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Sales & Customer Support: sales@markimicrowave.com
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MBAL-0620SMG

6 - 20 GHz MMIC Isolation Balun

DEVICE OVERVIEW

General Description

The MBAL-0620SMG is a MMIC surface mount high isolation balun. This balun features excellent amplitude and phase balance across its 6 to 20 GHz frequency range and offers a 2:1 impedance ratio. It provides 18 typical isolation between the balanced ports, minimizing unwanted signal coupling. The balun also suppresses common-mode signals, helping maintain signal integrity in differential applications. The MBAL-0620SMG is form-fit compatible with the BAL-0620SMG and is intended for customers supporting existing designs. For new designs, we recommend the MBAL-0624PSM, which offers improved performance in a compact 1.3 x 2mm DFN package.

Download s-parameters here

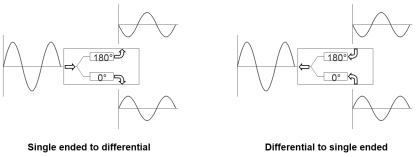
Features

- 2:1 Impedance Ratio
- Broadband Operation, 6 to 20 GHz
- High Isolation, 18dB Typical
- Insertion Loss as a Mode Converter, 1.7 dB Typical
- Common Mode Rejection, 28 dB Typical

Applications

- Test Equipment
- Electronic Warfare
- Radar and satellite communications
- High Channel Count Systems

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
MBAL-0620SMG	6 - 20 GHz MMIC Isolation Balun	DFN	REACH RoHS	Released	EAR99
EVB-MBAL-0620S	Evaluation Board, 6 - 20 GHz MMIC Isolation Balun	EVB	REACH RoHS	Released	EAR99

Table Of Contents

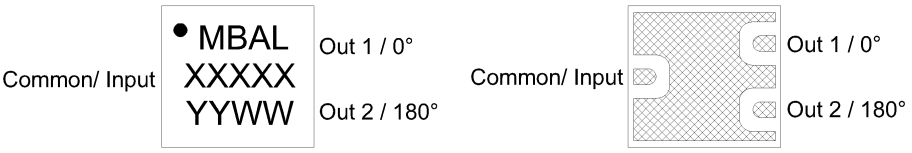
Revision History

Revision Code	Revision Date	Comment
-	2026-03-27	Initial Release

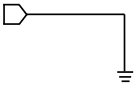
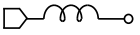
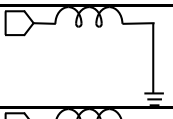
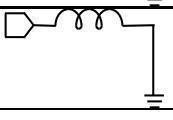
Port Configuration and Functions

Port Diagram

An X-ray top-down view of the MBAL-0620SMG package outline drawing is shown below. The MMIC Baluns are passive reciprocal devices allowing either signal splitting or combining.



Port Functions

Port	Function	Description	DC Equivalent Circuit
Ground Paddle	Gnd	Ground paddle should be connected to RF ground	
Pin 1	Common/Input	Pin 1 is DC open.	
Pin 2	Out 1 / 0° Port (Balanced)	Pin 2 is DC short to ground.	
Pin 3	Out 2 / 180° Port (Balanced)	Pin 3 is DC short to ground.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C
Pin 2 DC Current	24	mA
Pin 3 DC Current	24	mA

Package Information

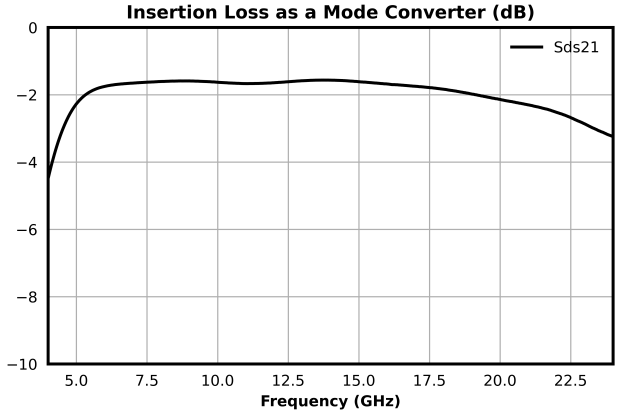
Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Dimensions	-	2.69 x 2.90 mm
Moisture Sensitivity Level	-	MSL 1

