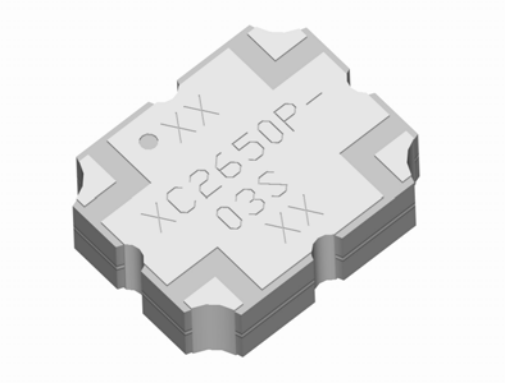
Xinger II

Hybrid Coupler
3 dB, 90°



Description

The XC2650P-03S is a low profile, high performance 3dB hybrid coupler in a new easy to use, manufacturing friendly surface mount package. It is designed for WiMAX applications. The XC2650P-03S is designed particularly for balanced power and low noise amplifiers, plus signal distribution and other applications where low insertion loss and tight amplitude and phase balance is required. It can be used in high power applications up to 50 Watts.

Parts have been subjected to rigorous 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, and RO4003. Produced with 6 of 6 RoHS compliant tin immersion finish.

Features:

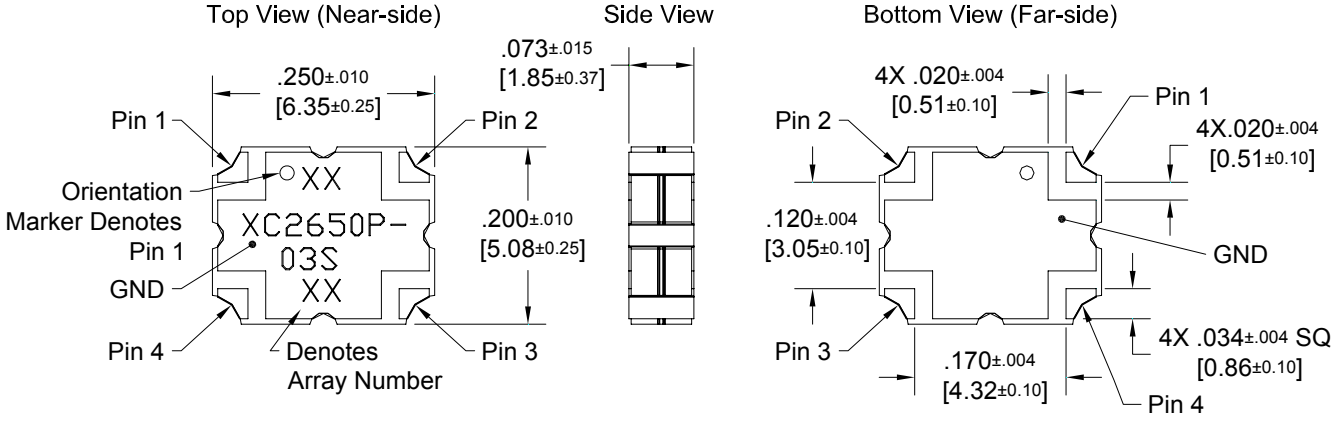
- **2650-2800 MHz**
- **WiMAX**
- **High Power**
- **Very Low Loss**
- **Tight Amplitude Balance**
- **High Isolation**
- **Production Friendly**
- **Tape and Reel**
- **Lead-Free**

Electrical Specifications **

Frequency	Isolation	Insertion Loss	VSWR	
MHz	*dB Min*	*dB Max*	*Max:1*	
2650-2800	20	0.25	1.20	
Amplitude Balance	**Phase Balance**	**Power**	**ΘJC**	**Operating Temp.**
dB Max	*Degrees*	*Ave. CW Watts*	*ºC/ Watt*	*ºC*
±0.15	90±3.0	50	60.5	-55 to +85

**Specification based on performance of unit properly installed on Anaren Test Board 54147-0001 with small signal applied. Specifications subject to change without notice. Refer to parameter definitions for details.

