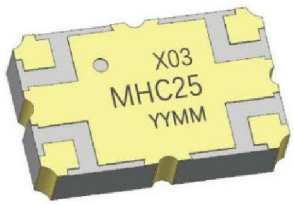
MHC25X03

3dB 90° Hybrid Coupler

Applications

1, Low Insertion Loss For Power Combining
2, Doherty Power Amplifier
3, Small Cell & Pico
4, Circular Polarized Antenna



Features

1, Low Insertion Loss
2, High Isolation, 25 dB typ.
3, Excellent high-power Capacity
4, RoHS Compliance (Pb-Free)

Description

The MHC25X03 is a low cost, high performance 3 dB coupler in an easy to use surface mount package. The MHC25X03 is ideal for Doherty power amplifier, circular polarized antenna and other applications where low insertion loss and tight amplitude and phase balance are required. MHC25X03 is constructed from ceramic filled PTFE composites which possess excellent electrical and mechanical stability. All components are 100% RF tested.

Characteristics

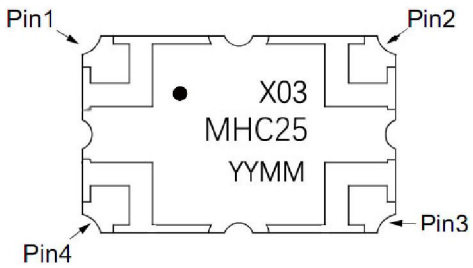
Table 1. MHC25X03 Characteristics

Item	Min.	Type	Max.	Unit
Frequency Range	2100		2900	MHz
Isolation	22	25		dB
Insertion Loss		0.2	0.35	dB
Phase Unbalance	-3.5		+3.5	degrees
Amplitude	-0.5		+0.5	dB
VSWR (:1)		1.15	1.25	:1
Operating Temp.	-45		+125	°C
Power			30	W

All the above data are based on specified demo board and tested in 25° environment.

PORT CONFIGURATIONS

Figure 1. MHC25X03 (Top View)



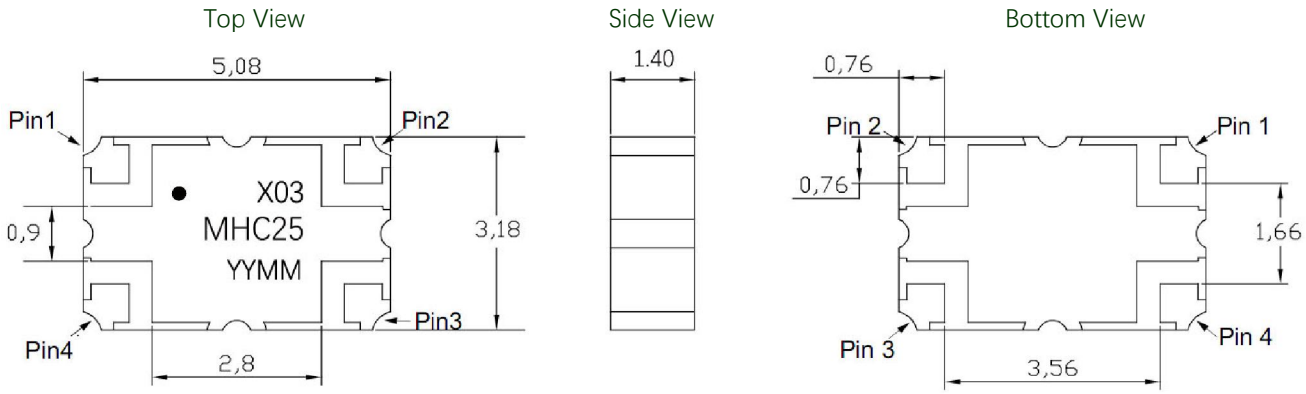
The MHC25X03 port configurations depending on how input signals are split. The Case 1, Case 2, Case 3, and Case 4, configurations mean that one input signal is split into two output signals. When port 1 is defined, the other ports are defined automatically

Table 2. MHC25X03 Port Configurations

Configuration	Port 1	Port 2	Port 3	Port 4
Case1.	Input	Isolated	Output -3dB, -90°	Coupling -3dB, 0°
Case2.	Isolated	Input	Coupling -3dB, 0°	Output -3dB, -90°
Case3.	Output -3dB, -90°	Coupling -3dB, 0°	Input	Isolated
Case4.	Coupling -3dB, 0°	Output -3dB, -90°	Isolated	Input

Outline Drawing

Figure 2. MHC25X03 Outline Drawing



Unit: mm

Typical Performance (25°C,2100-2900 MHz)

