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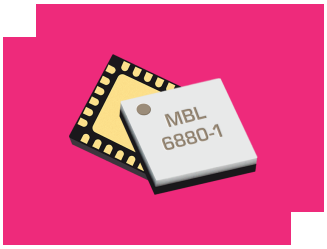
MBAL-0220SM

Passive MMIC 2-20 GHz Surface Mount Balun

DEVICE OVERVIEW

General Description

The MBAL-0220SM is a GaAs passive MMIC balun in a 4mm QFN surface mount package. Its frequency ranges from 2 to 20 GHz and offers a 2:1 impedance ratio. The 4mm QFN package is a lead free, RoHS compliant package compatible with standard leaded and lead-free solder reflows. Connectorized evaluation packages are available. The MBAL-0220SM is an excellent choice for balanced amplifiers, clock distribution, and higher order Nyquist sampling in analog to digital converters.



Download s-parameters here

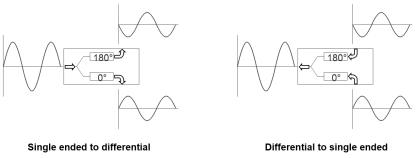
Features

- 2:1 Impedance Ratio
- 2 GHz to 20 GHz Balun (Balanced to Unbalanced Transformer)
- Tuned for Optimal Phase/Amplitude Balance
- RoHS Compliant

Applications

N/A

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Packing Size	Green Status	Product Lifecycle	Export Classification
MBAL-0220SM	Passive MMIC 2-20 GHz Surface Mount Balun	QFN	-	REACH RoHS	Released	EAR99
EVAL-MBAL-0220	Evaluation Board, Passive MMIC 2-20 GHz Surface Mount Balun	EVAL	-	REACH RoHS	Released	EAR99
MBAL-0220-TR	Tape and Reel, Passive MMIC 2-20 GHz Surface Mount Balun	QFN	7"	REACH RoHS	Released	EAR99

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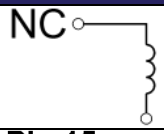
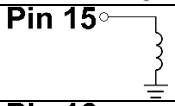
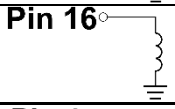
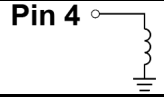
Port Configuration and Functions

Port Functions

Port	Function	Description	DC Equivalent Circuit
1-3, 5-14, 17-24	Non-connect (NC)	These pins are not connected internally. Datasheet performance is tested with NC pins grounded.	
15	Out 2	Pin 15 is DC short. Blocking capacitor is optional.	
16	Out 1	Pin 16 is DC short. Blocking capacitor is optional.	
4	Common	Pin 4 is DC short. Blocking capacitor is optional.	
Paddle	Ground	Ground pad should be connected to RF/DC ground with low electrical and thermal resistance.	

Specifications

Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	125	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-65	°C
Minimum Storage Temperature	-65	°C
RF Power Handling	30	dBm

Package Information

Parameter	Details	Rating
Dimensions	-	4 x 4 mm
Moisture Sensitivity Level	-	MSL 1

Electrical Specifications

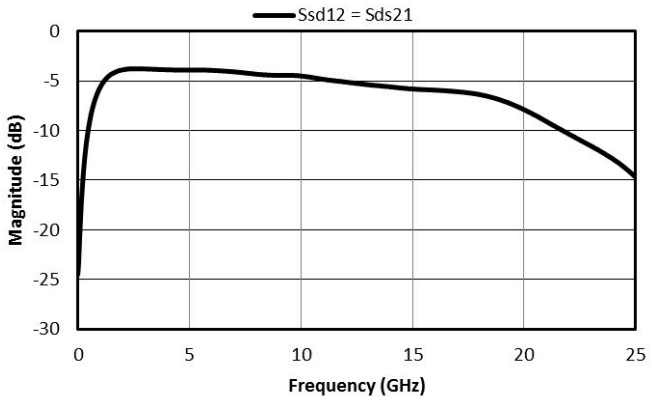
Specifications guaranteed for +25°C, measured in a 50Ω system. Measured data was taken on an Eval Board with output traces having an offset.