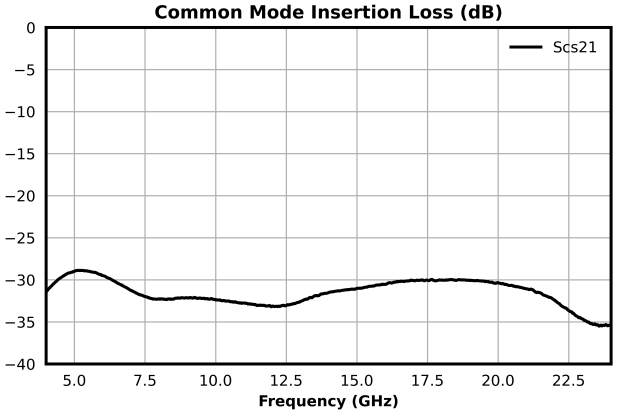
Electrical Specifications

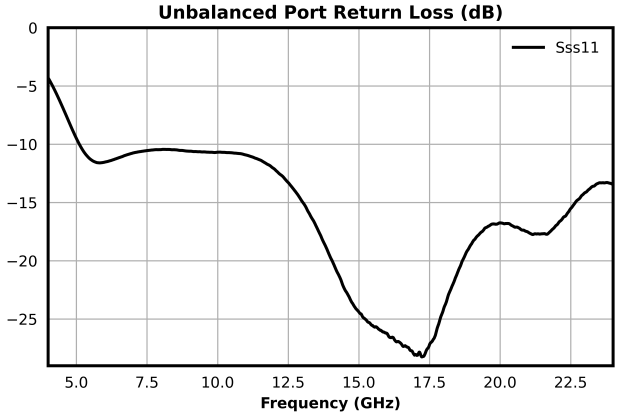
The electrical specifications apply at TA=+25°C in a 50Ω system. Min and Max limits are guaranteed at TA=+25°C.

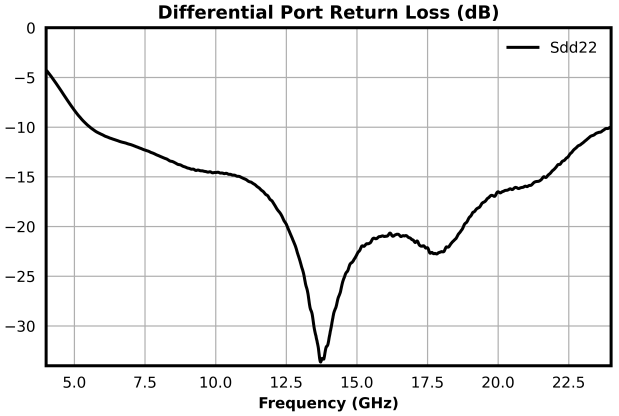
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Insertion Loss as a Mode Converter	Configuration A, Temp = 25°C	6	20	-	1.7	-	dB
Nominal Phase Shift	Configuration A, Temp = 25°C	-	-	-	180	-	°
Common Port Return Loss	Configuration A, Temp = 25°C	6	20	-	15	-	dB
Unbalanced Port Return Loss	Configuration A, Temp = 25°C	6	20	-	14.9	-	dB
Common Mode Return Loss	Configuration A, Temp = 25°C	6	20	-	11	-	dB
Output Return Loss	Configuration A, Temp = 25°C	6	20	-	13	-	dB
Isolation	Configuration A, Temp = 25°C	6	20	-	18	-	dB
Amplitude Balance	Configuration A, Temp = 25°C	6	20	-	0.2	-	dB
Phase Balance	Configuration A, Temp = 25°C	6	20	-	3.2	-	°
Common Mode Rejection	Configuration A, Temp = 25°C	6	20	-	28	-	dB
Impedance	Configuration A, Temp = 25°C	-	-	-	50	-	Ω
Impedance Ratio	-	6	20	-	2:1	-	