Mechanical Outline



Dimensions are in Inches [Millimeters]
XC2650P-03S Mechanical Outline

Tolerances are Non-Cumulative

Available on Tape and Reel for Pick and Place Manufacturing.

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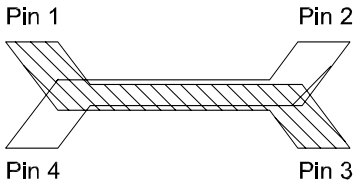
Hybrid Coupler Pin Configuration

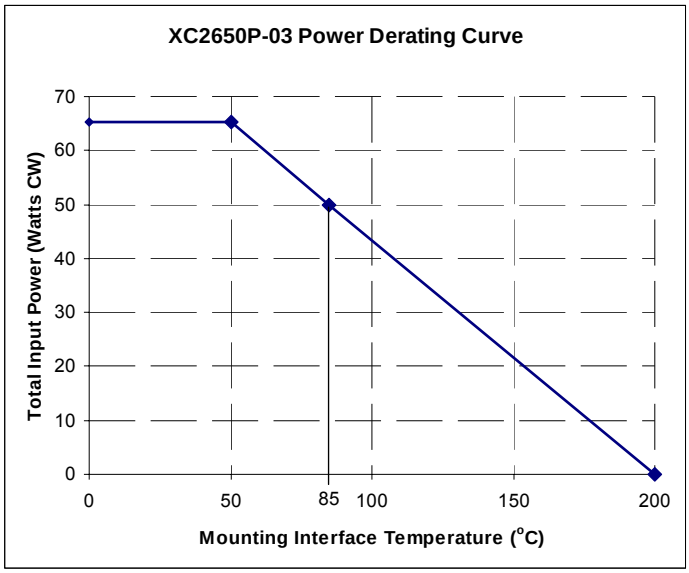
The XC2650P-03S has an orientation marker to denote Pin 1. Once port one has been identified the other ports are known automatically. Please see the chart below for clarification:



Configuration	Pin 1	Pin 2	Pin 3	Pin 4
Splitter	Input	Isolated	-3dB $\angle\theta - 90$	-3dB $\angle\theta$
Splitter	Isolated	Input	-3dB $\angle\theta$	-3dB $\angle\theta - 90$
Splitter	-3dB $\angle\theta - 90$	-3dB $\angle\theta$	Input	Isolated
Splitter	-3dB $\angle\theta$	-3dB $\angle\theta - 90$	Isolated	Input
***Combiner**	A$\angle\theta - 90$	A$\angle\theta$	Isolated	Output
***Combiner**	A$\angle\theta$	A$\angle\theta - 90$	Output	Isolated
***Combiner**	Isolated	Output	A$\angle\theta - 90$	A$\angle\theta$
***Combiner**	Output	Isolated	A$\angle\theta$	A$\angle\theta - 90$

*Note: "A" is the amplitude of the applied signals. When two quadrature signals with equal amplitudes are applied to the coupler as described in the table, they will combine at the output port. If the amplitudes are not equal, some of the applied energy will be directed to the isolated port.

Power Derating Curves



Power Derating:

The power handling and corresponding power derating plots are a function of the thermal resistance, mounting interface 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.

