Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

ABSD-11278PSM

General Description

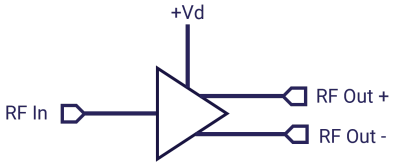
The ABSD-11278PSM is a GaAs active MMIC balun in a 3mm QFN surface mount package. Its frequency ranges from DC to 12 GHz. The ABSD-11278PSM operates from a single supply voltage, enabling low power consumption. The 3mm QFN package is a lead free, RoHS compliant package compatible with standard leaded and lead-free solder reflows. Connectorized evaluation packages are available. The ABSD-11278PSM is an excellent choice for single ended to differential mode conversion and higher order Nyquist sampling in analog to digital converters.

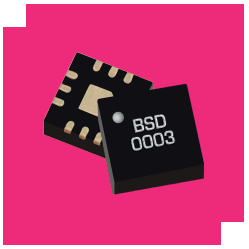
Download s-parameters here

Features

- 2:1 Impedance Ratio
- 12 GHz Active Balun (Single Ended to Differential Mode Conversion)
- Designed for low power consumption
- High linearity HD2 and HD3
- Single Supply Voltage, +5V/49mA

Functional Block Diagram





Electrical Performance Summary

Parameter	Typ	Unit
Frequency Range	0 to 12	GHz
Insertion Loss	6.3	dB
Phase Balance	0.5	°
Amplitude Balance	0.25	dB
Impedance Ratio	2:1	-

Summary only – refer to the Electrical Specifications, Absolute Maximum Ratings, and Recommended Operating Range tables for complete details.

Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
ABSD-11278PSM	12 GHz Single Ended to Differential Active Balun	QFN	REACH RoHS	Released	EAR99
EVB-ABSD-11278P	Evaluation Board	EVB		Released	-

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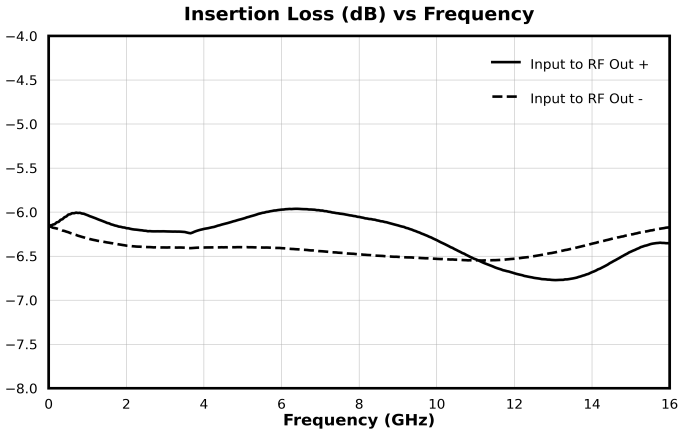
Table Of Contents

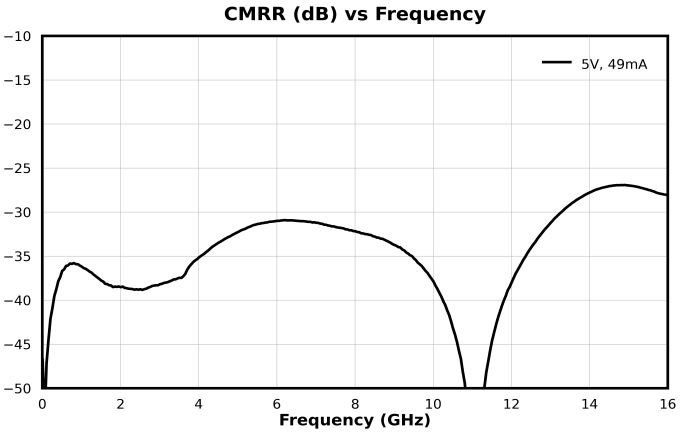
- **Device Overview**
  - General Description
  - Features
  - Functional Block Diagram
  - Electrical Performance Summary
  - Part Ordering Options
- **Specifications**
  - Typical Performance Plots
  - Differential Linearity
  - Noise Figure
  - Electrical Specifications
  - Recommended Operating Conditions
  - Absolute Maximum Ratings
  - Package Information
- **Port Configuration and Functions**
  - Port Diagram
  - Port Functions
- **Operation**
  - Application Circuit
  - Application Circuit Description
- **Mechanical Data**
  - Outline Drawing
- **Footprint Image**
- **Evaluation Board**
  - Evaluation Board Outline Drawing
- **Revision History**
- **Notes**

