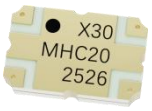
MHC20X30

30dB Directional Coupler

MiPD®

MEGSINE兆讯

Applications



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

Features

1, Low Insertion Loss
2, High Isolation, 52 dB typ.
3, Excellent high-power capacity up to 60W
4, RoHS compliance (Pb-Free)
5, AEC-Q200 qualified

Description

The MHC20X30 is a low cost, high performance 30 dB hybrid coupler in an easy used surface mount package. The MHC20X30 is ideal for doherty power amplifier, circular polarized antenna and other applications where low insertion loss and tight amplitude and phase balance are required. MHC20X30 is constructed from ceramic filled PTFE composites which possess excellent electrical and mechanical stability. All components are 100% RF tested.

Characteristics

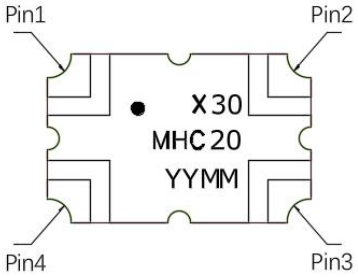
Table 1. MHC20X30 Characteristics

Item	Min.	Type	Max.	Unit
Frequency Range	1400		2700	MHz
Isolation		52		dB
Insertion Loss		0.1	0.2	dB
Amplitude	-1		+1	dB
Return loss	22	35		dB
Operating Temp.	-55		+125	°C
Power			60	W

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

Port Configuration

Figure 1. MHC20X30 (Top View)



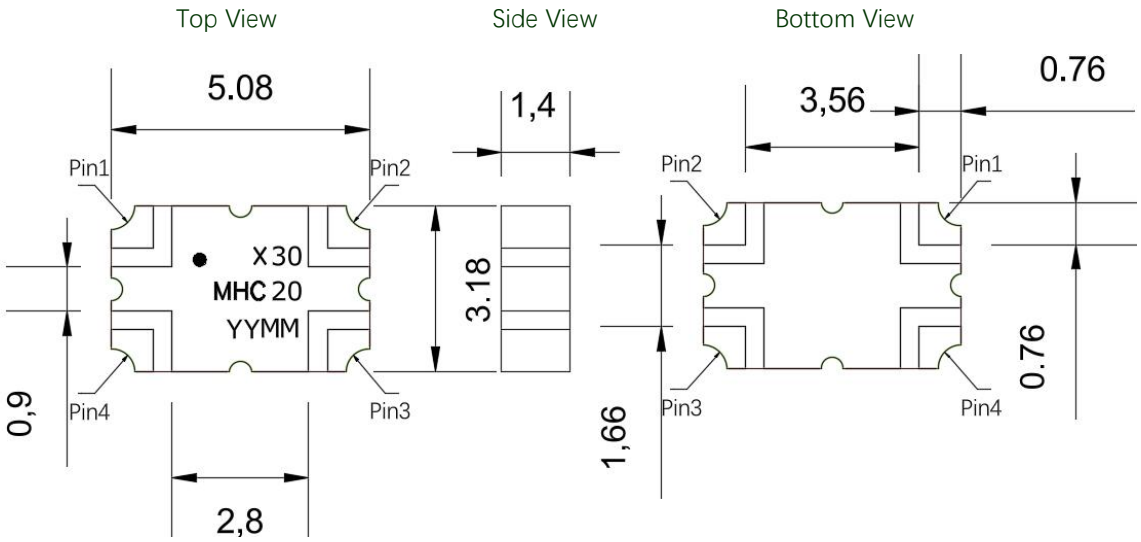
The MHC20X30 port configurations depending on how input signals are split. The Case 1, Case 2,configurations mean that one input signal is split into two output signals. When port 1 is defined, the other ports are defined automatically

Table 2. MHC20X30 Port Configurations

Configuration	Port 1	Port 2	Port 3	Port 4
Case1.	Input	Direct	Isolated	Coupling
Case2.	Direct	Input	Coupling	Isolated

Outline Drawing

Figure 2. MHC20X30 Outline Drawing



Unit: mm

Typical Performance (N=25°C、1400-2700 MHz)

