

Xinger[®]



High Power Directional Coupler 30 dB

Description:

The XEC24M6-30G is a low profile, high performance 30dB directional coupler, with a power rating of 600 Watts (AVG) and a peak to average ratio of 12dB. In an easy to use Xinger style manufacturing friendly surface mount package. It is designed for ISM band applications such as Industrial RF heating and Magnetron replacement, solid state amplifiers as well as Mil-Aero applications. The XEC24M6-30G is designed particularly for power and frequency detection, where tightly controlled coupling and low insertion loss 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, RF-35, RO4350 and polyimide.

Features:

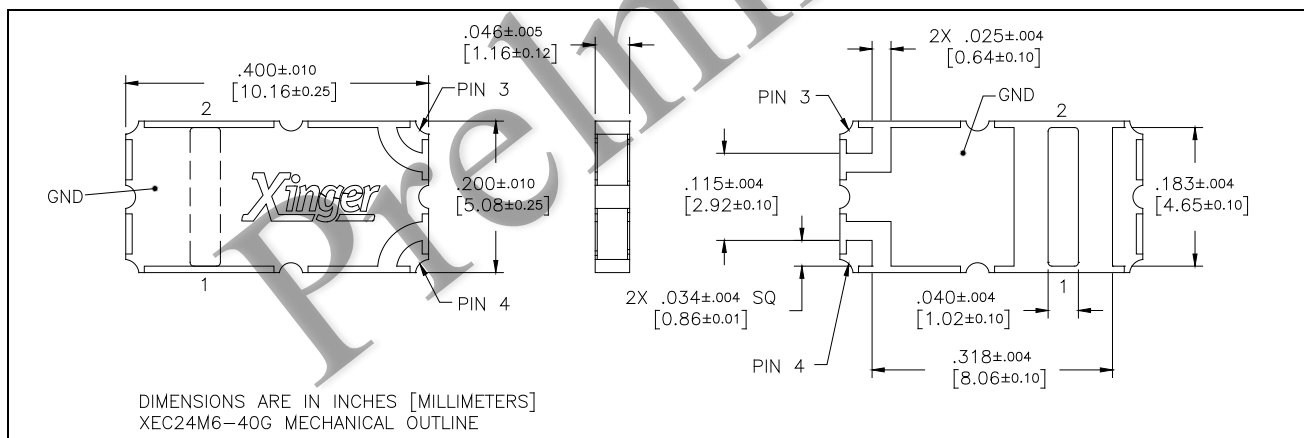
- 2400 - 2500 MHz
- ISM band Industrial and Mil-Aero Applications
- High Power 600 W (AVG)
- Peak to Avg Ratio 12dB
- Very Low Loss (<0.1dB)
- Tight Coupling (± 1.5 dB)
- Low Directivity (2.3dB)
- Production Friendly
- Tape and Reel
- ENIG Finish
- Lead Free

Electrical Specifications*:

Frequency	Mean Coupling	Insertion Loss	VSWR
MHz	dB	dB Max	Max : 1
2400 – 2500	30.0 ± 1.5	0.1	1.15
Directivity	Frequency Sensitivity	Power	Operating Temp.
dB Min	dB Max	Avg. CW Watts	°C
23	± 0.2	600	-55 to +150

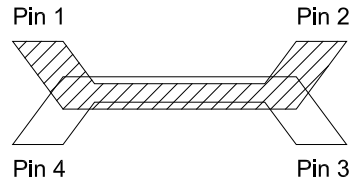
*Specification based on performance of unit properly installed on TTM Test Board with small signal applied. Specifications subject to change without notice. Refer to parameter definitions for details.

Mechanical Outline:



Directional Coupler Pin Configuration:

The **XEC24M6-30G** 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:



