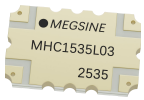
MHC1535L03

3dB 90° Hybrid Coupler

MiPD®

MEGSINE 兆讯

Applications



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

Features

1, Low Insertion Loss
2, High Isolation, 20 dB typ.
3, Excellent high-power capacity up to 100W
4, RoHS compliance (Pb-Free)

Description

The MHC1535L03 is a low cost, high performance 3 dB hybrid coupler in an easy used surface mount package. The MHC1535L03 is ideal for doherty power amplifier, circular polarized antenna and other applications where low insertion loss and tight amplitude and phase balance are required. MHC1535L03 is constructed from ceramic filled PTFE composites which possess excellent electrical and mechanical stability. All components are 100% RF tested.

Characteristics

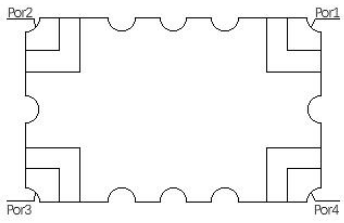
Table 1. MHC1535L03 Characteristics

Item	Min.	Type	Max.	Unit
Frequency Range	1500		3500	MHz
Isolation	20	22		dB
Insertion Loss		0.25	0.40	dB
Phase Unbalance	-3		+3	degrees
Amplitude	-1		+1	dB
Return Loss	17	20		dB
Operating Temp.	-55		+85	°C
Power			100	W

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

Port Configuration

Figure 1. MHC1535L03 (Bottom View)



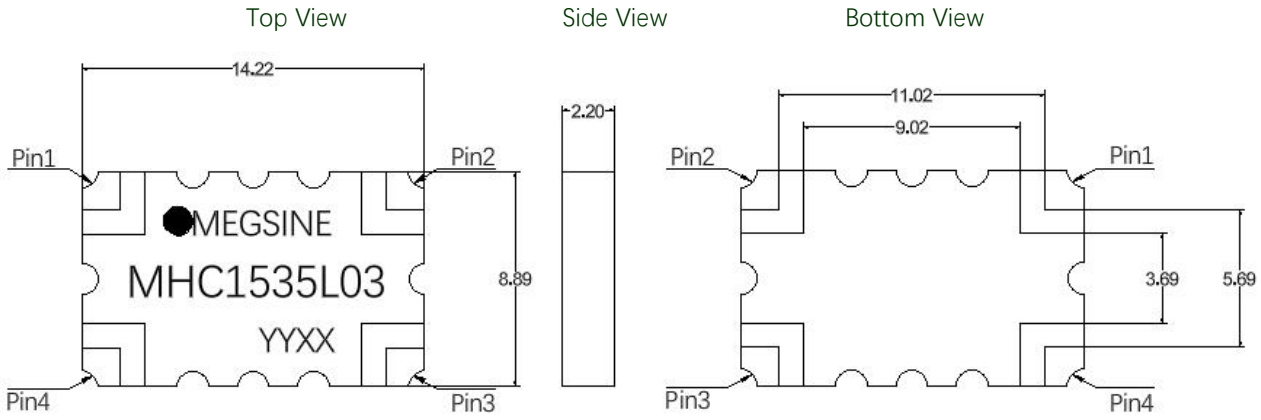
The MHC1535L03 port configurations depending on how input signals are split. The Case 1, Case 2, Case 3, and Case 4, configurations mean that one input signal is split into two output signals. When port 1 is defined, the other ports are defined automatically

Table 2. MHC1535L03 Port Configurations

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

Outline Drawing

Figure 2. MHC1535L03 Outline Drawing



Unit: mm

Typical Performance (25°C, 1500-3500 MHz)

Figure 3. MHC1535L03 Coupling

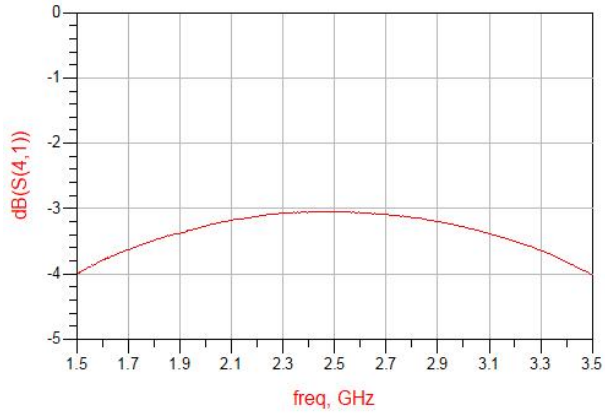


Figure 4. MHC1535L03 Transmission



Figure 5. MHC1535L03 Return Loss (S11)



Figure 6. MHC1535L03Return Loss (S22)