Figure 3. MHC20X30 Coupling

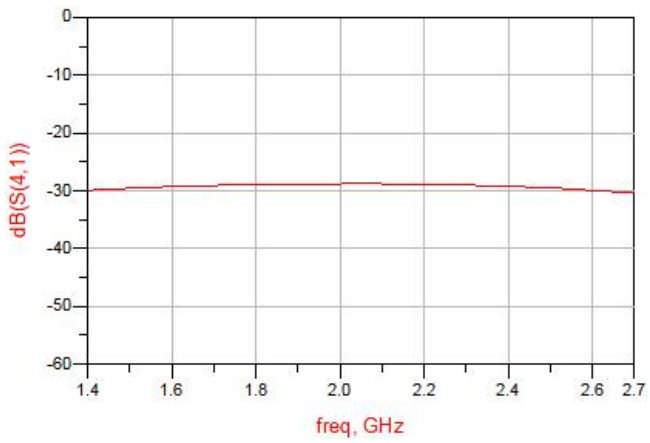


Figure 4. MHC20X30 Transmission

Figure 5. MHC20X30 Return Loss (S11)

Figure 6. MHC20X30 Return Loss (S22)

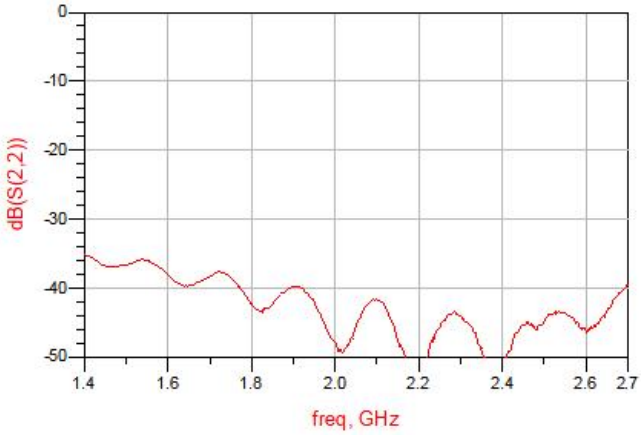


Figure 7. MHC20X30 Return Loss (S33)

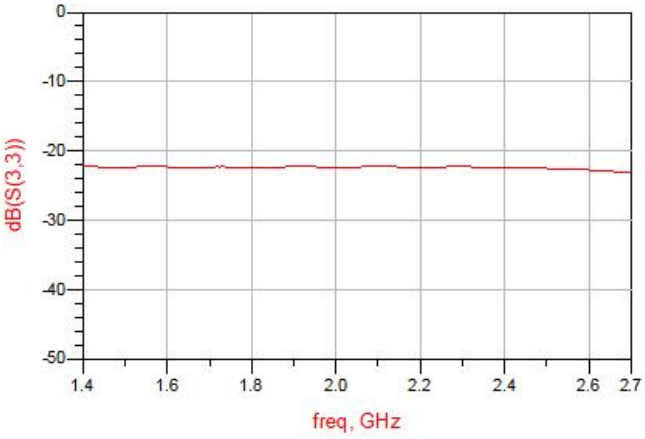


Figure 8. MHC20X30 Return Loss (S44)