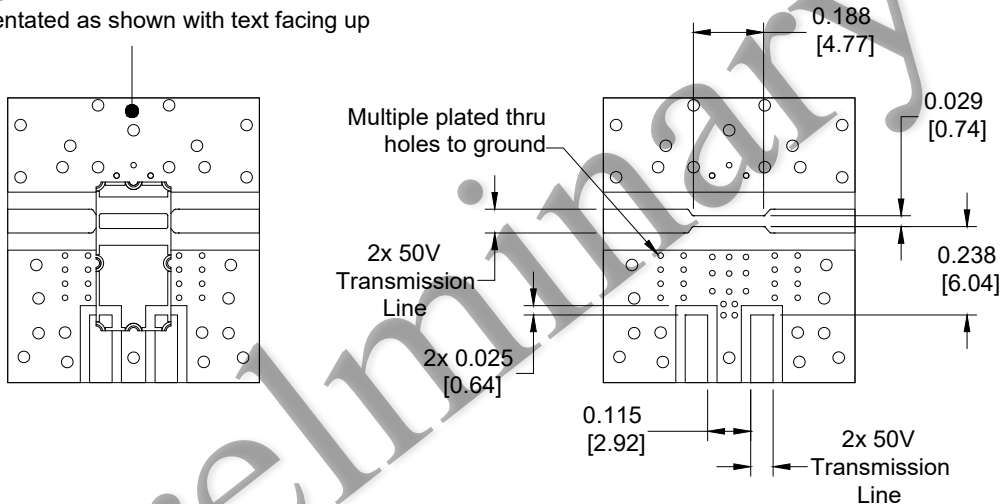
30dB Coupler Pin Configuration

Pin 1	Pin 2	Pin 3	Pin 4
Input	Direct	Isolated	Coupled
Direct	Input	Coupled	Isolated

Note: The direct port has a DC connection to the input port and the coupled port has a DC connection to the isolated port. For optimum IL and power handling performance, use Pin 1 or Pin 2 as inputs.

Mounting Footprint:

To ensure proper electrical and thermal performance there must be a ground plane with 100% solder connection underneath the part orientated as shown with text facing up



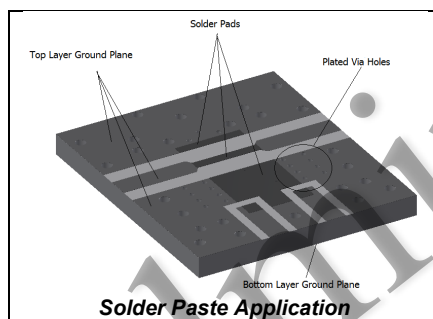
Dimensions are in Inches [Millimeters]
XEC24M6-40G Mounting Footprint

Solder Joint Composition:

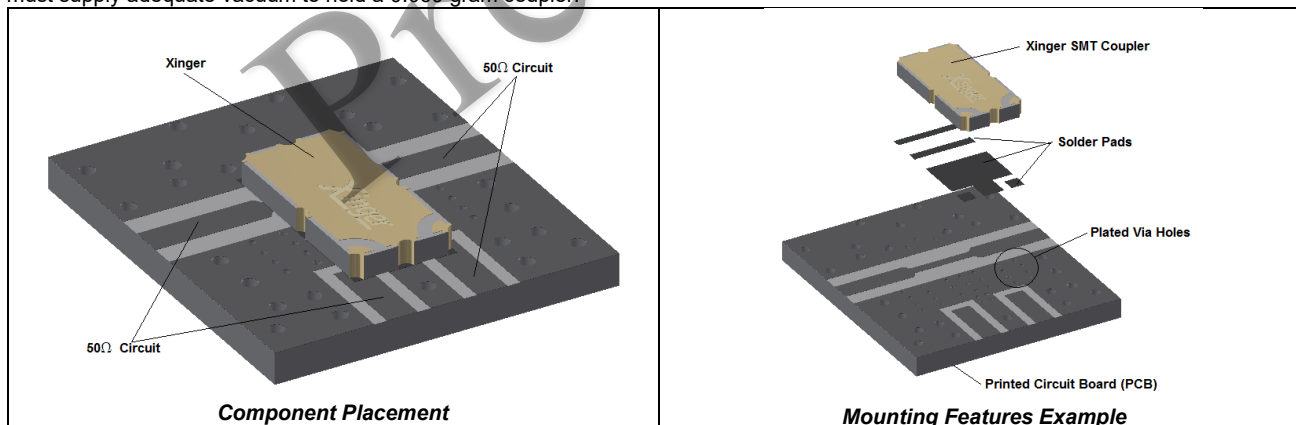
The percentage by mass of gold in Xinger Couplers with ENIG plating is low enough that it does not pose a gold embrittlement risk. Table below illustrates the configurations evaluated assuming the ENIG plating thickness is min 7µin, thickness of solder is 2000µin and thickness of Tin lead plating is 200µin

	Xinger Finish	PCB Pad Finish	Solder Composition	% Gold, Wt
1	ENIG	Tin-lead	Eutectic tin-lead	<3%
2	ENIG	ENIG	Eutectic tin-lead	<3%
3	ENIG	Tin-lead	Tin-silver	<3%
4	ENIG	ENIG	Tin-silver	<3%

