



**Directional Coupler
10dB**



Description:

The DC2337J5010AHF is a low cost, low profile sub-miniature (0805) high performance 10 dB directional coupler, with a power rating of 2 Watts (AVG) and a peak to average ratio of 12dB, in a new easy to use, Xinger style manufacturing friendly surface mount package. It is designed for 2000 – 4000MHz applications including: 5G, LTE and ISM. The DC2337J5010AHF is ideal for power detection, signal injection and other applications where low insertion loss signal monitoring is required.

Parts have been subjected to rigorous Xinger qualification testing and they are manufactured using materials with coefficients of thermal expansion (CTE) compatible with common substrates such as FR4, G-10, RF-35, RO4003 and polyimide. Produced with 6 of 6 RoHS compliant ENIG finish.

Features:

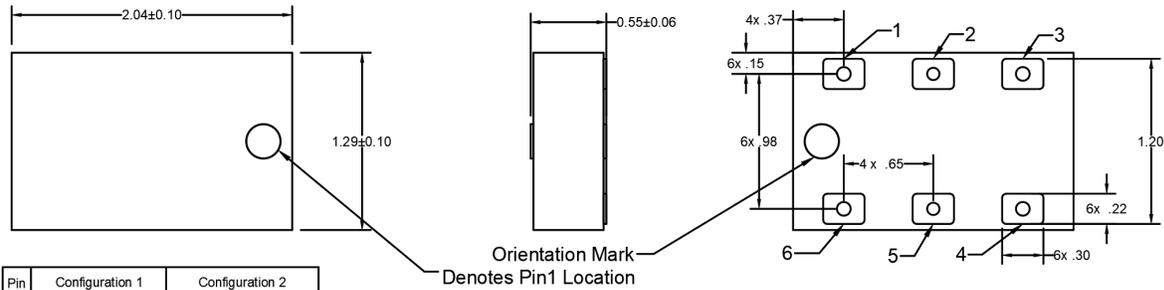
- 2000 – 4000 MHz
- 0.55mm Height
- 5G, LTE&ISM
- Power 2 Watts (AVG)
- Peak to Average Ratio 12dB
- Low Insertion Loss (<0.32dB)
- Surface Mountable
- Tape & Reel
- RoHS Compliant
- Halogen Free
- -55°C to 140°C

Electrical Specifications:

Frequency (MHz)	Mean Coupling (dB)			Insertion Loss (dB)		Return Loss (dB)		Directivity (dB)		Frequency Sensitivity (dB)		Power Handling (Avg watts) @85°C
	Min	Typ	Max	Typ	Max	Typ	Min	Typ	Min	Typ	Max	Max
2000 - 2300	10.2	10.7	11.5	0.15	0.22	30.3	20.0	24.4	20.0	0.30	0.35	2
2300 - 2400	10.2	10.7	11.2	0.15	0.22	30.3	20.0	24.4	20.0	0.07	0.08	2
2400 - 2500	10.0	10.5	11.1	0.15	0.22	30.8	20.0	25.2	20.0	0.05	0.07	2
2630 - 2655	9.8	10.4	10.9	0.15	0.22	30.6	20.0	28.0	20.0	0.01	0.02	2
2500 - 3300	10.0	10.7	11.2	0.19	0.25	30.3	20.2	22	18	0.2	0.3	2
3300 - 3700	10.2	10.8	11.6	0.21	0.29	22.8	17.4	21.1	16.0	0.50	0.60	2
3700 - 4000	10.0	10.5	12.5	0.25	0.32	30.8	20.0	25.2	11.5	0.62	0.70	2

* Specifications subject to change without notice. Specification based on performance of units properly installed on microstrip printed circuit boards with 50 Ω nominal impedances.

