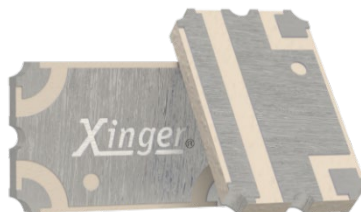




Directional Coupler 30 dB



Description:

Introducing the Next Generation Xinger product; XNGC40F2-30S — a new-generation of virtually lossless, low-profile 30 dB directional couplers, utilizing TTM's unique **"NVTA" non-vertical-transition architecture**, that sets new performance standards. The new Xinger_NG surface-mount package delivers exceptional loss and directivity, with 200 W average high-power capability at 125°C for LTE, 5G and S- & C-band applications. The XNGC40F2-30S uses CTE-matched materials to common PCB substrates, having RoHS-compliant Immersion Tin plating, and gives customers a compact, high-reliability solution that accelerates time to market. The device is ideal for power/frequency detection and VSWR monitoring where tightly controlled coupling and low insertion loss are required.

Features:

- 3200-4200 MHz
- 5G, LTE, L&S-Band COTS Mil-Aero
- "NVTA" non-vertical-transition architecture
- Requires mounting on ground plane spacing of 0.020"
- High power 200W (AVG)
- Peak to Average Ratio 12dB
- Very Low Loss (<0.06dB)
- High Directivity (>23dB)
- Production Friendly
- Tape and Reel

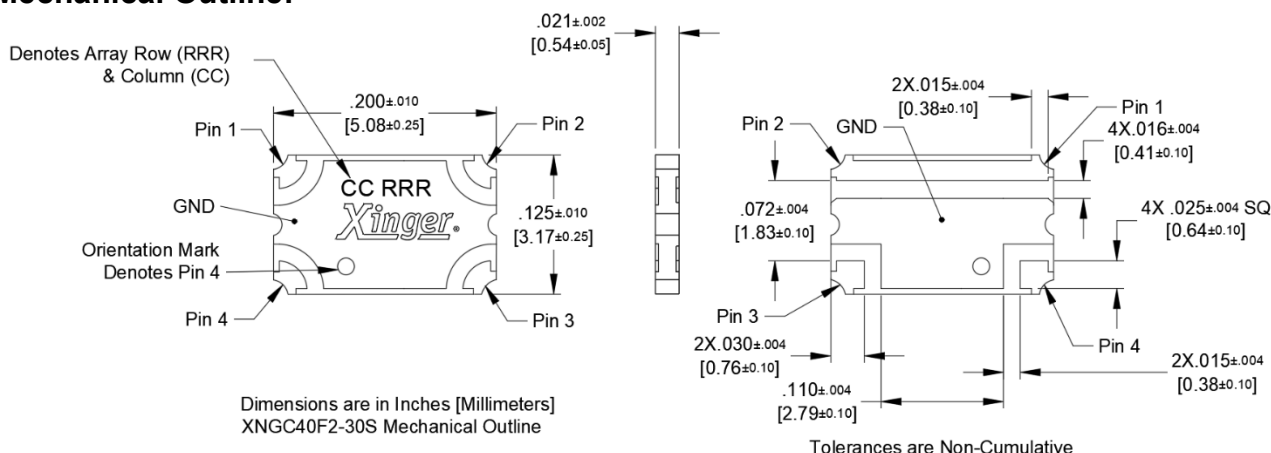
For guaranteed performance, this package requires a ground plane spacing dimension of 0.020" and recommended board stack-up. Relevant layout application notes are on construction for exact ground-plane spacing and layout examples.

Electrical Specifications*:

Frequency	Mean Coupling	Insertion Loss	Return Loss
MHz	dB	dB Max	dB
3200-4200	30.0 ±1.5	0.06	23
Frequency Sensitivity	Directivity	Power	Operating Temp.
dB	dB Min	Avg. Watts @125°C	°C
±2.0	23	200	-55 to +140

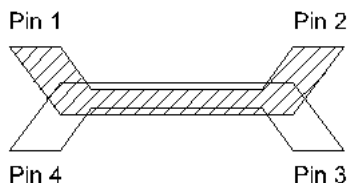
*Specification based on performance of unit properly installed on microstrip printed circuit boards with 50 Ω nominal impedance. Specifications subject to change without notice.

Mechanical Outline:



Pin Configuration:

The XNGC40F2-30S has an orientation marker to denote Pin 4. Once port one has been identified the other ports are known automatically. Please see the chart below for clarification.



