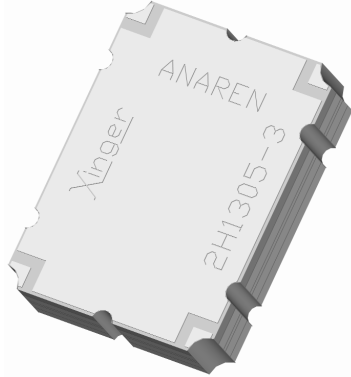


Xinger®

Hybrid Couplers 3 dB, 90°



Description

The 2H1305-3 is a low profile, high power 3dB hybrid coupler in an easy to use surface mount package covering the entire DCS and PCS bands. The 2H1305-3 is ideal for balanced amplifiers and signal combining and can be used in most high power designs. Parts have been subject to rigorous qualification testing and units are 100% tested. They are manufactured using materials with x and y thermal expansion coefficients compatible with common substrates such as FR4, G-10 and polyimide.

Features:

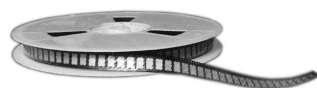
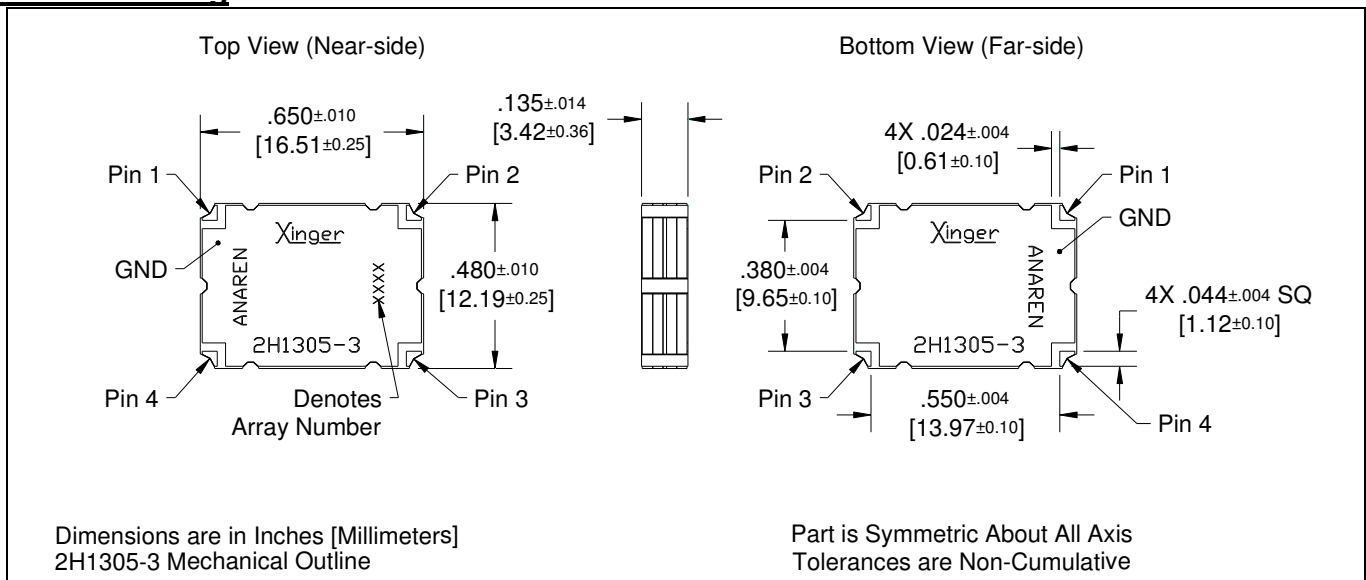
- 1805 - 1990 MHz
- High Power
- Very Low Loss
- High Isolation
- 90° Quadrature
- Surface Mountable
- Lead Free Finish
- Tape and Reel
- Convenient Package
- 100% Tested
- H-Style

