MHC1500L10

10dB 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, 20 dB typ.

3, Excellent high-power capacity up to 60W

4, RoHS compliance (Pb-Free)

Description

The MHC1500L10 is a low cost, high performance 10 dB hybrid coupler in an easy used surface mount package. The MHC1500L10 is ideal for doherty power amplifier, circular polarized antenna and other applications where low insertion loss and tight amplitude and phase balance are required. MHC1500L10 is constructed from ceramic filled PTFE composites which possess excellent electrical and mechanical stability. All components are 100% RF tested.

Characteristics

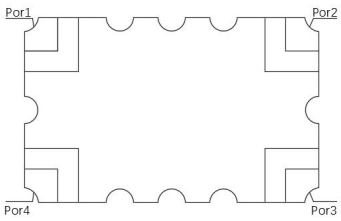
Table 1. MHC1500L10 Characteristics

Item	Min.	Type	Max.	Unit
Frequency Range	1000		2000	MHz
Isolation	23	25		dB
Insertion Loss		0.5	0.7	dB
Amplitude	-0.3		+0.3	dB
Return Loss	20	25		dB
Operating Temp.	-55		+105	°C
Power			60	W

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

Port Configuration

Figure 1. MHC1500L10 (Bottom View)



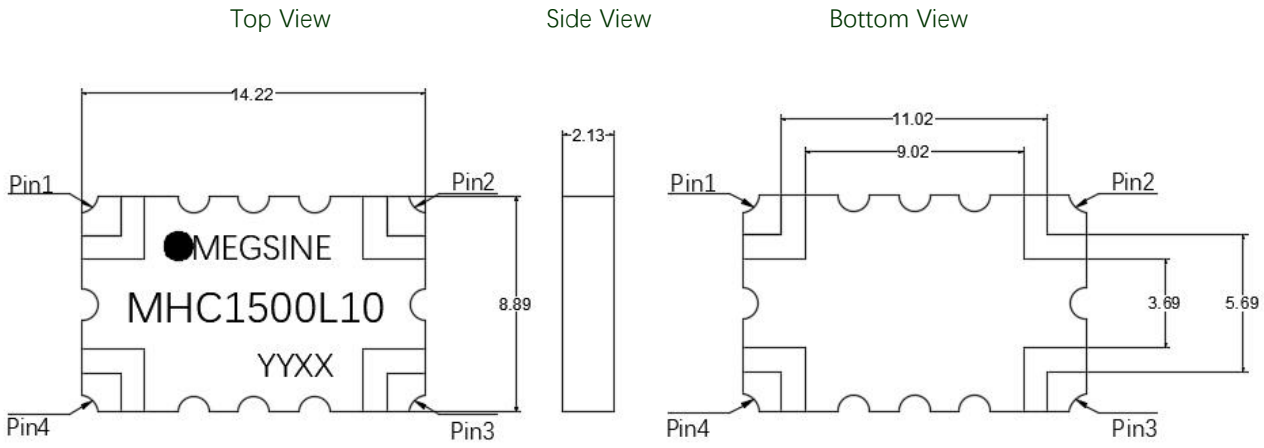
The MHC1500L10 port configurations depending on how input signals are split. The Case 1, Case 2, configurations mean that one input signal is split into two output signals. When port 1 is defined, the other ports are defined automatically

Table 2. MHC1500L10 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. MHC1500L10 Outline Drawing



Unit: mm

Typical Performance (25°C, 1000-2000 MHz)

Figure 3. MHC1500L10 Coupling



Figure 4. MHC1500L10 Transmission

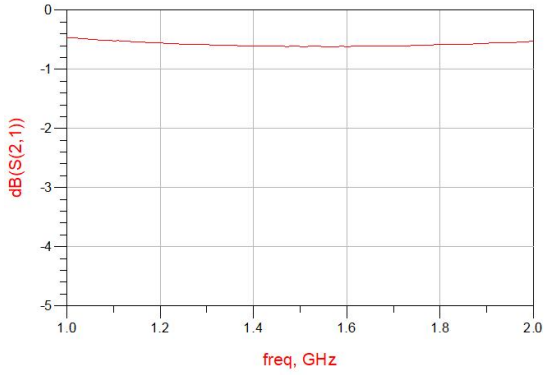


Figure 5. MHC1500L10 Return Loss (S11)

