










EWG4002ZZ

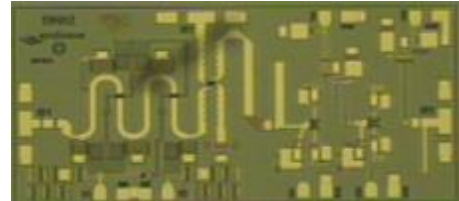
September 2009 – Rev 1

Production

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 Gate Bias Circuitry
-  100% RF and DC tested
-  Die size: 3.0x1.5x 0.1 mm

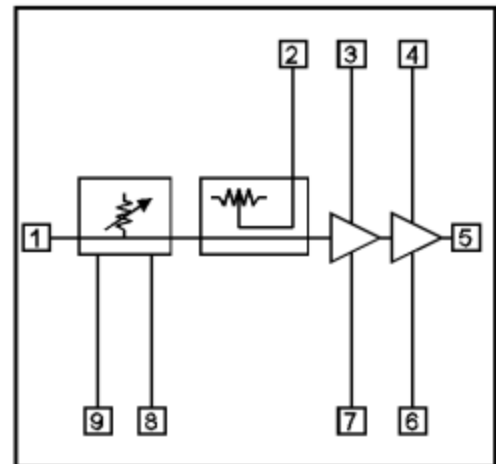
Device Photo



Description

The Endwave *EWG4002ZZ* is a highly integrated 0.15um 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. The chip has an input coupler to allow built in test functionality, as well as integrated ESD protection gate bias circuitry and may be used for a wide range of applications from defense electronics to commercial communication systems. All parts are 100% DC and RF tested and visually inspected using Mil-Std-883 Method 2010.

Block Diagram

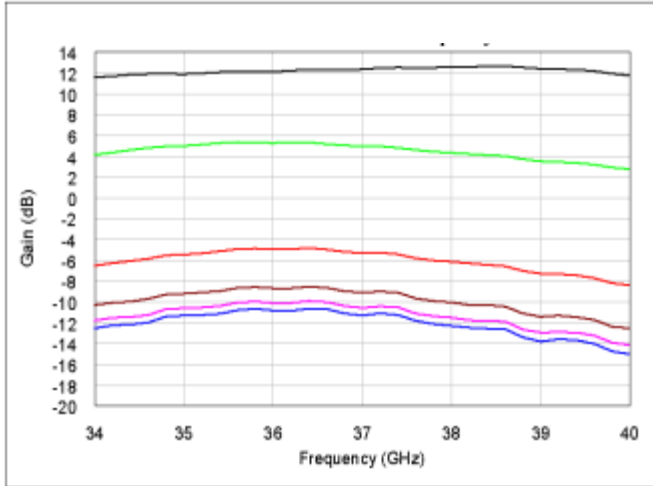


Electrical Characteristics (Temperature = +25 °C)

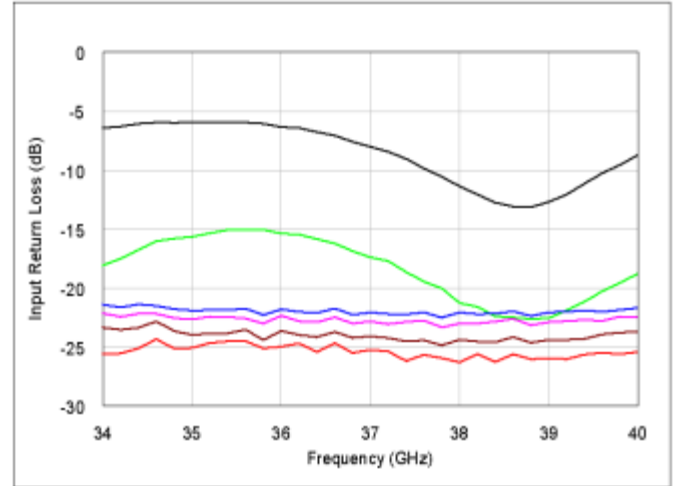
Parameter	Min.	Typ.	Max.	Units
Frequency Range	34		40	GHz
Gain (Max for Vctrl 1, 2 = -1.5 V)		11		dB
Dynamic Range (Gmax – Gmin)		22		dB
Input Return Loss (over dynamic range)		7		dB
Output Return Loss (over dynamic range)		7		dB
Output IP3 @ any attenuation		10		dBm
Gain Control Voltage (Vctrl 1, 2)	-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

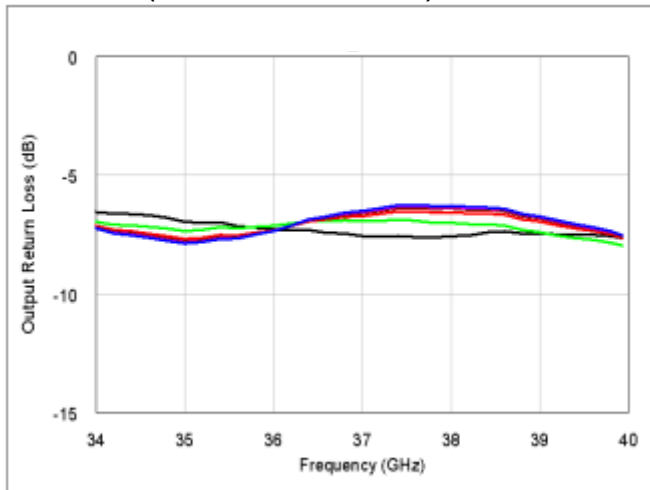
Variable Gain vs. Frequency
(Vd = +4.4 V and Id = 86 mA)



