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

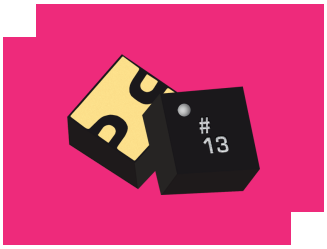
HLM-8010CSP1

DC - 40GHz Surface Mount Limiter

DEVICE OVERVIEW

General Description

The HLM-8010CSP1 is a high-power GaAs Schottky diode signal limiter featuring high IP3 over a broad DC - 40GHz bandwidth. It offers low insertion loss and excellent return loss from DC through Ka band and has a typical 1 dB compression point of +11 dBm. Its small size makes it ideal for protecting sensitive components and for applications requiring high channel counts. It is available as a plastic surface mount chip scale package or as a connectorized evaluation board.



Download s-parameters here

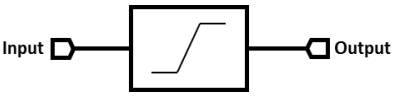
Features

- Low 1dB loss at 38 GHz
- 3.2 W Peak Power (pulsed), 1.9 W CW
- Typical P1dB of +11dBm
- This product embodies Marki Microwave's U.S. Pat. 11,869,858.

Applications

- RF Transceivers
- Test and Measurement Equipment
- SATCOM

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
HLM-8010CSP1	DC - 40GHz Surface Mount Limiter	CSP1	REACH RoHS	Released	EAR99
EVB-HLM-8010	DC - 40GHz Surface Mount Limiter	EVB	REACH RoHS	Released	EAR99

Table Of Contents

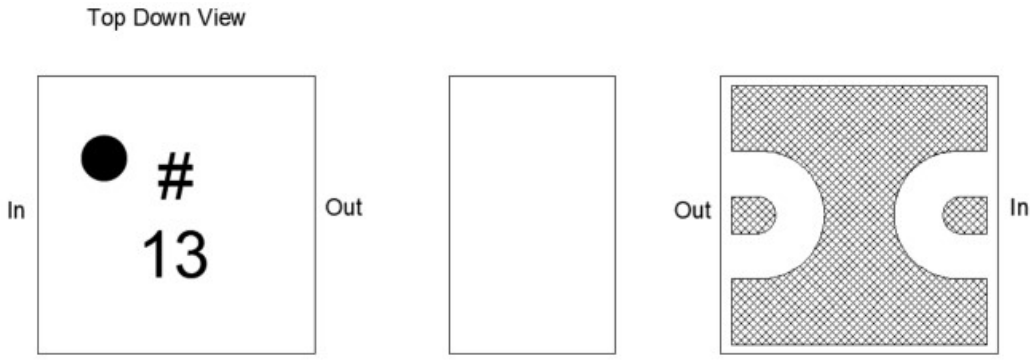
Revision History

Revision Code	Revision Date	Comment
-	2023-05-01	Datasheet Initial Release
A	2024-09-26	Included table of input power at observed failure
B	2025-02-11	Updates to Harmonic Sup vs Input Power Plot

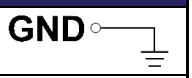
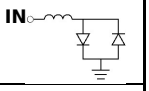
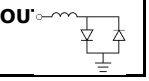
Port Configuration and Functions

Port Diagram

A top-down view of the HLM-8010's CSP1 package outline drawing is shown below. The HLM-8010CSP1 has the input and output ports given in Port Functions.



Port Functions

Port	Function	Description	DC Equivalent Circuit
Ground Paddle	Ground	CSP1 package ground path is provided through the ground paddle and should be connected to RF ground	
IN	Input	The input port is diode connected for the CSP1 and EVAL package.	
Output	Output	The output port is diode connected for the CSP1 and EVAL package.	