Outline Drawing:

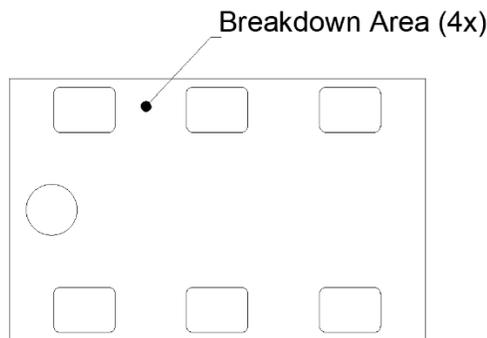


Pin	Configuration 1	Configuration 2
1	Input	Direct
2	Coupled	Isolated
3	Ground	Ground
4	Ground	Ground
5	Isolated	Coupled
6	Direct	Input

Dimensions are in Millimeters
Tolerance are Non-Cumulative

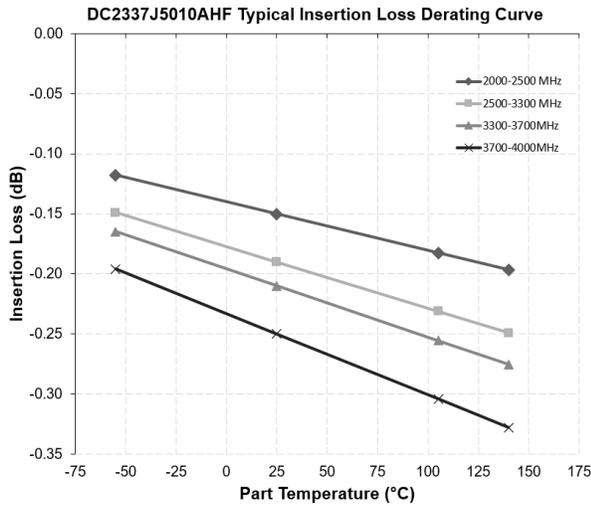
Peak Power Handling:

High-Pot testing of these couplers during the qualification procedure resulted in a minimum breakdown voltage of 1Kv (minimum recorded value). This voltage level corresponds to a breakdown resistance capable of handling at least 12dB peak over average power levels, for very short durations. The breakdown location consistently occurred across the pads and the ground bar (see illustration below). The breakdown levels at these points will be affected by any contamination in the gap area around these pads. These areas must be kept clean for optimum performance. It is recommended that the user test for voltage breakdown under the maximum operating conditions and over worst-case modulation induced power peaking. This evaluation should also include extreme environmental conditions (such as high humidity).



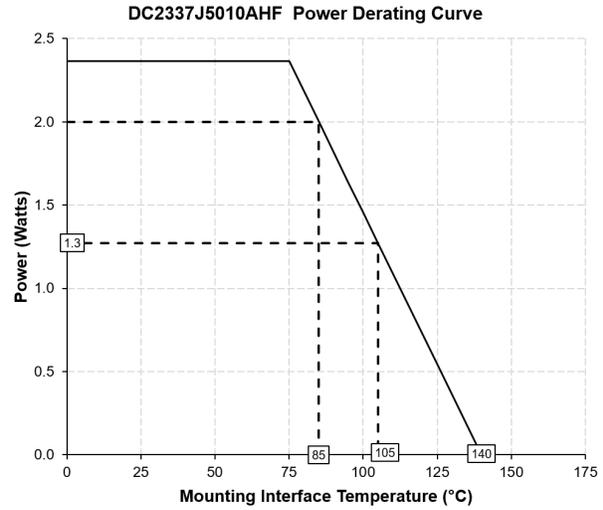
Insertion Loss and Power Derating Curves:

Insertion Loss Derating:



The insertion loss, at a given frequency of the coupler is measured at 25°C and then averaged. The measurements are performed under small signal conditions (i.e. using a Vector Network Analyzer). The process is repeated at -55°C, 105°C and 140°C. A best-fit line for the measured data is computed and then plotted from -55°C to 140°C.

