

## Data Sheet

### EC-BIAS-TM High Power Bias Network 50MHz to 6GHz



## Applications

- RF transistor characterization
- Power amplifiers
- Broadband amplifiers

## Features

- Max VDC = 200V, Max IDC = 4A
- Return Loss > 13, Isolation > 26dB
- Insertion loss < 1.6 dB over 6 GHz BW

## Description

The EC-BIAS-TM is a high-power, high-voltage, high-current DC bias network (bias tee) for RF transistor biasing applications. This static DC bias network can be used for RF and microwave transistor characterization as well as broadband, low-noise and power amplifier development. The DC bias network has three ports: RF, DC and RF+DC. The RF port accepts RF signals, the DC port accepts DC biases, and the RF+DC port presents the combined signal to the device. The EC-BIAS-TM can handle DC voltages up to 200 V and DC currents up to 4 A. The DC bias network is especially well-suited for biasing high-voltage, high-current RF power devices like GaN HEMT transistors.

The RF-to-RF+DC path operates from 50 MHz to 6 GHz when considering a maximum insertion loss of 1.6 dB and minimum return loss of 13 dB. The DC-to-RF and DC-to-RF+DC isolation is > 27 dB.

## Specifications

Parameter	Test Cond.	Min.	Typ.	Max.	Units
Impedance			50		Ohm
Operating Frequency	IL < 1.6dB	0.05		6.0	GHz
VSWR	0.1 to 6 GHz	1.1		1.6	
Return Loss	0.1 to 6 GHz			12	dB
Insertion loss	0.05 to 6 GHz			1.6	dB
Isolation	0.05 to 6 GHz		27		dB
DC port voltage				200**	DC or Pulsed
DC port current				4*	ADC
RF power handling	f0 = 2 GHz	20**			W

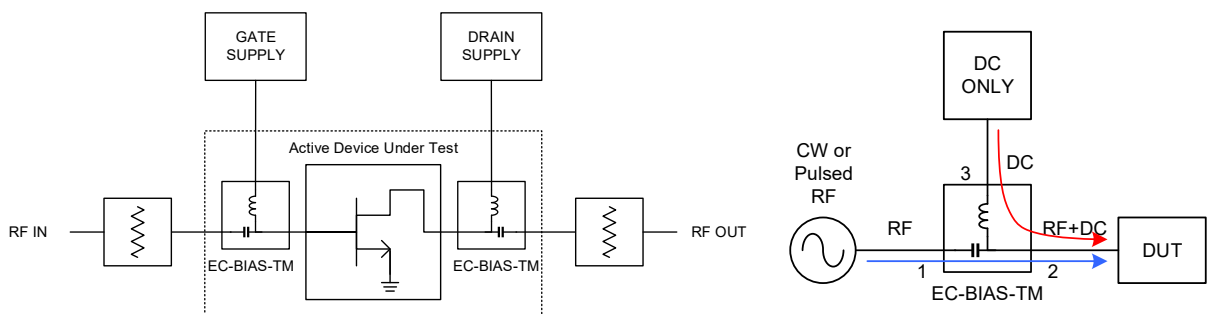
\*based on component specs, \*\*tested up to these levels

## Typical Application

The EC-BIAS-TM is typically used in conjunction with an active transistor device or amplifier requiring a DC bias at the device terminals. A conventional application with a transistor test fixture is shown below. In the diagram, one EC-BIAS-TM is placed at the gate of the device and one is placed at the drain of the device. The input bias tee module receives an RF signal from a source, combines this with the bias voltage and applies the composite signal to the device gate. The gate voltage can be positive or negative, making it suitable for all FET devices. The output bias tee simultaneously feeds the bias voltage to the drain and allows for the RF output produced by the transistor to pass to the next stage.

A typical connection to the EC-BIAS-TM is shown below. The DC signal is supplied by a static DC voltage. The RF signal is supplied by a pulsed RF or a CW RF signal.