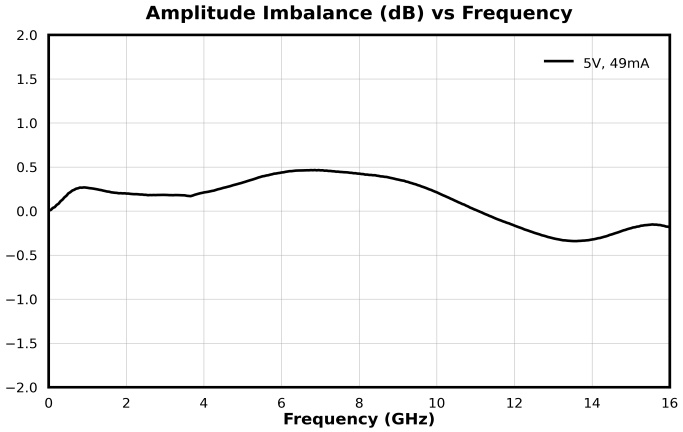
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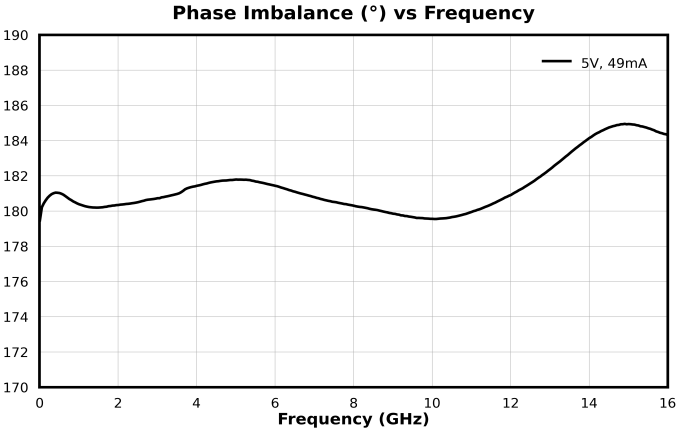
Typical Performance Plots

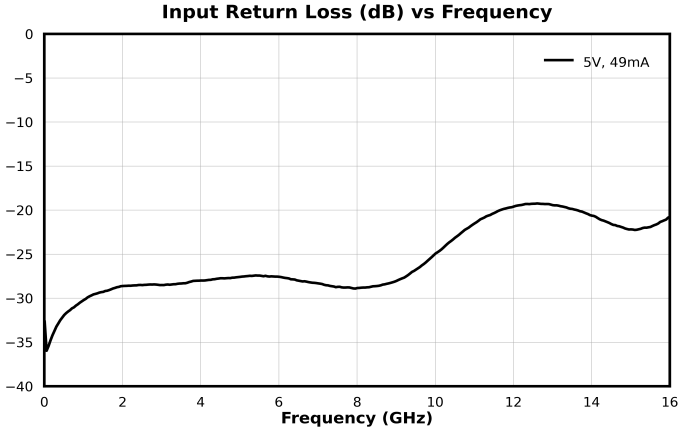
Three-port scattering parameters measured as three single-ended 50Ω ports unless otherwise noted. Small signal gain, return losses and reverse isolation have evb and connector effects de-embedded.

