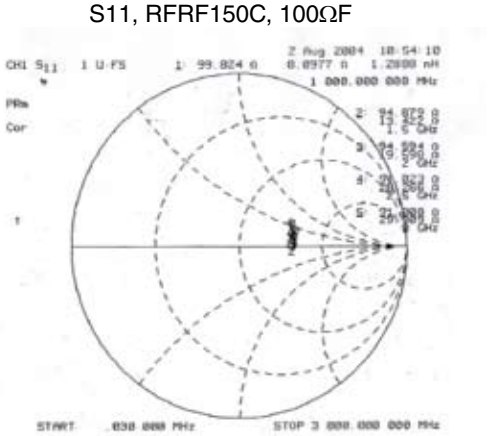


RFRF250C, 100ΩF

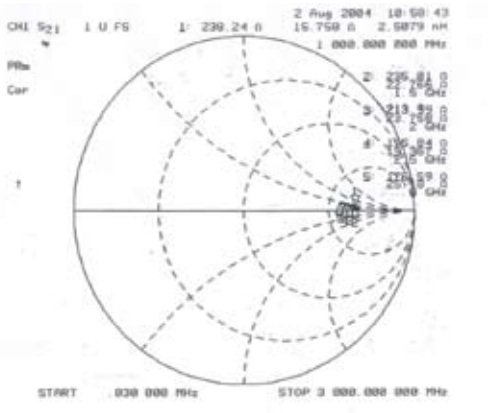


RF Data

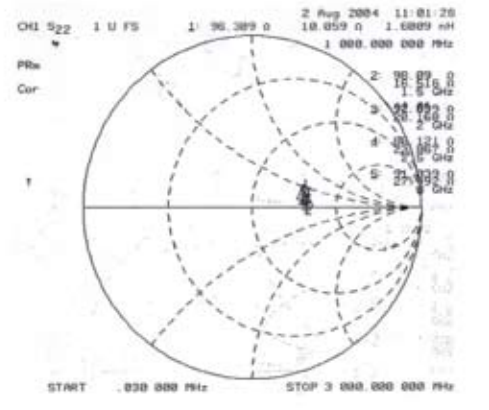
S11, RFRF150C, 100ΩF



S21, RFRF150C, 100ΩF



S22, RFRF150C, 100ΩF



Flanged RF Power Terminators

TT electronics
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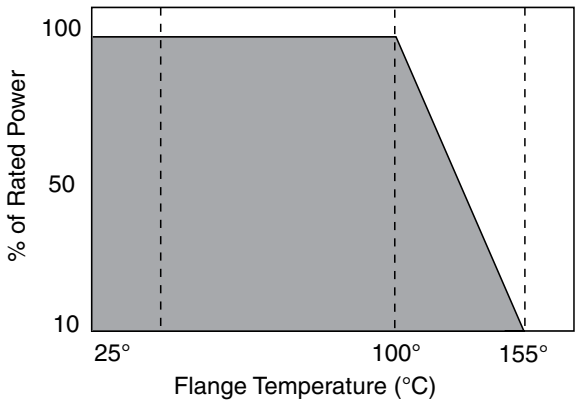
Power Derating Curve



Ordering Data

Prefix HFR - RFRF10 - C50 OHM F 000

Model
RFRF10; RFRF40; RFRF50; RFRF100
RFRF150; RFRF250;

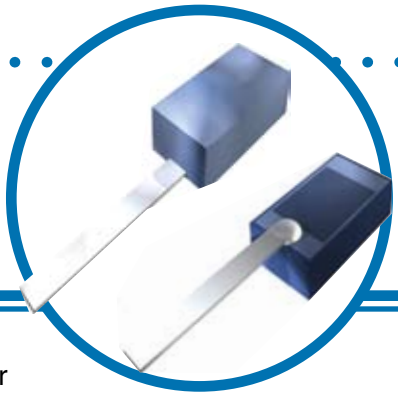
Resistance
C50 OHM; C100 OHM; C150 OHM; C200 OHM

Tolerance
F = ±1%

Packaging
000 = 100 pcs/bulk

High Frequency, High Power Surface Mount Terminators

TT electronics
IRC Advanced Film Division



RFTL Series

- High power surface mount termination for DC up to 3GHz applications
- Small size and wide frequency range
- Long life and temperature stability resulting from thin film technology

The RFTL series of high power terminators offers maximum power dissipation in minimum size. Combining single lead construction with a rugged thin film element results in a terminator capable of dissipating power to 250 watts when heat-sinked. Operation to 3GHz is accomplished through the use of a computer designed thin film element on an aluminum nitride substrate.

Applications for the RFTL include power splitters, power amplifiers, wide band RF and spread spectrum radio.

Electrical Data

Model	Resistance	TCR	VSWR @ 1GHz	Power Rating @ 100°C	Thermal Impedance °C/W	Tolerance	Operating Temperature
RFTL10	50Ω	50ppm/°C	1.15	10W	6.50	±1%	-55°C to +155°C
RFTL50			1.2	50W	2.50		
RFTL100			1.2	100W	1.30		
RFTL250			1.2	250W	0.50		

Note:
(1) Rated power is based on part being solder mounted heat-sink plate at 100°C.
(2) Termination has two terminals, one is plate tab terminal and other is backing plate that is to be solder mounted on to heat sink.

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High Frequency, High Power Surface Mount Terminators

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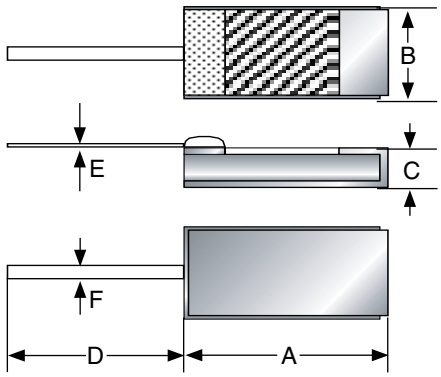
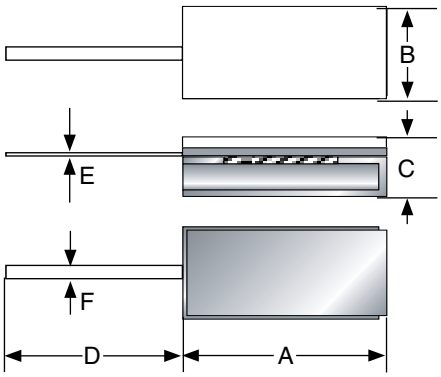
Physical Data



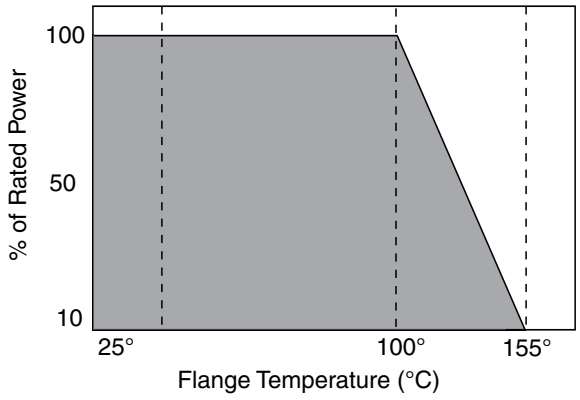
Style A without cover



Style B with cover

Dimension (mm)							
Model	Style	**A**	**B**	**C**	**D**	**E**	**F**
RFTL10	A	2.54	1.27	1.27	6.35	0.10	0.80
RFTL50	B	5.08	5.08	2.2 max	6.35	0.10	0.80
RFTL100	B	5.84	8.89	2.2 max	6.35	0.10	0.80
RFTL250	B	9.52	9.52	2.2 max	6.35	0.10	0.80

Power Derating Curve



Ordering Data

Prefix HFR - RFTL10A C 50 Ohm F

Model
RFTL10A; RFTL50B; RFTL100B; RFTL250B

TCR
C = ±50ppm/°C

Resistance
50 Ohm

Absolute Tolerance Code
F = ±1%

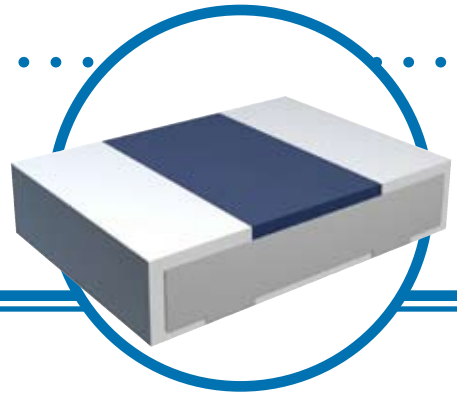
For additional information or to discuss your specific requirements, please contact our Applications Team using the contact details below.

High Power, Surface Mount RF Terminators

TT electronics
IRC Advanced Film Division

RFTS Series

- High frequency operation up to 3 GHz
- Up to 250W dissipation on Aluminum Nitride substrate
- Long life, temperature stable thin film technology



The RFTS is a leadless high power chip termination solution. Operation to 3 GHz is available through the use of a rugged thin film element providing performance stability over time and temperature. A selection of four termination configurations allow maximum versatility for different circuit designs and construction.

An aluminum nitride substrate provides the high thermal conductivity for power dissipation ratings from 5 watts to 250 watts. Applications include satellite communications, isolator/circulators, cell base stations and high power microwave/RF power amplifiers.