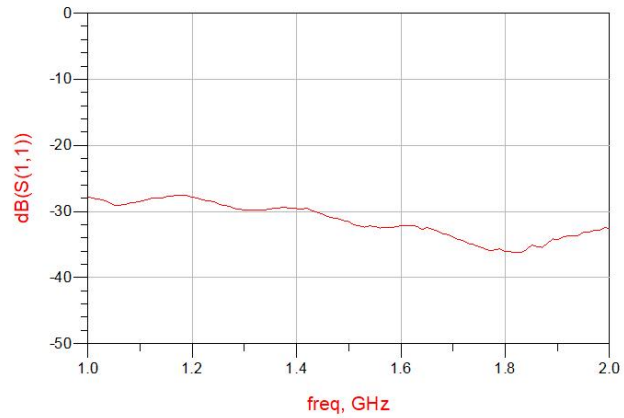


Figure 6. MHC1500L10Return Loss (S22)



Figure 7. MHC1500L10 Return Loss (S33)



Figure 8. MHC1500L10 Return Loss (S44)

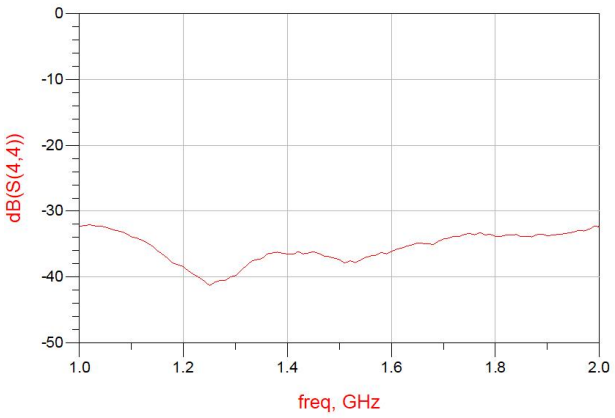


Figure 9. MHC1500L10 Isolation

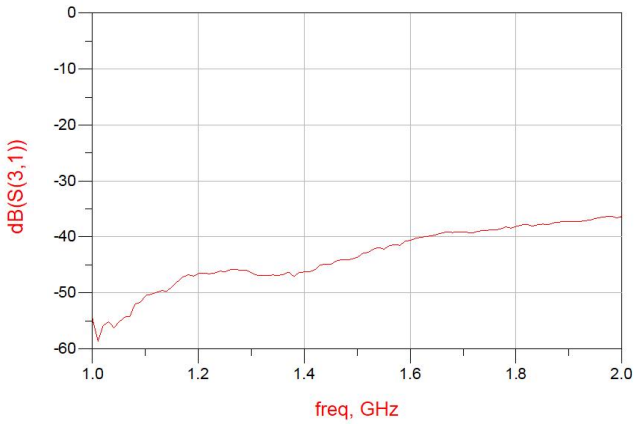


Figure 10. MHC1500L10 IL



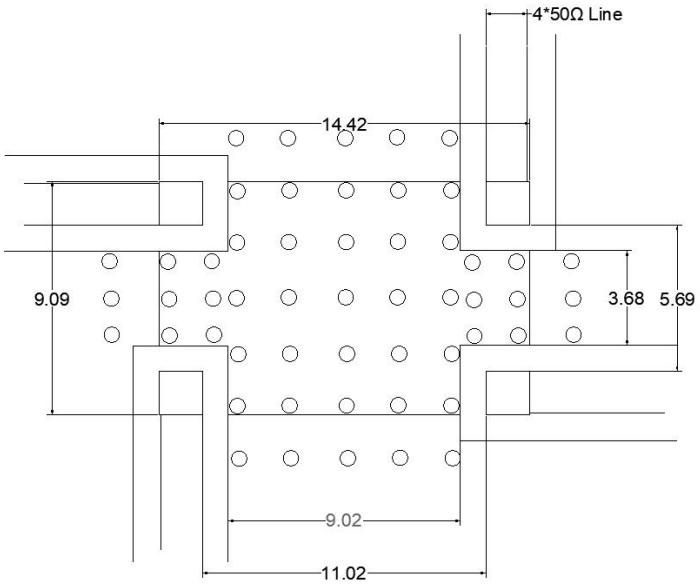
Definition of Measured Specifications

Table 3. Mathematical Formula for the MHC1500L10 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.	$VSWR = \frac{V_{max}}{V_{min}}$ Vmax = voltage maxima of a standing wave Vmin = 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 $10\log\frac{P_{transmission}}{\frac{P_{cp1}+P_{transmission}}{2}}$