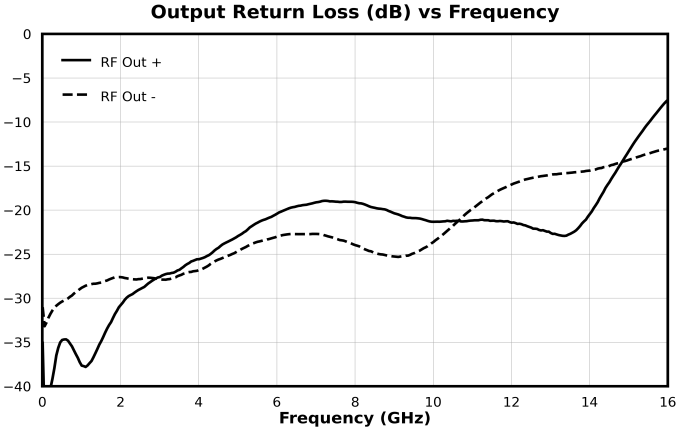




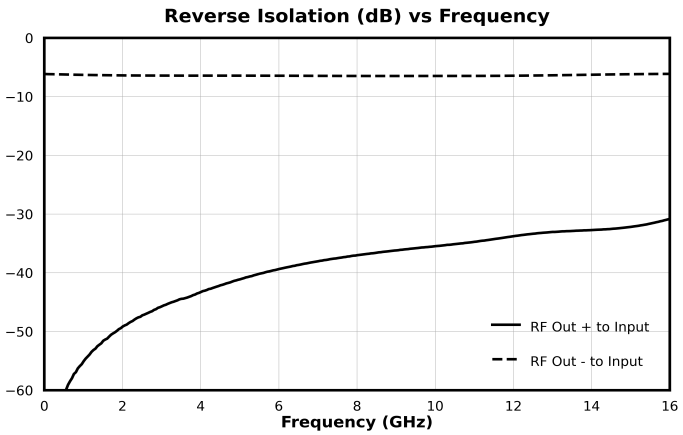


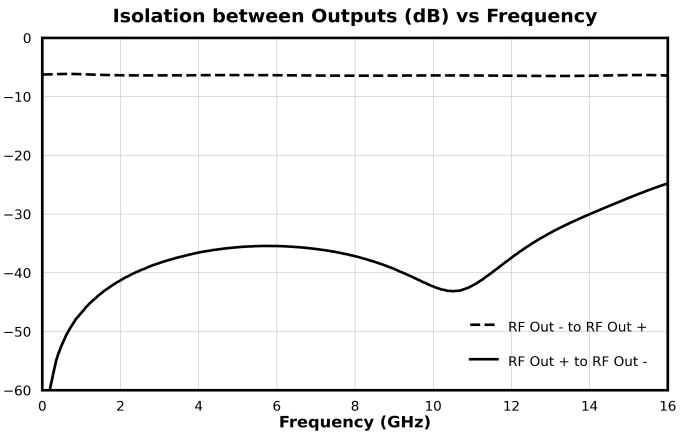






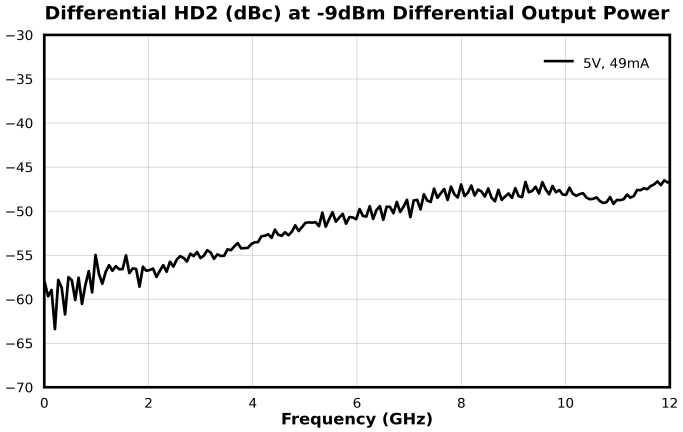
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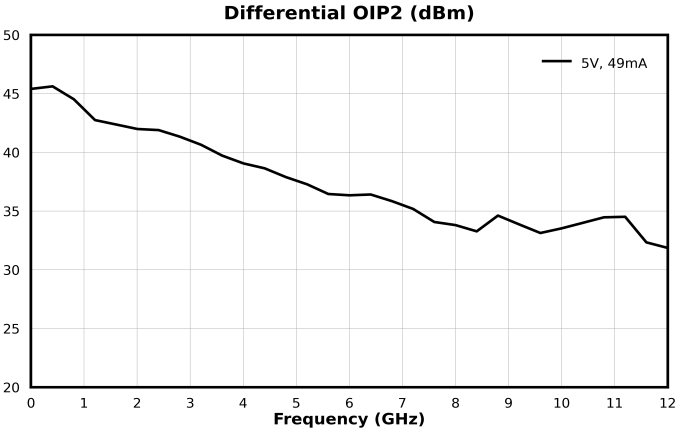