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
RF Power Handling , Average	1.9	W
RF Power Handling , Peak	3.2	W
θJC, Junction to Case Thermal Resistance	35	°C/W

Package Information

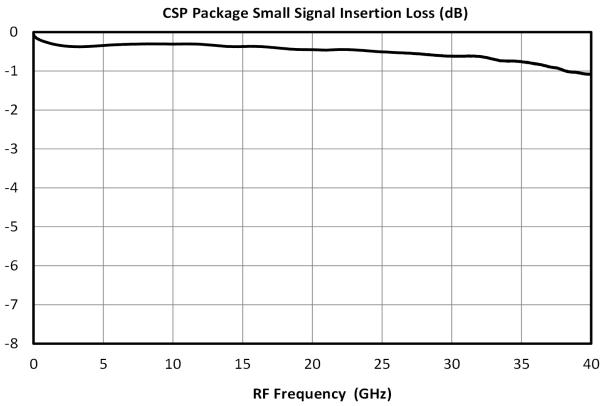
Parameter	Details	Rating
ESD	250 to < 500 Volts	HBM Class 1A
Weight	Package name: CSP1	0.0067g
Dimensions	-	1.5 x 1.5 mm
Moisture Sensitivity Level	-	MSL 3

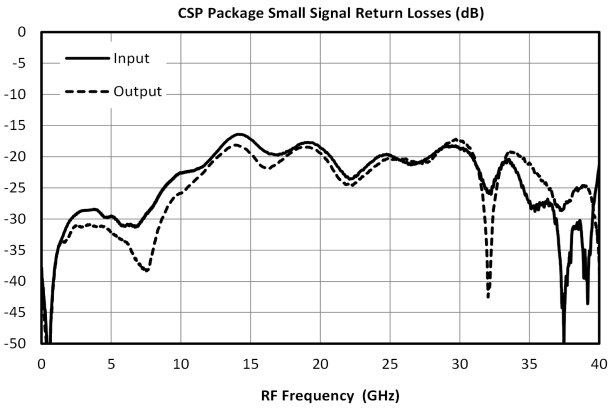
Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the connectorized EVAL-package limiter unless otherwise specified. CSP1-package data shown is deembedded from the EVAL-package data. Linear Specifications valid for input power up to the 0.1dB compression point. See page 5 for P0.1dB graph. Min and Max limits are guaranteed at TA=+25°C.

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Flat Leakage	1GHz – 20dBm input	-	-	-	14	-	dBm
Flat Leakage	20GHz – 20dBm input	-	-	-	11	-	dBm
Flat Leakage	40GHz – 16dBm input	-	-	-	8	-	dBm
Input IP3	DC – 40GHz	0	40	-	25	-	dBm
Input P1dB	DC – 40GHz	0	40	-	11	-	dBm
Insertion Loss	DC – 40GHz	0	40	-	0.5	1.2	dB
Return Loss	DC – 40GHz	0	40	16	24	-	dB