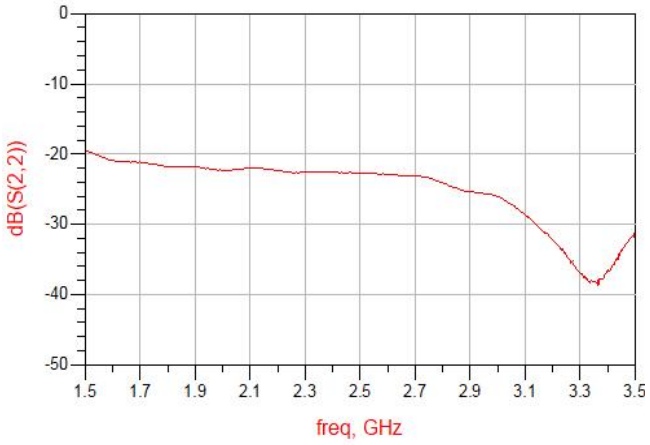


Figure 7. MHC1535L03 Return Loss (S33)

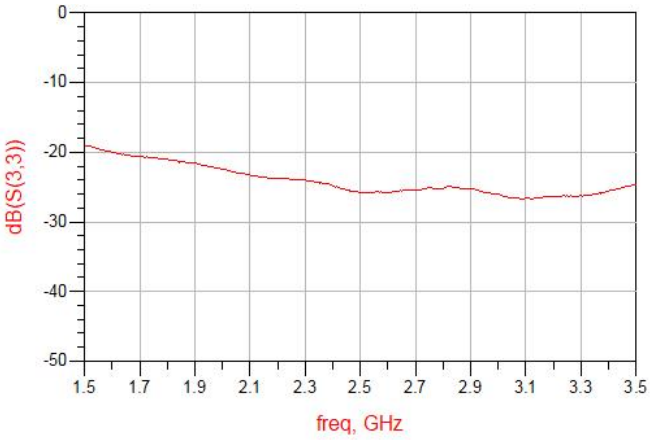


Figure 8. MHC1535L03 Return Loss (S44)

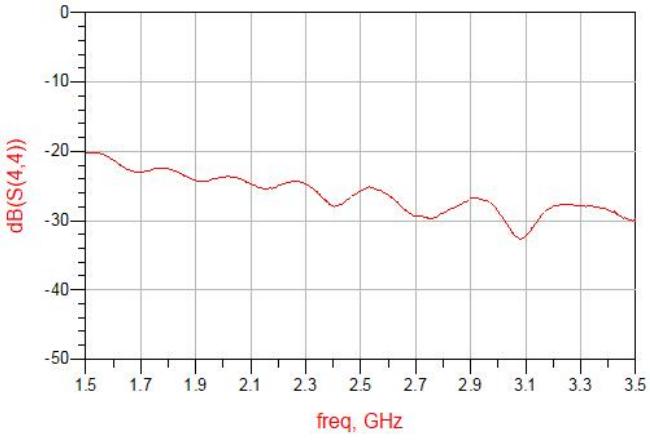


Figure9. MHC1535L03 Isolation



Figure 10. MHC1535L03 Phase

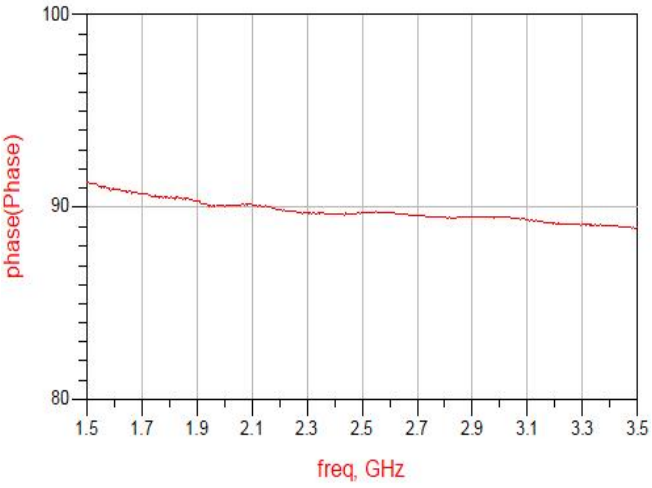
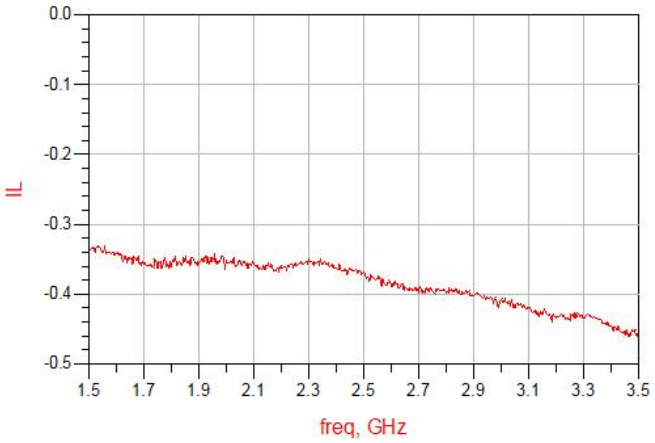