Power Derating:

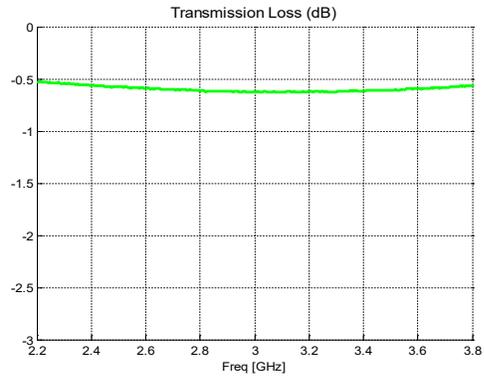
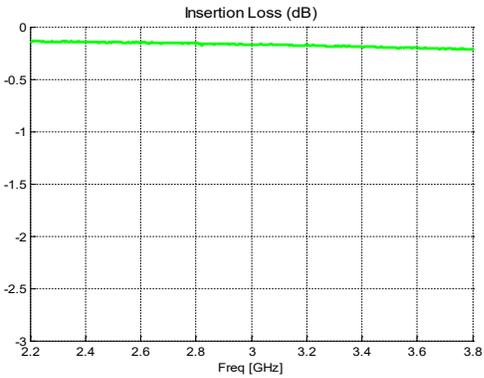
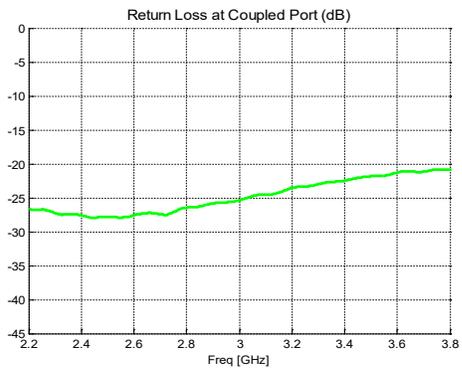
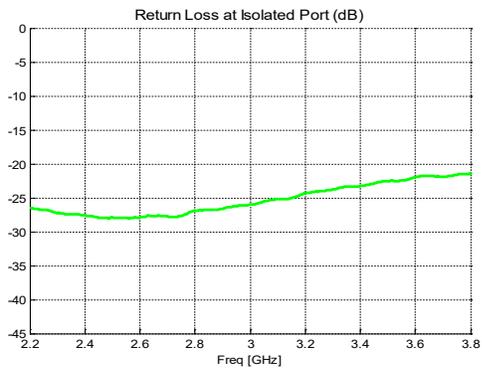
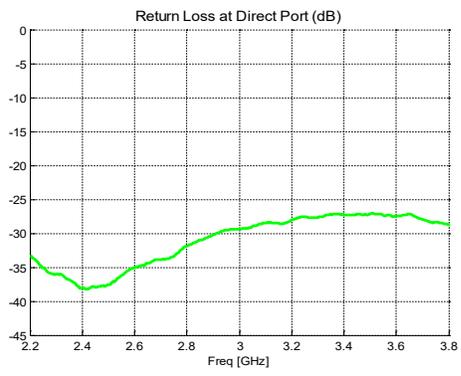
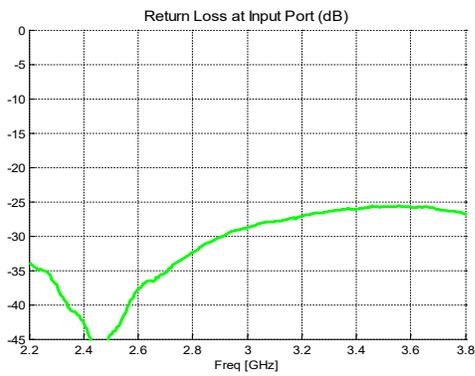
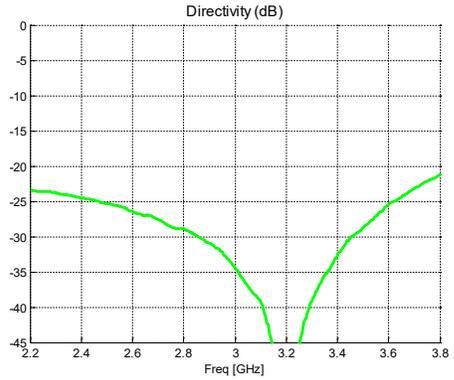
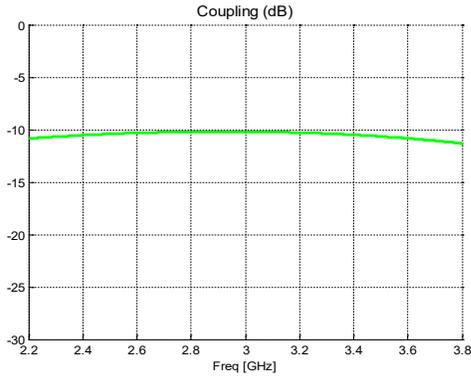