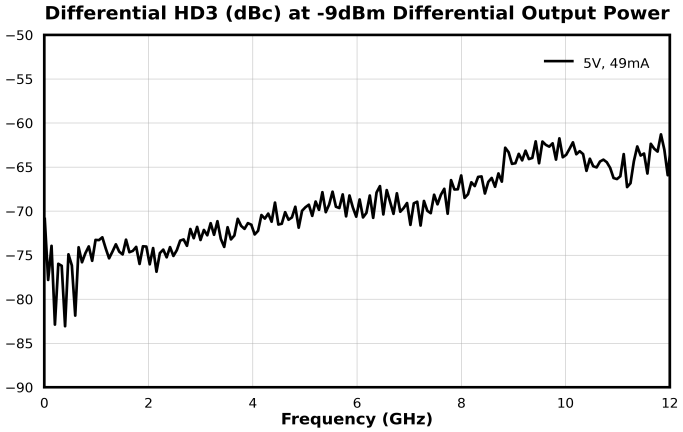


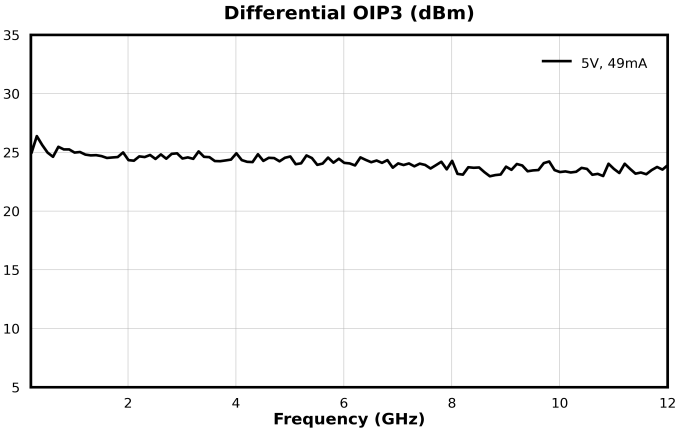
Differential Linearity

Measurements are with 50-Ω single-ended input, and 100-Ω differential output. EVB and connector effects are included in these measurements.





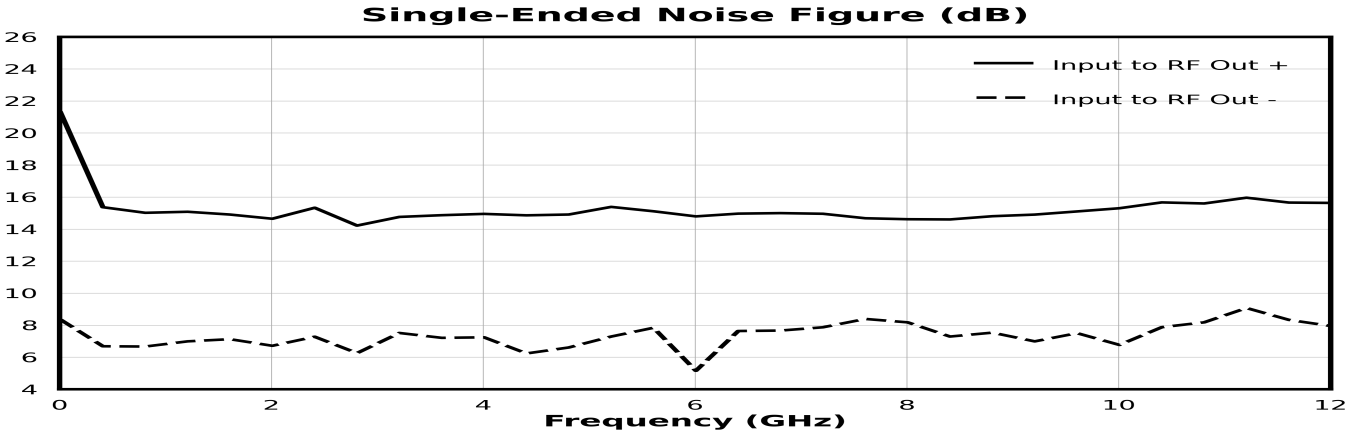




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Noise Figure

Measured as two single-ended Noise Figure measurements with unused port terminated in 50 ohm load.



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SPECIFICATIONS

Electrical Specifications

Specifications guaranteed for +25°C, measured in a 50Ω system. Measured data was taken on an evaluation board and includes PCB trace and connector effects unless otherwise noted.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Frequency Range	-	0	12	-	-	-	GHz
OIP2	Differential OIP2, measured at -5dBm input power	0	12	-	36	-	dBm
OIP3	Differential OIP3, measured at -5dBm input power	0	12	-	24	-	dBm
Noise Figure	Single-Ended Noise Figure, Input to RF Out +	0	12	-	15	-	dB
Noise Figure	Single-Ended Noise Figure, Input to RF Out -	0	12	-	7.3	-	dB
Reverse Isolation	RF Out + to Input	0	12	-	-40	-	dB
Reverse Isolation	RF Out - to Input	0	12	-	6	-	dB
Isolation between differential ports	Insertion Loss going from RF Out + to RF Out -	0	12	-	39	-	dB
Isolation between differential ports	Insertion Loss going from RF Out - to RF Out +	0	12	-	6	-	dB
Amplitude Balance	5V/49mA	0	12	-	0.25	-	dB
Common Mode Rejection Ratio	5V/49mA	0	12	-	36	-	dB
Common Port Return Loss [1]	5V/49mA	0	12	-	28	-	dB
DC Supply Quiescent Current (Idq)	Vd=5V	-	-	-	49	-	mA
HD2	Differential HD2 (dBc) at 5V/49mA, differential output power=-9dBm	0	12	-	-51	-	dBc
HD3	Differential HD3 (dBc) at 5V/49mA, with differential output power=-9dBm	0	12	-	-70	-	dBc
Impedance Ratio	-	-	-	-	2:1	-	-
Insertion Loss [2]	5V/49mA	0	12	-	6.3	-	dB
Nominal Phase Shift	5V/49mA	0	12	-	180	-	°
Output Return Loss [3]	5V/49mA	0	12	-	22	-	dB
Phase Balance	5V/49mA	0	12	-	0.5	-	°

[1][2][3] Measured single-ended with connector and evb effects de-embedded.