Electrical Data

	RFTS05	RFTS10	RFTS50	RFTS100	RFTS250
Resistance	50Ω				
VSWR @ 1GHz	1.15	1.15	1.2	1.2	1.2
Power Rating @100°C (on IMS Boards)	5W	10W	50W	100W	250W
Pulse Power < 1 second	10W	60W	100W	200W	500W
Thermal Resistance	12.5°C/W	6.5°C/W	2.5°C/W	1.3°C/W	0.5°C/W
Tolerance	1%				
Operating Temperature	-55°C to +155°C				
Ablsoluet TCR	±50 ppm/°C				

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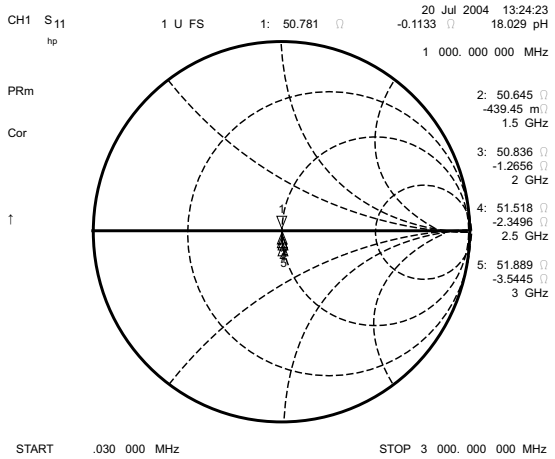
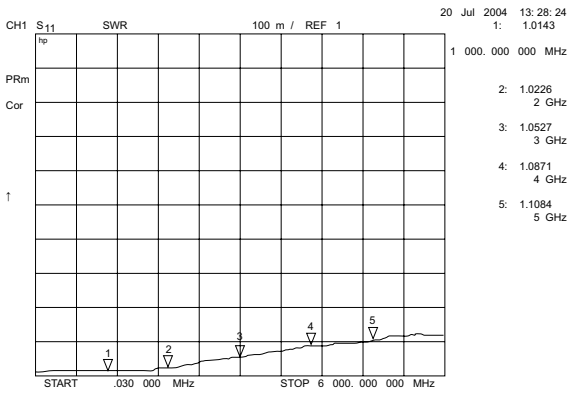
S11 and VSWR Data

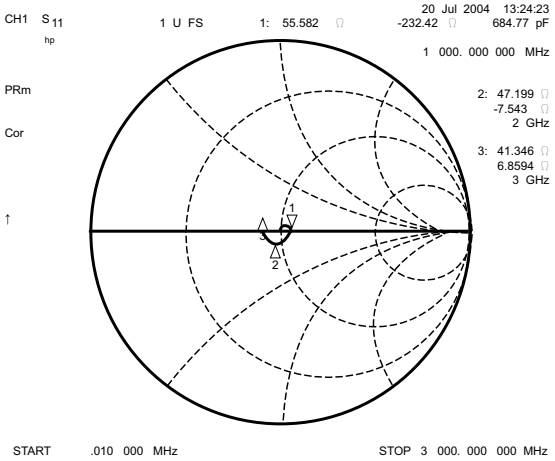
S11, RFTS05C 50Ω F0F0



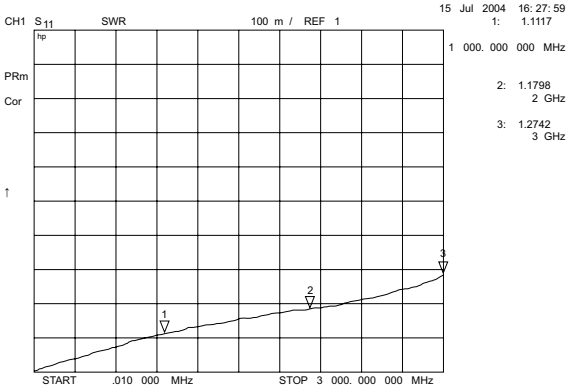
VSWR RFTS05C 50Ω F0F0



S11, RFTS100C 50Ω F0F0



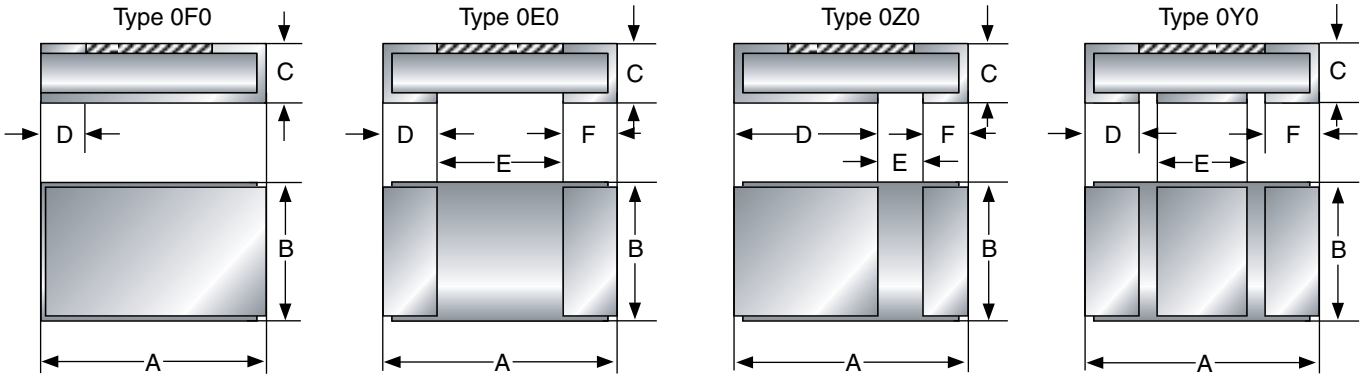
VSWR RFTS100C 50Ω F0F0



High Power, Surface Mount RF Terminators

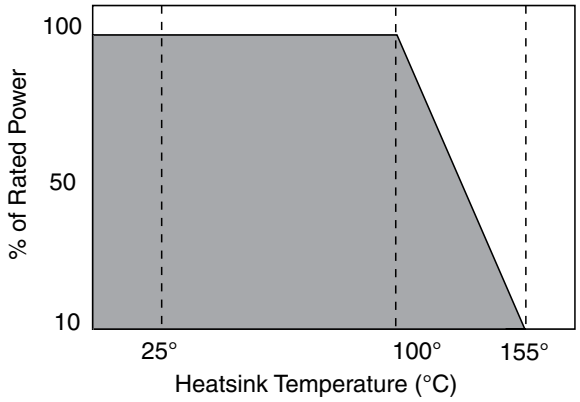
IRC Advanced Film Division

Physical Data



Dimension (mm)							
Type	Type	**A**	**B**	**C**	**D**	**E**	**F**
RFTS05	0F0	2.54	1.27	1.00	0.60	—	—
RFTS05	0E0	2.54	1.27	1.00	0.60	1.00	0.60
RFTS10	0F0	5.08	2.54	1.00	1.00	—	—
RFTS10	0E0	5.08	2.54	1.00	1.00	3.00	1.00
RFTS50	0F0	5.08	5.08	1.20	1.00	—	—
RFTS50	0E0	5.08	5.08	1.20	1.00	3.00	1.00
RFTS50	0Z0	5.08	5.08	1.20	3.00	1.08	1.00
RFTS50	0Y0	5.08	5.08	1.20	1.00	2.00	1.00
RFTS100	0F0	5.84	8.89	1.20	1.20	—	—
RFTS100	0E0	5.84	8.89	1.20	1.20	2.40	1.20
RFTS100	0Z0	5.84	8.89	1.20	3.40	1.20	1.20
RFTS100	0Y0	5.84	8.89	1.20	1.20	2.40	1.20
RFTS250	0F0	9.52	9.52	1.20	1.20	—	—
RFTS250	0E0	9.52	9.52	1.20	1.20	7.10	1.20
RFTS250	0Z0	9.52	9.52	1.20	7.10	1.20	1.20
RFTS250	0Y0	9.52	9.52	1.20	1.20	6.00	1.20

Power Derating Curve



Ordering Data

Prefix HFR - RFTS05 C50 OHM - F - 0F0

Model
RFTS05; RFTS10; RFTS50; RFTS100; RFTS250

Resistance
C50 OHM

Tolerance
F = ±1%

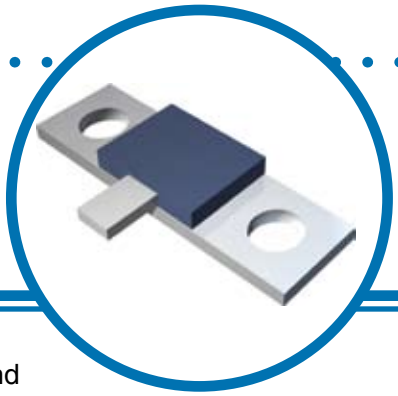
Outline Type (See Physical Data)
0F0, 0E0, 0Z0, 0Y0

High Frequency Surface Mount Terminator

TT electronics
IRC Advanced Film Division

RFTF Series

- Low return loss
- High power dissipation up to 250W
- Long life, temperature stable thin film technology



IRC's RFTF series utilizes the combined benefits flange cooling and the high thermal conductivity of aluminum nitride (AIN) to provide power ratings from 10W-250W. This series comes with single-sided or double-sided flanges and single leaded terminal configurations, adding increased RF design flexibility. Typical applications for the RFTF series include aerospace, wireless communication, satellites, RF power sources and power amplifiers.