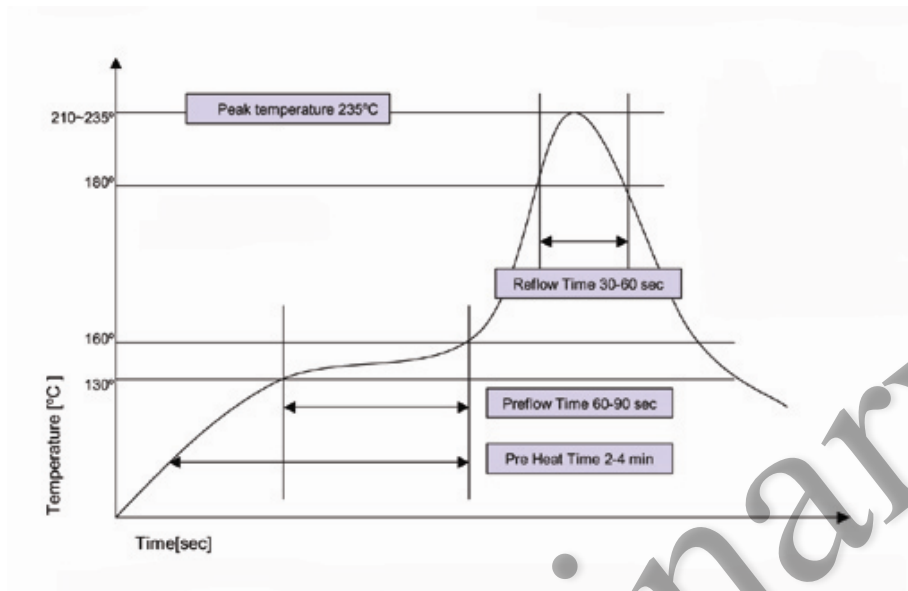
Reflow: The surface mount coupler is conducive to most of today's conventional reflow methods. Low and high temperature thermal reflow profiles are shown in Figures 5 and 6, respectively. Manual soldering of these components can be done with conventional surface mount non-contact hot air soldering tools. Board pre-heating is highly recommended for these selective hot air soldering methods. Manual soldering with conventional irons should be avoided.



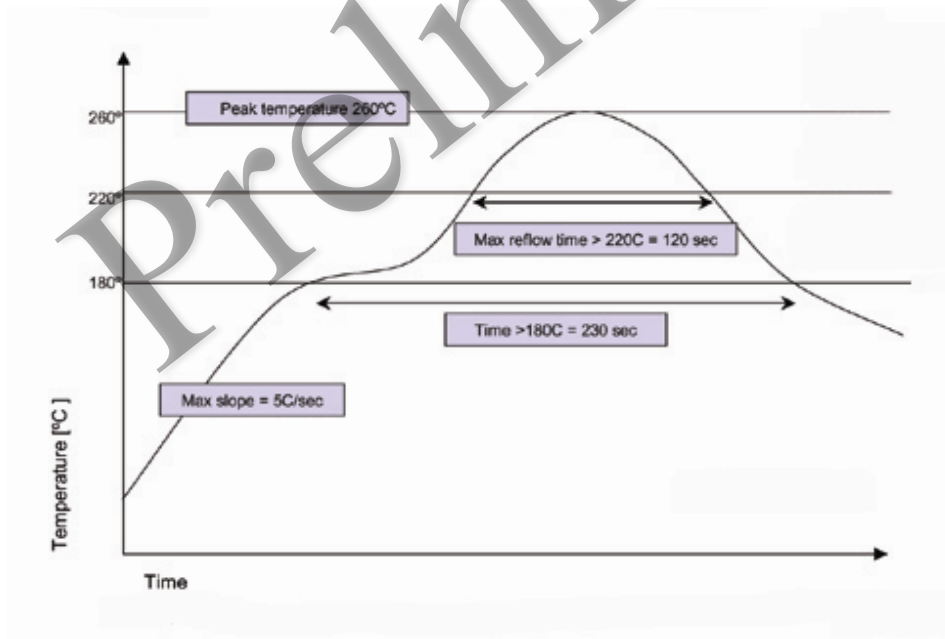
Coupler Positioning: The surface mount coupler can be placed manually or with automatic pick and place mechanisms. Couplers should be placed (see Figure 3 and 4) onto wet paste with common surface mount techniques and parameters. Pick and place systems must supply adequate vacuum to hold a 0.069 gram coupler.