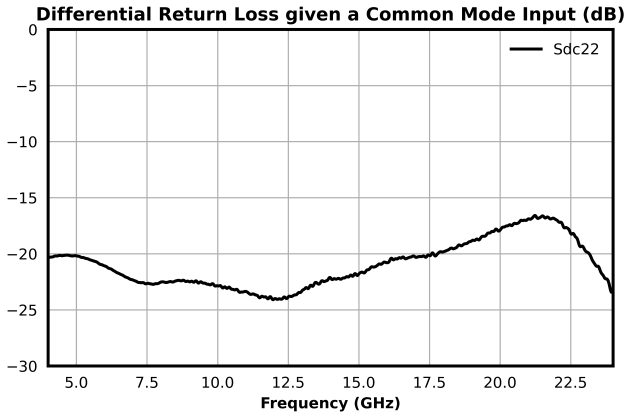
Mixed Mode Scattering Parameters

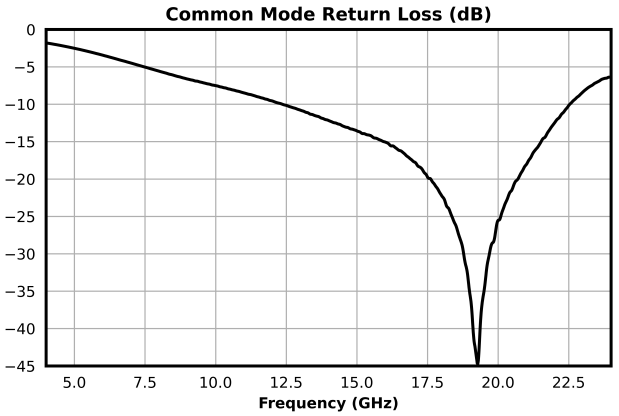




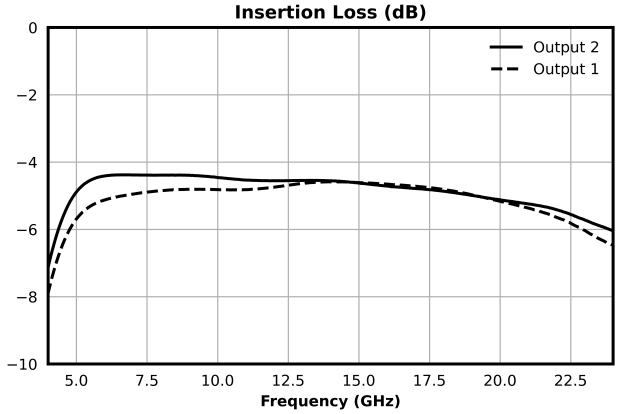


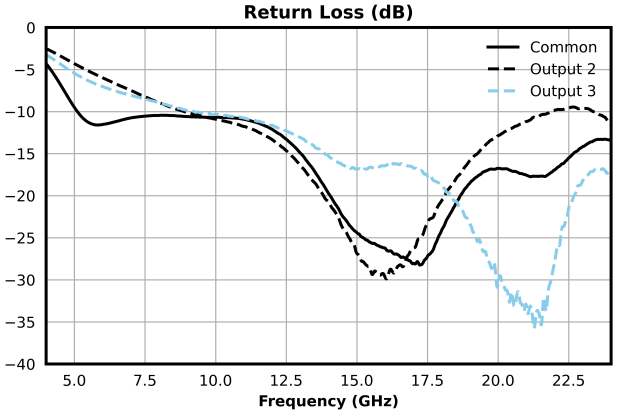


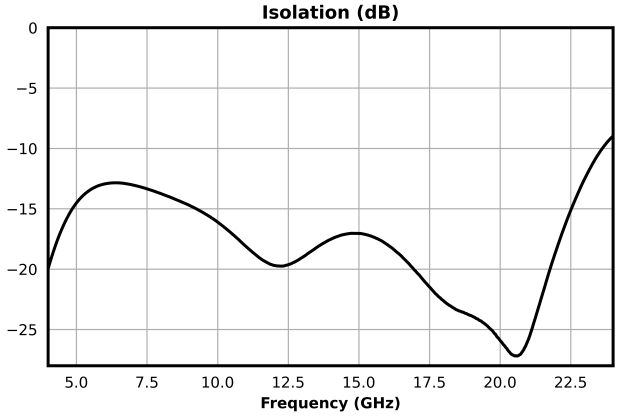