Recommended Operating Conditions

Parameter	Min	Nominal	Max	Unit
Positive DC Voltage (Vd)	5	5	5	V
Positive DC Current (Id) (No RF Input)	49	49	49	mA

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. This device is designed and characterized in a 50Ω system (100Ω differential output), and operation in a reflective environment can cause performance degradation.

Parameter	Maximum Rating	Unit
Drain Current (Id) (No RF Applied) [1]	60	mA
Drain Supply Voltage (Vd)	5	V
Maximum Operating Temperature	85	°C
Maximum Storage Temperature	150	°C

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Parameter	Maximum Rating	Unit
Minimum Operating Temperature	-40	°C
Minimum Storage Temperature	-65	°C
RF Input Power	15	dBm
Thermal Resistance, θJC	62	°C/W

[1] Max current density across TFR

Package Information

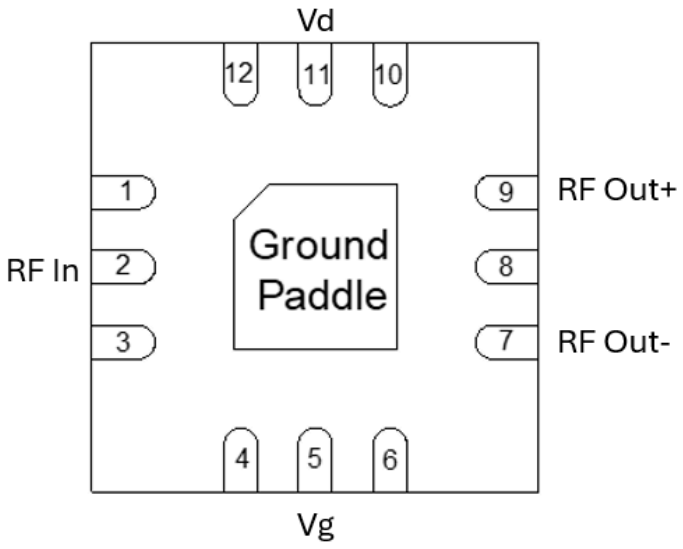
Parameter	Details	Rating
ESD	< 50 Volts	HBM 0Z
Dimensions	-	3 x 3 mm
Moisture Sensitivity Level	-	MSL 1

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PORT CONFIGURATION AND FUNCTIONS

Port Diagram

Below is the port diagram for the ABSD-11278PSM. The diagram is shown as an x-ray view from the top down.