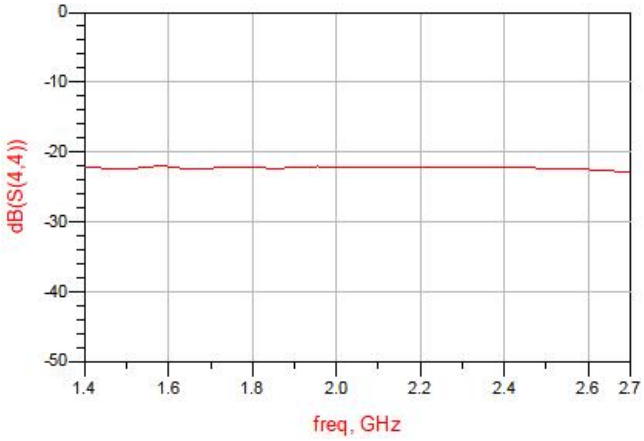


Figure 9. MHC20X30 Isolation

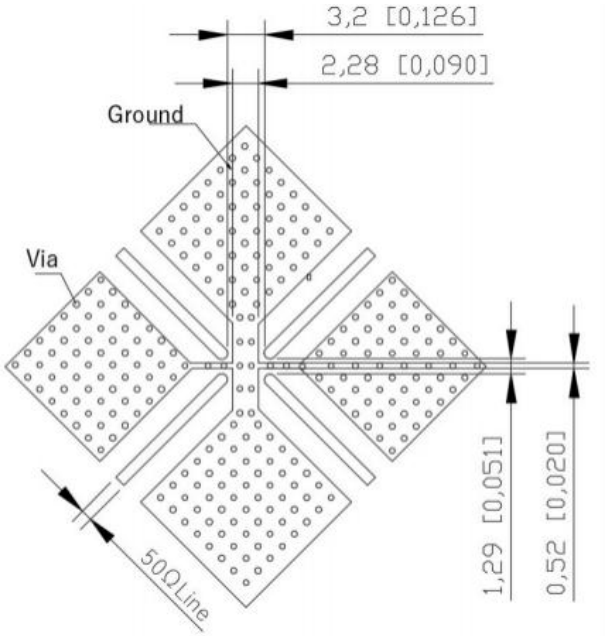
Definition of Measured Specifications

Table 3. Mathematical Formula for the MHC20X30 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.	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 $10\log\frac{P_{transmission}}{\frac{P_{cp1}+P_{transmission}}{2}}$

Recommended PCB Layout

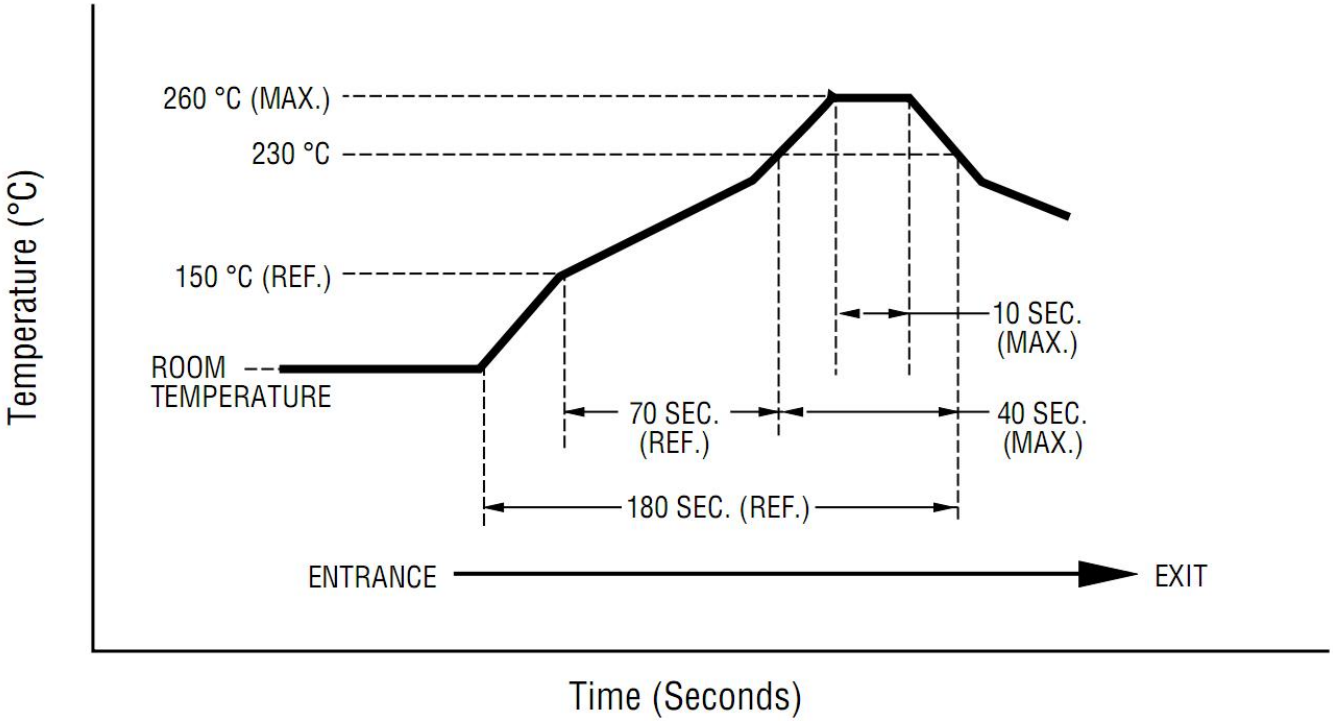
Figure 10. Recommended PCB Layout



50Ω Line mm/inch

Reflow Profile

Figure 11. MHC20X30 Thermal Reflow Profile



Packaging and Ordering Information

Table 4. MHC20X30 Ordering Information

Device	Package	Reel	Shipping
MHC20X30	5.08*3.18mm	7''	1000 Reel

Revison	Description	Date
Rev0	Preliminary	2025/5/29
Rev1	Update	2026/3/7