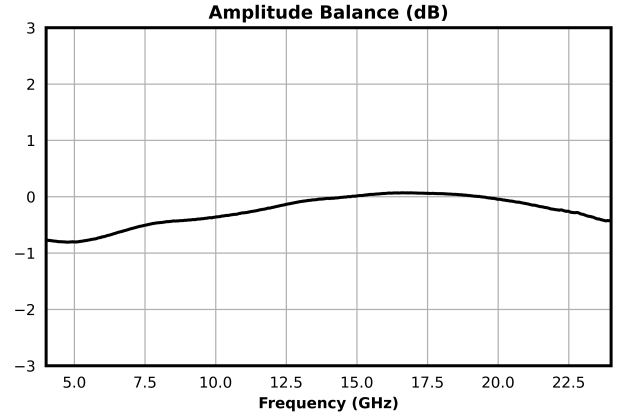


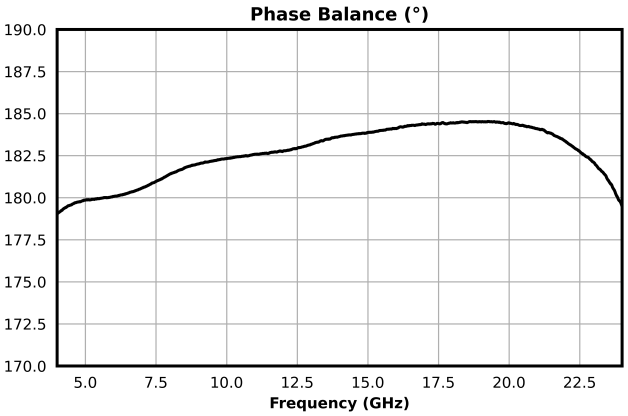
Typical Performance Scattering Parameters

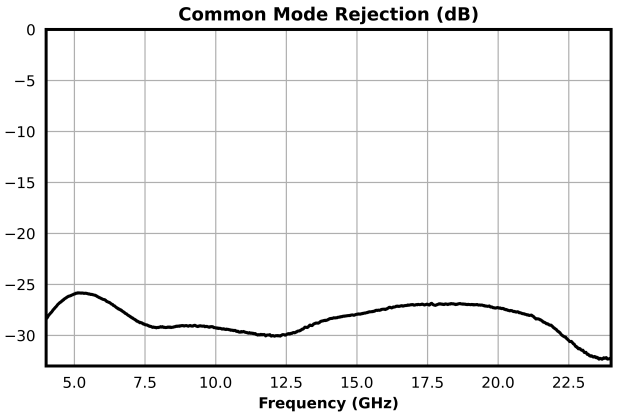












Measured data is de-embedded from fixture using AFR.

