

MHC30S10

10dB Directional Coupler



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Applications

- 1, Low Insertion Loss For Power Combining
- 2, Doherty Power Amplifier
- 3, Small Cell & Pico

Features

- 1, Low Insertion Loss
- 2, High Directivity, 25 dB typ.
- 3, Excellent high-power capacity up to 2W
- 4, RoHS compliance (Pb-Free)
- 5, AEC-Q200 qualified

Description

The MHC30S10 is a low cost, high performance 10 dB hybrid coupler in an easy used surface mount package. The MHC30S10 is ideal for doherty power amplifier, circular polarized antenna and other applications where low insertion loss and tight amplitude and phase balance are required. MHC30S10 is constructed from ceramic filled PTFE composites which possess excellent electrical and mechanical stability. All components are 100% RF tested.

Characteristics

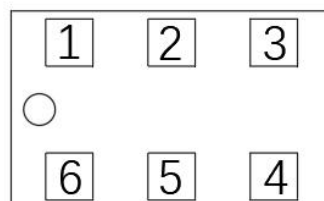
Table 1. MHC30S10 Characteristics

Item	Min.	Type	Max.	Unit
Frequency Range	2300		3700	MHz
Insertion Loss		0.9	1	dB
Coupling		10		dB
Directivity		25		dB
Return Loss	20			dB
Operating Temp.	-55		+125	°C
Power			2	W

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

Port Configuration

Figure 1. MHC30S10 (Bottom View)



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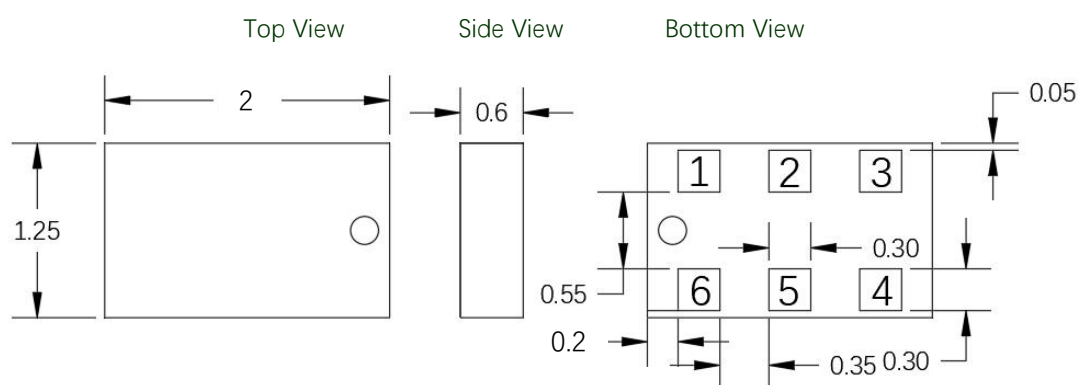
The MHC30S10 port configurations depending on how input signals are split. The Case 1, Case 2, configurations mean that one input signal is split into two output signals. When port 1 is defined, the other ports are defined automatically

Table 2. MHC30S10 Port Configurations

Configuration	Port 1	Port 5	Port 6	Port 2
Case1.	Input	Isolated	Direct	Coupling
Case2.	Isolated	Input	Coupling	Direct

Outline Drawing

Figure 2. MHC30S10 Outline Drawing



Unit: mm

Typical Performance (25°C, 2300-3700 MHz)

