34 - 40 GHz GaAs MMIC Variable Gain Amplifier

EWG4002ZZ

September 2009 – Rev 1

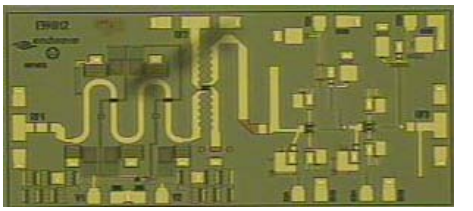
Production

Variable Gain Amplifier – Bare Die

Features

- Integrated VVA, Coupler and RF Amp
- RF Bandwidth: 34 to 40 GHz
- Maximum Gain: 11 dB, typical
- Noise Figure: 6.5 dB (max gain)
- Dynamic Range: 22 dB, typical
- Output IP3: +10 dBm (any gain)
- ESD Protection Bias Circuitry
- 100% RF and DC tested
- Die size: 3.0x1.5x 0.1 mm
- RoHS Compliant

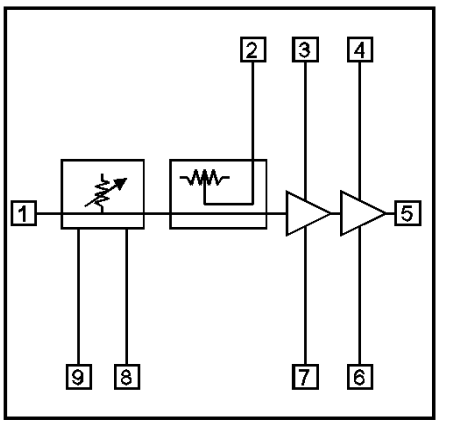
Device Photo



Description

The Endwave *EWG4002ZZ* is a highly integrated GaAs pHEMT variable gain MMIC amplifier which provides 11 dB of gain and 22 dB dynamic range with +10 dBm output IP3 at any attenuation. The high dynamic range is achieved through the use of a voltage variable attenuator following a fixed gain amplifier ensuring optimal linearity. Maximum VVA flexibility is achieved through independent monotonic VVA control. This device has an input coupler to allow built in test functionality, as well as integrated ESD protection bias circuitry and can be used for a wide range of applications from defense electronics to commercial communication systems. All die are 100% DC and RF tested and visually inspected to Mil-Std-883 Method 2010.

Block Diagram



Electrical Characteristics (Temperature = +25 °C)

Parameter	Min.	Typ.	Max.	Units
Frequency Range	34		40	GHz
Gain (Max for Vctrl 1, 2 = -1.5 V)		11		dB
Dynamic Range (Gmax – Gmin)		22		dB
Input Return Loss (over dynamic range)		7		dB
Output Return Loss (over dynamic range)		7		dB
Output IP3 @ any attenuation		10		dBm
Gain Control Voltage (Vctrl 1, 2)	-1.5		0	V
Drain Bias Voltages (Vd 1, 2)		4.4		V
Drain Bias Currents (Id1 + Id2)		66		mA
Gate Bias Voltages (Vg1)		-1.5		V