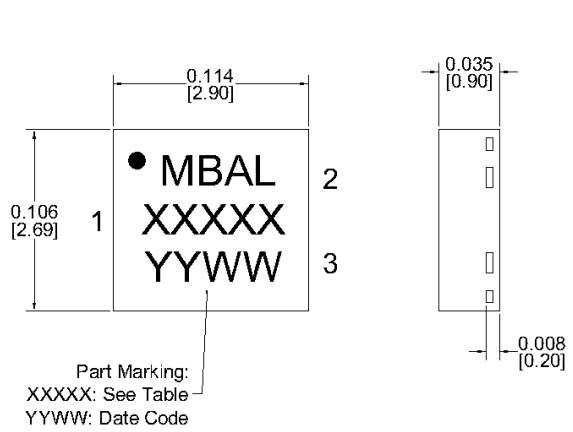
Mechanical Data

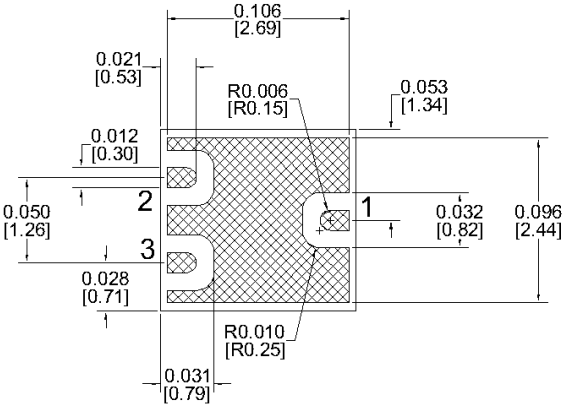
Outline Drawing

Download : Outline 2D Drawing | Outline 3D STP

Port Number	Function
1	SE
2	DIFF +/-
3	DIFF +/-

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVALS
A	Initial Release	2/11/26	AT





XXXXX	Surface Mount PN
10996	MBAL-0208SMG
10997	MBAL-0416SMG
10998	MBAL-0620SMG

Notes: (Unless otherwise specified)

1. Backside Metal: Cu Alloy 194
2. Substrate: Plastic Overmold
3. Finish: Ni: 0.5 - 2.0 µm
   Pd: 0.08 - 0.15 µm
   Au: 0.008 - 0.050 µm

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NOTES:		
	DRAWN BY	DATE
MATERIAL:	Tnn	09-24-2025
FINISH:	AR, AN	11/17/25
DO NOT SCALE DRAWING		

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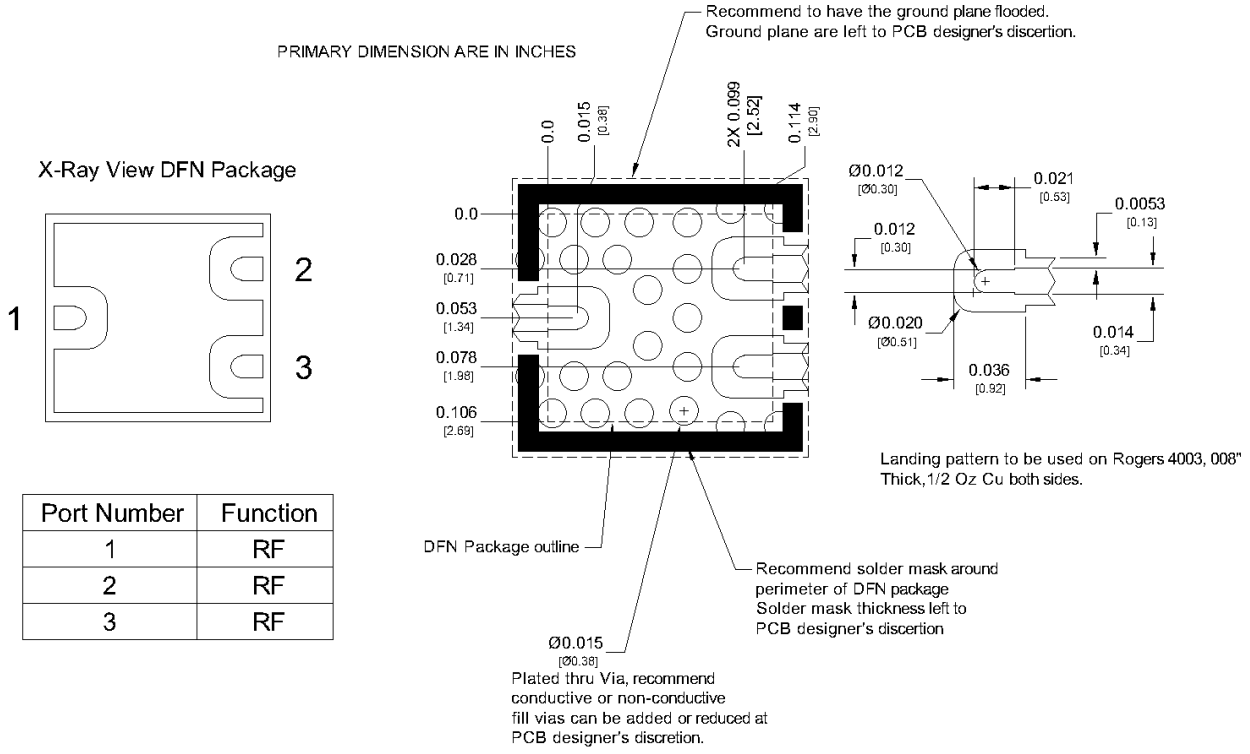
Outline
2.90mm X 2.69mm DFN