Figure 3. MHC30S10 Coupling

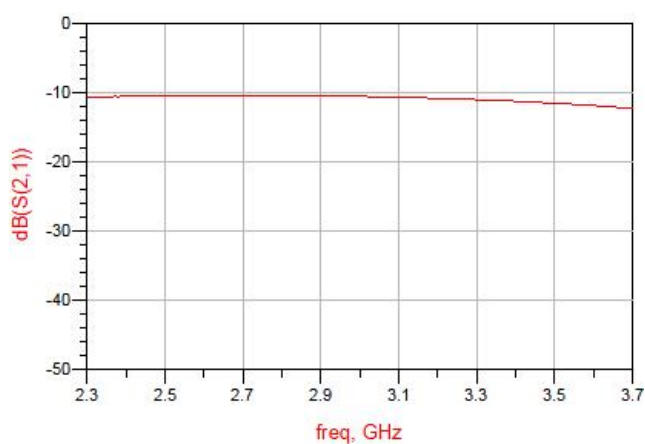
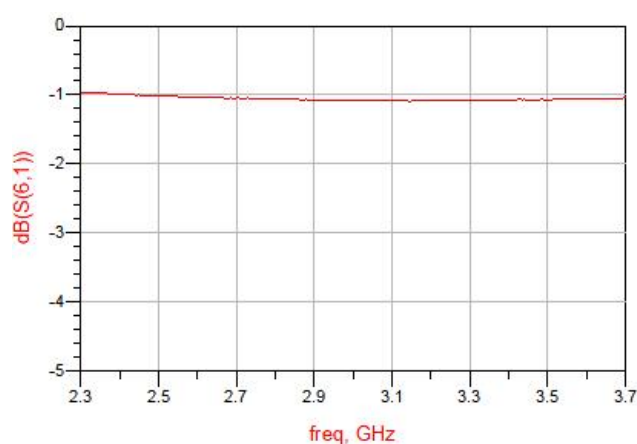


Figure 4. MHC30S10 Transmission



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Figure 5. MHC30S10 Return Loss (S11)



Figure 6. MHC30S10 Return Loss (S22)



Figure 7. MHC30S10 Return Loss (S66)

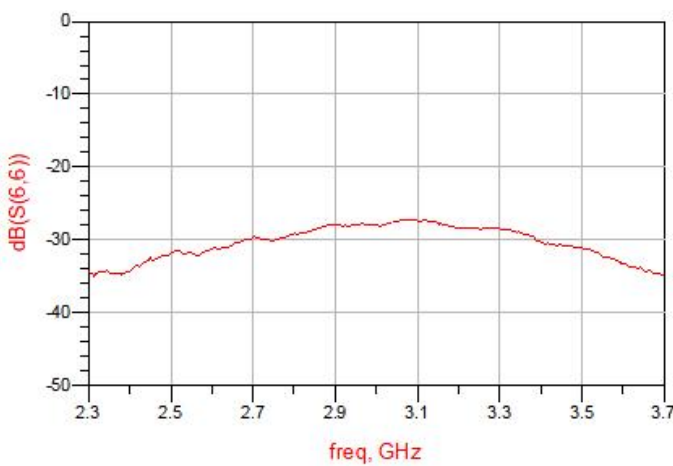


Figure 8. MHC30S10 Return Loss (S55)