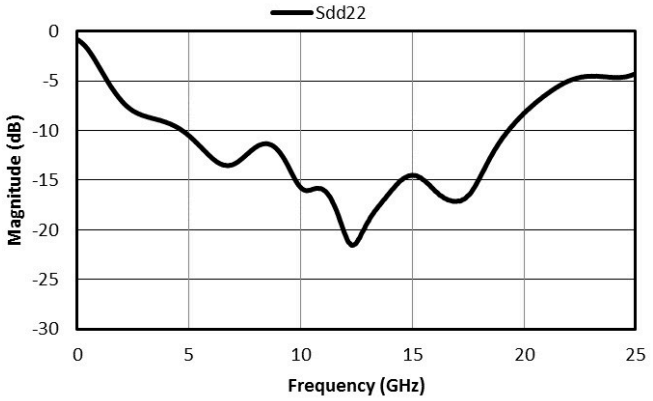
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Amplitude Balance [1]	-	2	20	-	0.25	1	dB
Common Mode Rejection	-	2	20	22	30	-	dB
Insertion Loss as a Mode Converter [2]	-	2	20	-	6	8.5	dB
Isolation	-	2	20	-	10	-	dB
Nominal Phase Shift	-	2	20	-	1800	-	°
Phase Balance [3]	-	2	20	-	3	10	°
VSWR (Common)	-	2	20	-	1.4	-	
VSWR (Output)	-	2	20	-	2	-	
Impedance Ratio	-	-	-	-	2:1	-	

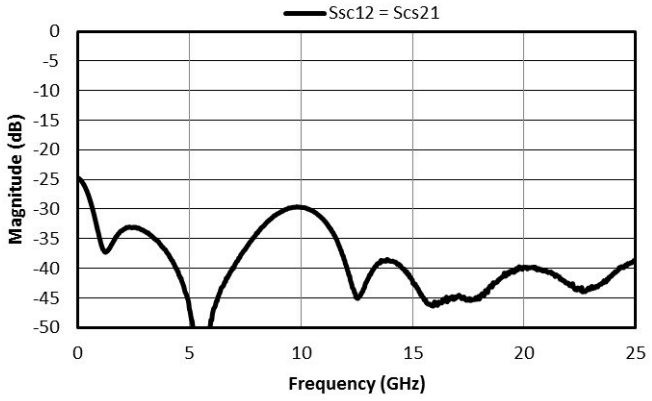
[1][3] Guaranteed only for eval board.
[2] Includes fixture losses.

