Xinger®

Pico Xinger
10dB Directional Coupler

Description:

The 1P610S Pico Xinger is a low profile, miniature 10dB directional coupler in an easy to use surface mount package designed for MMDS and WLAN applications. The 1P610 is for power and frequency detection as well as power injection. The 1P610 is an ideal solution for the ever-increasing demands of the wireless industry for smaller printed circuit boards and high performance. Parts have been subjected 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. Produced with 6 of 6 RoHS compliant tin immersion. Available in 6 of 6 RoHS compliant tin immersion (1P610S).

Features:

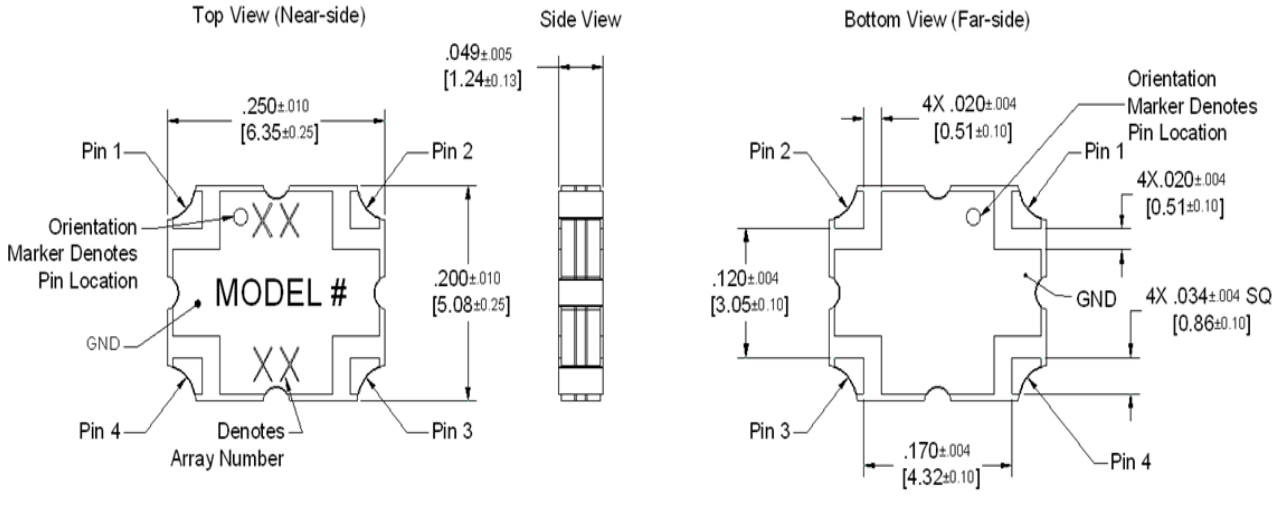
- **2300-2700 MHz**
- **MMDS and WLAN**
- **Very Low Loss**
- **High Directivity**
- **Surface Mountable**
- **Tape and Reel**
- **Lead Free**

Electrical Specifications**

Frequency	Mean Coupling	Insertion Loss	VSWR
MHz	*dB*	*dB Max*	*Max : 1*
2300-2700	10 ± 0.75	0.25	1.22
Directivity	**Freq. Sensitivity**	**Power Handling**	**Operating Temp.**
dB Min	*dB Max*	*Avg CW Watts @85°C*	*°C*
20	± 0.2	20	-55 to +150

**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:

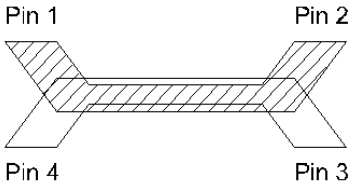


Dimensions are in Inches [Millimeters]
1P610* Rev A Mechanical Outline

*For RoHS Compliant Versions order with S suffix
Tolerances are Non-Cumulative

Directional Coupler Pin Configuration

The 1P610S 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.