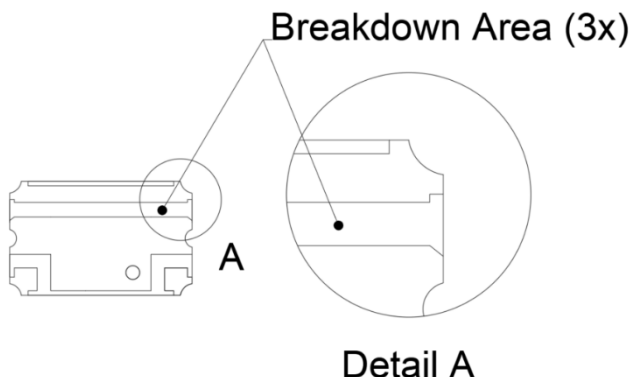
Pin 1	Pin 2	Pin 3	Pin 4
Input	Direct	Isolated	Coupled
Direct	Input	Coupled	Isolated

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.

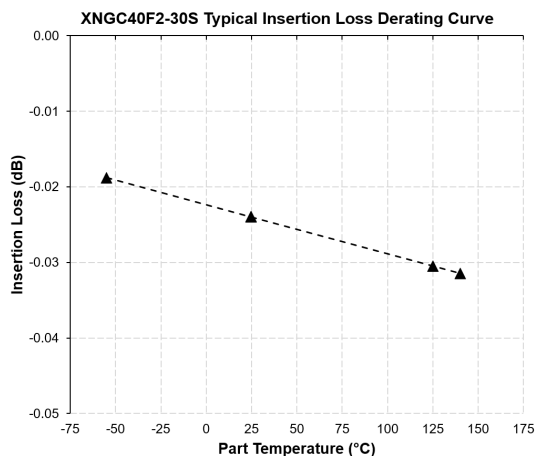
This package requires controlled ground-plane spacing and recommended stack-up to meet the specified IL and directivity. Refer to the Xinger application note or contact RF Engineering for the recommended ground-plane spacing and layout guidelines.

Peak Power Handling:

High-Pot testing of these couplers during the qualification procedure resulted in a minimum breakdown voltage of 1.24Kv (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 air interface at the coupler contact pads (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).

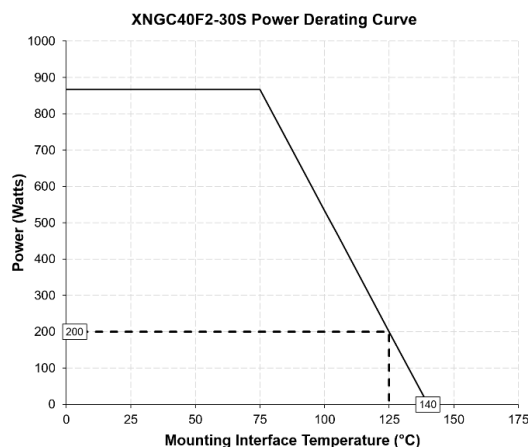


Insertion Loss and Power Derating Curves



Insertion Loss Derating:

The insertion loss, at a given frequency, of the component 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, 125°C and 140°C. A best-fit line for the measured data is computed and then plotted from -55°C to 140°C.