Electrical Data

	RFTF10	RFTF40	RFTF50	RFTF100	RFTF150	RFTF250
Power Rating	10W	40W	50W	100W	150W	250W
Capacitance	<0.5pF	<0.5pF	<1.0pF	<1.0pF	<1.0pF	<1.0pF
Rated Voltage	$\sqrt{P \times R}$					
Absolute TCR	±50ppm/°C					
Frequency Range	DC to 3GHz					
Tolerance	±1%, ±2%, ±5%					
Operating Temperature Range	-55°C to +155°C					
VSWR	<1.1					
Rated Temperature	-55°C to 155°C					
Resistance	50Ω					

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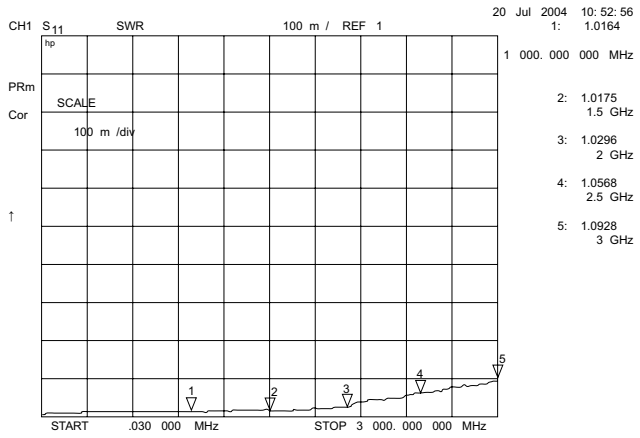
High Frequency Surface Mount Terminator

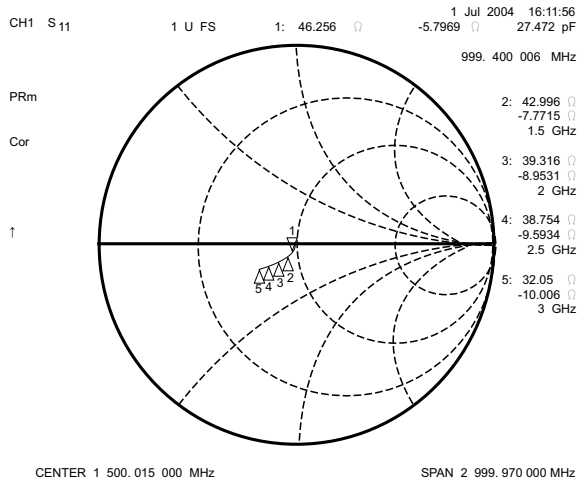
IRC Advanced Film Division

Flange Power Terminations

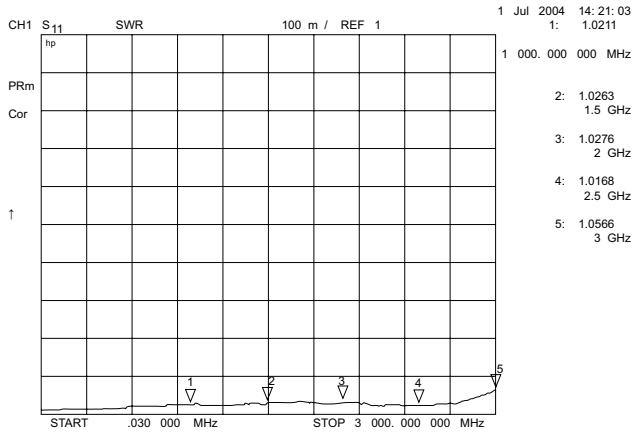
VSWR, RFTF150C, 100ΩF



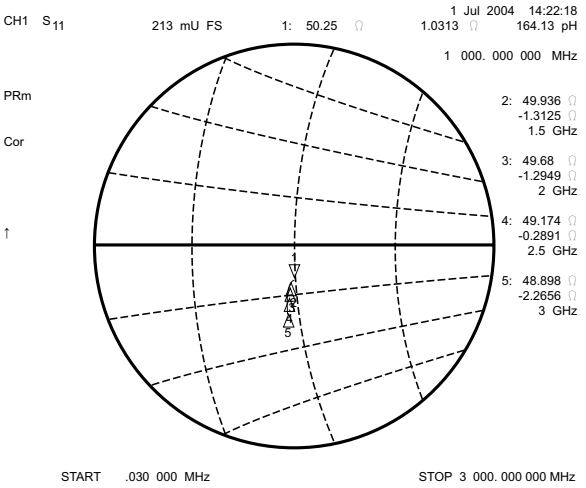
S11, RFTF150C, 50ΩF



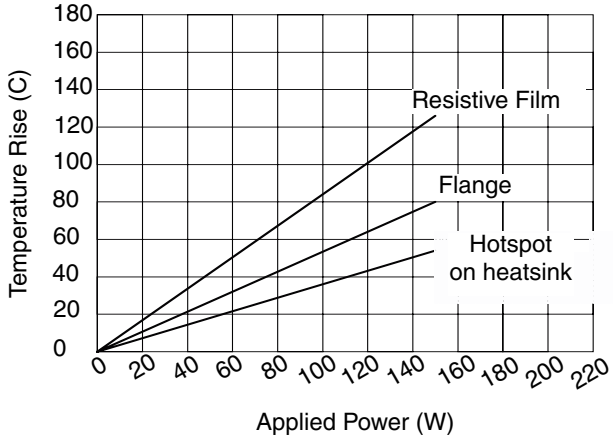
VSWR, RFTF250C, 50ΩF



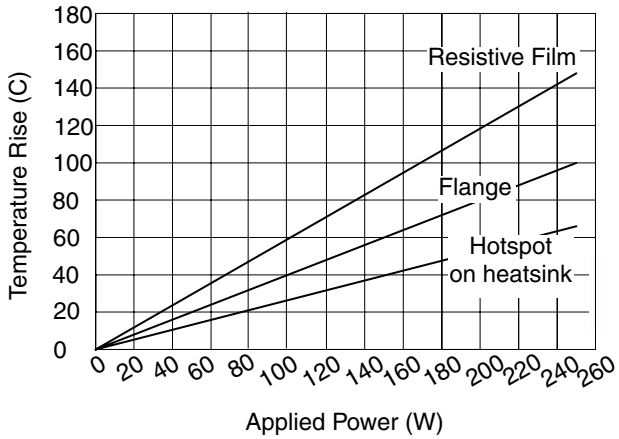
S11, RFTF250C, 50ΩF



RFTF150C, 50ΩF with 0.2K/W Heatsink



RFTF250C, 50ΩF with 0.2K/W Heatsink

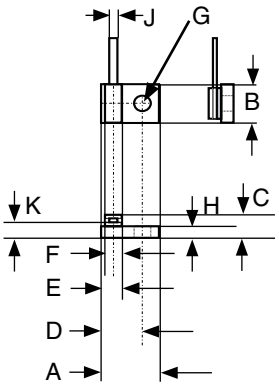


High Frequency Surface Mount Terminator

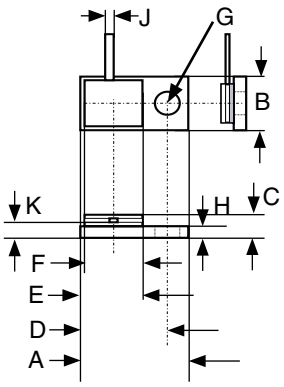
IRC Advanced Film Division

Physical Data

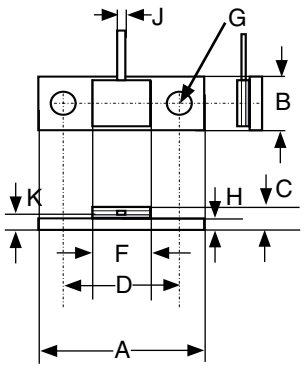
RFTF10



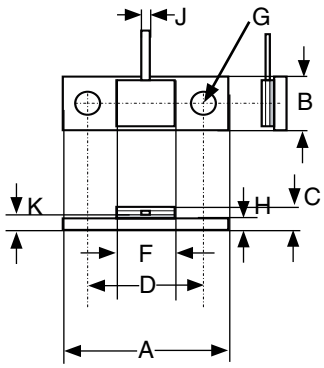
RFTF40Z



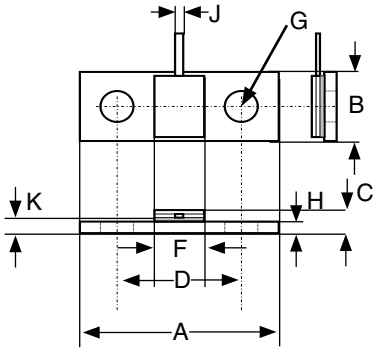
RFTF50



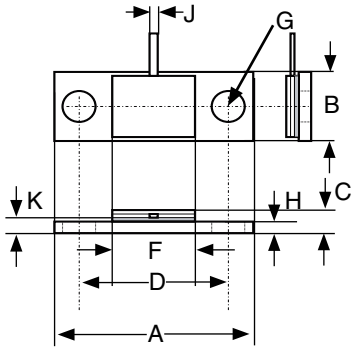
RFTF100



RFTF150



RFTF250



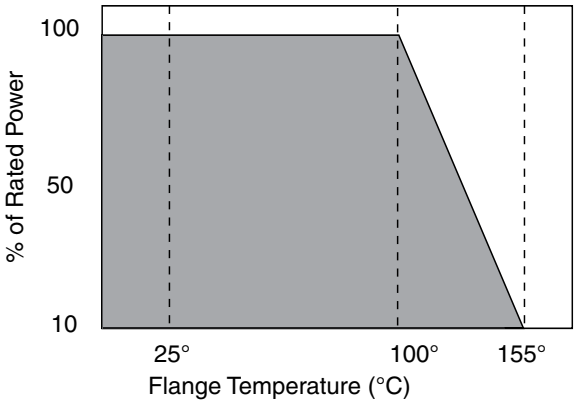
Dimensions (mm)										
Model	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**K**
RFTF10	7.6	5.10	3.1	5.0	3.0	3.0	2.9	1.5	0.8	2.2
RFTF40	13.0	6.35	3.1	9.9	–	6.8	2.9	1.5	0.8	2.2
RFTF50	20.3	5.70	3.1	14.2	–	8.5	3.2	1.5	1.5	2.6
RFTF100	20.3	5.70	3.1	14.2	–	6.3	3.2	1.5	1.5	2.6
RFTF150*	20.3	5.70	3.1	14.2	–	8.5	3.2	1.5	1.5	2.6
RFTF250	25.0	9.53	4.6	18.42	–	9.6	3.2	3.0	3.0	4.1

Notes: Lead length 5.08mm. Lead thickness 0.1mm.

High Frequency
Surface Mount Terminator

IRC Advanced Film Division

Power Derating Curve



Ordering Data

Prefix ..... HFR - RFTF100

Model .....