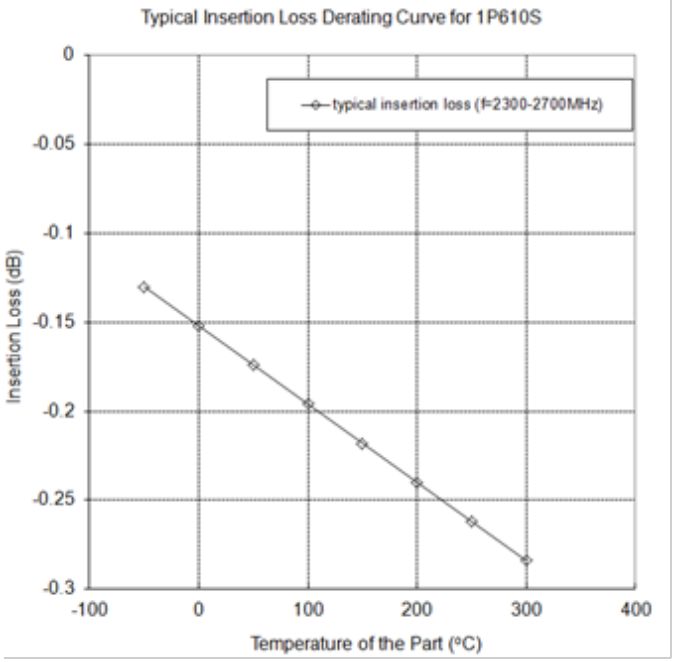


10dB Coupler Pin Configuration

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

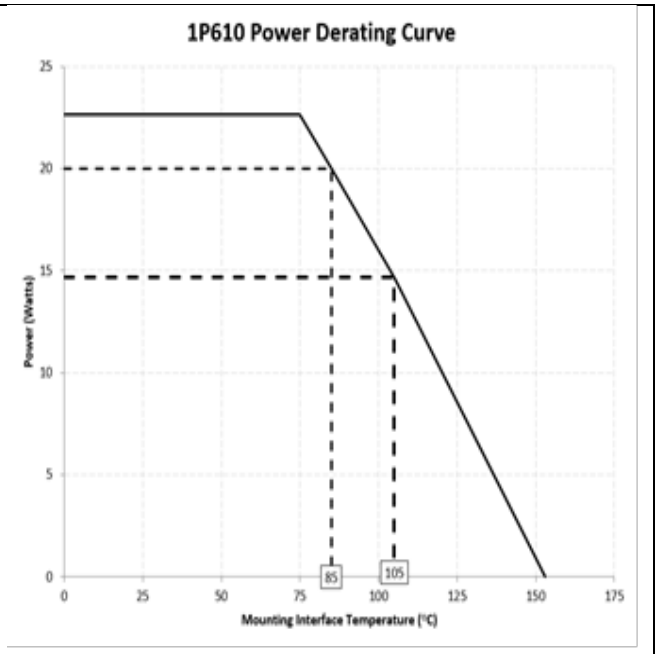
Note: The direct port has a DC connection to the input port and the coupled port has a DC connection to the isolated port. For optimum performance use Pin 1 or Pin 2 as inputs.

Insertion Loss and Power Derating Curves



Insertion Loss Derating

The insertion loss, at a given frequency, of a group of couplers 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 and 85°C. Based on copper as well as dielectric losses, the insertion loss is computed from -55°C to 300°C.