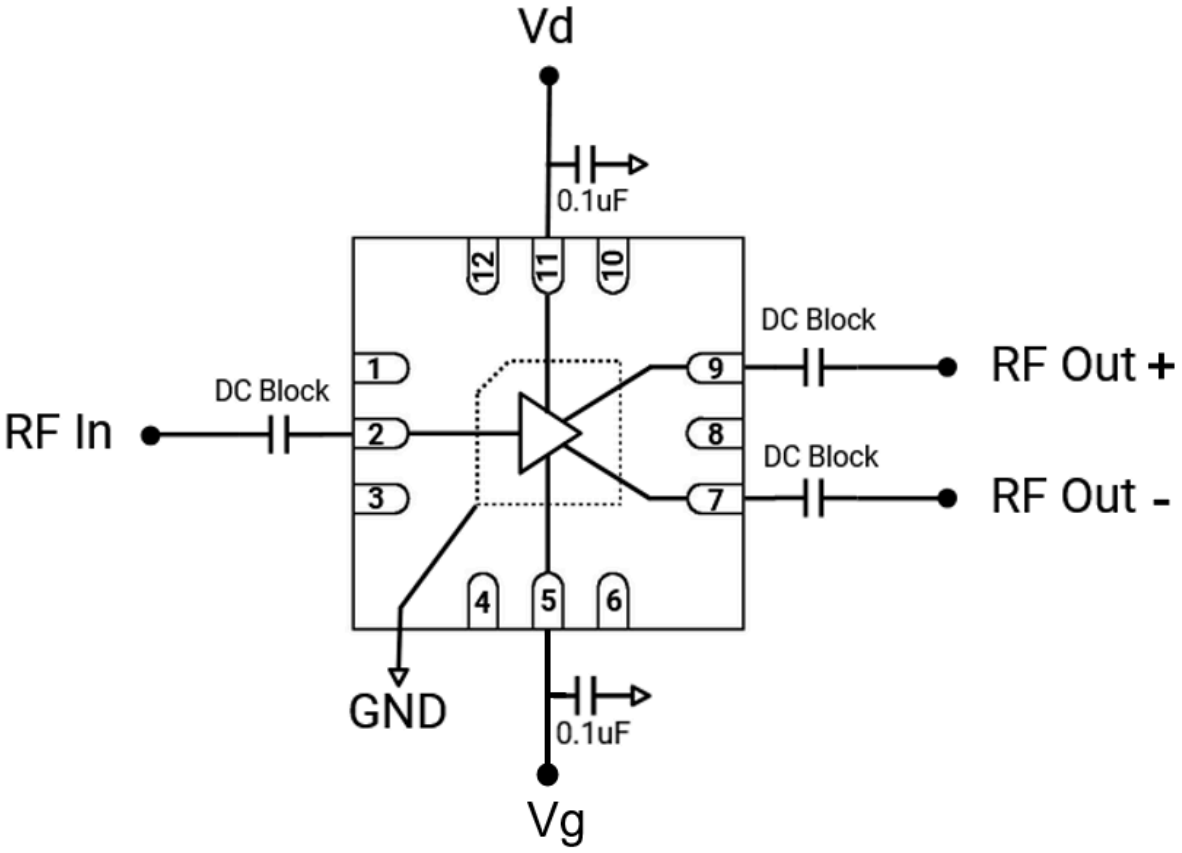
Port Functions

Port	Function	Description	DC Equivalent Circuit
11	Vd	Pin 11 is the positive DC supply voltage for the device. Connect to +5V for normal operation.	-
1,3,4,6,8,10 and 12	Non-connect (NC)	These pins are not connected internally. Datasheet performance is tested with NC pins grounded.	-
2	RF Input	Pin 2 is the RF input of the device. This pin is internally RF matched to 50 Ohms and is DC coupled. This pin requires an external DC blocking capacitor.	-
5	Vg	Pin 5 is connected to an internal DC voltage for the device. This pin should be left open for normal operation. Do not connect to ground.	-
7	RF Out -	Pin 7 is the negative RF output of the device. This pin is internally RF matched to 50 Ohms and is DC coupled. This pin requires an external DC blocking capacitor.	-
9	RF Out +	Pin 9 is the positive RF output of the device. This pin is internally RF matched to 50 Ohms and is DC coupled. This pin requires an external DC blocking capacitor.	-
Paddle	Ground	Ground pad should be connected to RF/DC ground with low electrical and thermal resistance.	-