Low Temperature Eutectic Solder (63/37) Reflow Thermal Profile:



High Temperature SnAg or SAC Solder Reflow Thermal Profile:



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.	$VSWR = \frac{V_{max}}{V_{min}}$ <p>Vmax = voltage maxima of a standing wave Vmin = voltage minima of a standing wave</p>
Return Loss	The impedance match of the coupler to a 50Ω system. Return Loss is an alternate means to express VSWR.	$Return\ Loss(dB) = 20\log \frac{VSWR + 1}{VSWR - 1}$
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.	$Coupling(dB) = C(\omega_n) = 10\log \frac{P_{in}(\omega_n)}{P_{cpl}(\omega_n)}$ $Mean\ Coupling(dB) = \frac{\sum_{n=1}^N C(\omega_n)}{N}$
Insertion Loss	The input power divided by the sum of the power at the two output ports.	$Insertion\ Loss(dB) = 10\log \frac{P_{in}}{P_{cpl} + P_{direct}}$
Transmission Loss	The input power divided by the power at the direct port.	$10\log \frac{P_{in}}{P_{direct}}$
Directivity	The power at the coupled port divided by the power at the isolated port.	$10\log \frac{P_{cpl}}{P_{iso}}$

Packaging and Ordering Information:

Parts are available in reels. Packaging follows EIA 481-2. Parts are oriented in tape and reel as shown below. Minimum order quantities are 2000 per reel and 250 per reel.

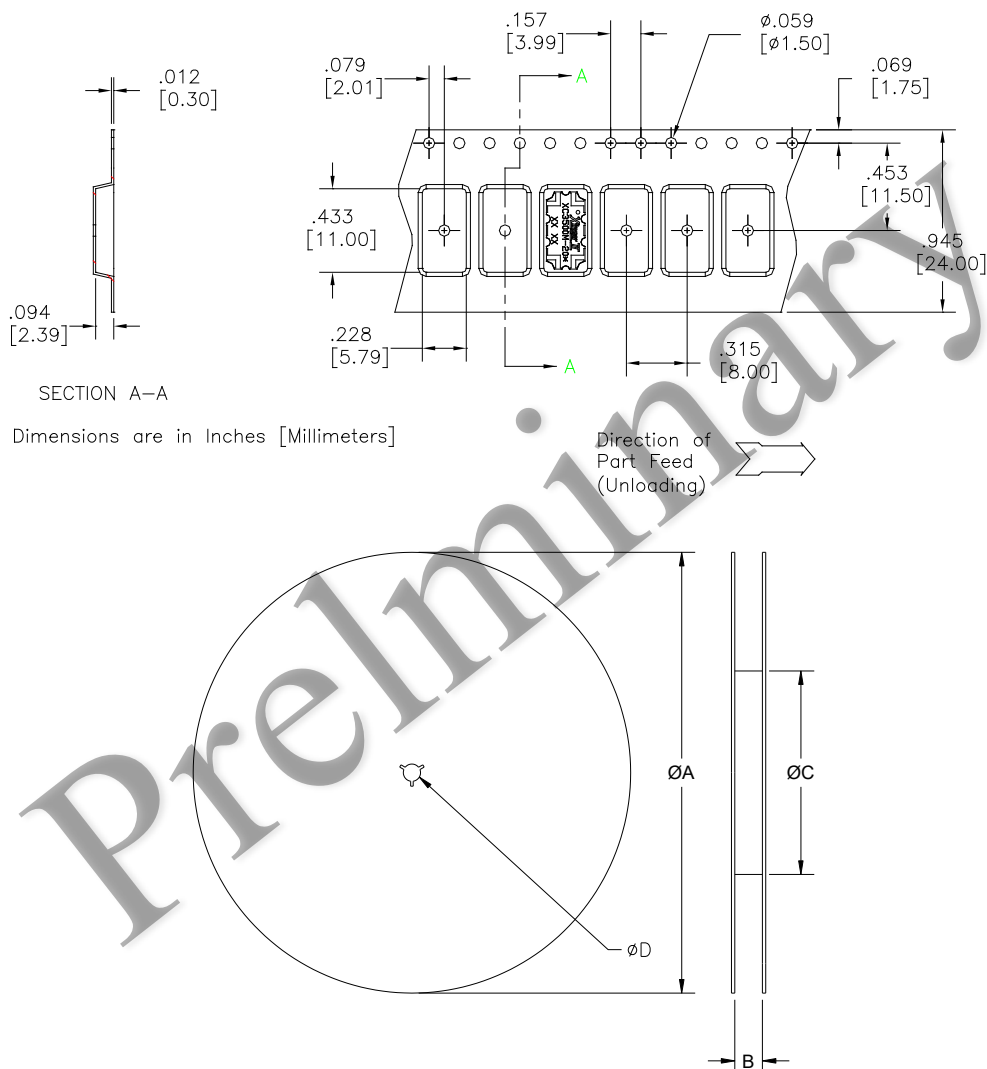


TABLE 1: REEL DIMENSIONS (mm)					
	QUANTITY/REEL	ϕA	B	ϕC	ϕD
XEC24M6-30GR	2000	330.00	24.0	102.03	13.00
XEC24M6-30GR1	250	177.80	24.0	50.80	13.00



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