Recommended PCB Layout

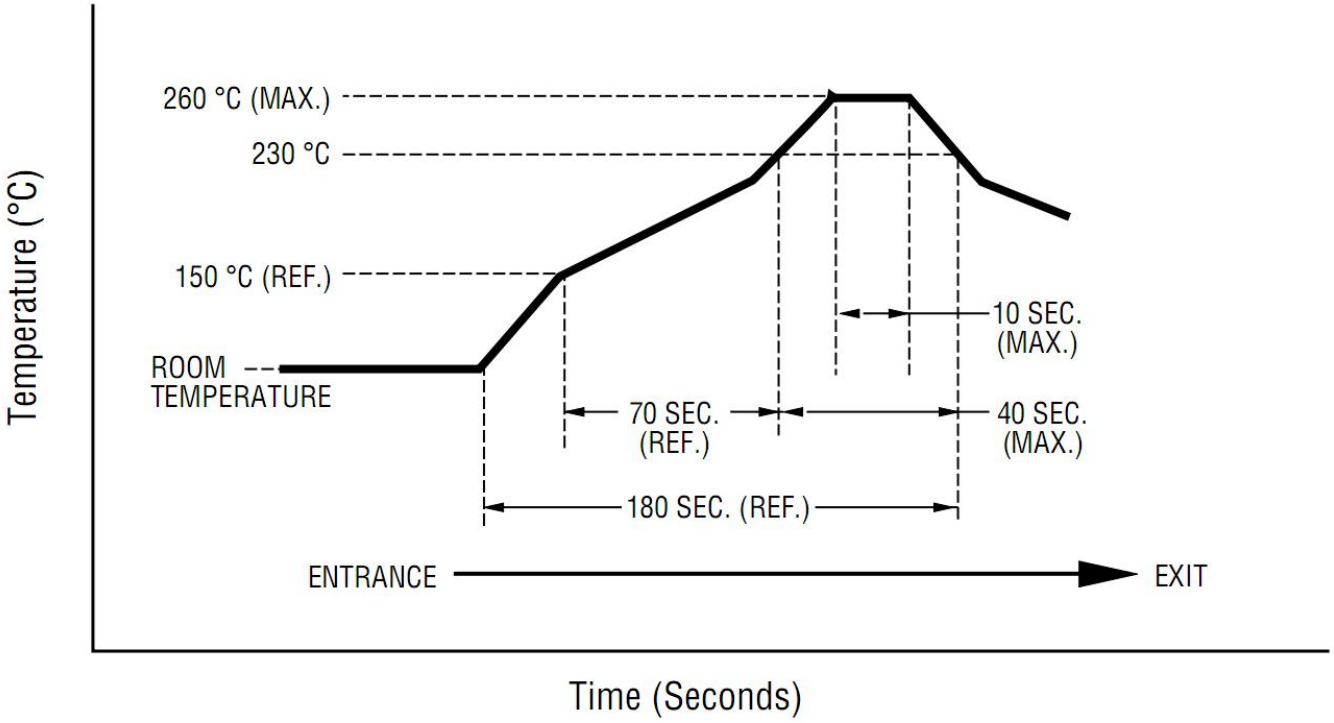
Figure 11. Recommended PCB Layout



50Ω Line mm/inch

Reflow Profile

Figure 12. MHC1500L10 Thermal Reflow Profile



Packaging and Ordering Information

Table 4. MHC1500L10 Ordering Information

Device	Package	Reel	Shipping
MHC1500L10	14.22*8.89mm	7''	1000 Reel

Revison	Description	Date
Rev0	Preliminary	2024/2/26