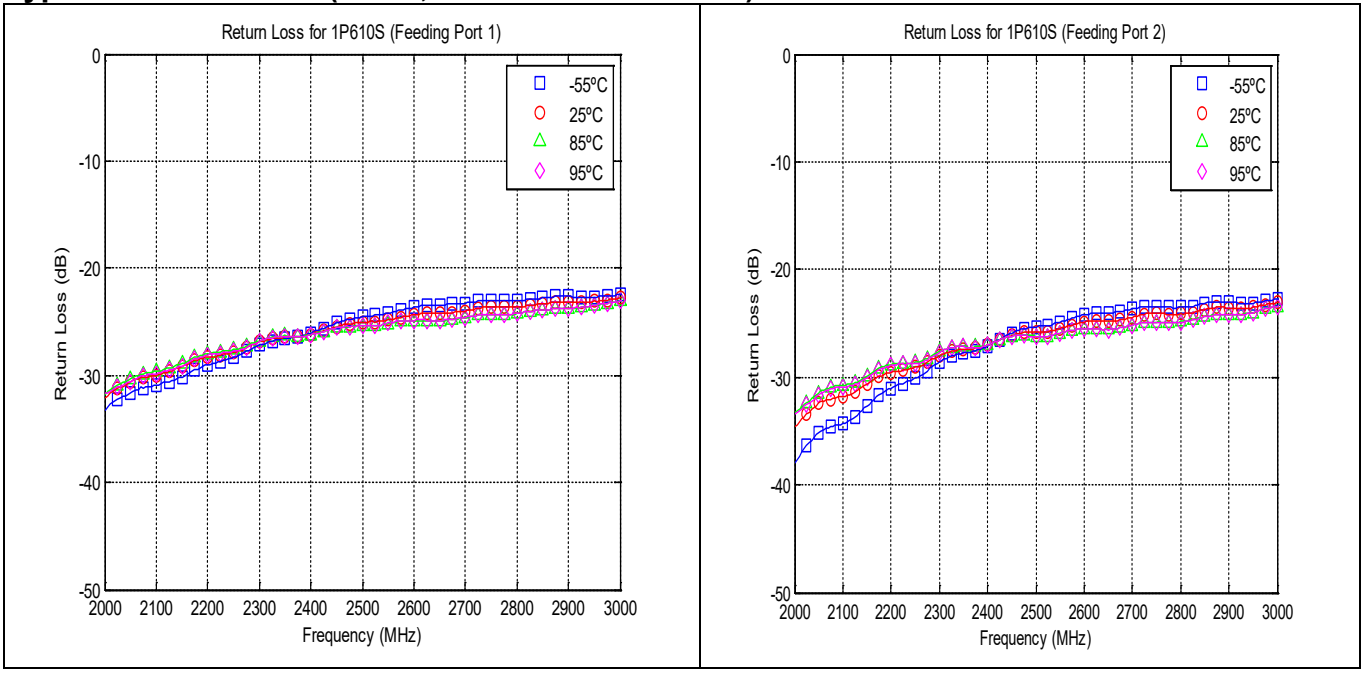
Power Derating

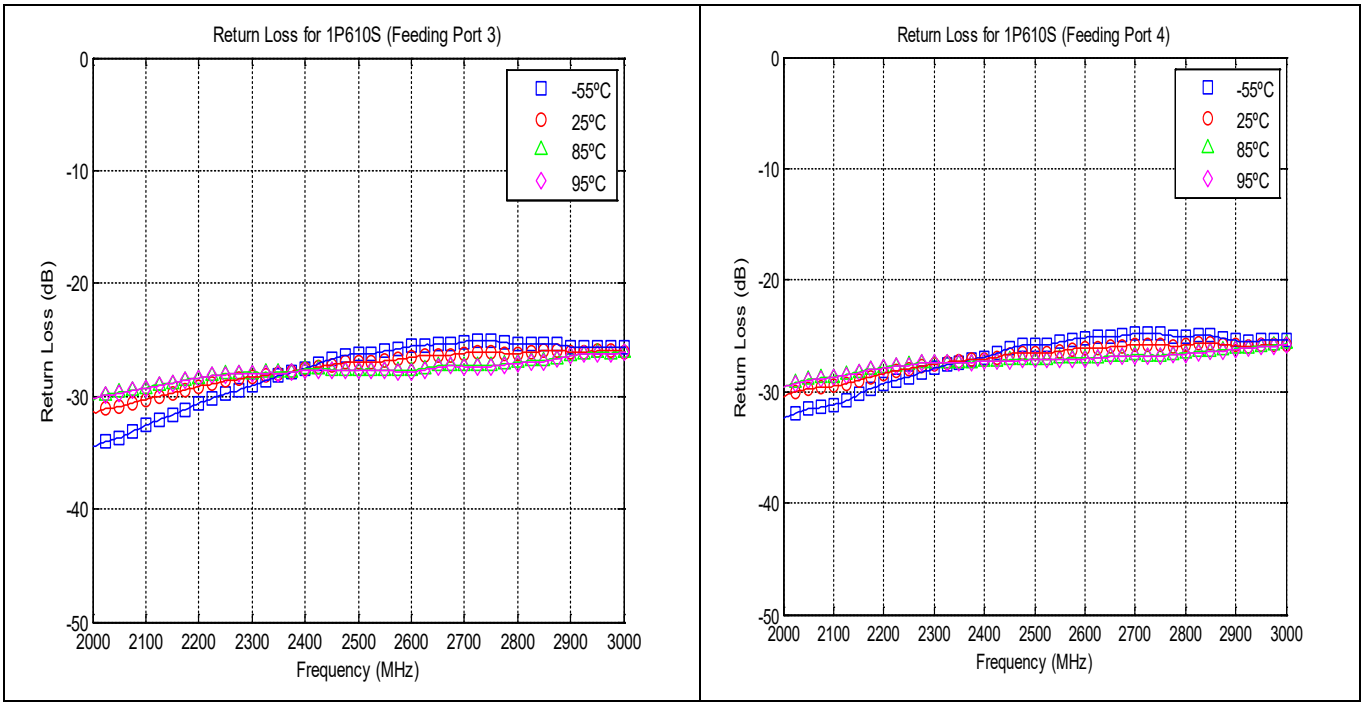
The power handling and corresponding power derating plots are a function of the thermal resistance, mounting surface temperature (base plate temperature), maximum continuous operating temperature of the coupler, and the thermal insertion loss. The thermal insertion loss is defined in the Power Handling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