Figure 11. MHC1535L03 IL



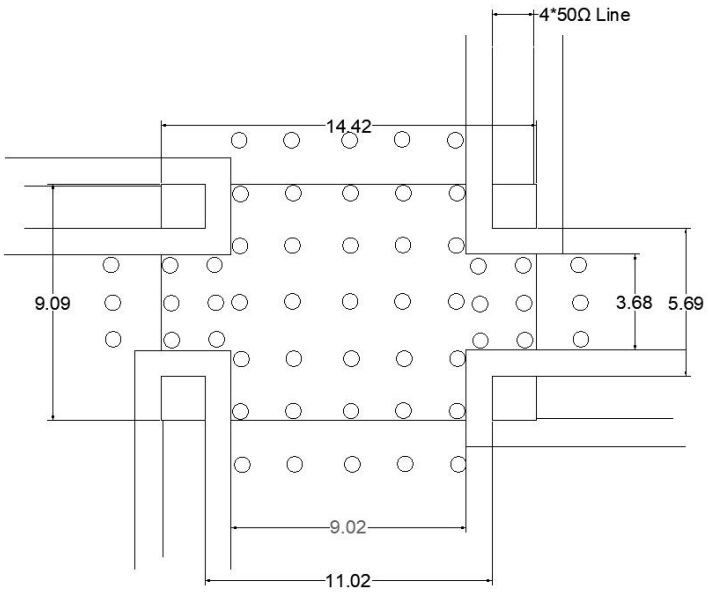
Definition of Measured Specifications

Table 3. Mathematical Formula for the MHC1535L03 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 $10\log\frac{P_{transmission}}{\frac{P_{cp1}+P_{transmission}}{2}}$

Recommended PCB Layout

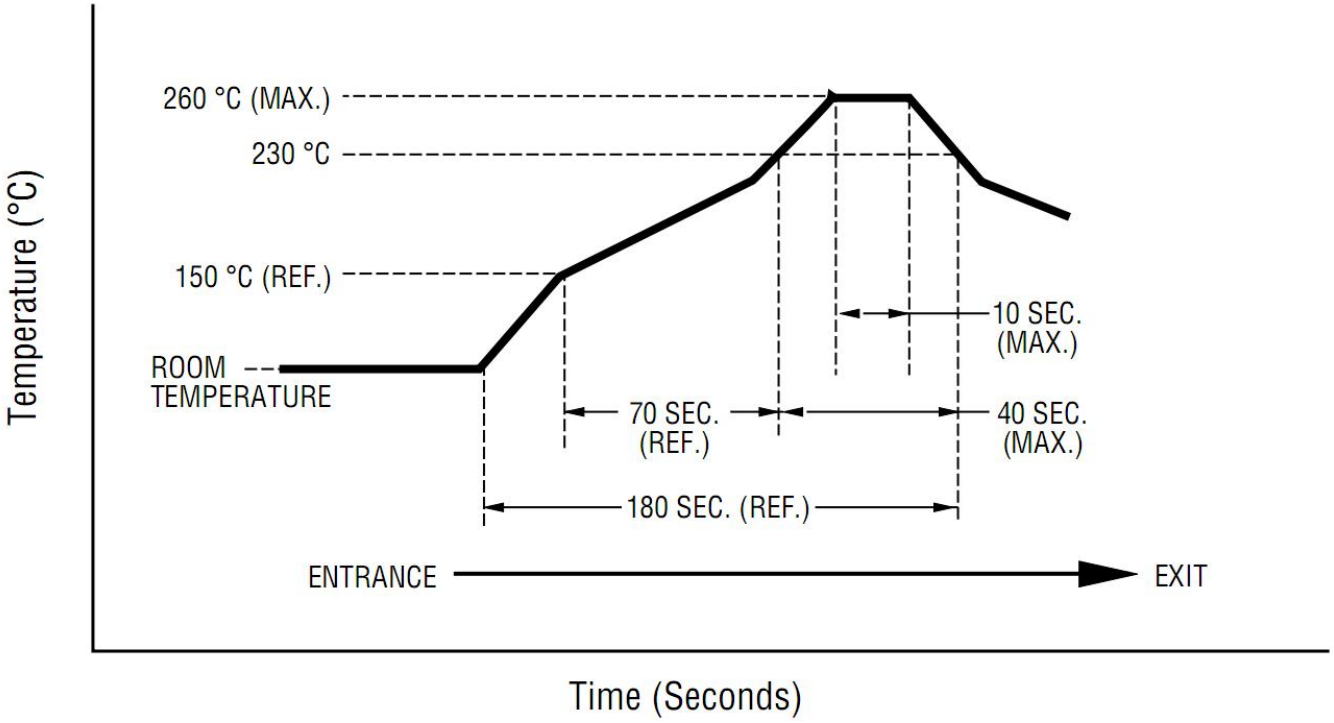
Figure 12. Recommended PCB Layout



50Ω Line mm/inch

Reflow Profile

Figure 13. MHC1535L03 Thermal Reflow Profile



Packaging and Ordering Information

Table 4. MHC1535L03 Ordering Information

Device	Package	Reel	Shipping
MHC1535L03	14.22*8.89mm	7''	2000 Reel

Revison	Description	Date
Rev0	Preliminary	2024/2/26
Rev1	Update	2025/8/13
Rev2	Update	2026/10/26