Figure 3. MHC25X03 Coupling & Transmission

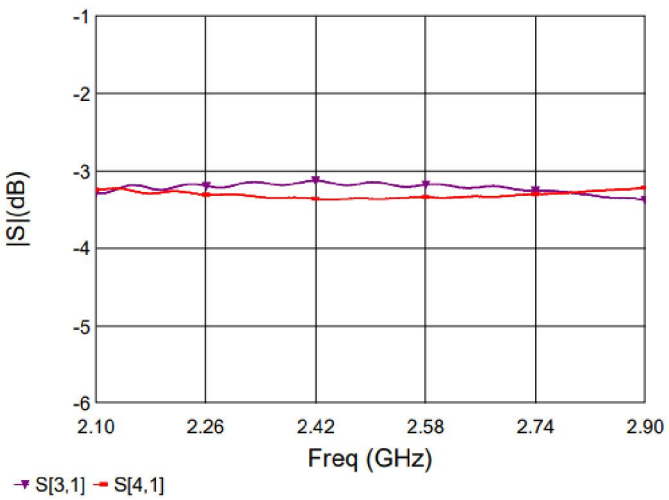


Figure 4. MHC25X03 Return Loss

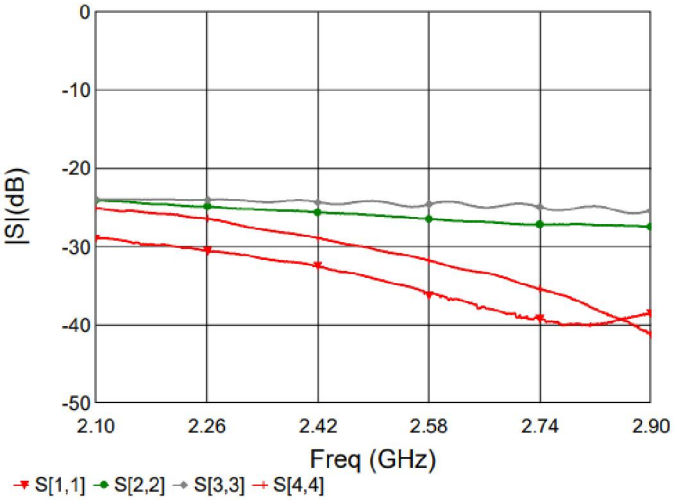


Figure 5. MHC25X03 Isolation

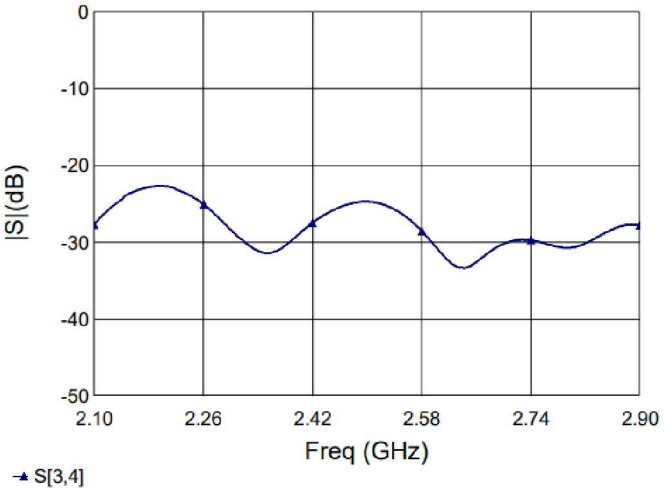
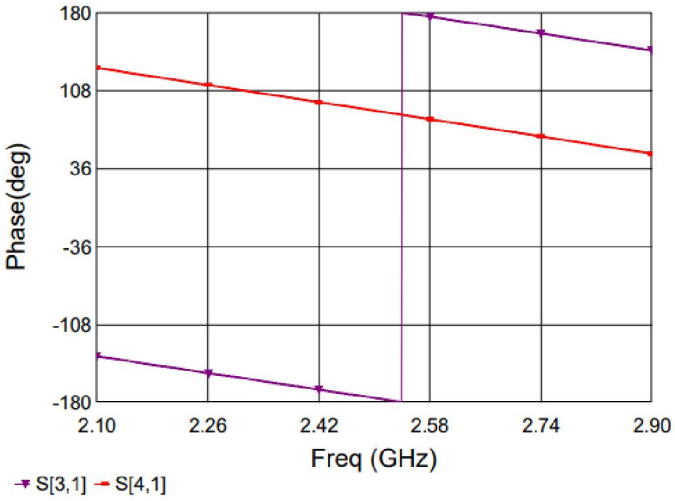