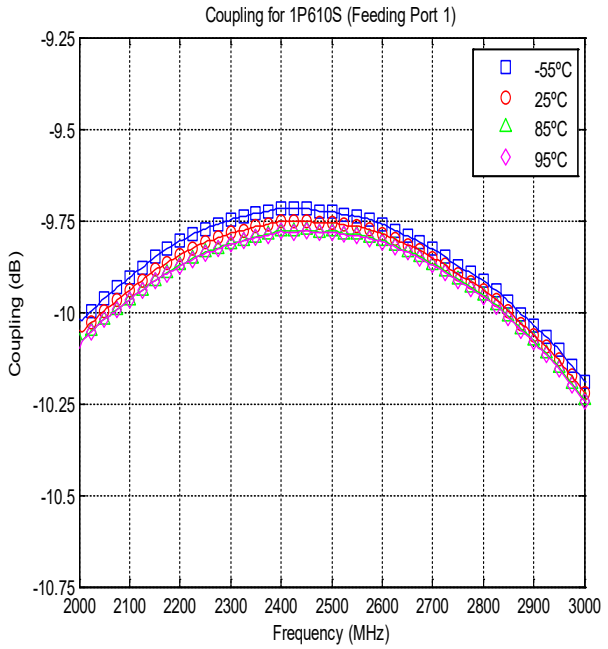
As the mounting interface temperature approaches the maximum continuous operating temperature, the power handling decreases to zero.

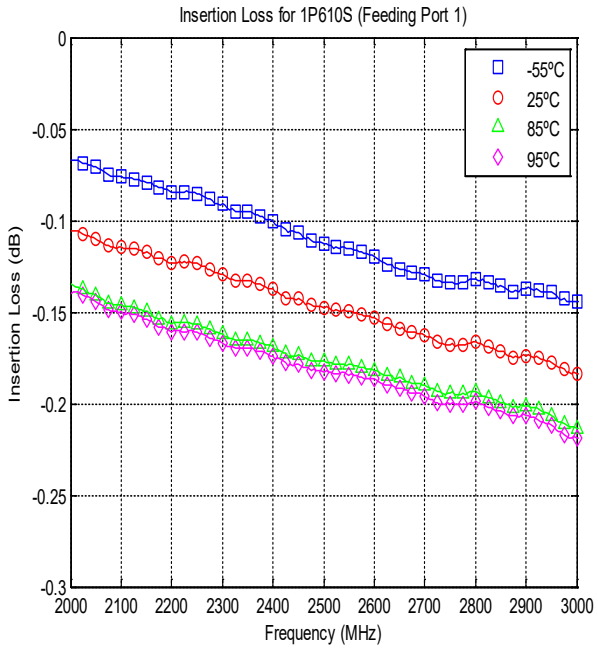
If mounting temperature is greater than 85°C, Xinger coupler will perform reliably as long as the input power Is derated to the curve above.