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OPERATION

Application Circuit



Application Circuit Description

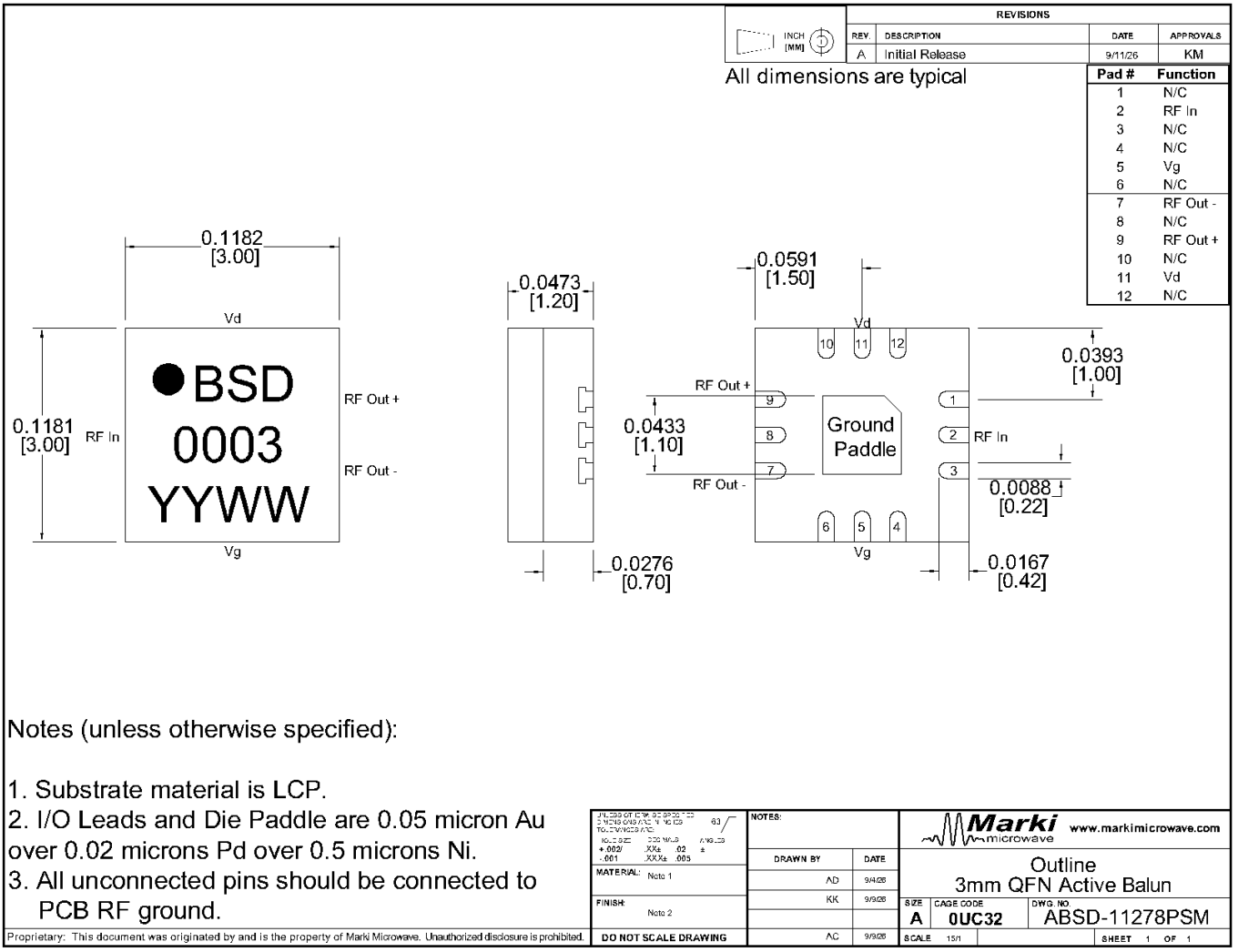
The application circuit for the ABSD-11278PSM is shown above. This part requires DC blocking capacitors at all RF pins (2,7 and 9). DC power is supplied via Vd (pin 11). It is recommended to provide 0.1uF bypass capacitors connected to Vd and Vg. Do not apply DC voltage to Vg pin. NC pins are not internally connected but should be grounded. The paddle of the QFN should be connected to GND via a low thermal and electrical resistance.

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MECHANICAL DATA

Outline Drawing

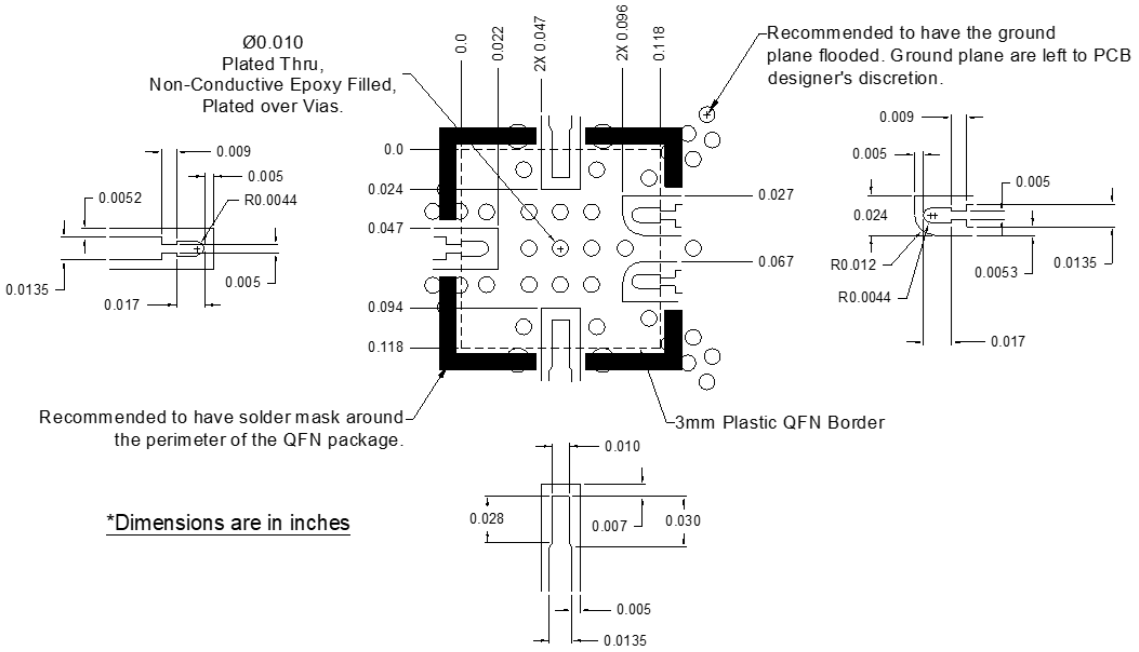
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FOOTPRINT IMAGE