Transistor characterization setup using EC-BIAS-T

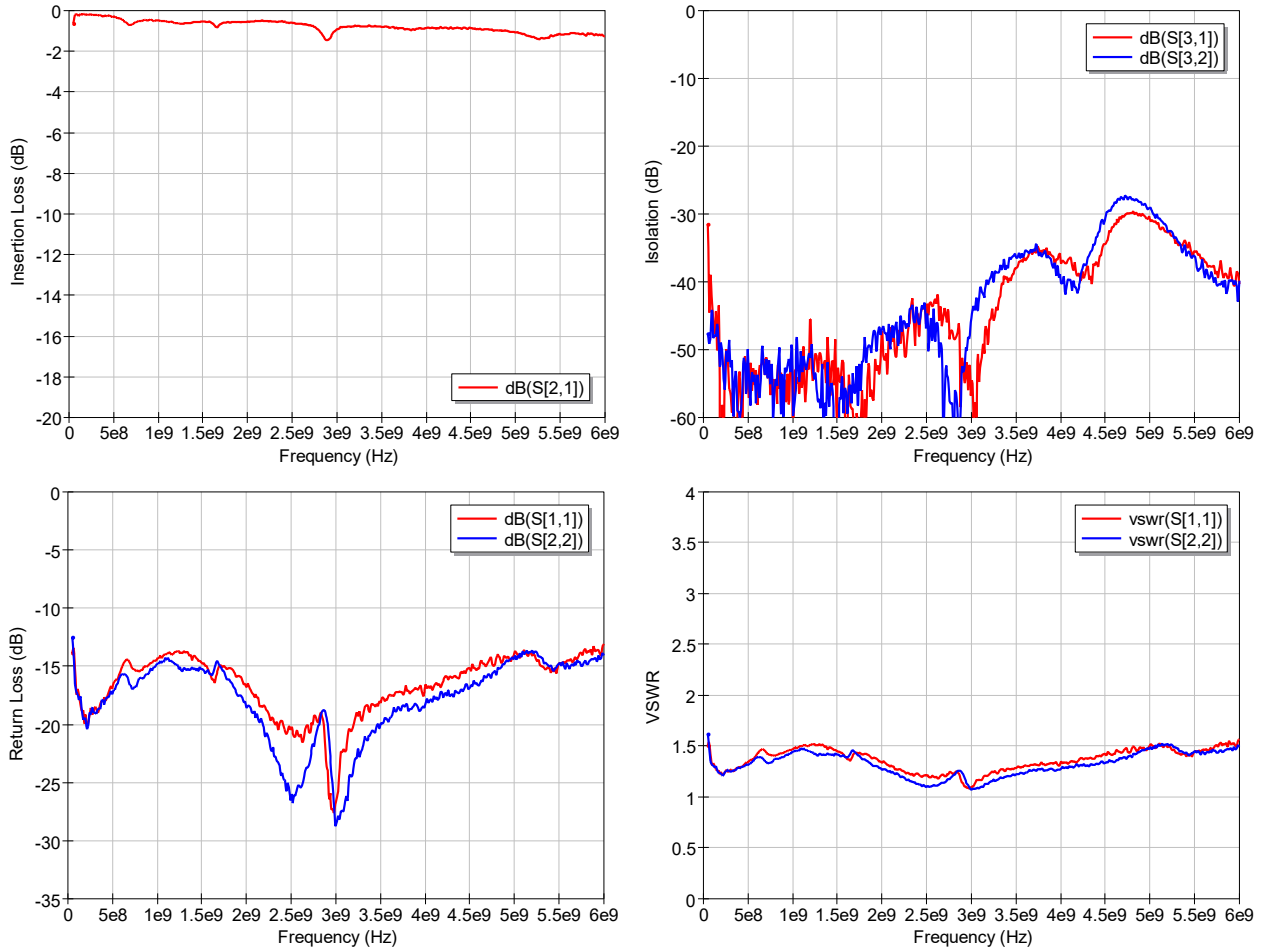


## Performance

### Small-signal Performance

The S-parameters for the EC-BIAS-TM are provided below. The three port network consisting of RF (port 1), RF+DC (port 2), DC (port 3) ports are measured from 0.05 GHz to 6.0 GHz and show excellent insertion loss, return loss and isolation.