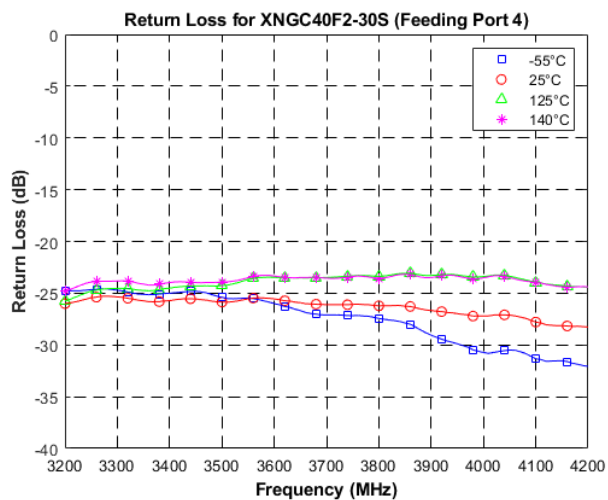
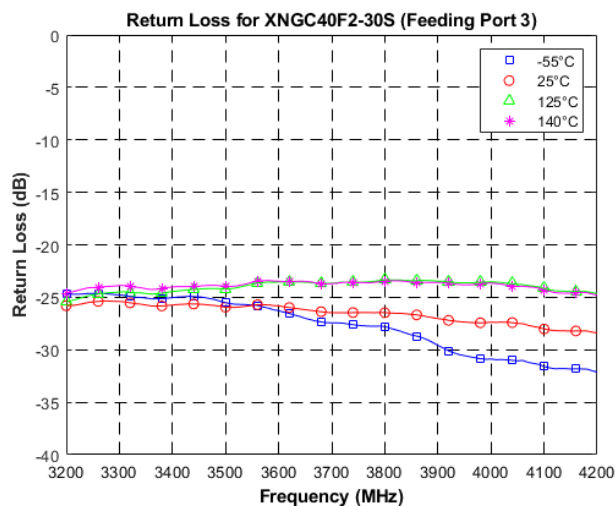
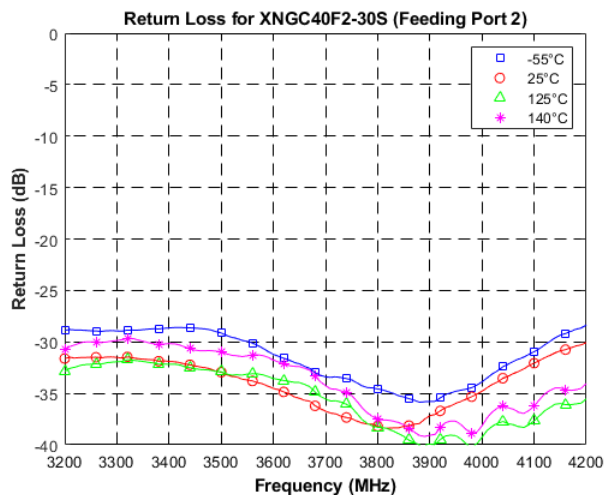
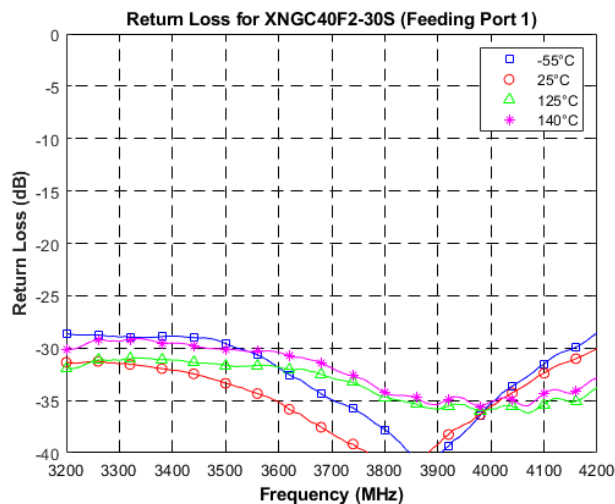
Power Derating:

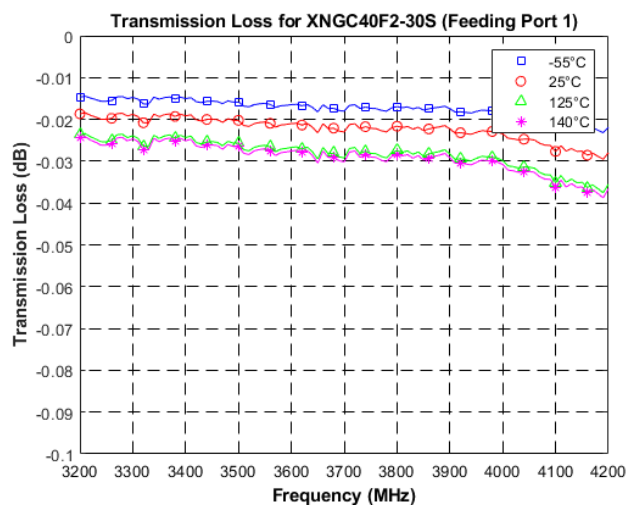
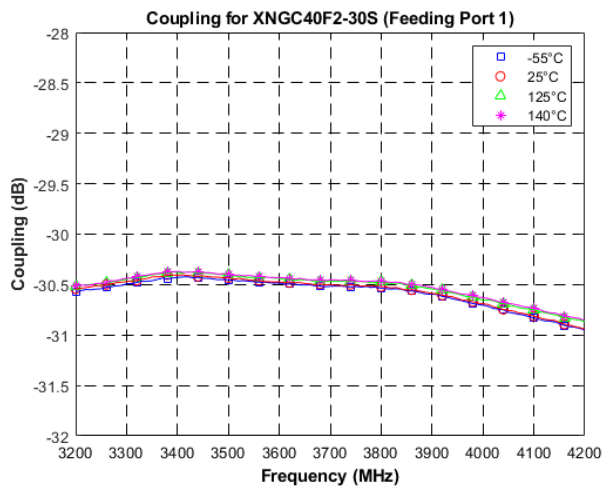
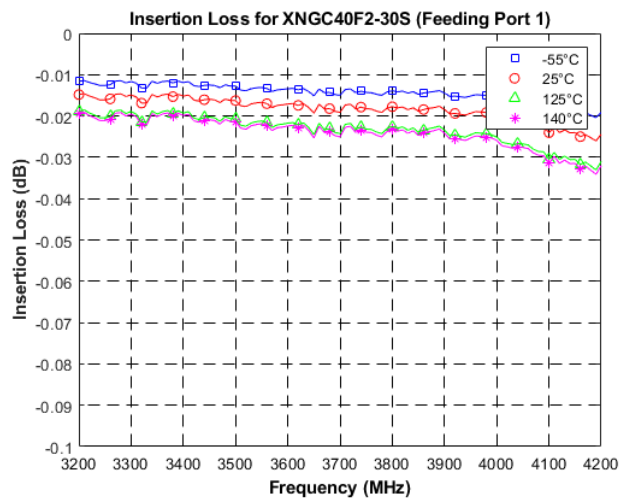
The power handling and corresponding power derating plots are a function of the thermal resistance, mounting surface temperature (base plate temperature), maximum continuous operating temperature of the component, and the thermal insertion loss. The thermal insertion loss is defined in the Power Handling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