Figure 6. MHC25X03 Phase



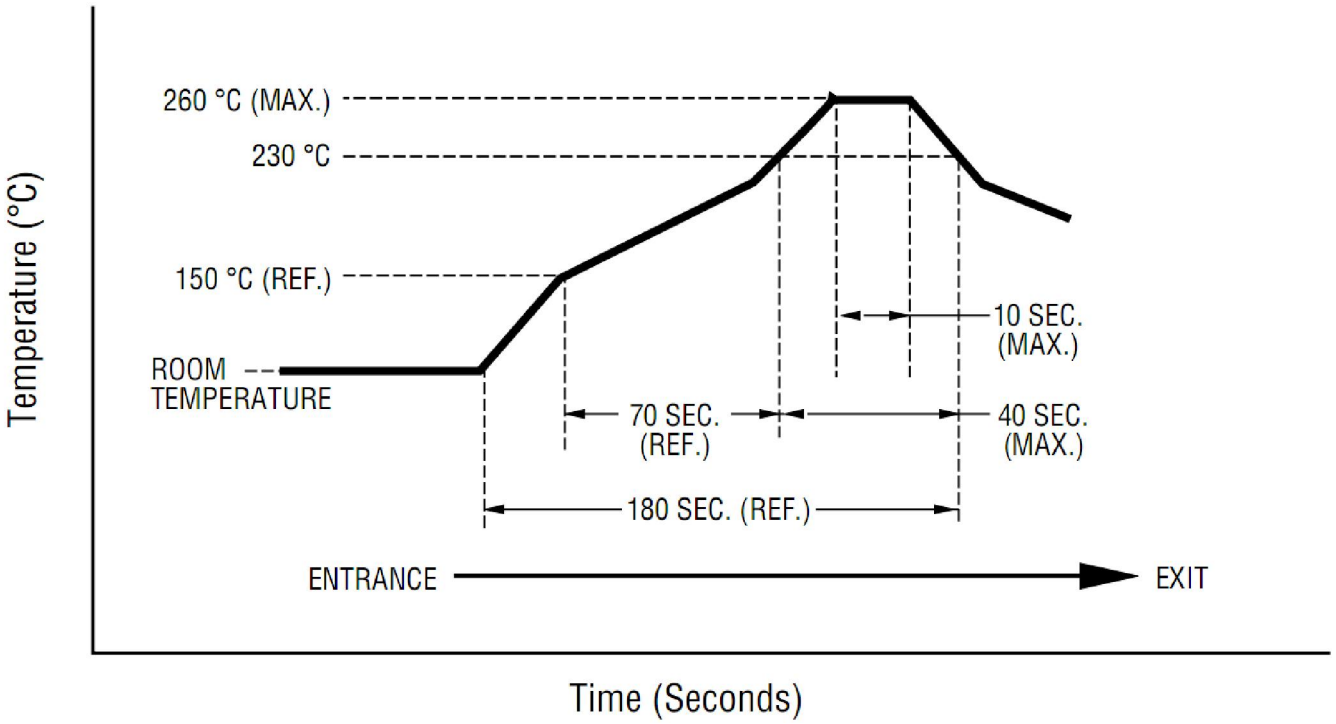
Definition of Measured Specifications

Table 3. Mathematical Formula for the MHC25X03 Parameters

Parameter	Definition	Mathematical Representation
VSWR (Voltage Standing Wave Ratio)	The impedance match of the coupler to a 50W system. A VSWR of 1:1 is optimal.	$VSWR = \frac{V_{max}}{V_{min}}$ V_{max} = voltage maxima of a standing wave V_{min} = voltage minima of a standing wave
Return Loss	The impedance match of the coupler to a 50W 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)= $10\log\frac{P_{in}}{P_{cp1}+P_{transmission}}$
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 transmisson port
Amplitude Balance	The power at each output divided by the average power of the two outputs.	$10\log\frac{P_{cp1}}{\frac{P_{cp1}+P_{transmission}}{2}}$ and $10\log\frac{P_{transmission}}{\frac{P_{cp1}+P_{transmission}}{2}}$