Download : Footprint Drawing

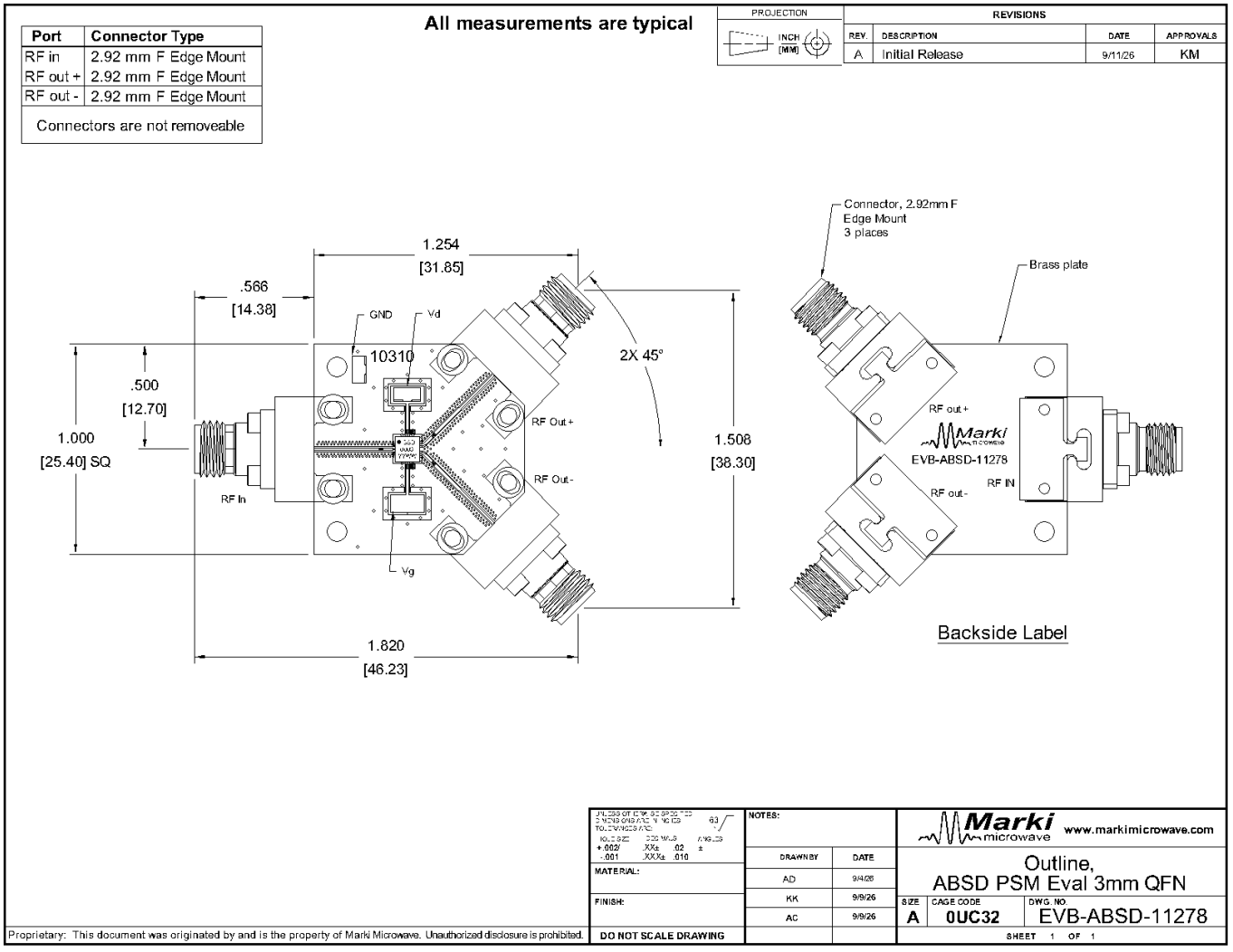


The landing pattern is to be used on Rogers 4003, 0.008" thick, $\frac{1}{2}$ Oz Cu both sides.

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EVALUATION BOARD

Evaluation Board - Outline Drawing



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REVISION HISTORY

Revision Code	Revision Date	Comment
-	2026-11-10	Initial Release

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Notes

The RF transitions on the input and output traces of the recommended footprint are specific to the material type and thickness used on the Marki evaluation board. They are currently designed for single-ended 50 Ohm transmission line. They will need to be re-designed for pcb stackups using different materials and or different transmission line impedances.

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