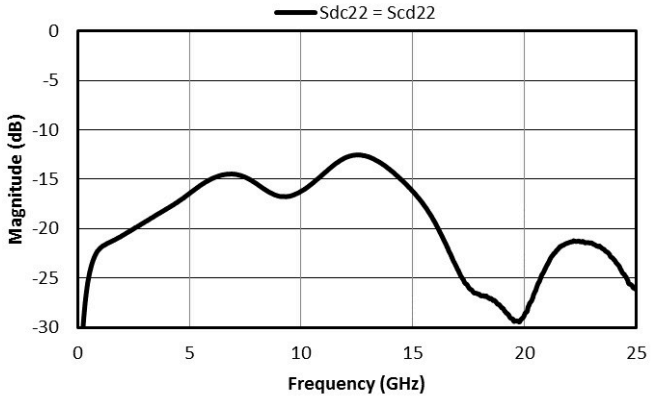
Mixed Mode Scattering Parameters

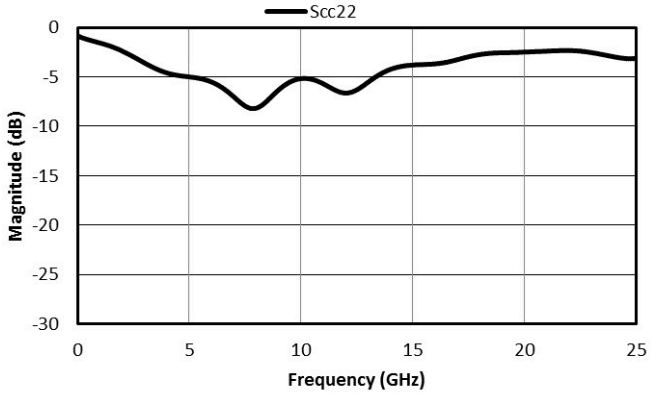
Mixed mode scattering parameters are used to characterize differential circuits. For baluns, this means that the 0° and 180° ports become a single 100Ω differential port and the common port remains the same 50Ω common port. The two-port s-parameters of the balun are then characterized based on differential (d), common mode (c), or single-ended (s) signals. For example: Scs12 is the Common output response given a single ended input.