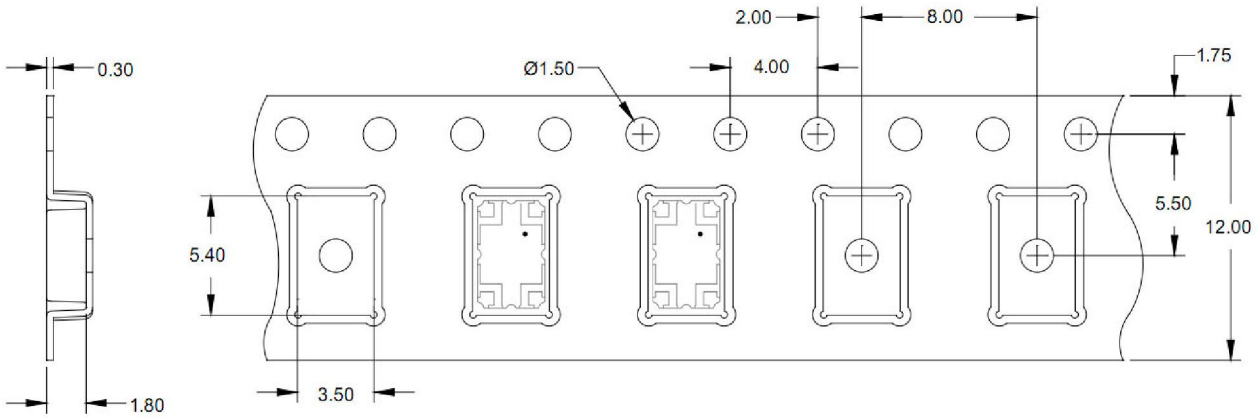
REFLOW PROFILE

Figure 7. MHC25X03 Thermal Reflow Profile



Packaging and Ordering Information

Figure 8. MHC25X03 Packaging Information



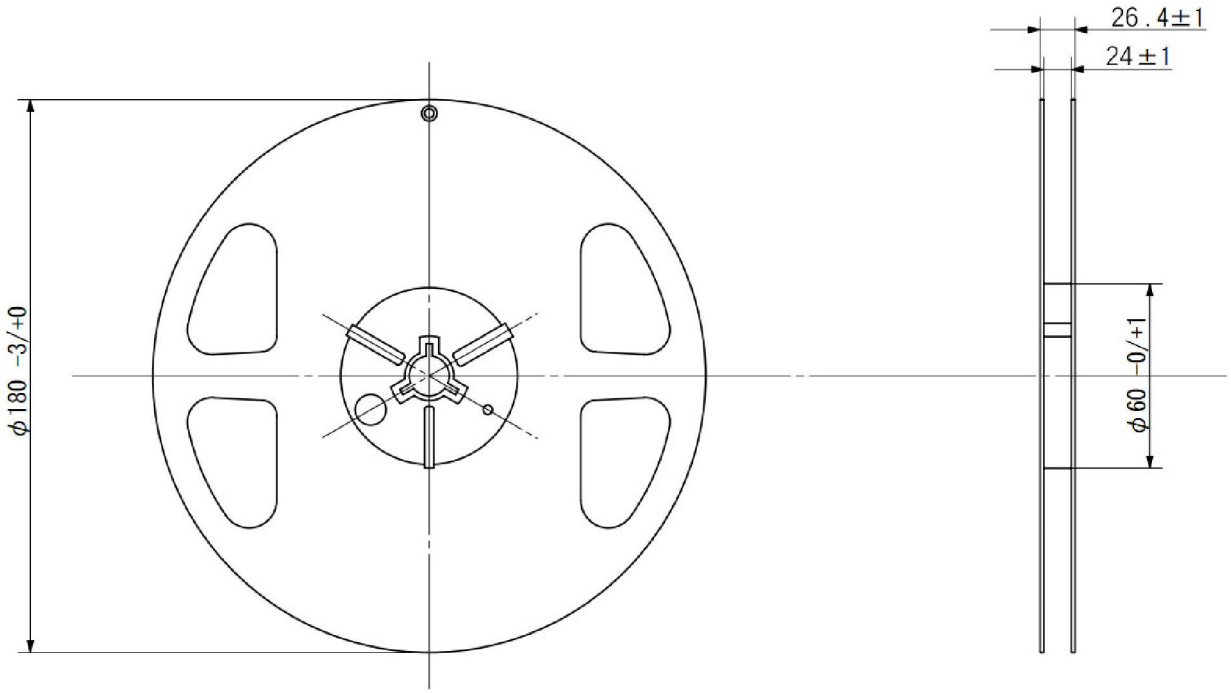


Table 4. MHC25X03 Ordering Information

Device	Package	Reel	Shipping
MHC25X03	5.08*3.18mm	7''	2000 Reel

Revison	Description	Date
Rev0	Preliminary	2023/5/29
Rev1	Frequency Range	2023/11/2