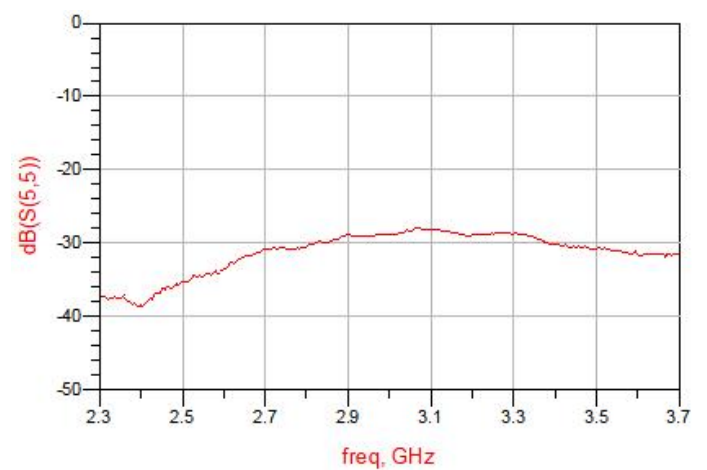


Figure 9. MHC30S10 Isolation

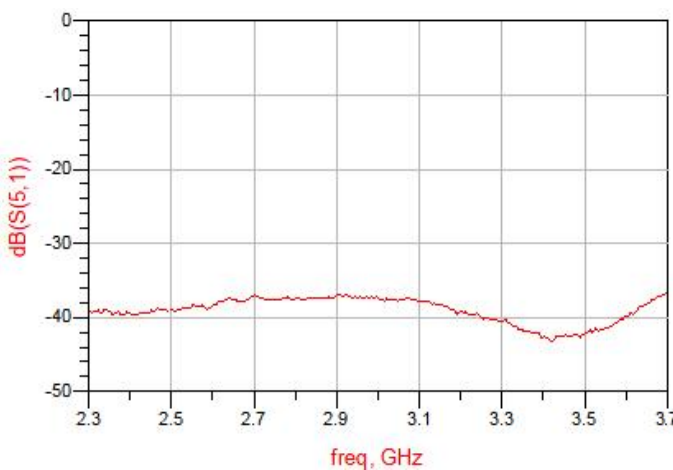
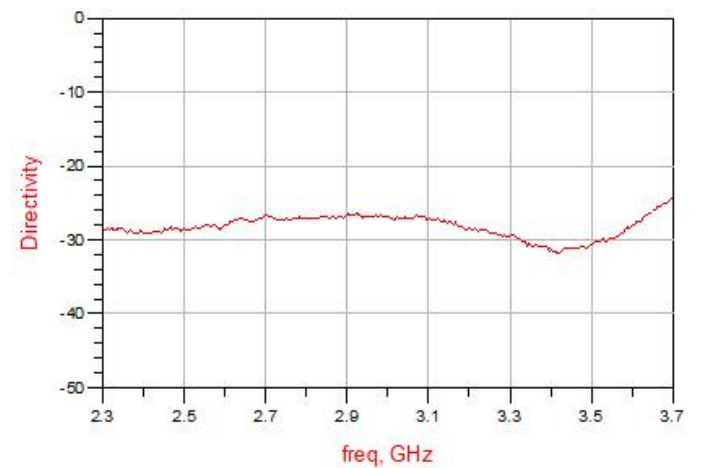


Figure 10. MHC30S10 Directivity



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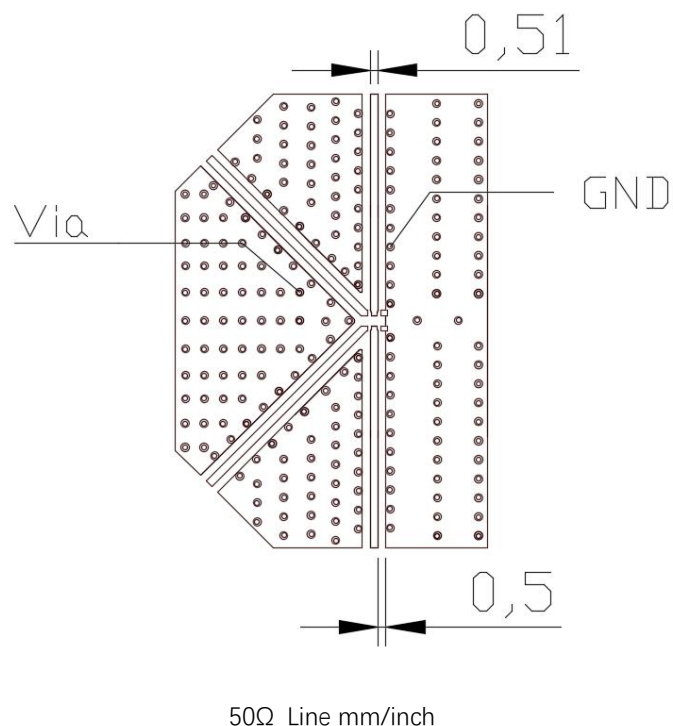
Definition of Measured Specifications