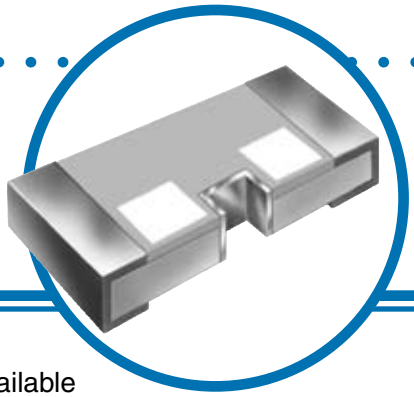
RFTF10; RFTF40Z; RFTF50; RFTF100
RFTF150; RFTF250

Thin Film Surface Mount Attenuators

TT electronics
IRC Advanced Film Division

PFC A1206 Attenuator Series

- Absolute TCR ±100 ppm/°C
- Ultra-reliable TaNFilm® element
- Available in 50Ω and 75Ω impedances
- Excellent high frequency characteristics



The PFC A1206 chip attenuator is a surface mount attenuator available in nominal values of 50 ohms and 75 ohms to meet the needs of both communication and video designs. Packaged in a rugged 1206 ceramic chip package, the PFC-A1206 lends itself to RF and microwave applications up to 6GHz.

The tantalum nitride thin film element is well known for its ruggedness in the most severe outdoor environments and its stability over temperature and time. For your most demanding environmental attenuator applications, specify the IRC PFC-A1206 chip attenuator.

Electrical Data

Attenuation	Impedance	Tolerance*	TCR (ppm/°C)	Power @70°C
1dB	50Ω, 75Ω	±0.3dB	±100	125mW
2dB	50Ω, 75Ω	±0.3dB		
3dB	50Ω, 75Ω	±0.3dB		
4dB	50Ω, 75Ω	±0.5dB		
5dB	50Ω, 75Ω	±0.5dB		
6dB	50Ω, 75Ω	±1.0B		
7dB	50Ω, 75Ω	±1.0dB		
8dB	50Ω, 75Ω	±1.0dB		
9dB	50Ω, 75Ω	±1.0dB		
10dB	50Ω, 75Ω	±1.0dB		
20dB	50Ω, 75Ω	±2.0dB		

Note*: Typical from 0 to 6 GHz.

Environmental Data

Test Per MIL-PRF-55342	Performance	
	Typical	Max
Thermal Shock	±0.02%	±0.10%
Low Temperature Operation	±0.01%	±0.05%
Short-time Overload	±0.01%	±0.05%
High Temperature Exposure	±0.03%	±0.10%
Effects of Solder	±0.01%	±0.10%
Moisture Resistance	±0.03%	±0.10%
Life	±0.03%	±0.10%

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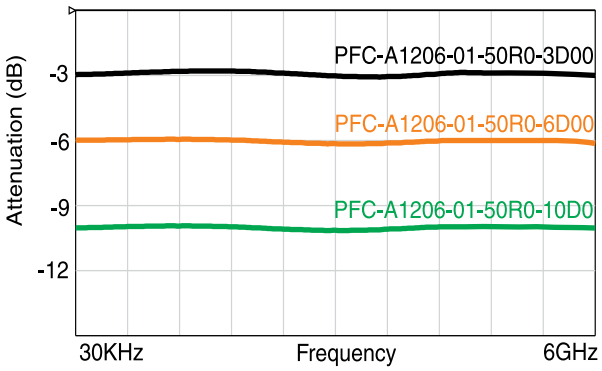
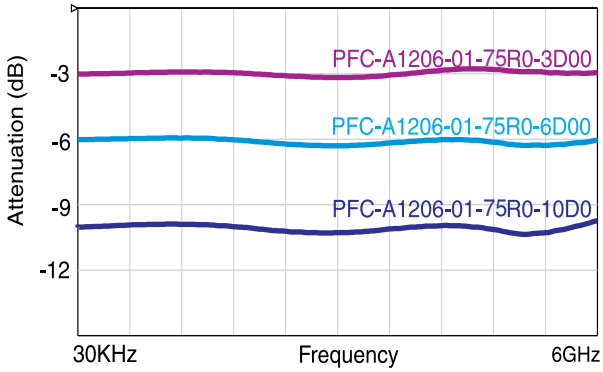
PFC A1206 Series Issue June 2007 Sheet 1 of 2

Thin Film Surface Mount Attenuators

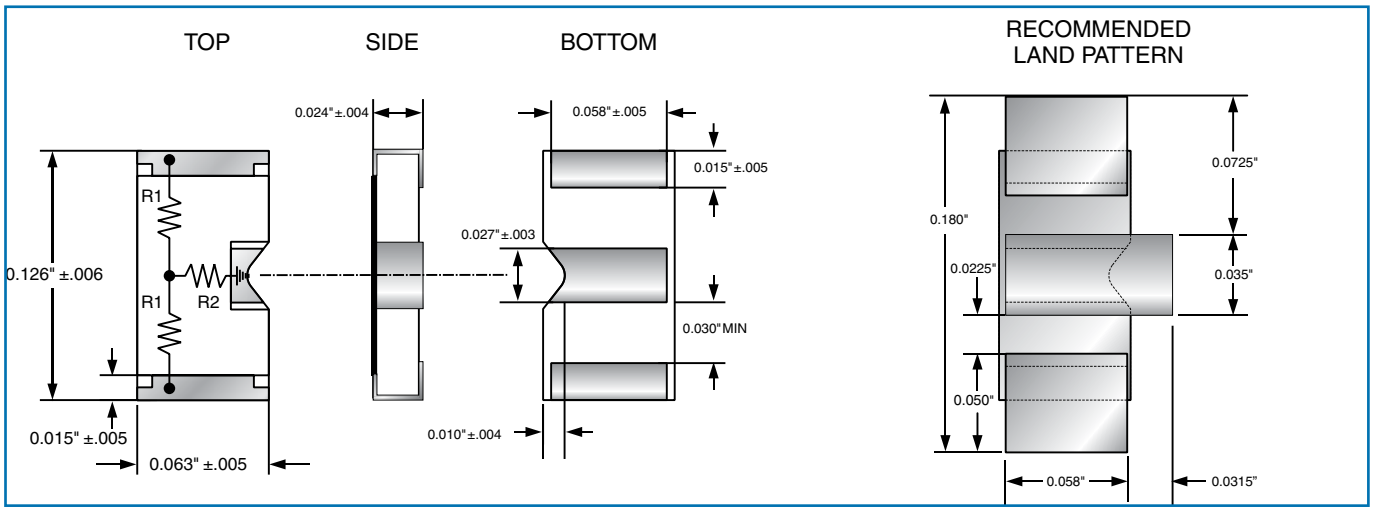
TT electronics
IRC Advanced Film Division

Insertion Loss Data (S21)

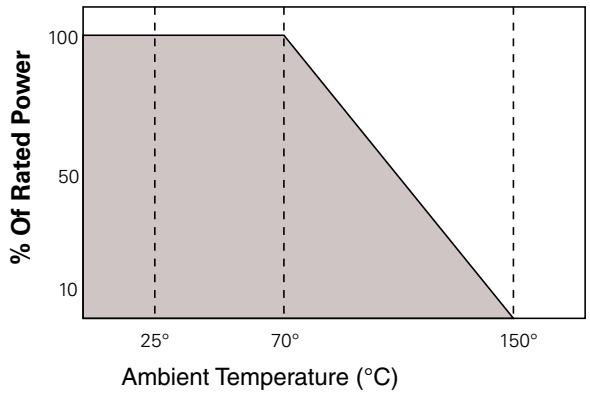




Outline and Packaging Data



Power Derating Curve



Ordering Data

Prefix PFC - A1206 - 01 - 50R0 - 10D0

Model
A1206

TCR Code
01 = ±100 ppm/°C

Impedence Code
50R0 = 50Ω; 75R0 = 75Ω

Attenuation Code
1D00=1dB, 2D00 = 2Db, 3D00 = 3dB,
4D00=4dB, 5D00 = 5Db, 6D00 = 6dB,
7D00=7dB, 8D00 = 8Db, 9D00 = 9dB,
10D0=10dB, 20D0 = 20db

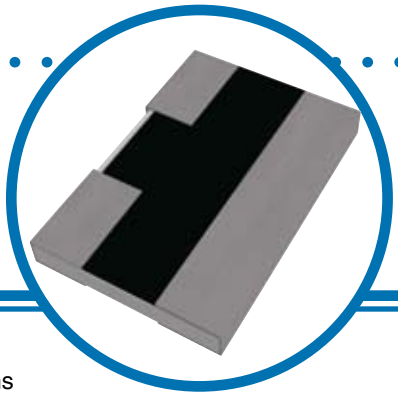
For additional information or to discuss your specific requirements, please contact our Applications Team using the contact details below.

High Frequency Surface Mount Attenuators

TT electronics
IRC Advanced Film Division

PAT-S Series

- RoHS Compliant
- Frequency operation to 10 GHz
- Low parasitic capacitance and inductance
- Thin film stability over time and temperature



The PAT chip attenuator series is available in a wide range of power ratings from 32mW to 250mW. The surface mount package is ideal for applications where parasitic capacitance and inductance are concerns. Typical applications include wireless communication receivers and transmitters.

Electrical Data

	PAT0510S	PAT0816	PAT1220	PAT1632	PAT3042SC	PAT3042SD
Impedance	50Ω	50Ω	50Ω	50Ω	50Ω	75Ω
Frequency Range	DC to 10 GHz			DC to 3GHz	DC to 3GHz	DC to 2GHz
VSWR	1.5				1.3	1.3
Attenuation (dB)	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10dB				0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 20dB	
Attenuation Tolerance	0 to 3dB ±0.3dB 4 to 7dB ±0.5dB 8 to 10dB ±1.0dB		±0.3dB	0 to 10dB: ±0.3dB 16dB: ±0.5dB	0 to 10dB: ±0.3dB 16, 20dB: ±0.5dB	
TCR	±50ppm/°C					
Power Rating	32mW	64mW	100mW	125mW	250mW	
Operating Temperature Range	-55°C to +125°C					

Environmental Data

	Test Condition	Tolerance	
		Attenuation	Δ Impedance
Short Time Overload	2.5 x rated voltage, 5 sec	±0.03dB	±0.5%
Load Life	1000 Hours, 70°C	±0.05dB	±1.0%
Moisture Resistance	1000 Hours, 60°C, 95% RH	±0.05dB	±1.0%
Temperature Cycle	5 Cycles, 125°C High, -55°C Low	±0.03dB	±0.5%
Resistance to Solder Heat	260°C, 10 sec.	±0.03dB	±0.5%
Terminal Strength	Fulcrum dist: 90mm, Bending width: 3mm Substrate: Glass epoxy t=1.6mm	±0.03dB	±0.5%
Solderability	235°C, 3 sec.	>95% coverage	
Insulation Resistance	500V, 1 minute	>1000MΩ	

General Note
IRC reserves the right to make changes in product specification without notice or liability.
All information is subject to IRC's own data and is considered accurate at time of going to print.