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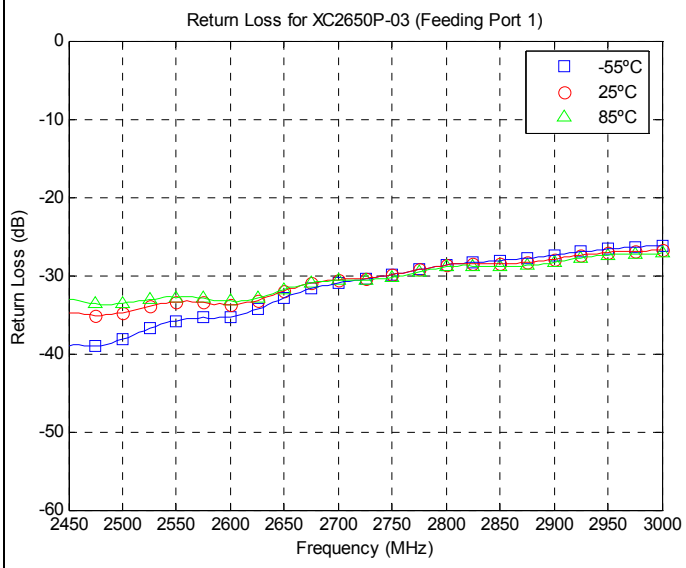
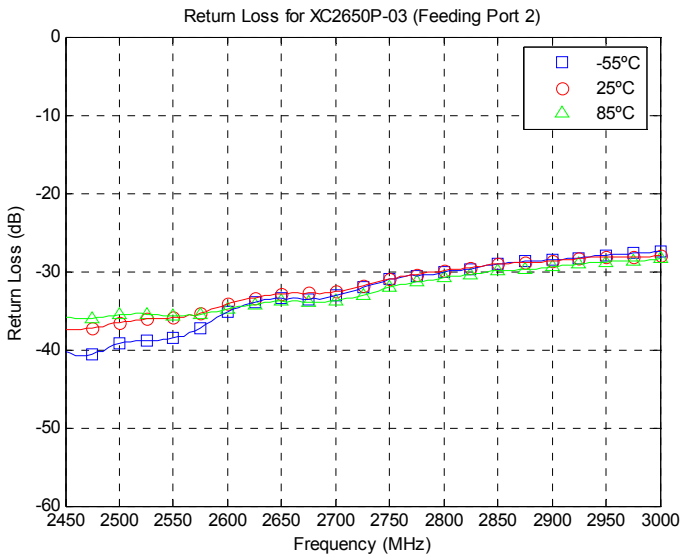
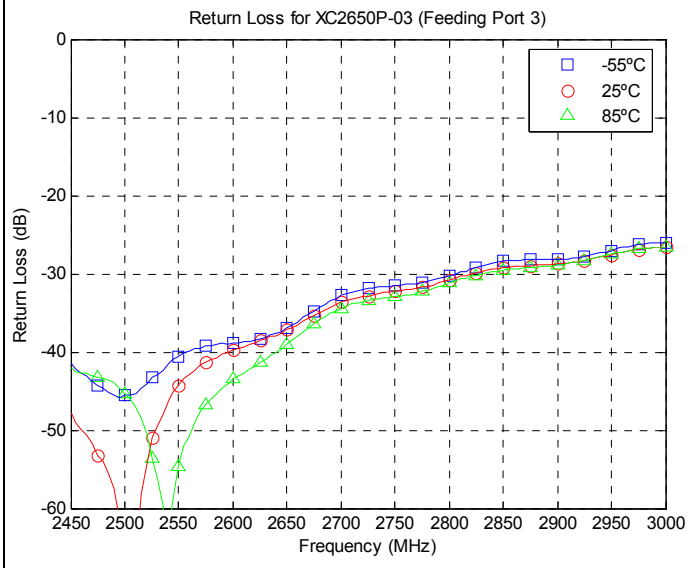
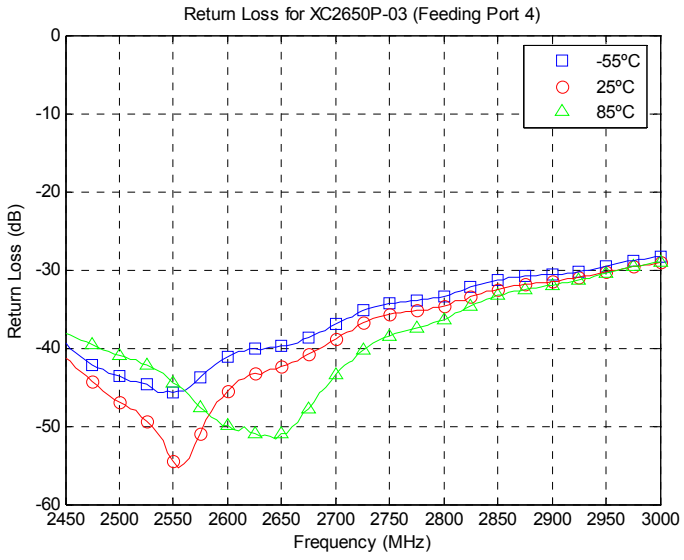
Typical Performance (-55°C, 25°C and 85°C): 2450-3000 MHz