ELECTRICAL SPECIFICATIONS**

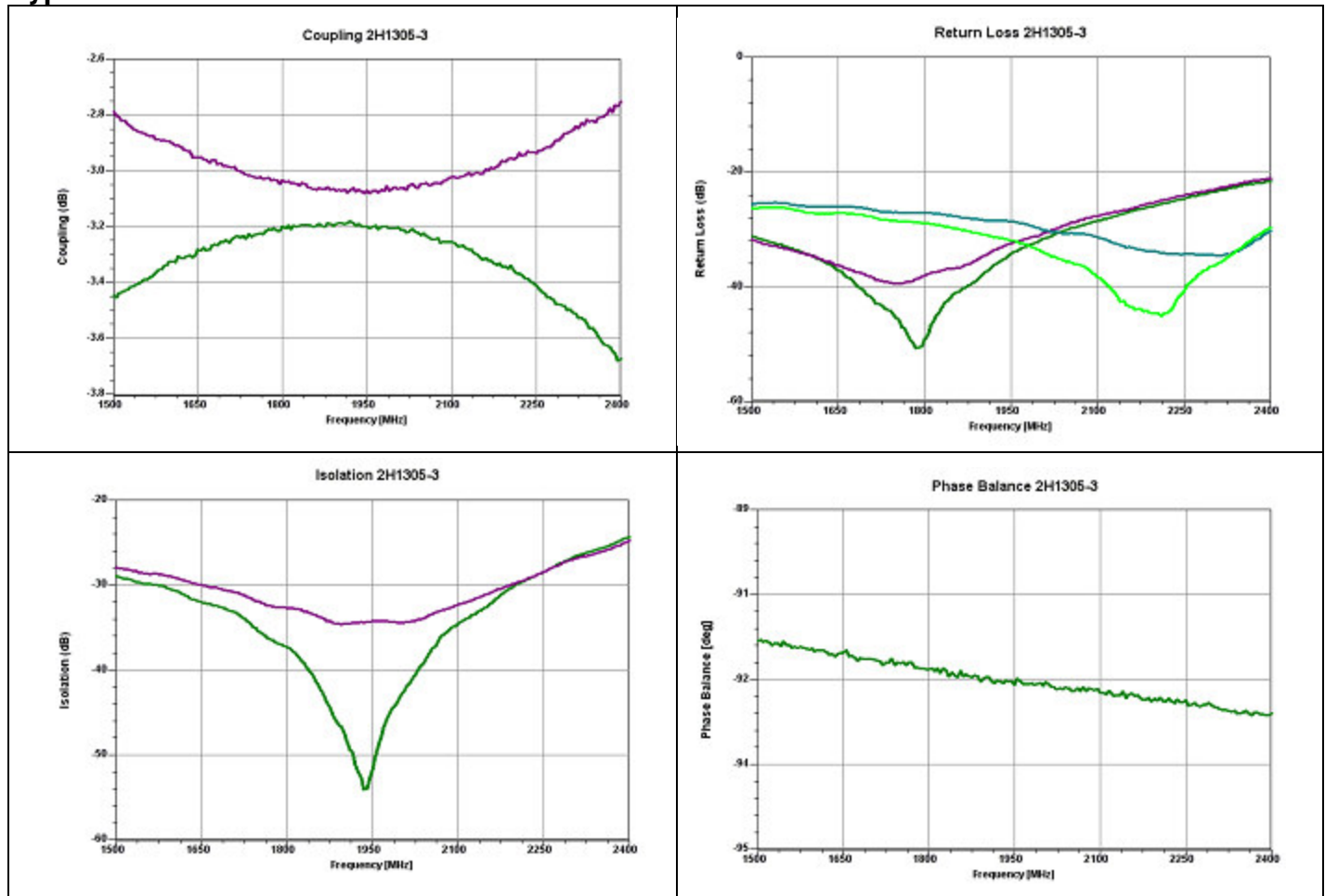
Frequency	Isolation	Insertion Loss	VSWR	
<i>MHz</i>	<i>dB Min</i>	<i>dB Max</i>	<i>Max:1</i>	
1805 – 1990	22	0.20	1.20	
Amplitude Balance	Phase Balance	Power	ΘJC	Operating Temp.
<i>dB Max</i>	<i>Degrees</i>	<i>Ave. CW Watts</i>	<i>°C/Watt</i>	<i>°C</i>
± 0.30	± 3	120	26.8	-55 to +85

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

Outline Drawing



Typical Performance: 1500 MHz. to 2400 MHz.



AMPLITUDE BALANCE

3dB hybrids are a type of backward wave coupler. In the design of these couplers, the even mode impedance was chosen to 'critically couple' or slightly 'over couple' at mid band to maximize performance and bandwidth. The amplitude balance specification is defined as the decibel difference between the two output curves.

PHASE BALANCE

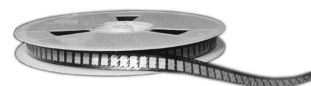
In theory, output ports of a backward wave hybrid coupler remain in perfect phase quadrature independent of frequency. In practice, factors associated with the manufacturing processes slightly degrade performance. The specification is typically two to three degrees maximum. In practice, phase balance is statistically better than specified ($<1^\circ$).