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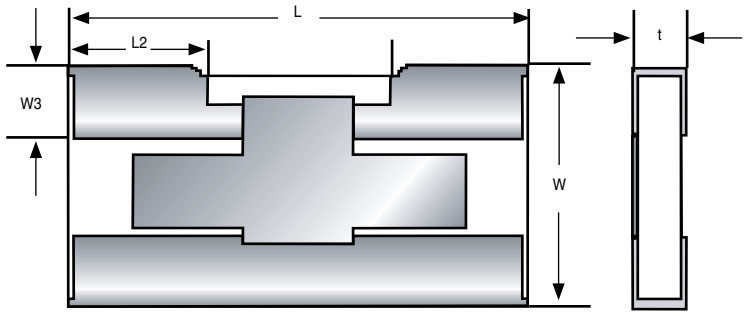
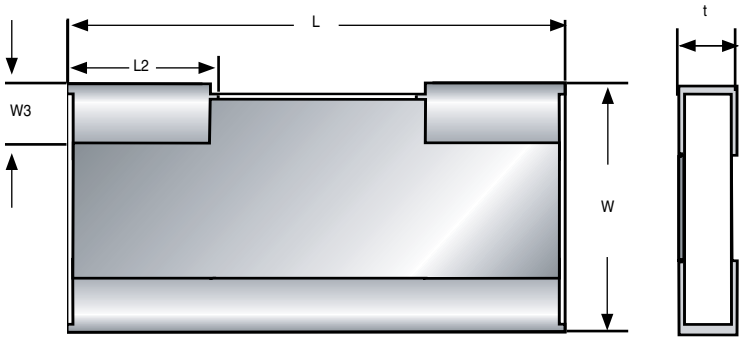
Physical Data

PAT1220



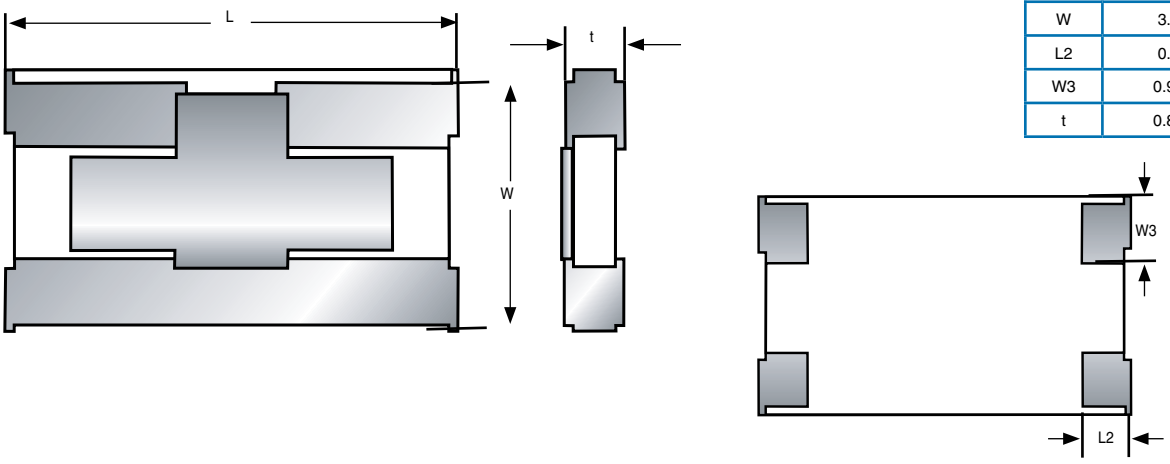
Dimensions (mm)	
L	2.0 ± 0.2
W	1.25 ± 0.2
L2	0.6 ± 0.2
W3	0.35 ± 0.2
t	0.4 ± 0.1

PAT1632



Dimensions (mm)	
L	3.2 ± 0.2
W	1.6 ± 0.2
L2	1.0 ± 0.2
W3	0.4 ± 0.2
t	0.4 ± 0.1

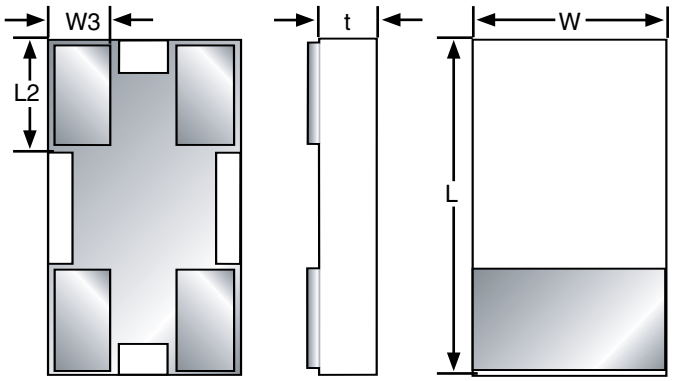
PAT3042S



Dimensions (mm)	
L	4.2 ± 0.2
W	3.0 ± 0.2
L2	0.5 ± 0.2
W3	0.95 ± 0.2
t	0.8 ± 0.15

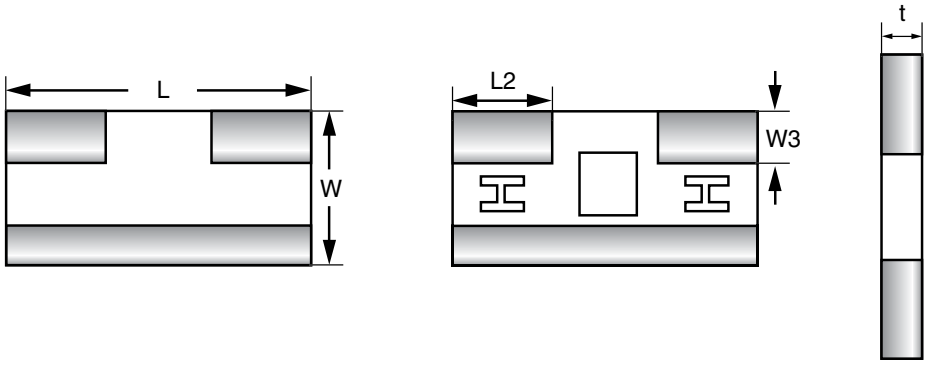
Physical Data

PAT0510S



Dimensions (mm)	
L	1.0 ± 0.05
W	0.5 ± 0.05
L2	0.27 ± 0.05
W3	0.12 ± 0.04
t	0.3 ± 0.05

PAT0816



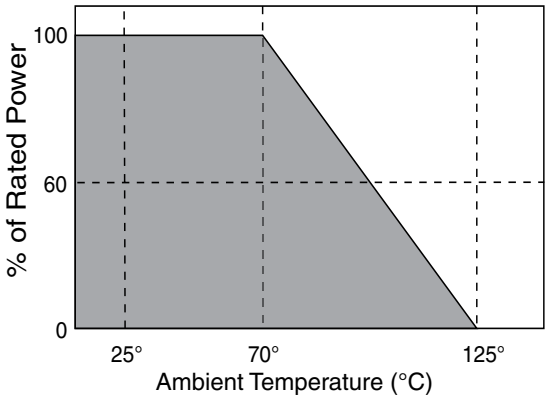
Dimensions (mm)	
L	1.60 ± 0.1
W	0.8 ± 0.1
L2	0.4 ± 0.15
W3	0.2 ± .015
t	0.4 ± 0.1

High Frequency
Surface Mount Attenuators

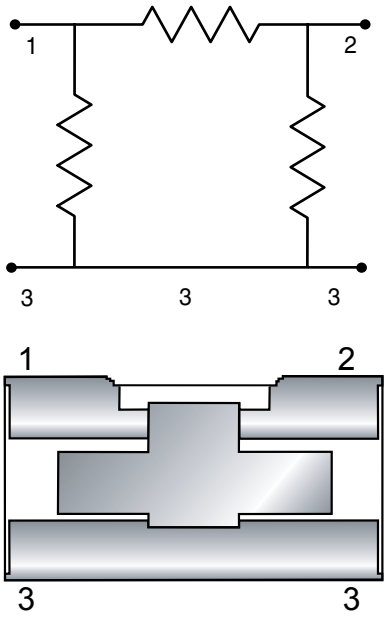
IRC Advanced Film Division

All RoHS Compliant

Power Derating Curve



Schematic Diagram Data



Ordering Data

Prefix HFR - PAT1220LF - C - 3dB - T(5)

Model
PAT0510SLF; PAT0816LF; PAT1220LF; PAT1632LF
PAT3042SLF

Impedence
C = 50Ω; D = 75Ω

Attenuation
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 20dB

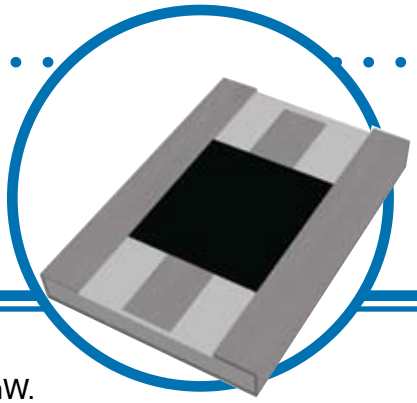
Package
T=Tape, B=Bulk, Taping Quantity Unit:5 (5000), 1 (1000)

High Frequency Surface Mount Attenuators

TT electronics
IRC Advanced Film Division

PAT-W

- RoHS Compliant
- 10GHz operation
- ±50ppm/°C absolute TCR
- 50Ω impedance available in 2 chip sizes available
- Wrap Around 100% Sn Terminations



The PAT-W series high performance chip attenuator provides excellent high frequency performance at power ratings up to 500mW. The wrap-around construction provides reliable low cost, surface mount assembly. Long term operational stability is achieved from the thin film construction. Typical uses include applications in medical, industrial, and communications.