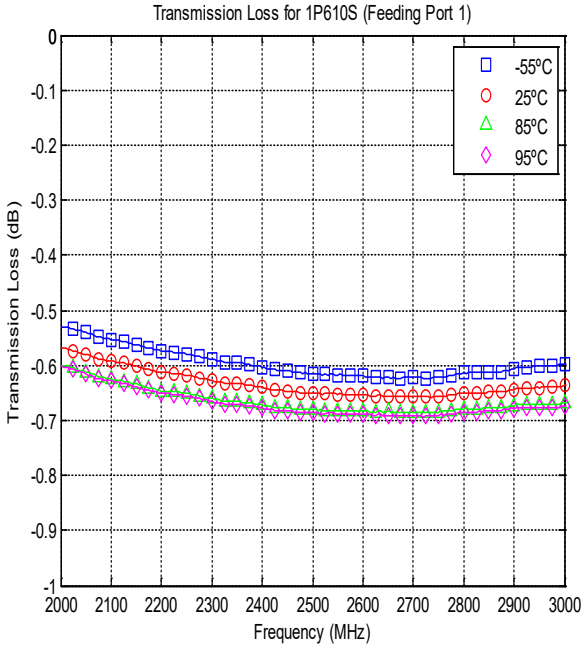
Typical Performance (-55°C, 25°C. 85°C and 95°C): 2000-3000 MHz

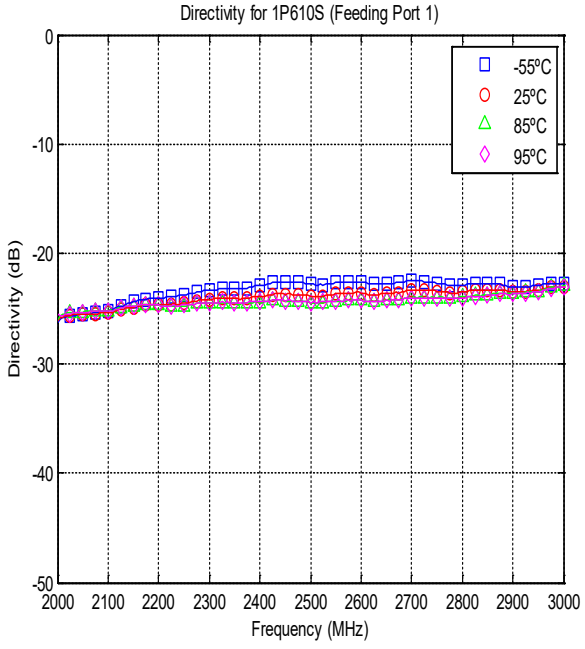





Coupling for 1P610S (Feeding Port 1)
Coupling (dB)
Frequency (MHz)
-55ºC
25ºC
85ºC
95ºC


Insertion Loss for 1P610S (Feeding Port 1)
Insertion Loss (dB)
Frequency (MHz)
-55ºC
25ºC
85ºC
95ºC


Transmission Loss for 1P610S (Feeding Port 1)
Transmission Loss (dB)
Frequency (MHz)
-55ºC
25ºC
85ºC
95ºC