The power handling and corresponding power derating plots are a function of thermal resistance, mounting surface temperature (base plate temperature), maximum continuous operating temperature of the coupler, and the thermal insertion loss. The thermal insertion loss is defined in the Power Handling section of the data sheet.

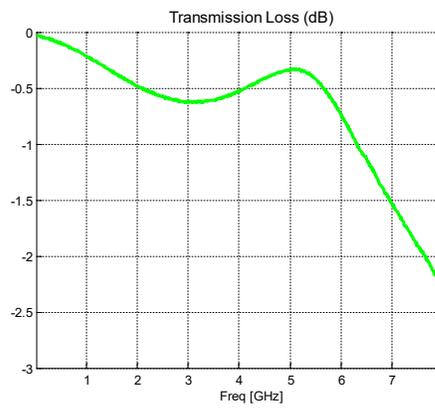
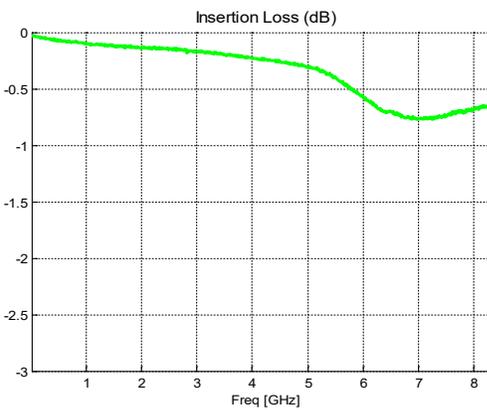
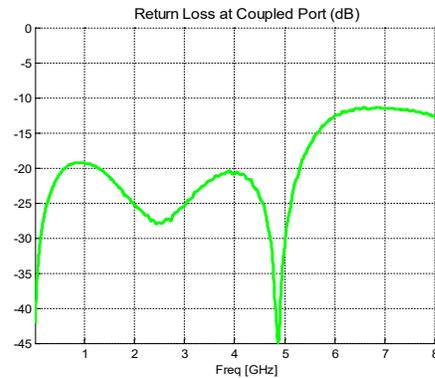
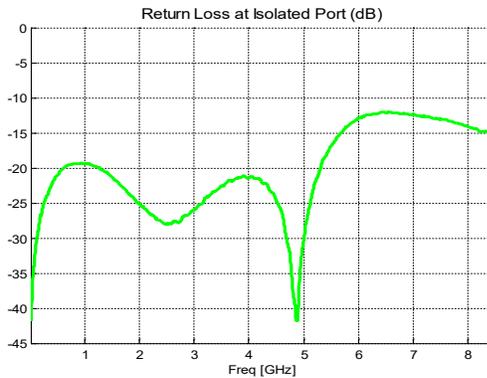
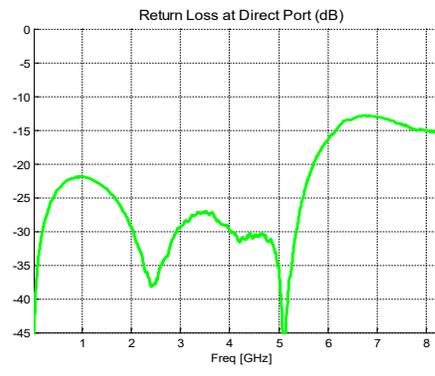
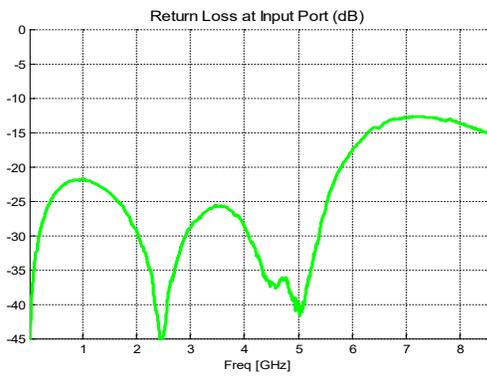
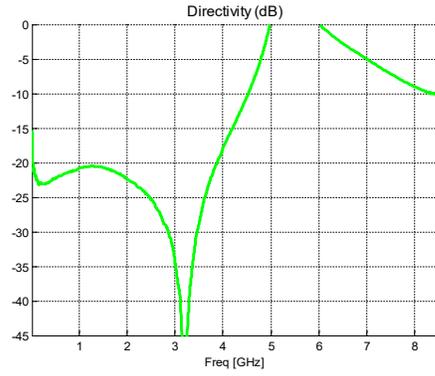
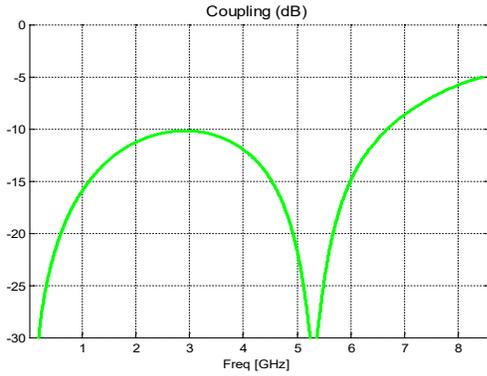
As the mounting interface temperature approaches the maximum continuous operating temperature, the power handling decreases to zero.