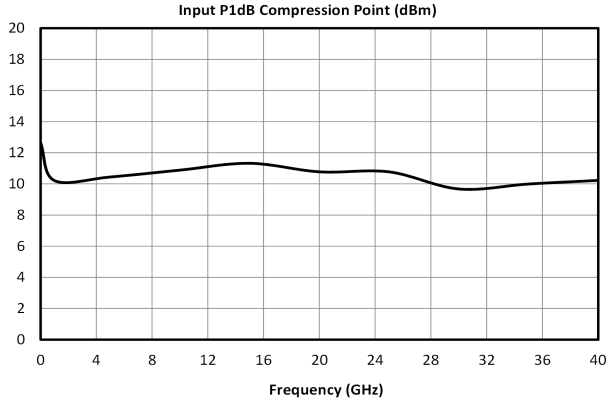
Typical Performance Plots



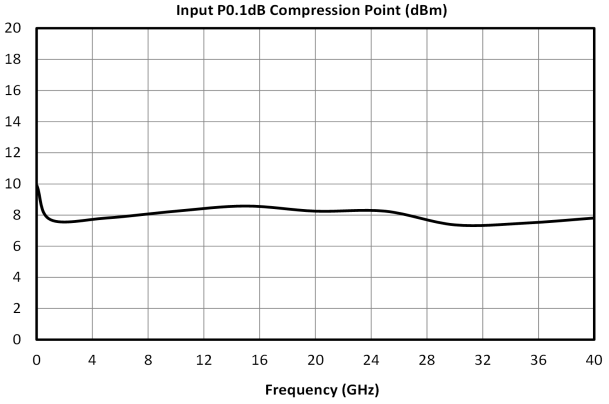


Typical Performance Plots EVB Package

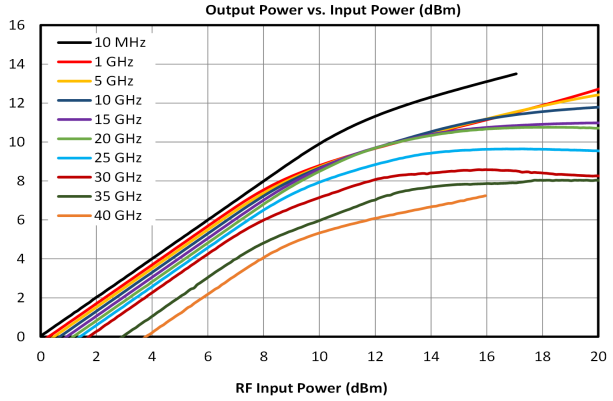
Input P1dB Compression Point (dBm)



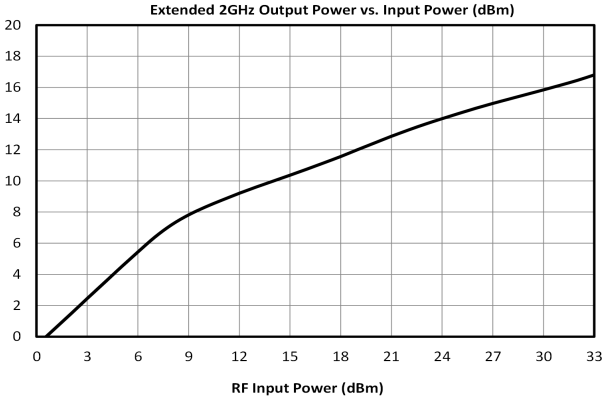
Input P0.1dB Compression Point (dBm)



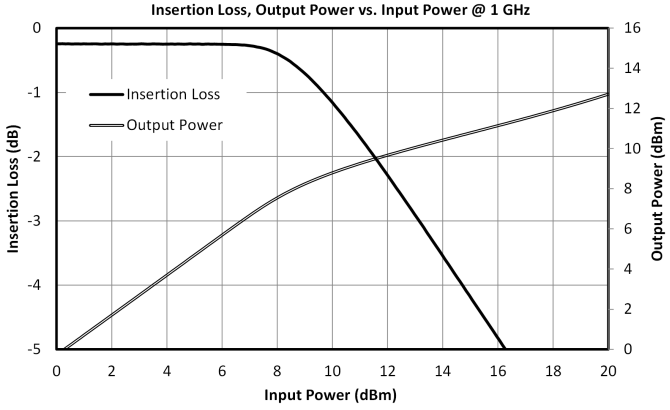
Output Power vs. Input Power (dBm)



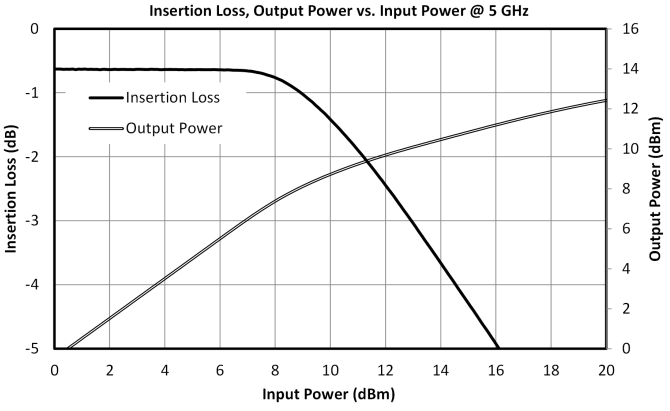
Extended 2GHz Output Power vs. Input Power (dBm)