Electrical Data

	PAT3042	PAT4556
Power Rating @ 70°C	250mW	500mW
Impedance	50Ω	
TCR	±50ppm/°C	
Attenuation (dB)	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 20	
VSWR	DC to 2GHz = 1.1 2GHz to 5GHz = 1.2 5GHz to 10GHz = 1.3	
Operating Temperature Range	-55°C to +125°C	
Terminations	100% Sn	

Attenuation Tolerance Data

Attenuation Value	Attenuation Tolerance Code	DC to 2GHz	2GHz to 5GHz	5GHz to 10GHz
0dB	A	+0.1/ -0dB	+0.2/ -0dB	+0.4/ -0dB
0 to 10dB	A	±0.1dB	±0.2dB	±0.4dB
	B	±0.2dB	±0.3dB	±0.5dB
16, 20dB	B	±0.2dB	±0.3dB	±0.5dB

Environmental Data

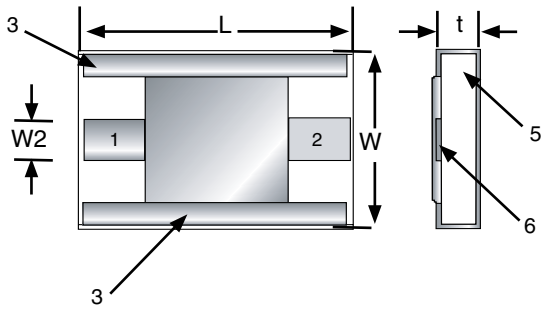
	Test Condition	Attenuation		Impedance
		0 to 10dB	16, 20dB	
Short Time Over Load	2.5 x Rated Voltage, 5 sec	±0.01dB	±0.02dB	±0.2%
Load Life	1000 Hours, 70°C	±0.02dB	±0.04dB	±0.5%
Moisture Resistance	1000 hours, 60°C, 95% RH	±0.02dB	±0.04dB	±0.5%
Temperature Cycle	5 Cycles, 125°C High, -55°C Low	±0.01dB	±0.02dB	±0.2%
Resistance to Solder Heat	260°C, 10 sec.	±0.01dB	±0.02dB	±0.2%
Solderability	235°C, 3 sec	>95% coverage		
Insulation Resistance	500V, 1 minute	>1000MΩ		

High Frequency Surface Mount Attenuators

IRC Advanced Film Division

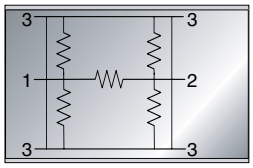
Physical Data

PAT3042

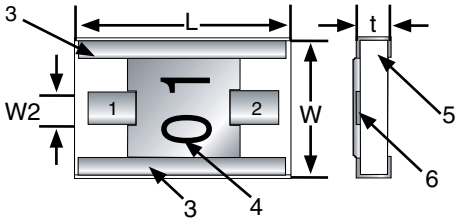


Dimensions (mm)	
W2	0.9 ± 0.10
L	4.20 ± 0.20
W	3.02 ± 0.20
t	0.80 ± 0.15

Bottom View

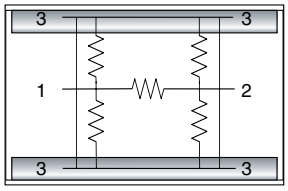


PAT4556



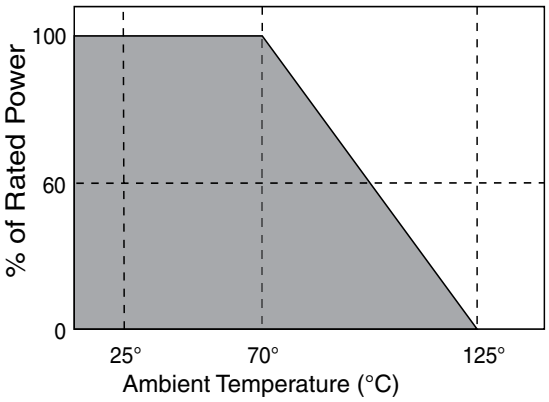
Dimensions (mm)	
W2	1.39 ± 0.1
L	5.6 ± 0.2
W	4.5 ± 0.2
t	0.80 ± 0.15

Bottom View



1, 2: Input and output terminals 3: Ground Terminal 4: Overcoat 5: Alumina substrate 6: Thin film resistor

Power Derating Curve



Ordering Data

Prefix HFR - PAT3042W - 50R0 - 3 A

Model
PAT3042WLF = Surface Mount Attenuator with 100% Sn Terminations
PAT4556WLF = Surface Mount Attenuator with 100% Sn Terminations

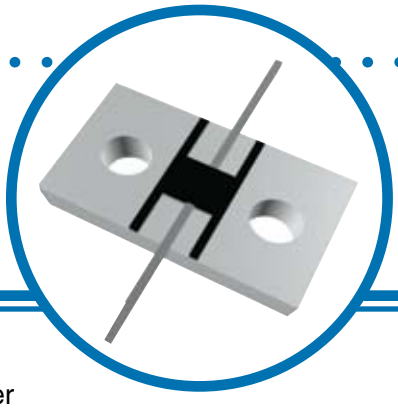
Impedance
50R0 = 50Ω

Attenuation
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 20dB

Attenuation Tolerance
A, B

High Power Flanged Attenuators

TT electronics
IRC Advanced Film Division



PAT-P Series

- Power dissipation to 10W
- High frequency operation to 10GHz
- Flanged Package for heat sink mounting

The PAT-P series power attenuator has a very low VSWR from DC to 10 GHz. High frequency performance combined with high power dissipation make this an ideal RF power attenuator. Typical applications are power meters and amplifiers where a reduction in power is needed while maintaining transmission line characteristic impedances.

Electrical Data

Impedance		50Ω
Frequency Range		DC - 10GHz
Operating Temperature Range		-55°C to +125°C
Thermal Impedence		5°C/W
Attenuation (dB)		0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 20
Attenuation Tolerance	DC to 2GHz	±0.2 dB
	2GHz to 5GHz	±0.3 dB
	5GHz to10GHz	±0.5 dB
VSWR	DC to 2GHz	1.1
	2GHz to 5GHz	1.2
	5GHz to10GHz	1.3
Power Rating @70°C	PAT3042P	1W (Max. 5W Heatsinked)
	PAT3060P	1.5W (Max. 10W Heatsinked)
Terminations	100% Sn	

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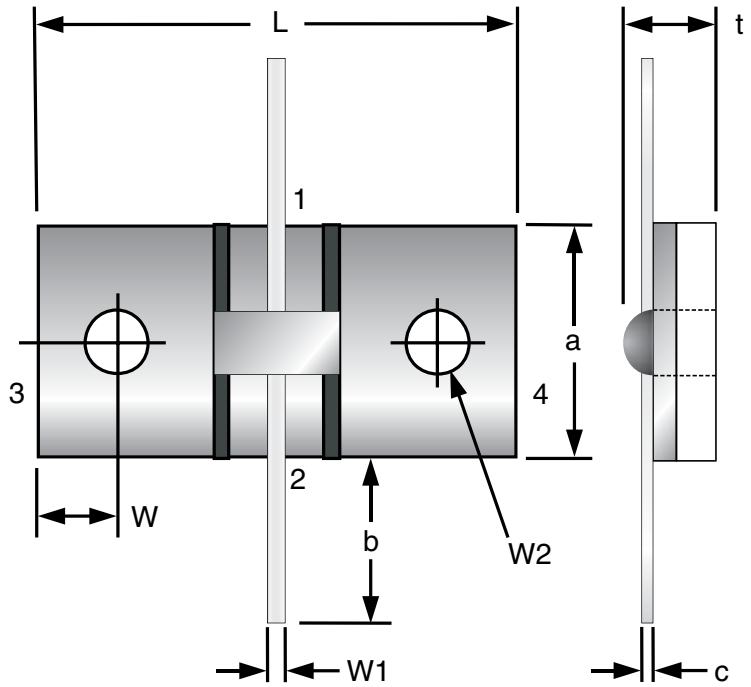
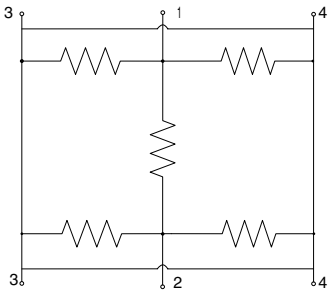
High Power
Flanged Attenuators

IRC Advanced Film Division

Physical Data

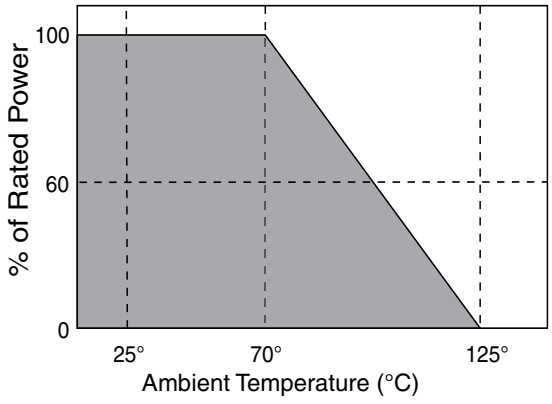


Schematic



Dimensions (mm)		
	PAT3042P	PAT3060P
L	15.0 ± 0.30	13.0 ± 0.30
W	2.50 ± 0.30	2.50 ± 0.30
t	2.50 max	2.50 ± 0.30
a	4.20 ± 0.30	6.00 ± 0.30
b	5.00 min	5.00 ± 0.30
c	0.20 typ	0.20 typ
W1	0.40 typ	0.40 typ
W2	2-ϕ2.5 ± 0.20	2-ϕ2.5 ± 0.20