If mounting temperature is greater than 105°C, the Xinger coupler will perform reliably if the input power is derated to the curve above.

Typical Performance: 2200 MHz to 3800 MHz (Configuration 1)



Wide Band Performance: 0 to 8500MHz (Configuration 1)



Definition of Measured Specifications:

Parameter	Definition	Mathematical Representation
Return Loss	The impedance match of the coupler to a 50Ω system. Return Loss is an alternate means to express VSWR.	$\text{Return Loss(dB)} = 20\log \frac{\text{VSWR} + 1}{\text{VSWR} - 1}$
Directivity	The power at the isolated port divided by the power at the coupled port	$\text{Directivity(dB)} = 10\log \frac{P_{\text{iso}}}{P_{\text{cpl}}}$
Insertion Loss	The input power divided by the sum of the power at the two output ports.	$\text{Insertion Loss(dB)} = 10\log \frac{P_{\text{in}}}{P_{\text{cpl}} + P_{\text{direct}}}$
Mean Coupling	At a given frequency (ω_n), coupling is the input power divided by the power at the coupled port. Mean coupling is the average value of the coupling values in the band. N is the number of frequencies in the band.	$\text{Coupling(dB)} = C(\omega_n) = 10\log \frac{P_{\text{in}}(\omega_n)}{P_{\text{cpl}}(\omega_n)}$ $\text{Mean Coupling(dB)} = \frac{\sum_{n=1}^N C(\omega_n)}{N}$
Transmission Loss	The input power divided by the power at the direct port	$\text{Transmission Loss(dB)} = 10\log \frac{P_{\text{in}}}{P_{\text{direct}}}$
Frequency sensitivity	The decibel difference between the maximum in band coupling value and the minimum in band coupling value.	$(\text{Max Coupling (dB)} - \text{Min Coupling (dB)})/2$

*100% RF test is performed on configuration 1 where port 1 is connected to pin1, port 2 is connected to pin 2, port 3 is connected to pin 5 and port 4 is connected to pin 6.