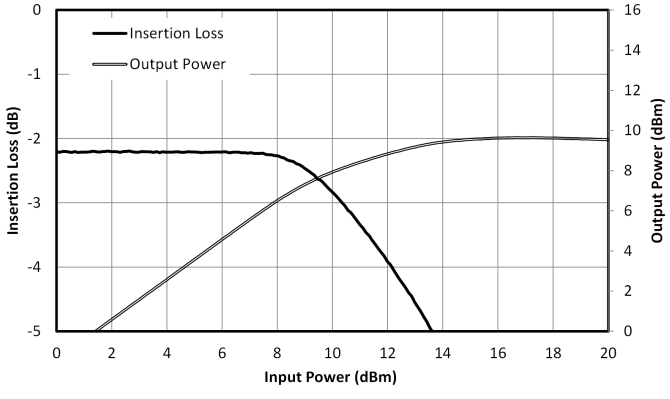
Insertion Loss, Output Power vs. Input Power @ 1 GHz



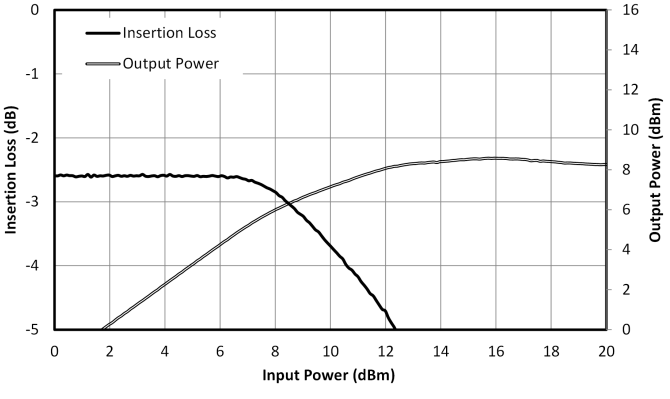
Insertion Loss, Output Power vs. Input Power @ 5 GHz

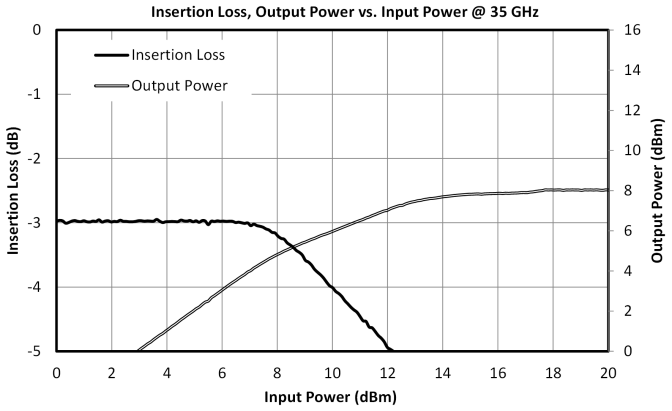


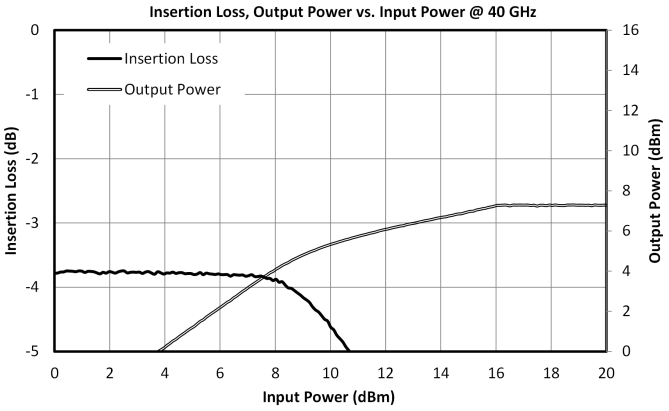
Insertion Loss, Output Power vs. Input Power @ 25 GHz