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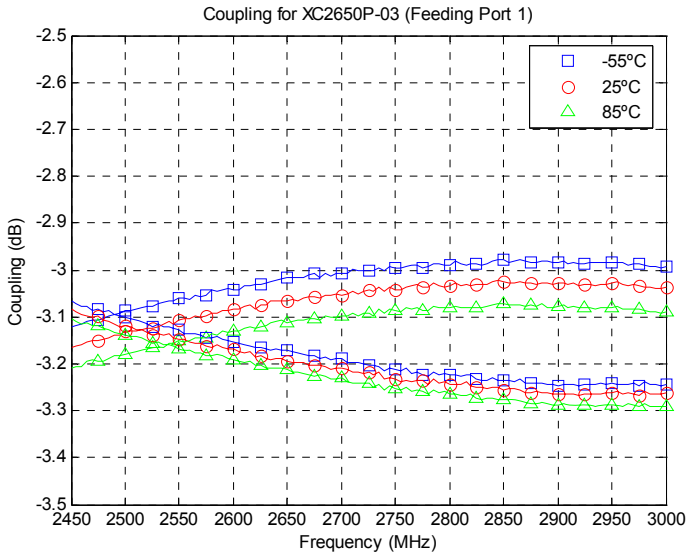

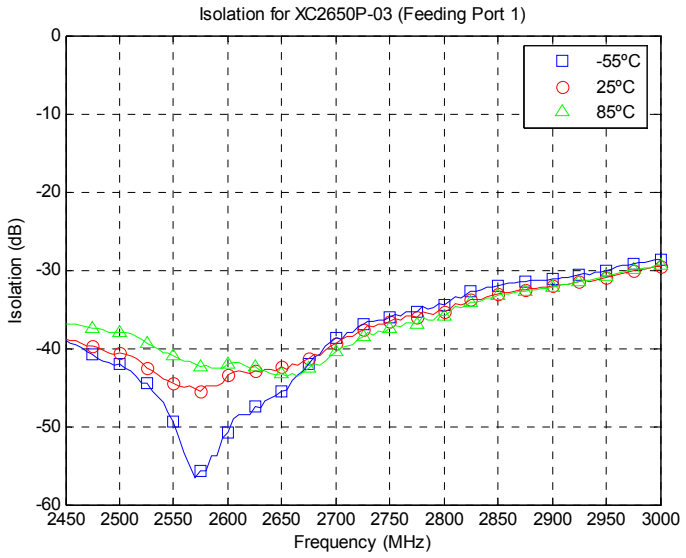

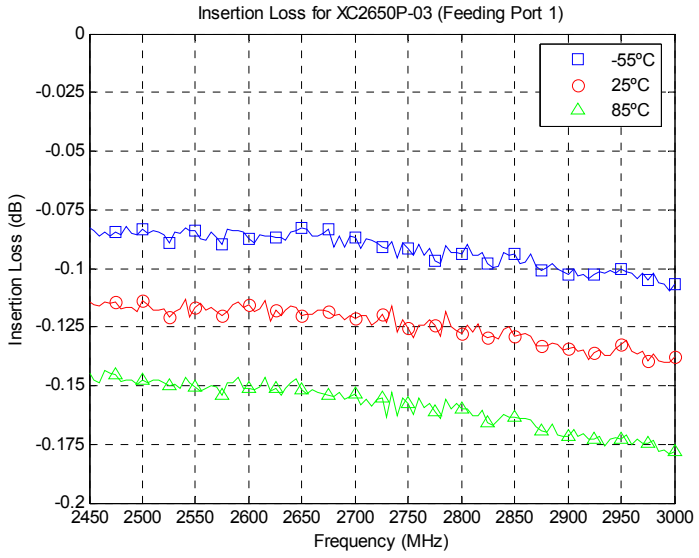

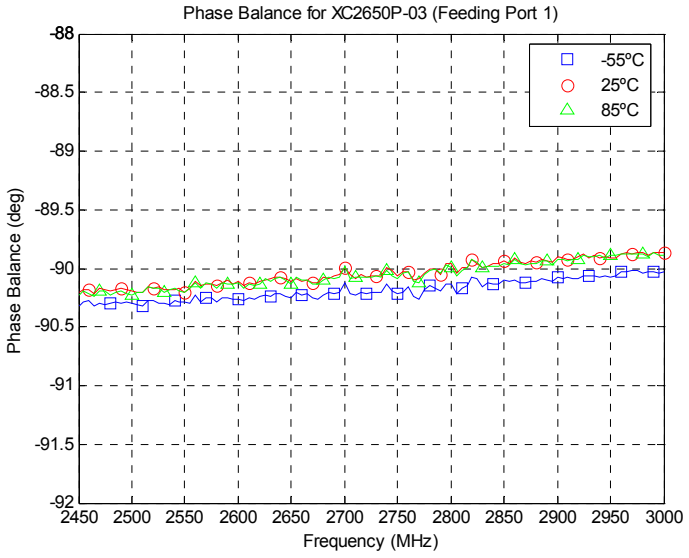

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Definition of Measured Specifications

Parameter	Definition	Mathematical Representation
VSWR (Voltage Standing Wave Ratio)	The impedance match of the coupler to a 50Ω system. A VSWR of 1:1 is optimal.	$VSWR = \frac{V_{max}}{V_{min}}$ Vmax = voltage maxima of a standing wave Vmin = voltage minima of a standing wave
Return Loss	The impedance match of the coupler to a 50Ω system. Return Loss is an alternate means to express VSWR.	Return Loss (dB)= $20\log \frac{VSWR + 1}{VSWR - 1}$