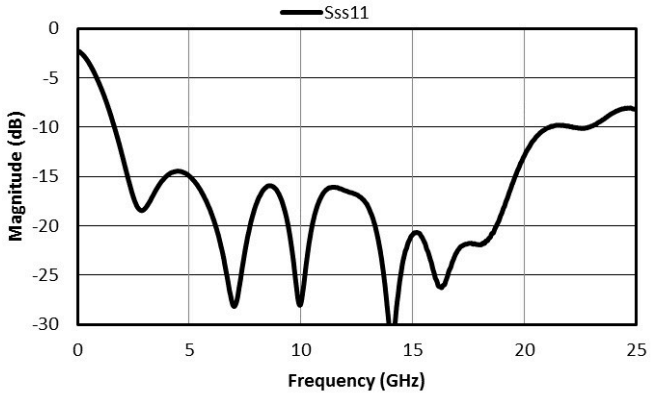






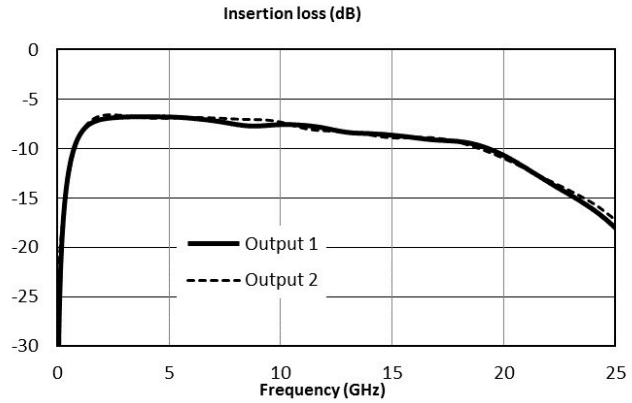


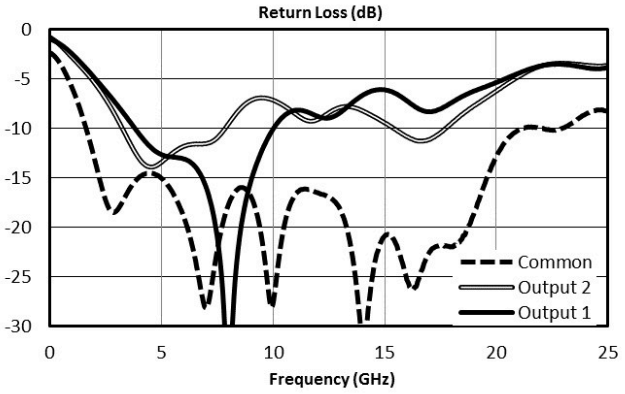


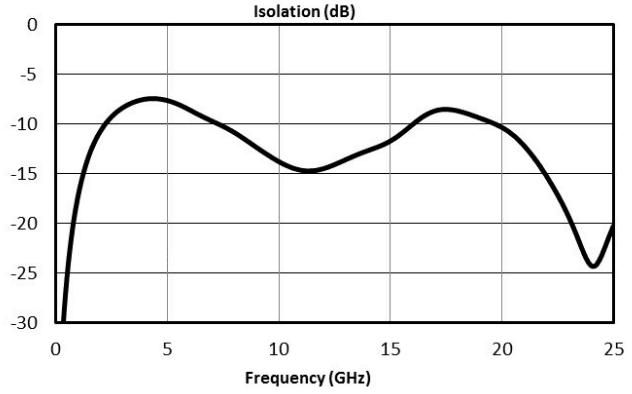


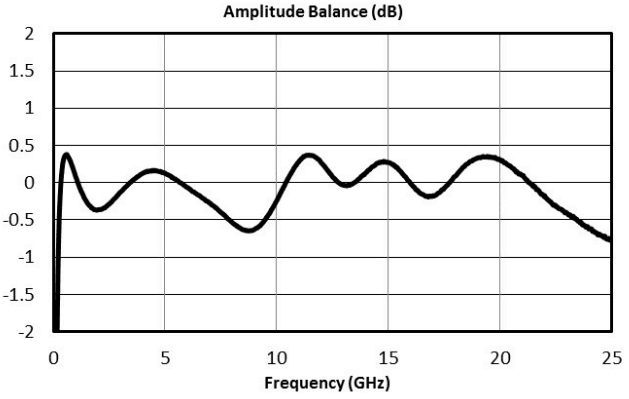
Typical Performance Scattering Parameters

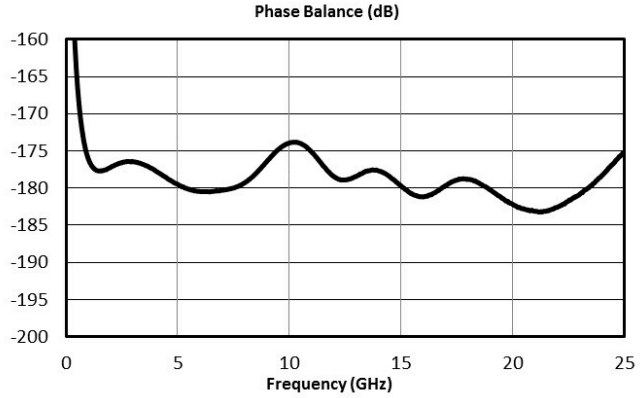
Three port scattering parameters measured as three single-ended 50Ω ports showing relationship between any two ports.