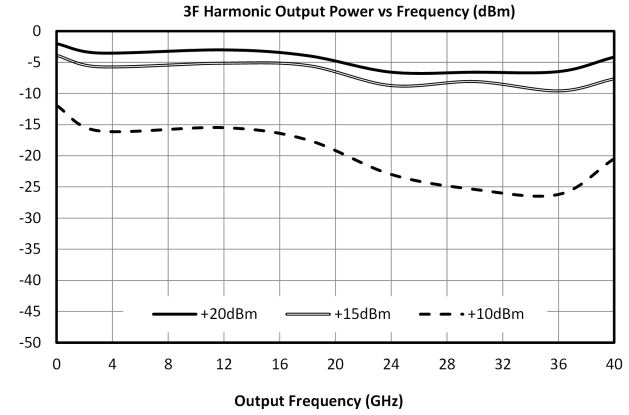


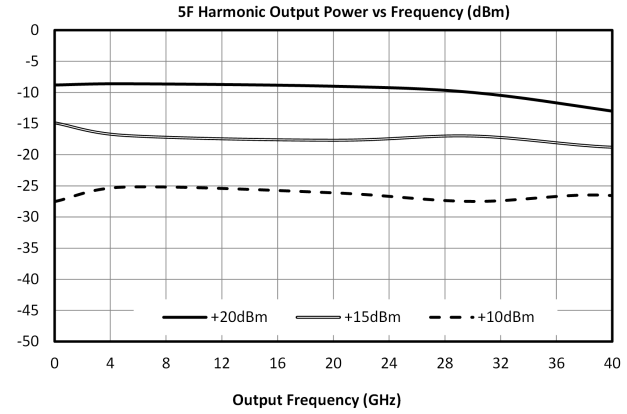
Insertion Loss, Output Power vs. Input Power @ 30 GHz

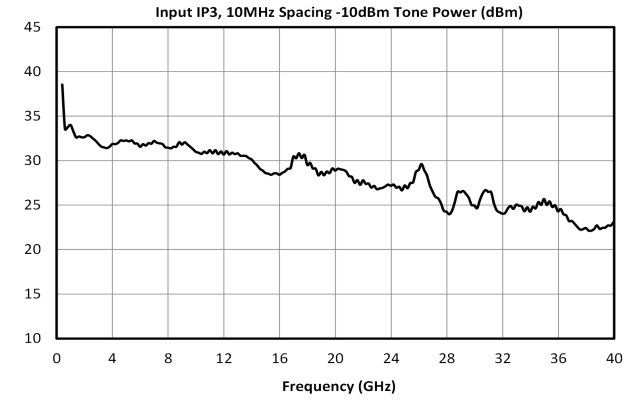


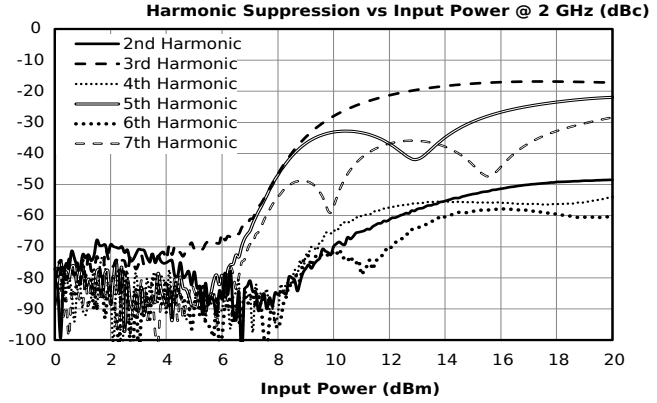












Input Power at Observed Failure

Power handling specification is based on tests performed at different combinations of temperature and frequency. Input power was increased until catastrophic failure was observed. Results are shown in the following table. The power handling specification listed in section 3.1 is based on the worst observed power handling derated by 2dB.