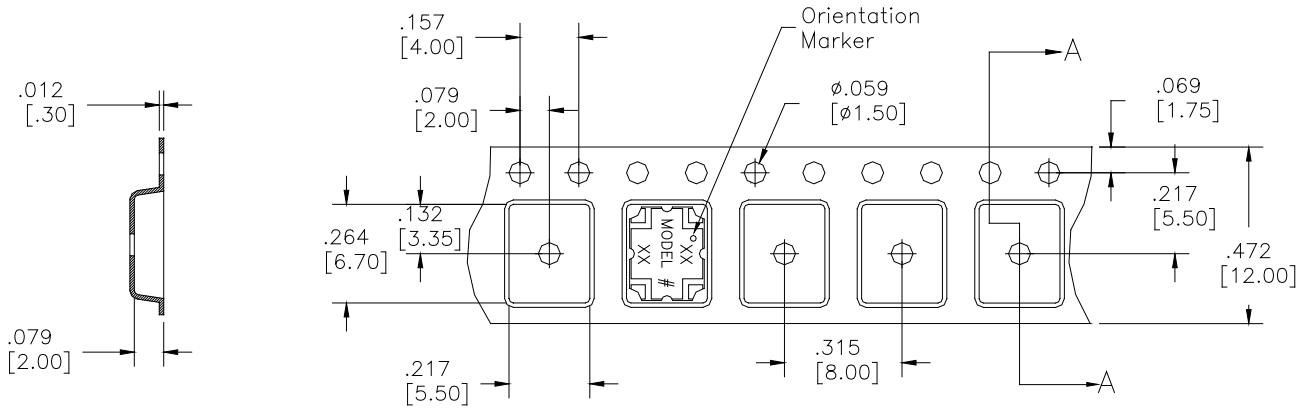

Directivity for 1P610S (Feeding Port 1)
Directivity (dB)
Frequency (MHz)
-55ºC
25ºC
85ºC
95ºC

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.	$Return\ Loss\ (dB) = 20log\ \frac{VSWR+1}{VSWR-1}$
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.	$\mathrm{Coupling(dB)} = \mathrm{C}(\omega_n) = 10\log\frac{\mathrm{P_{in}}(\omega_n)}{\mathrm{P_{cpl}}(\omega_n)}$ $Mean\ Coupling\ (dB) = \frac{\sum_{n=1}^{N} C(\omega_n)}{N}$
Insertion Loss	The input power divided by the sum of the power at the two output ports.	$10log\frac{P_{in}}{P_{cpl}+P_{direct}}$
Transmission Loss	The input power divided by the power at the direct port.	$10log\frac{P_{in}}{P_{direct}}$
Directivity	The power at the coupled port divided by the power at the isolated port.	$10log\frac{P_{cpl}}{P_{iso}}$
Frequency Sensitivity	The decibel difference between the maximum in band coupling value and the mean coupling, and the decibel difference between the minimum in band coupling value and the mean coupling.	Max Coupling (dB) – Mean Coupling (dB) and Min Coupling (dB) – Mean Coupling (dB)

Packaging and Ordering Information:

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



Xinger® Tape & Reel Diagram

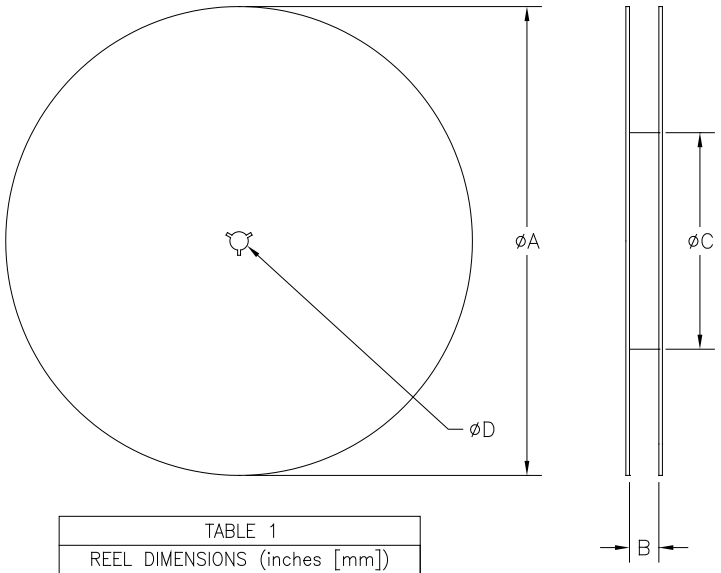


TABLE 1	
REEL DIMENSIONS (inches [mm])	
øA	13.3 [333.0]
B	0.472 [12.0]
øC	4.017 [102.03]
øD	0.512 [13.0]

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