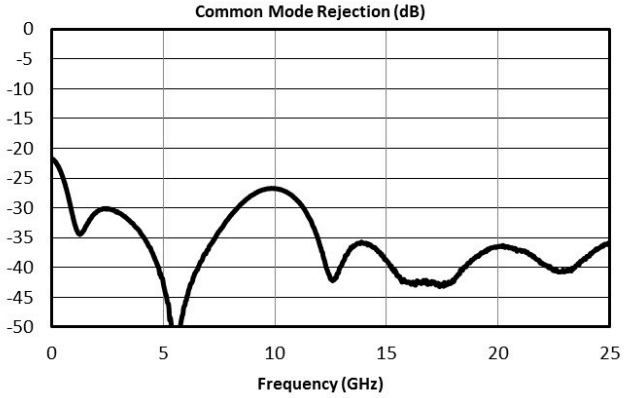










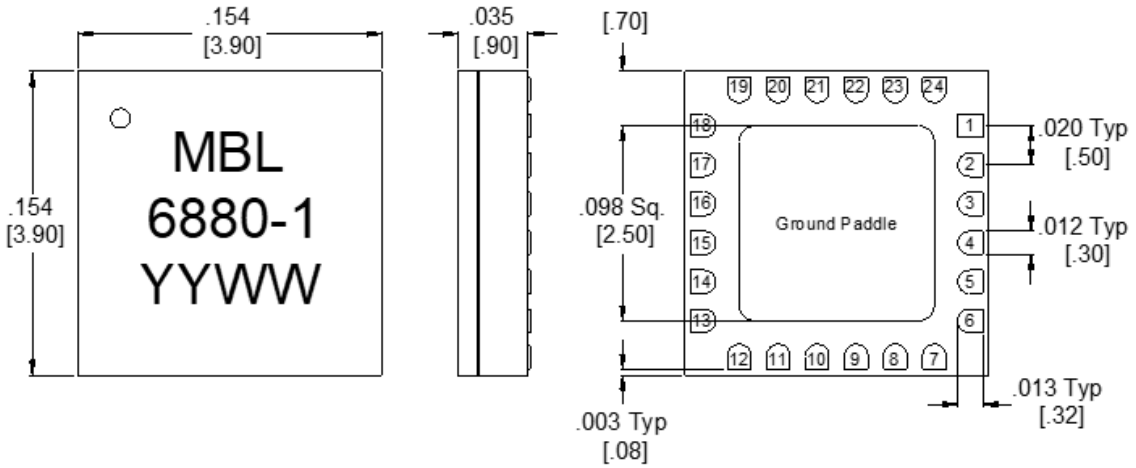


Mechanical Data

Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP

Outline Drawing



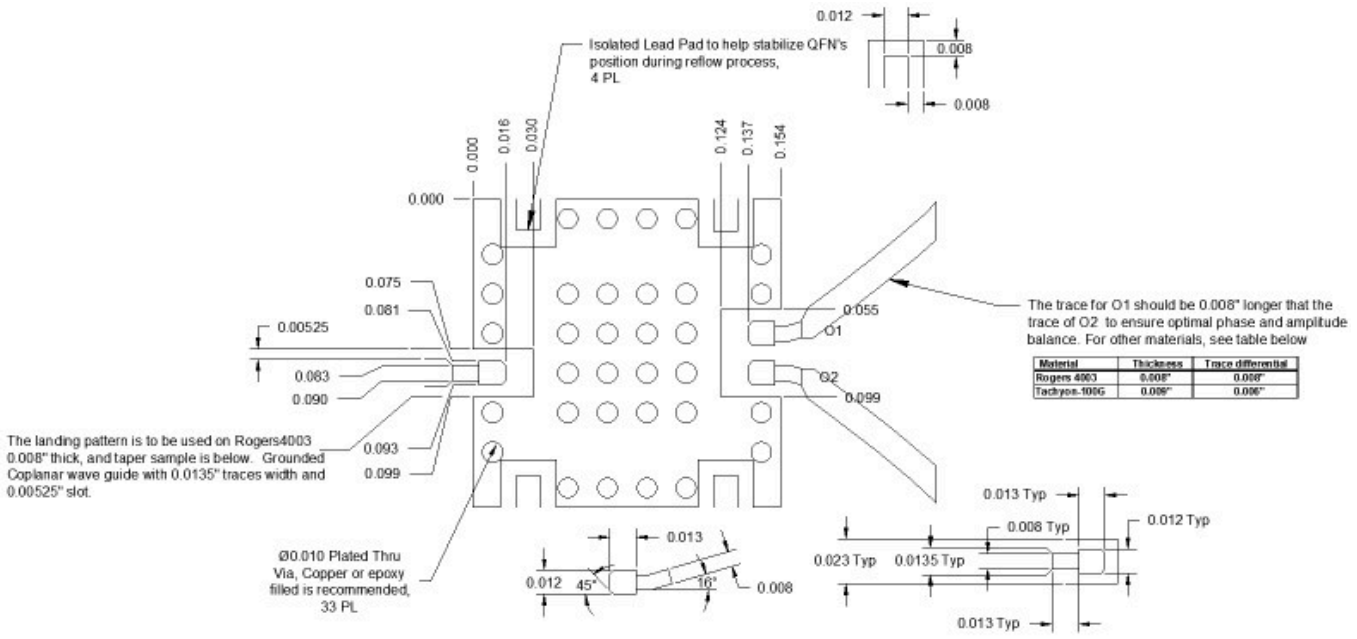
Pad #	Function
1	N/C
2	N/C
3	N/C
4	Common
5	N/C
6	N/C
7	N/C
8	N/C
9	N/C
10	N/C
11	N/C
12	N/C
13	N/C
14	N/C
15	Output 2
16	Output 1
17	N/C
18	N/C
19	N/C
20	N/C
21	N/C
22	N/C
23	N/C
24	N/C