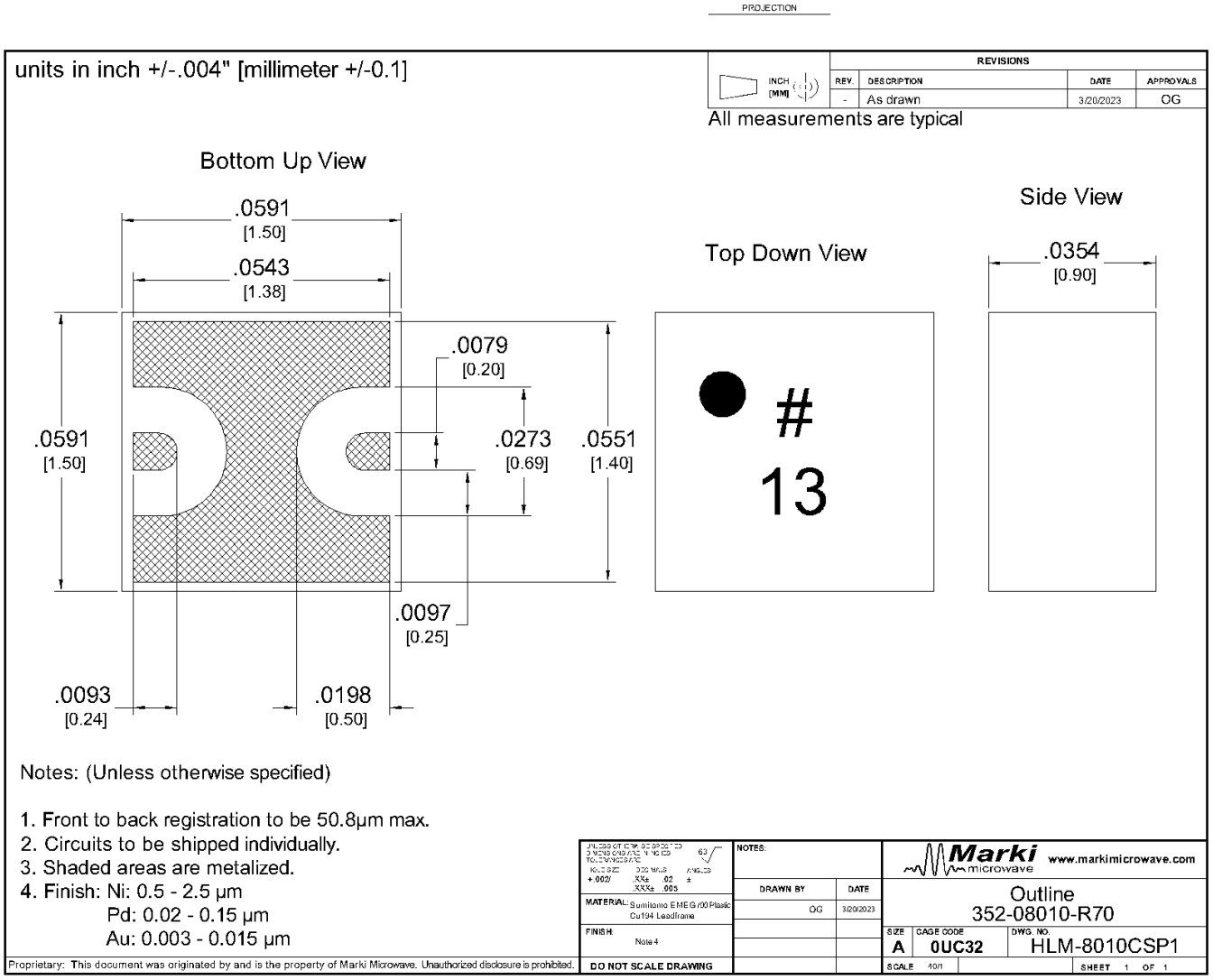
Frequency	Maximum Average Power Handling	Unit
2 GHz	4	W
18 GHz	3	