Note 1: Min gain for Vctrl 1, 2 = 0 volts

Endwave Corporation 130 Baytech Drive San Jose CA 95134 877-Endwave
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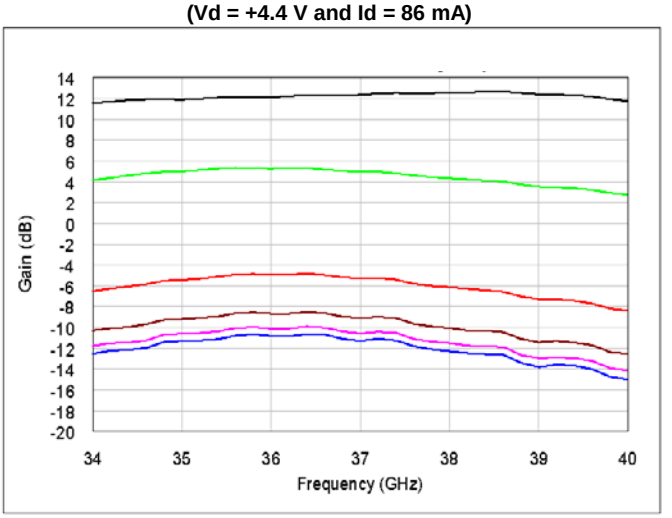
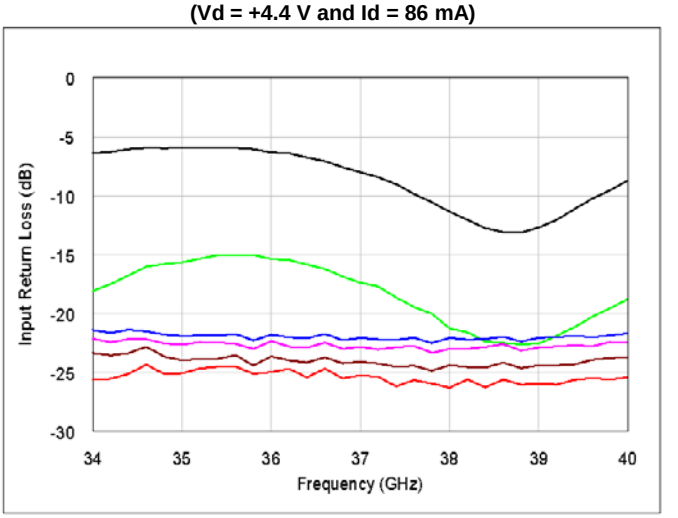
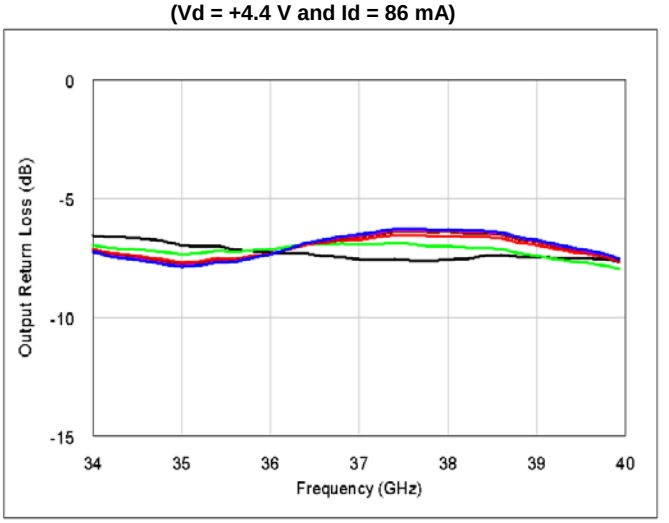
Variable Gain vs. Frequency
(Vd = +4.4 V and Id = 86 mA)



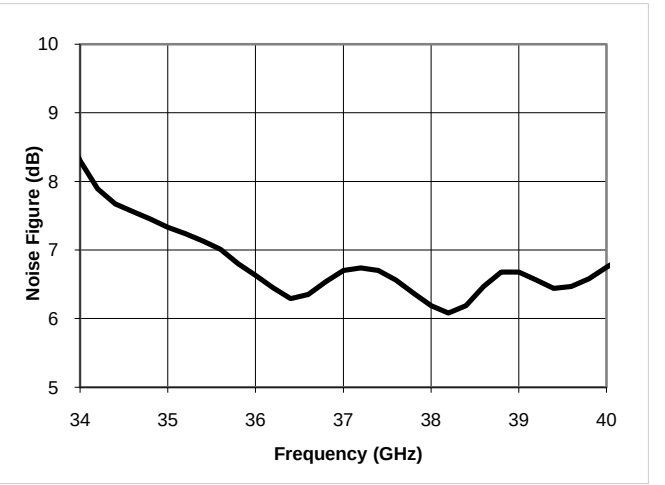
Input Return Loss vs. Frequency
(Vd = +4.4 V and Id = 86 mA)



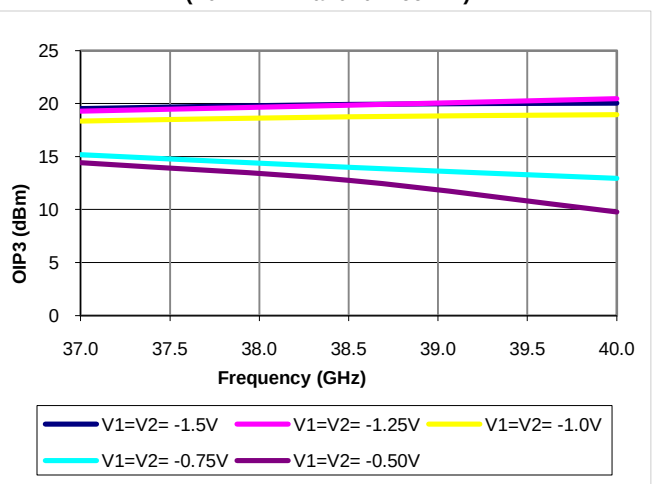
Output Return Loss vs. Frequency
(Vd = +4.4 V and Id = 86 mA)