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

If the mounting temperature is greater than 125°C and input power is derated to the curve above, then the Xinger component will perform reliably well.

Typical Temperature Performance Plots:



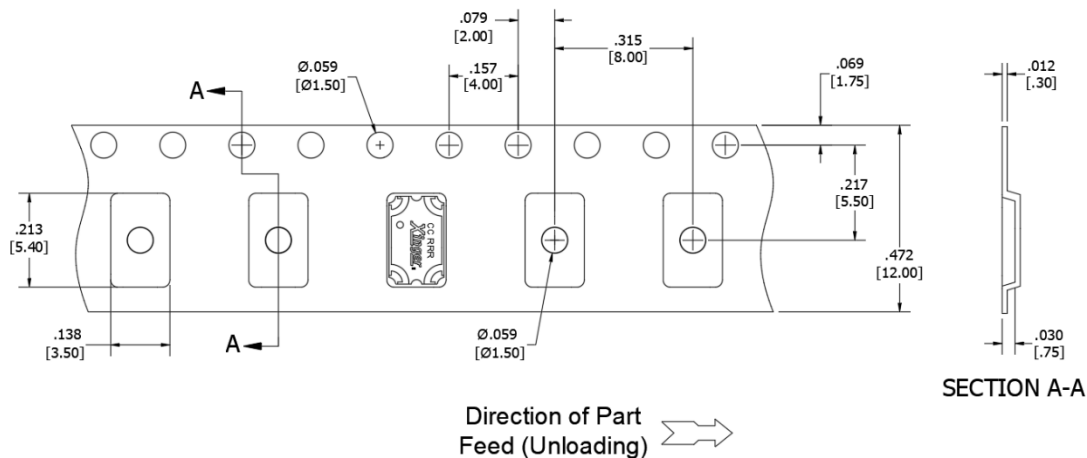


Definition of Measured Specifications:

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.	$Return\ Loss(dB) = 20\log \frac{VSWR + 1}{VSWR - 1}$
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:

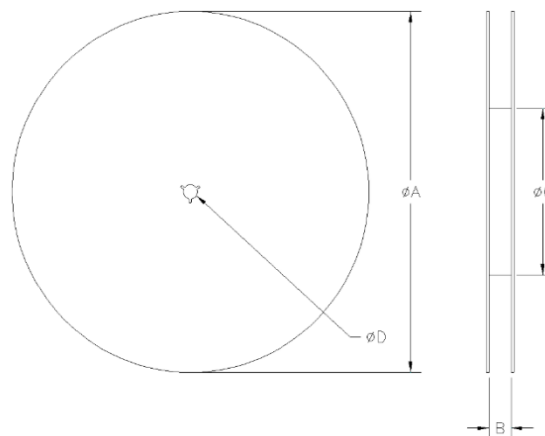
Parts are available in reel and are packaged per EIA 481. Parts are oriented in tape and reel as shown below. Minimum order quantities are 4000 per reel.



Dimensions are in Inches [Millimeters]

TABLE 1 (for 4000 pcs)
REEL DIMENSIONS: inches [mm]

ØA	13.0 [330.00]
B	.472 [12.00]
ØC	7.0 [177.80]
ØD	0.512 [13.00]



Part Naming Convention:

XNGC 40 F 2 - 30 S

Function & Family	Frequency	Package Size	Power Handling	Coupling	Finish
XNGC = Xinger Next Generation Coupler	40 = mid freq 4.0 GHz	F = 0.200" x 0.125"	2 = 101-200W	30 = 30dB	S = Immersion Tin

Contact us:
rf&s_support@ttm.com