Typical S-parameters from 0.05 to 6.0 GHz

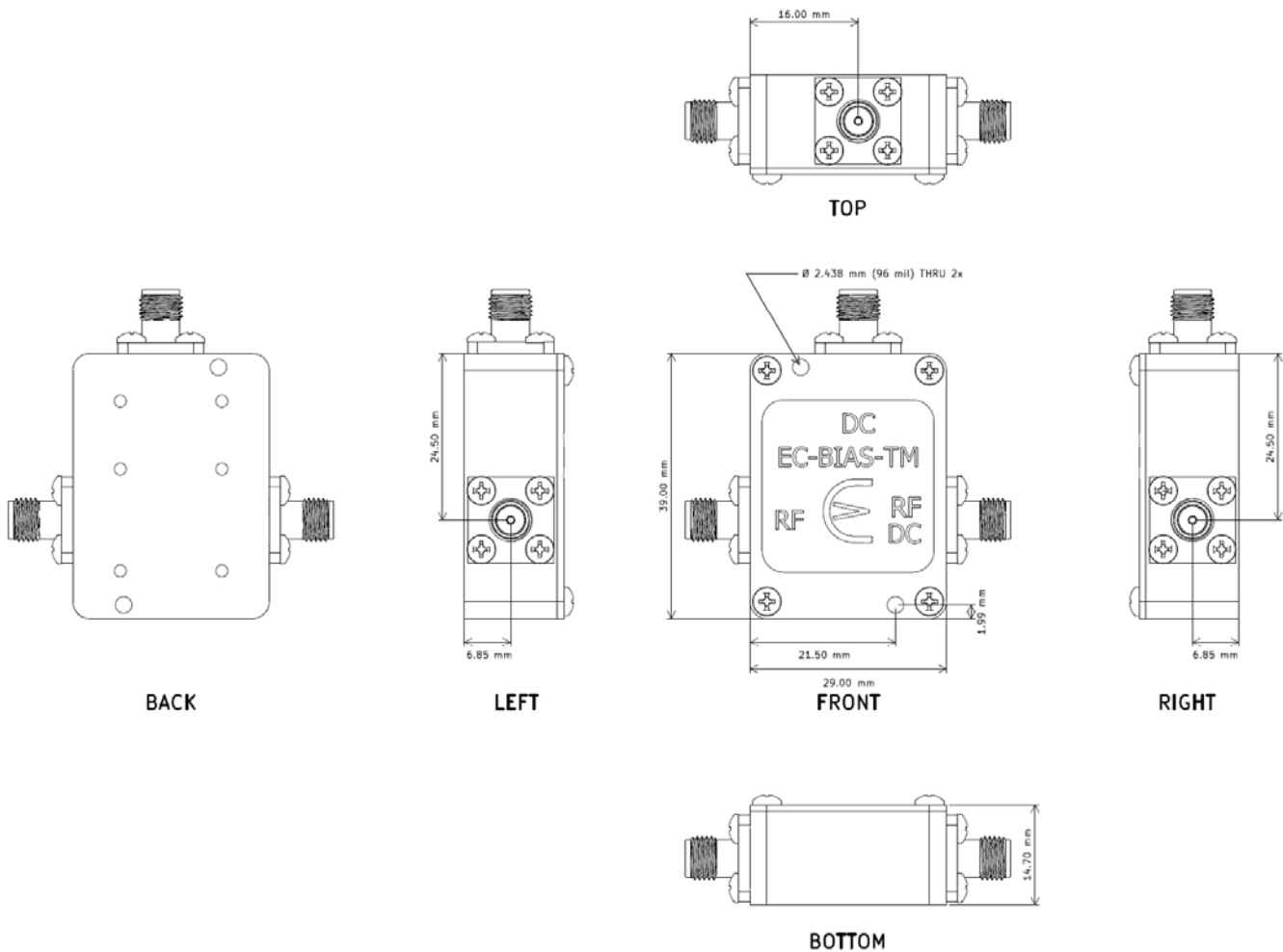


## Mechanical

Mechanical dimensions. All units in mm [inches].