NF vs. Frequency
(VD = +4.4 V and Id = 63 mA)



OIP3 vs. Frequency
(Vd = +4.4 V and Id = 66 mA)



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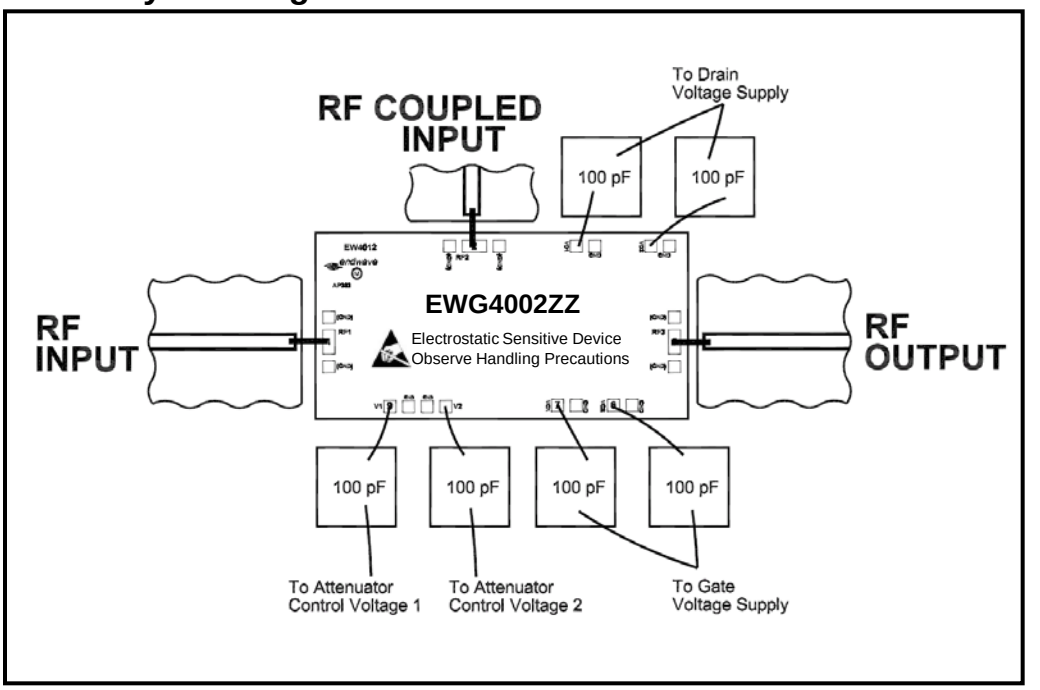
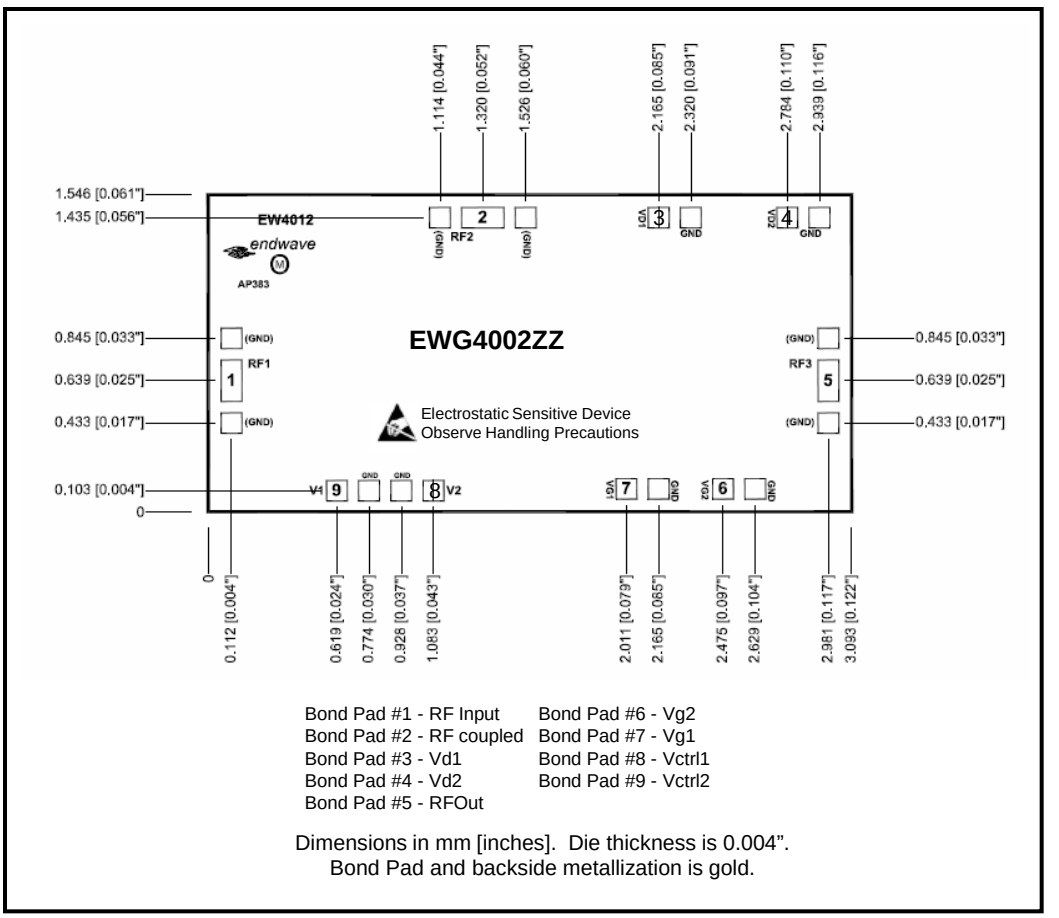
Assembly Drawing