Power Derating Curve



Ordering Data

Prefix ..... HFR - PAT3042P - 50R0 - 03

Model
PAT3042PLF = Surface Mount Attenuator with 100% Sn Terminations
PAT3060PLF = Surface Mount Attenuator with 100% Sn Terminations

Impedance
50R0 = 50Ω

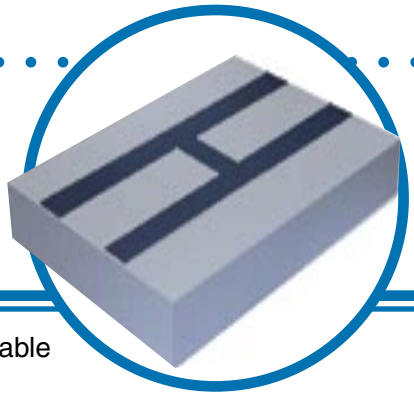
Attenuation
00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 16, 20dB

High Frequency Surface Mount Attenuators

TT electronics
IRC Advanced Film Division

RFAxx Series

- High power chip attenuators
- Low return loss
- Long life, temperature stable thin film on ceramic technology



The RFAxx series of 50 ohm high frequency attenuators are available in a variety of sizes and termination styles to suit applications for mounting on heat sinks or normal PC board materials. High thermal conductivity aluminum nitride substrates provide the low resistance thermal path for high power dissipation applications. Frequency performance up to 4 GHz assures proper operation in RF and microwave power amplifiers, RF transmitters and receivers and RF power sources.

Electrical Data

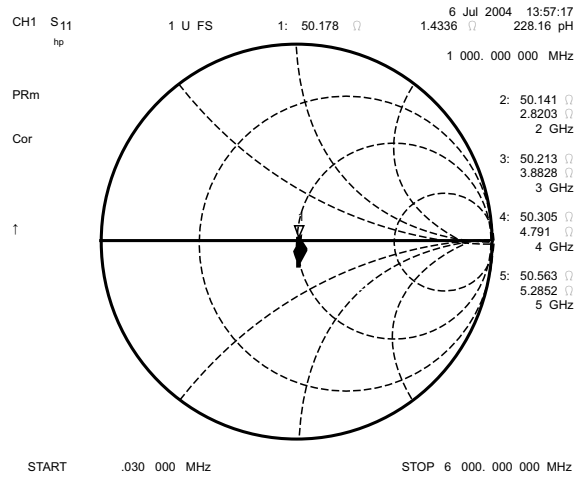
Model	**RFA53SD**	**RFA54DD**	**RFA55SD**	**RFA55DD**
Frequency Range	DC to 4GHz	DC to 4GHz	DC to 4GHz	DC to 4GHz
Power Rating @ 70°C	0.25W	0.25W	0.25W	0.25W
Attenuation[1]	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40 dB			
Impedance	50Ω ±2%			
Absolute TCR	±50ppm/°C			

Model	**RFA84SD**	**RFA84DD**	**RFA37DD**
Frequency Range	DC to 1GHz	DC to 1GHz	DC to 1GHz
Power Rating @ 70°C	0.50W	0.50W	1.0W
Attenuation[1]	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40 dB		
Impedance	50Ω ±2%		
Absolute TCR	±50ppm/°C		

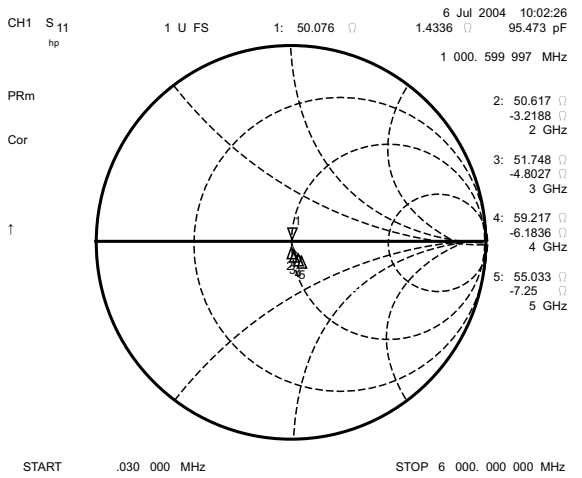
Notes: 1. Attenuations tolerances as follows: 1, 2, 3, 4, 5, 6dB: ±0.2dB 7, 8, 9, 10dB: ±0.3dB 20, 30, 40dB: ±0.4dB