Insertion Loss	The input power divided by the sum of the power at the two output ports.	Insertion Loss(dB)= $10\log \frac{P_{in}}{P_{cpl} + P_{direct}}$
Isolation	The input power divided by the power at the isolated port.	Isolation(dB)= $10\log \frac{P_{in}}{P_{iso}}$
Phase Balance	The difference in phase angle between the two output ports.	Phase at coupled port – Phase at direct port
Amplitude Balance	The power at each output divided by the average power of the two outputs.	$10\log \frac{P_{cpl}}{\left(\frac{P_{cpl} + P_{direct}}{2}\right)}$ and $10\log \frac{P_{direct}}{\left(\frac{P_{cpl} + P_{direct}}{2}\right)}$

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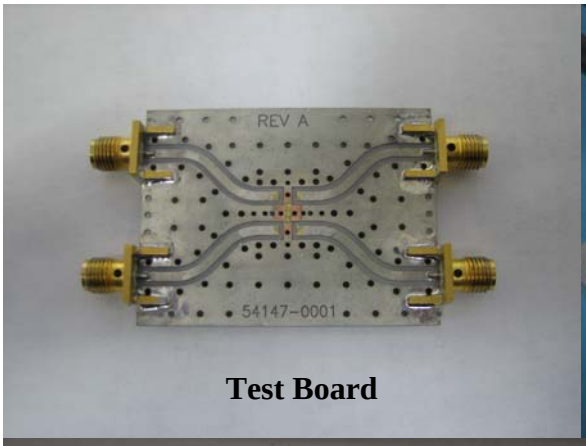
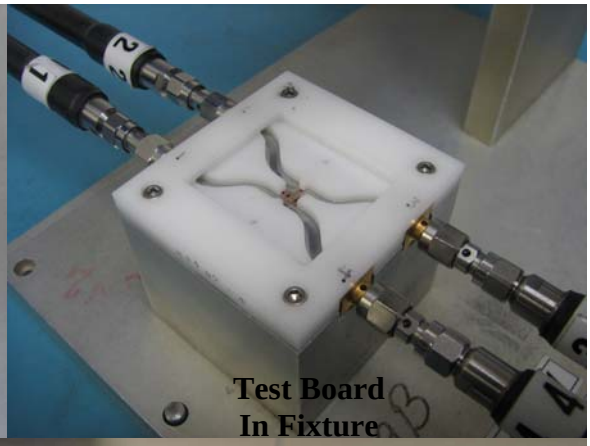
Notes on RF Testing and Circuit Layout