Frequency	Maximum Peak Power Handling	Unit
2 GHz	6	W
18 GHz	5	

Mechanical Data

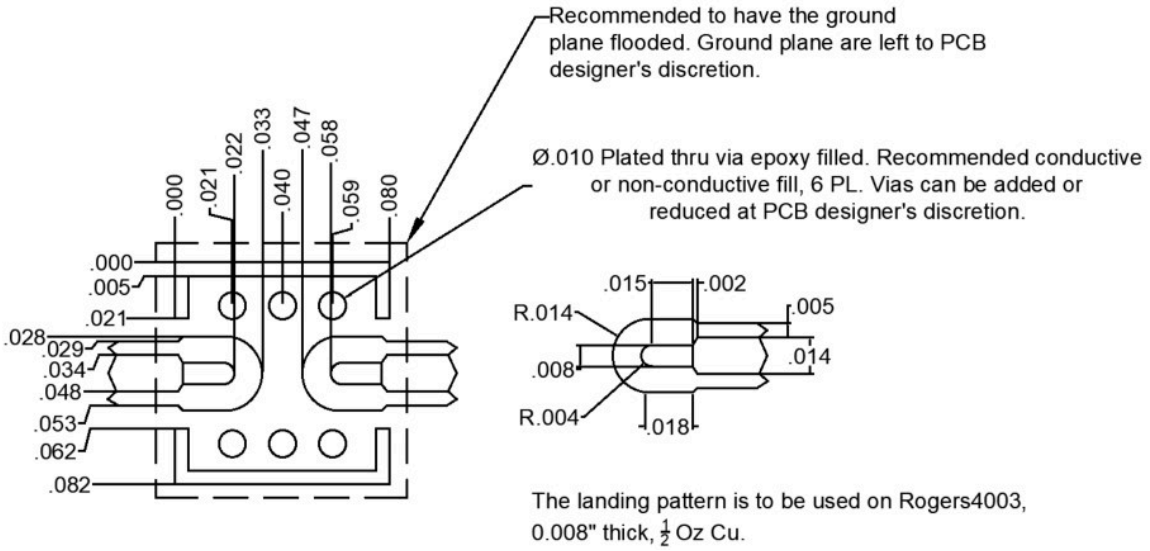
Outline Drawing

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

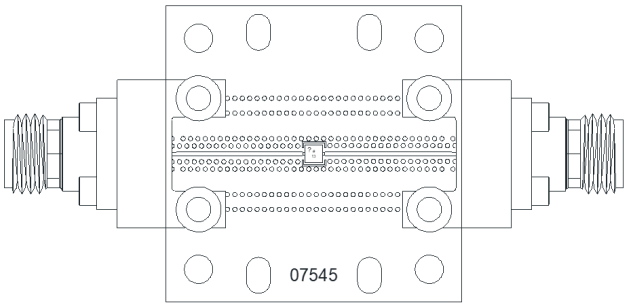


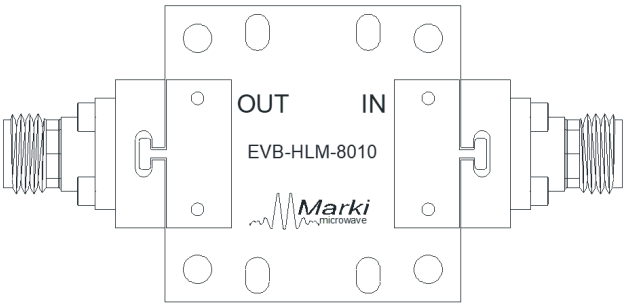
Footprint Image

Download : Footprint Drawing



Evaluation Board - Outline Drawing





DISCLAIMER

MARKI MICROWAVE, LLC., (“MARKI”) PROVIDES TECHNICAL SPECIFICATIONS AND DATA (INCLUDING DATASHEETS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, AND OTHER INFORMATION AND RESOURCES “AS IS” AND WITH ALL FAULTS. MARKI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.

These resources are intended for developers skilled in the art designing with Marki products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards and other requirements. Marki makes no guarantee regarding the suitability of its products for any particular purpose, nor does Marki assume any liability whatsoever arising out of your use or application of any Marki product.

Marki grants you permission to use these resources only for development of an application that uses Marki products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Marki intellectual property or to any third-party intellectual property. Marki reserves the right to make changes to the product(s) or information contained herein without notice.

MARKI MICROWAVE and T3 MIXER are trademarks or registered trademarks of Marki Microwave, LLC. All other trademarks used are the property of their respective owners.