VSWR & ISOLATION

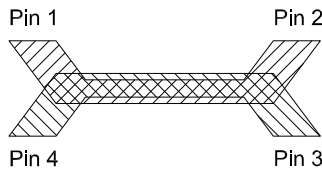
Similar to phase balance, the VSWR and isolation of a coupler are theoretically perfect; where the input and output ports are perfectly matched and no power is coupled to the isolated port. In practice, factors associated with the design and manufacturing processes limit VSWR and isolation. The significant limitations are associated with limitations of building perfect 50Ω transitions at the input and output ports of the device.

INSERTION LOSS

Coupler insertion loss is defined as the difference of the input power from the sum of the output power. In practice, loss is typically 0.20 dB. Specification limits are somewhat higher due to imperfect test conditions; as the couplers must be tested in fixtures that negatively affect results.



PIN CONFIGURATION



Hybrid H-Style Coupler Pin Configuration				
	Pin 1	Pin 2	Pin 3	Pin 4
Configuration #1	Input	-3dB, -90°	Isolated	-3dB, 0°
Configuration #2	-3dB, -90°	Input	-3dB, 0°	Isolated
Configuration #3	Isolated	-3dB, 0°	Input	-3dB, -90°
Configuration #4	-3dB, 0°	Isolated	-3dB, -90°	Input

All of the standard surface mount 3dB hybrid couplers have pin orientations that are symmetrical. When a port is designated as the input, automatically the two output and isolated ports are defined. For example, if the input port for a device was selected to be Pin 1, Pin 2 is automatically the isolated port, Pin 4 is the 0 degree reference output port, and Pin 3 is the output port which "lags" behind the reference output port by 90 degrees. Similarly, if Pin 3 was to be selected as the input port, the adjacent port on the long side (Pin 4) is the isolated port, the adjacent port on the short side (Pin 2) is the 0 degree output port, and the opposite port (Pin 1) is the -90 degree output port. Below is a table of all possible orientations.

MOUNTING

In order for Xinger surface mount couplers to work optimally, there must be 50Ω transmission lines leading to and from all of the RF ports. Also, there must be a very good ground plane under the part to ensure proper electrical performance. If either of these two conditions are not satisfied, insertion loss, coupling, VSWR and isolation may not meet published specifications.

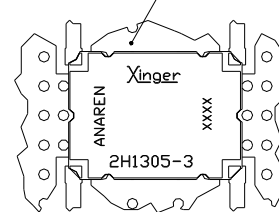
Overall ground is improved if a dense population of plated through holes connect the top and bottom ground layers of the PCB. This minimizes ground inductance and improves ground continuity. All of the Xinger hybrid and directional couplers are constructed from ceramic filled PTFE composites that possess excellent

electrical and mechanical stability having X and Y thermal coefficient of expansion (CTE) of 17 ppm/°C.

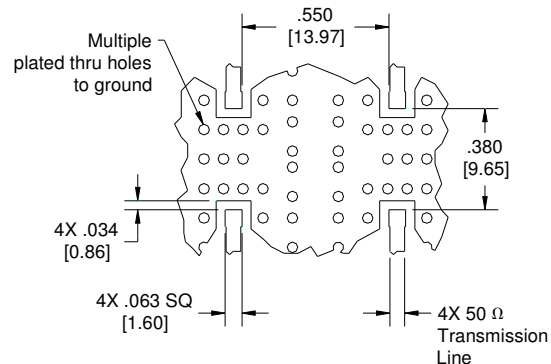
When a surface mount hybrid coupler is mounted to a printed circuit board, the primary concerns are; ensuring the RF pads of the device are in contact with the circuit trace of the PCB and insuring the ground plane of neither the component nor the PCB is in contact with the RF signal. As long as the geometry of the unit fits onto the layout of the circuit trace on the PCB, and the conditions of the previous paragraph are followed, the coupler's performance is ensured. An example of how the PCB footprint could look is shown below. In specific designs, the 50Ω lines need to be adjusted to the unique dielectric coefficients and thicknesses as well as varying pick and place equipment tolerances. To ensure proper electrical and thermal performance there must be a ground plane with 100% solder connection underneath the part.

SUGGESTED FOOTPRINT

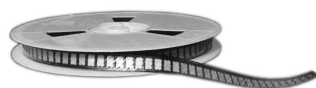
To ensure proper electrical and thermal performance there must be a ground plane with 100% solder connection underneath the part



Part is Symmetric About All Axis



Dimensions are in Inches [Millimeters]
2H1305-3 Mounting Footprint



PACKAGING

Parts are available in both reel and tube. Packaging follows EIA 481-2. Parts are provided in tape and reel as shown below. Minimum order quantities are 1000 per reel and 35 per tube.