<i>Configuration</i>	<i>Parameter</i>	<i>Typical</i>	<i>Units</i>
Body without connectors	Width	29	mm
	Length	39	mm
	Height	14.7	mm
Overall with connectors (approximate)	Width	47.9	mm
	Length	48.5	mm
	Height	15.9	mm
Connector	Torque	8	In-lbs

Mechanical drawing



## Ordering Information

Please use the following model number designation for ordering this part from our bias line:

Part	Configuration	Description
EC-BIAS-TM	Standard	SMA Jack (F) at RF+DC, RF and DC ports
EC-BIAS-TM	Opt. 001	SMA Plug (M) at RF+DC port. SMA Jack (F) at RF and DC ports
EC-BIAS-TM	Opt. 002	SMA Plug (M) at RF+DC port and RF port. SMA Jack (F) at DC port

## Web Resource

For more information and supporting files for this product please visit [www.echoicrf.com/products](http://www.echoicrf.com/products)

Copyright © 2024

Echoic Engineering LLC. All Rights Reserved.

Information in this document is provided in connection with Echoic Engineering LLC ("Echoic") products or services. These materials, including the information contained herein, are provided by Echoic as a service to its customers and may be used for informational purposes only by the customer. Echoic assumes no responsibility for errors or omissions in these materials or the information contained herein. Echoic may change its documentation, products, services, specifications or product descriptions at any time, without notice. Echoic makes no commitment to update the materials or information and shall have no responsibility whatsoever for conflicts, incompatibilities, or other difficulties arising from any future changes.

No license, whether express, implied, by estoppel or otherwise, is granted to any intellectual property rights by this document. Echoic assumes no liability for any materials, products or information provided hereunder, including the sale, distribution, reproduction or use of Echoic products, information or materials, except as may be provided in Echoic Terms and Conditions of Sale.

THE MATERIALS, PRODUCTS AND INFORMATION ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR USE, MERCHANTABILITY, PERFORMANCE, QUALITY OR NON-INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT; ALL SUCH WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. ECHOIC DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. ECHOIC SHALL NOT BE LIABLE FOR ANY DAMAGES, INCLUDING BUT NOT LIMITED TO ANY SPECIAL, INDIRECT, INCIDENTAL, STATUTORY, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS THAT MAY RESULT FROM THE USE OF THE MATERIALS OR INFORMATION, WHETHER OR NOT THE RECIPIENT OF MATERIALS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Echoic products are not intended for use in medical, lifesaving or life-sustaining applications, or other equipment in which the failure of the Echoic products could lead to personal injury, death, physical or environmental damage. Echoic customers using or selling Echoic products for use in such applications do so at their own risk and agree to fully indemnify Echoic for any damages resulting from such improper use or sale. FOR NON-CRITICAL RESEARCH TEST LAB USE ONLY. Not FCC approved for resale.

Customers are responsible for their products and applications using Echoic products, which may deviate from published specifications as a result of design defects, errors, or operation of products outside of published parameters or design specifications. Customers should include design and operating safeguards to minimize these and other risks. Echoic assumes no liability for applications assistance, customer product design, or damage to any equipment resulting from the use of Echoic products outside of stated published specifications or parameters.

Echoic, the Echoic symbol, 5G Links and the 5G Links symbol are trademarks or registered trademarks of Echoic Engineering LLC, in the United States and other countries. Third-party brands and names are for identification purposes only, and are the property of their respective owners. Additional information, including relevant terms and conditions, posted at [store.echoicrf.com](http://store.echoicrf.com), are incorporated by reference.