Table 3. Mathematical Formula for the MHC30S10 Parameters

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.	$\text{Return Loss (dB)} = 20 \log \frac{VSWR+1}{VSWR-1}$
Insertion Loss	The input power divided by the sum of the power at the two output ports.	$\text{Insertion Loss(dB)} = 10 \log \frac{P_{in}}{P_{cp1} + P_{transmission}}$
Isolation	The input power divided by the power at the isolated port.	$\text{Isolation(dB)} = 10 \log \frac{P_{in}}{P_{iso}}$
Phase Balance	The difference in phase angle between the two output ports.	Phase at coupled port – Phase at transmission port
Amplitude Balance	The power at each output divided by the average power of the two outputs.	$10 \log \frac{P_{cp1}}{\frac{P_{cp1} + P_{transmission}}{2}} \text{ and } 10 \log \frac{P_{transmission}}{\frac{P_{cp1} + P_{transmission}}{2}}$

Recommended PCB Layout

Figure 11. Recommended PCB Layout



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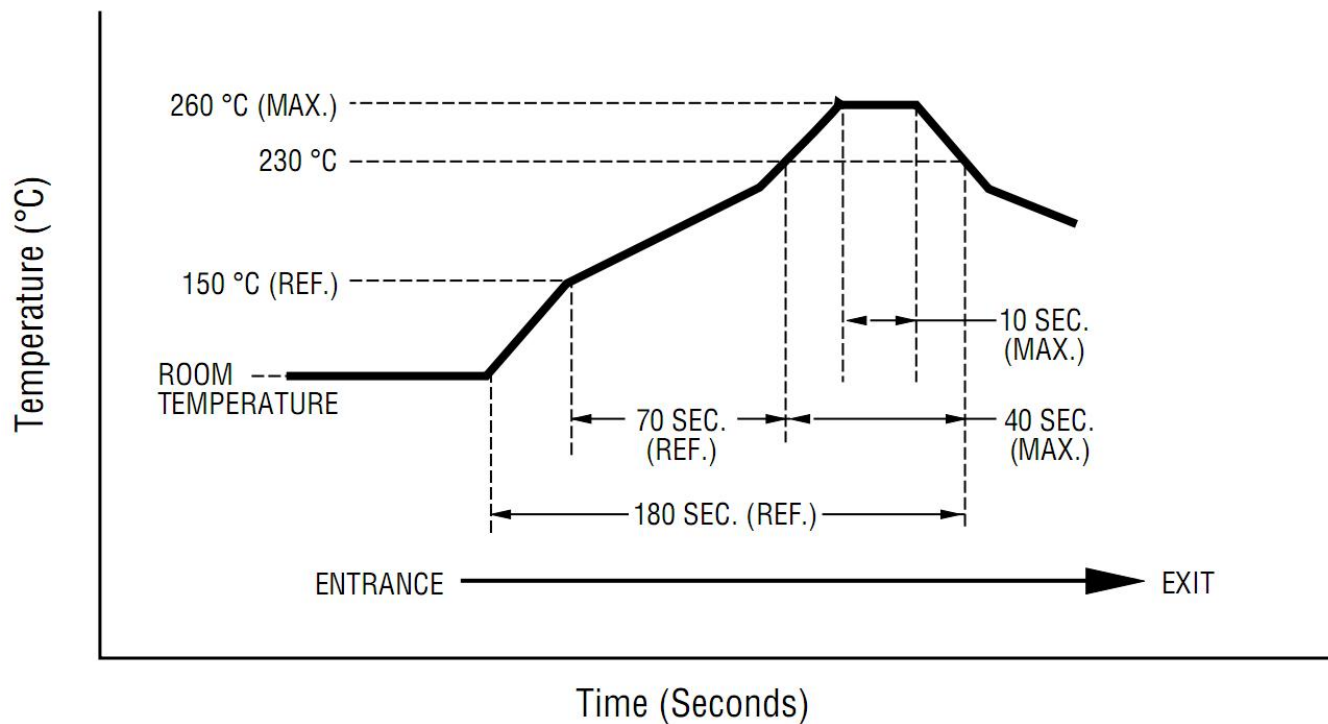
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Reflow Profile

Figure 12. MHC30S10 Thermal Reflow Profile



Packaging and Ordering Information

Table 4. MHC30S10 Ordering Information

Device	Package	Reel	Shipping
MHC30S10	2.0*1.25mm	7"	4000 Reel

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Revision	Description	Date
Rev0	Preliminary	2026/1/7
Rev1	Update	2026/1/20

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