1. Substrate material
2. I/O Leads and Ground Paddle plating is (from base to finish):

Ni:	8.89um	MAX	1.27um MIN
Pd:	0.17um	MAX	0.07um MIN
Au:	0.254um	MAX	0.03um MIN

Footprint Image

Download : Footprint Drawing

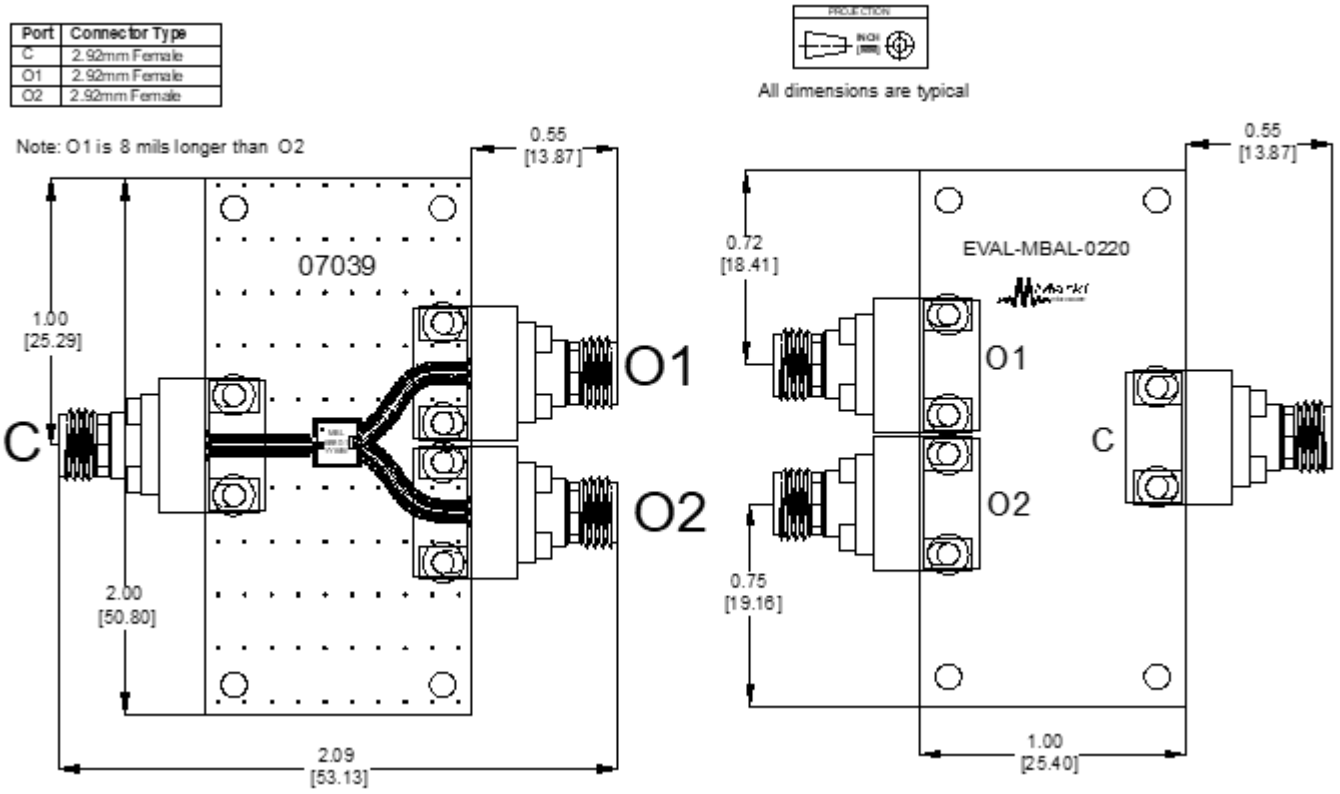


Evaluation Board - Performance Data

Parameter	Test Conditions	Frequency Range (GHz)	Min	Typ	Max	Unit
Impedance Ratio	-	-	-	2	-	

Evaluation Board - Outline Drawing

Port	Connector Type
C	2.92mm Female
O1	2.92mm Female
O2	2.92mm Female



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