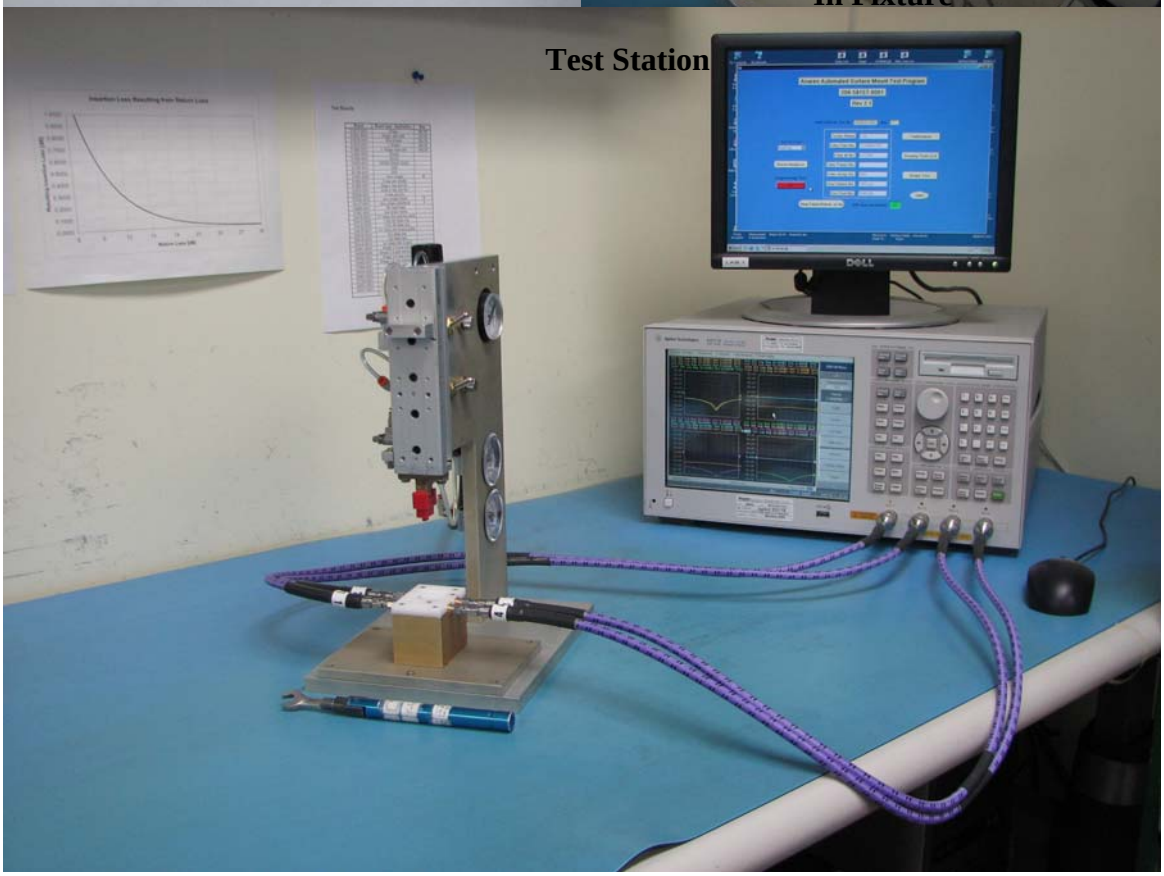
The XC2650P-03S Surface Mount Couplers require the use of a test fixture for verification of RF performance. This test fixture is designed to evaluate the coupler in the same environment that is recommended for installation. Enclosed inside the test fixture, is a circuit board that is fabricated using the recommended footprint. The part being tested is placed into the test fixture and pressure is applied to the top of the device using a pneumatic piston. A four port Vector Network Analyzer is connected to the fixture and is used to measure the S-parameters of the part. Worst case values for each parameter are found and compared to the specification. These worst case values are reported to the test equipment operator along with a Pass or Fail flag. See the illustrations below.



Test Board



Test Board In Fixture



Test Station

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