Surface Mount RF Power Attenuators

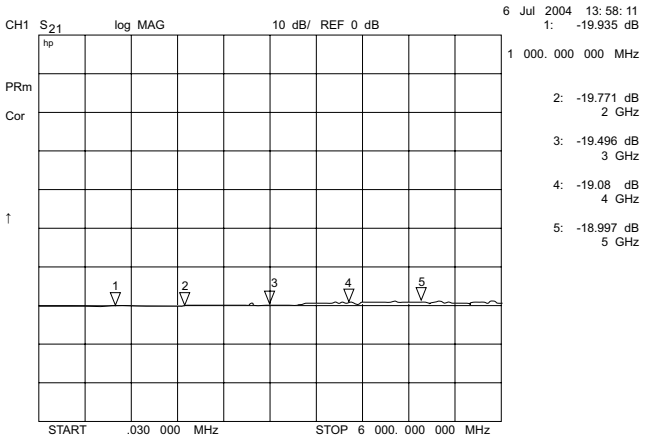
RFA55DD20dB Impedance



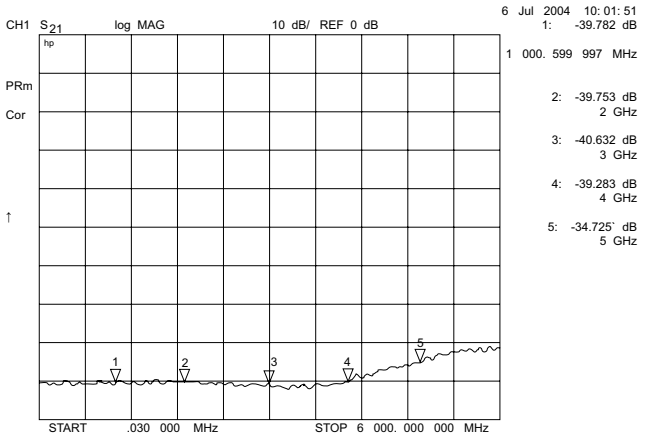
RFA55DD40dB Impedance



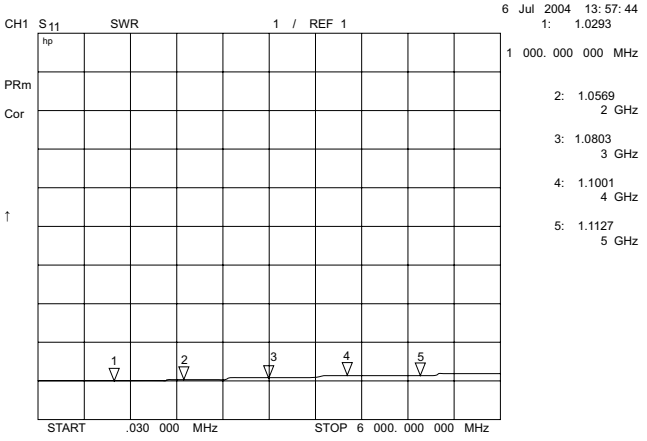
RFA55DD20dB Attenuation



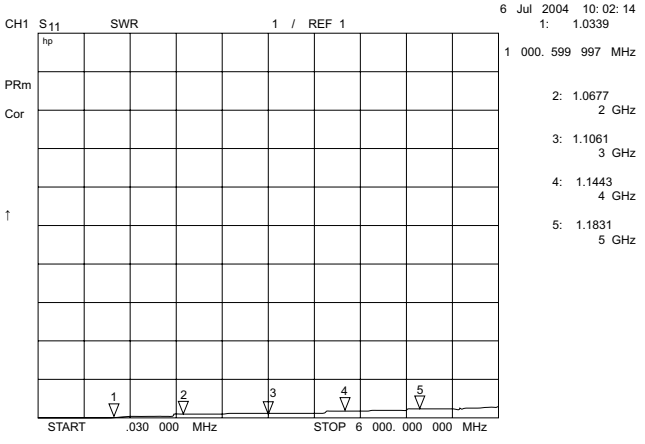
RFA55DD40dB Attenuation



RFA55DD20dB VSWR



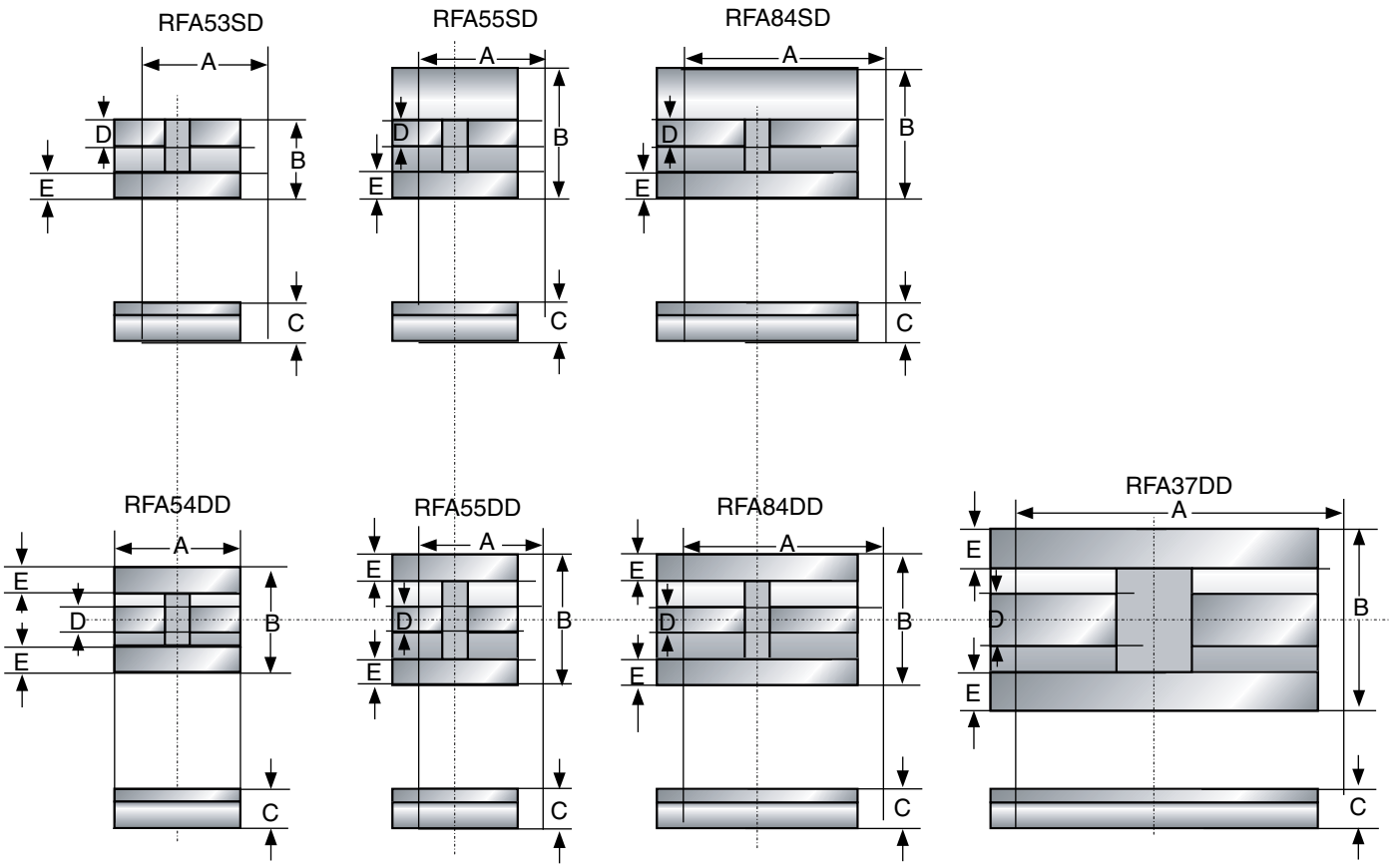
RFA55DD40dB VSWR



High Frequency
Surface Mount Attenuators

IRC Advanced Film Division

Physical Data



Type	RFA53SD	RFA54DD	RFA55SD	RFA55DD	RFA84SD	RFA84DD	RFA37DD
A	5.00	5.00	5.00	5.00	8.00	8.00	13.00
B	2.70	3.80	4.50	4.50	5.25	5.25	7.00
C	0.70	0.70	0.70	0.70	0.70	0.70	0.70
D	1.20	1.20	1.20	1.20	1.40	1.40	2.00
E	0.80	0.80	1.00	1.00	1.10	1.10	1.40

Note: All dimensions are in mm.

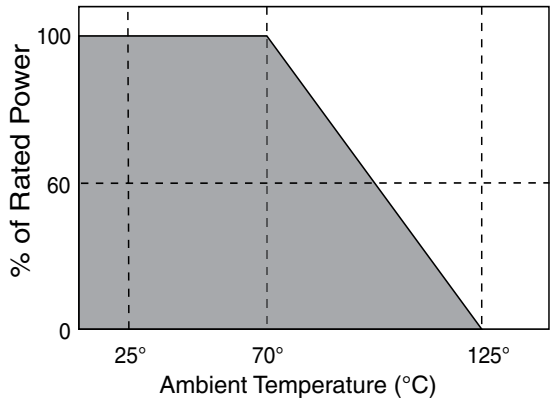
High Frequency Surface Mount Attenuators

IRC Advanced Film Division

Environmental Data

	Test Condition	To meet
Load Life	1000 Hours, 70°C	±1.0%
Moisture Load Life	1000 Hours, 40°C 95% RH	±1.0%
Solder Heat Resistance	350°C, 3 sec.	±1.0%
Solderability	235°C, 3 sec.	>95% coverage

Power Derating Curve



Ordering Data

Prefix HFR - RFA53SD - 10dB G Z00

Model
RFA53SD; RFA54DD; RFA55SD; RFA55DD
RFA84SD; RFA84DD; RFA37DD

Attenuation
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40dB

Impedance Tolerance
G = ±2%

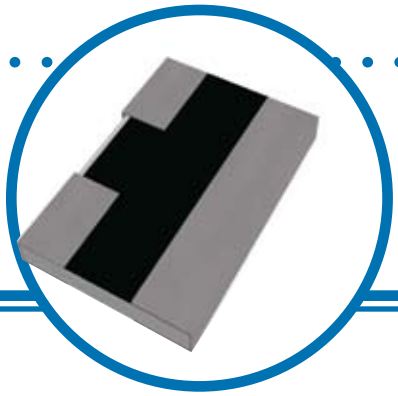
Packaging
Z00 = 100 pcs/bulk package

High Frequency Surface Mount Impedance Converter

TT electronics
IRC Advanced Film Division

PCH1632 Series

- Ideal impedance coversion solution
- Low cost surface mount construction
- Operation frequency to 1.5GHz
- RoHS Compliant



The PCH1632 series impedance converter provides impedance conversion between the two most common characteristic impedances in use, 50Ω and 75Ω. The PCH1632 series provides impedance conversion across a frequency bandwidth of DC to 1.5 GHz with an insertion loss of 6dB. Typical applications include telecommunication and networking equipment as well as applications. Thin film construction provides consistent operational stability over temperature and time.

Electrical Data

Impedance	50Ω /75Ω
Insertion Loss	6 ± 0.3dB
Frequency Range	DC to 1.5GHz
Power Rating @70°C	125mW
Operating Temperature Range	-55°C to +125°C
Terminations	100% Sn

Environmental Data

Test	Test Condition	To Meet
Short Time Overload	2.5 x Rated Voltage, 5 sec.	±0.05dB
Load Life	1000 Hours 70°C	±0.1dB
Moisture Resistance	1000 Hours, 60°C 95% RH	±0.1dB
Temperature Cycle	5 Cycles 125°C High, -55°C Low	±0.05dB
Resistance to Soldering Heat	260°C, 10 sec.	±0.05dB
Solderability	235°C, 3 sec	More than 95%

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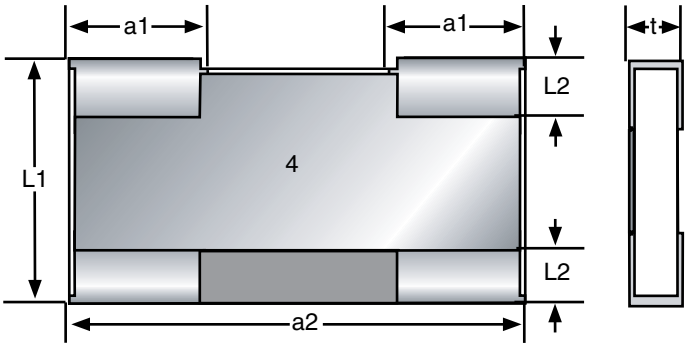
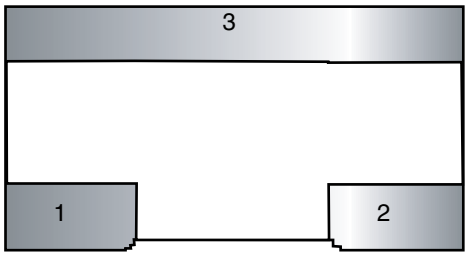
Telephone: 361 992 7900 • Facsimile: 361 992 3377 • Email: afdsales@irctt.com • Website: www.irctt.com

High Frequency Surface Mount Impedance Converter

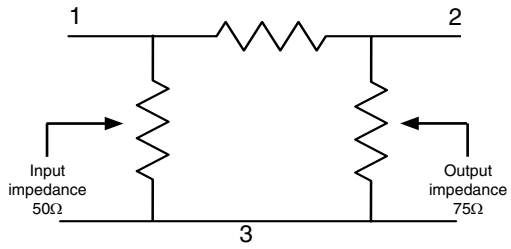
IRC Advanced Film Division

Physical Data





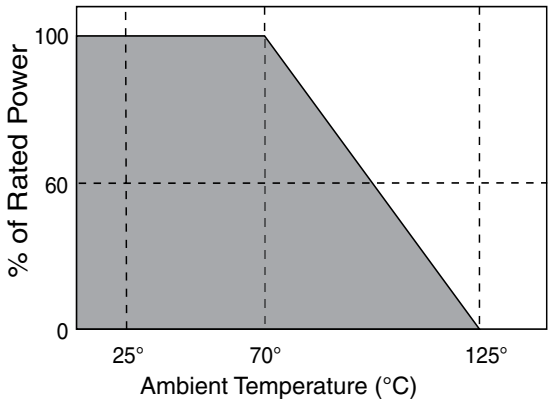
Schematic



Dimensions (mm)	
L1	1.6 ± 0.2
L2	0.4 ± 0.2
a1	1.0 ± 0.2
a2	3.2 ± 0.2
t	0.5 ± 0.2

1, 2: Input and output terminals 3: Electrode (surface soldering and lead-free possible) 4: Covering resin

Power Derating Curve



Ordering Data

Prefix HFR - PCH1632LF - 50/75

Model
PCH1632LF = Converter with 100% Sn terminatons

Impedance
50/75 = 50 to 75Ω converter

IRC Advanced Film Division
4222 South Staples Street
Corpus Christi, Texas 78411, USA

Telephone: 361 992 7900
Facsimile: 361 992 3377
Email: ircafd@irctt.com
Website: www.irctt.com

A subsidiary of TT electronics plc