Outline Drawing



Bond Pad #1 - RF Input	Bond Pad #6 - Vg2
Bond Pad #2 - RF coupled	Bond Pad #7 - Vg1
Bond Pad #3 - Vd1	Bond Pad #8 - Vctrl1
Bond Pad #4 - Vd2	Bond Pad #9 - Vctrl2
Bond Pad #5 - RFOut	

Dimensions in mm [inches]. Die thickness is 0.004".
Bond Pad and backside metallization is gold.

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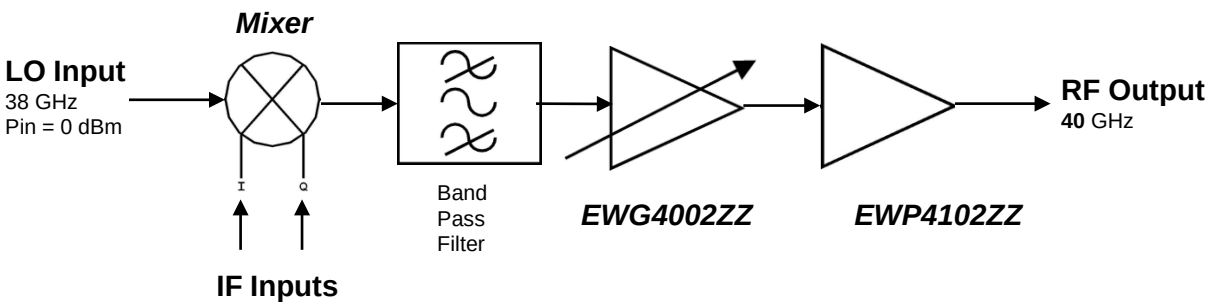
Absolute Maximum Ratings

RF Input Power (max gain)	+18 dBm
Supply Voltage (Vd1, 2)	+5.5 V
Supply Current (Id1+Id2)	130 mA
Supply Voltage (Vg1, 2)	-2.5 to 0V
Control Voltage (Vctrl1, 2)	-2.5 to 0V
Storage Temperature	-65 to +150°C
Operating Temperature	-40 to +85°C
Channel Temperature	+175°C

Typical Application



Support Documentation

Support documentation including Assembly Notes, Application Notes and Qualification Procedures can be found on our website at www.endwave.com.

Ordering Information

Part Number	Description
EWG4002ZZ	RoHS compliant bare die in waffle or gel packs
EWG4002ZZ-EV	*EWG4002ZZ* in a connectorized test fixture