SIZE	CAGE CODE	DWG. NO.
A	0UC32	MBAL-####SMG

SCALE none SHEET 1 OF 1

Footprint Image

Download : Footprint Drawing



Port Number	Function
1	RF
2	RF
3	RF

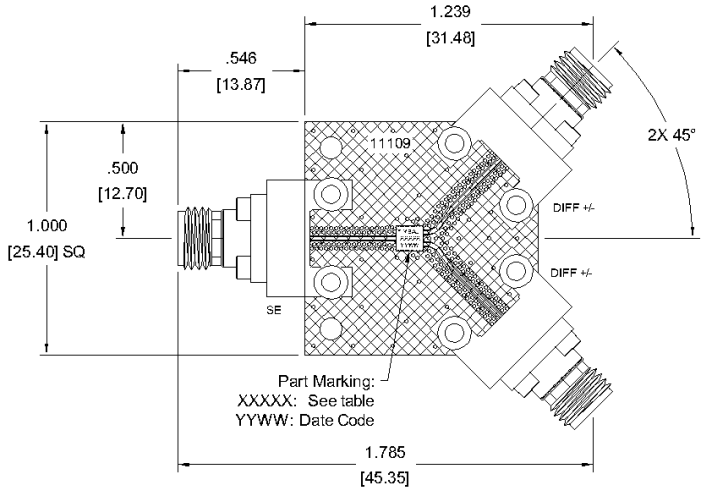
Evaluation Board - Outline Drawing

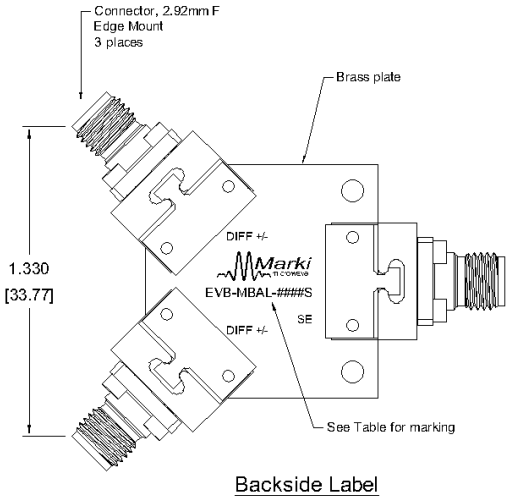
Port	Connector Type
SE	2.92 mm F Edge Mount
DIFF +/-	2.92 mm F Edge Mount
DIFF +/-	2.92 mm F Edge Mount

Connectors are not removeable

All measurements are typical

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVALS
A	Initial Release	2/18/26	AT





Backside Label

XXXXX	EVB-MBAL-####S	Surface Mount PN
10996	EVB-MBAL-0208S	MBAL-0208SMG
10997	EVB-MBAL-0416S	MBAL-0416SMG
10998	EVB-MBAL-0620S	MBAL-0620SMG

NOTES:

DRAWN BY	DATE
Tnn	09-22-2025
AN	11/17/25
AR	11/17/25

MATERIAL:

FINISH:

DO NOT SCALE DRAWING

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Outline,
MBAL SMG Eval Board

SIZE	CAGE CODE	DWG. NO.
A	0UC32	EVB-MBAL-####S

SHEET 1 OF 1

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