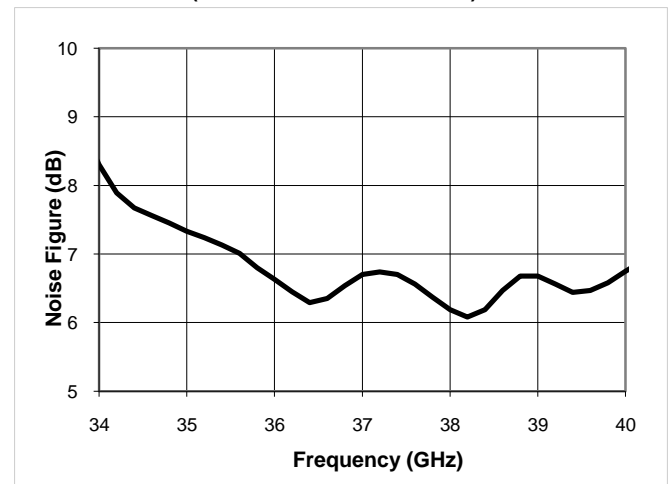
Input Return Loss vs. Frequency
(Vd = +4.4 V and Id = 86 mA)



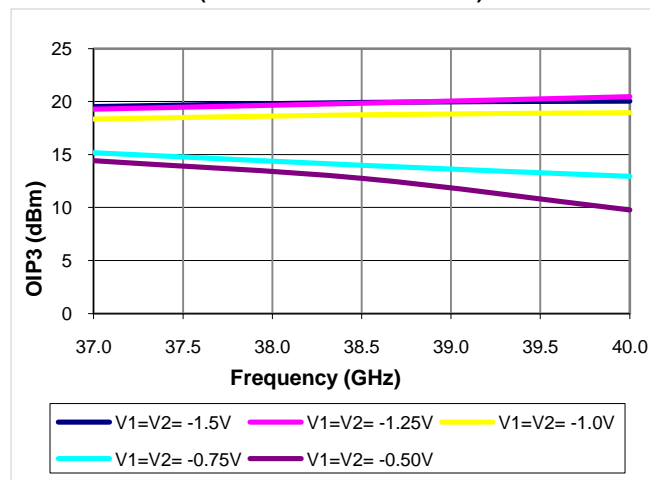
Output Return Loss vs. Frequency
(Vd = +4.4 V and Id = 86 mA)



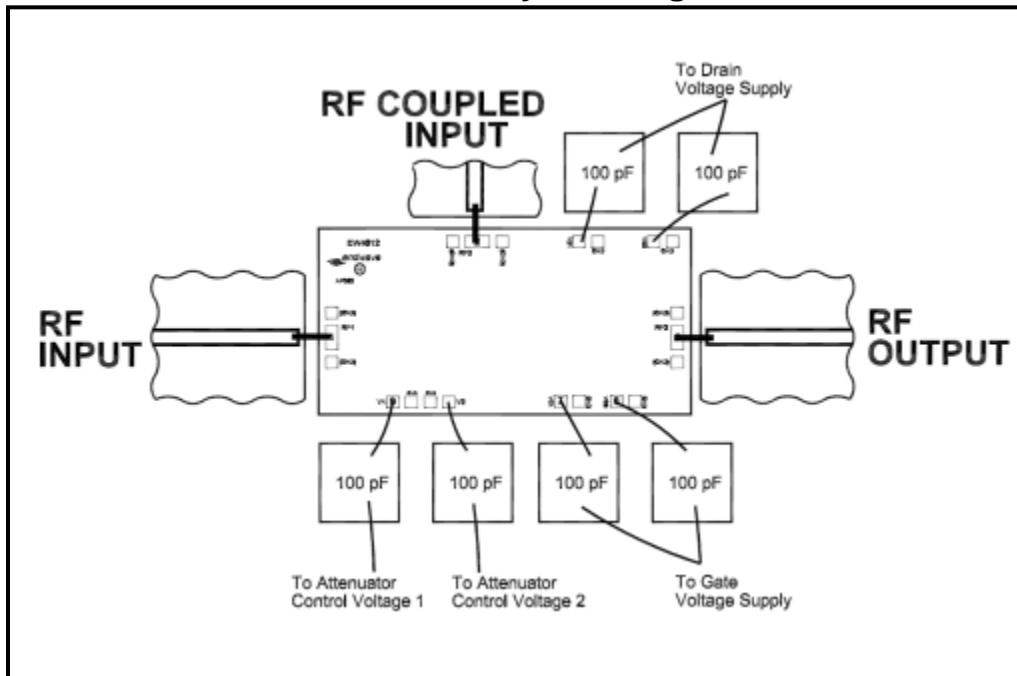
NF vs. Frequency
(VD = +4.4 V and Id = 63 mA)



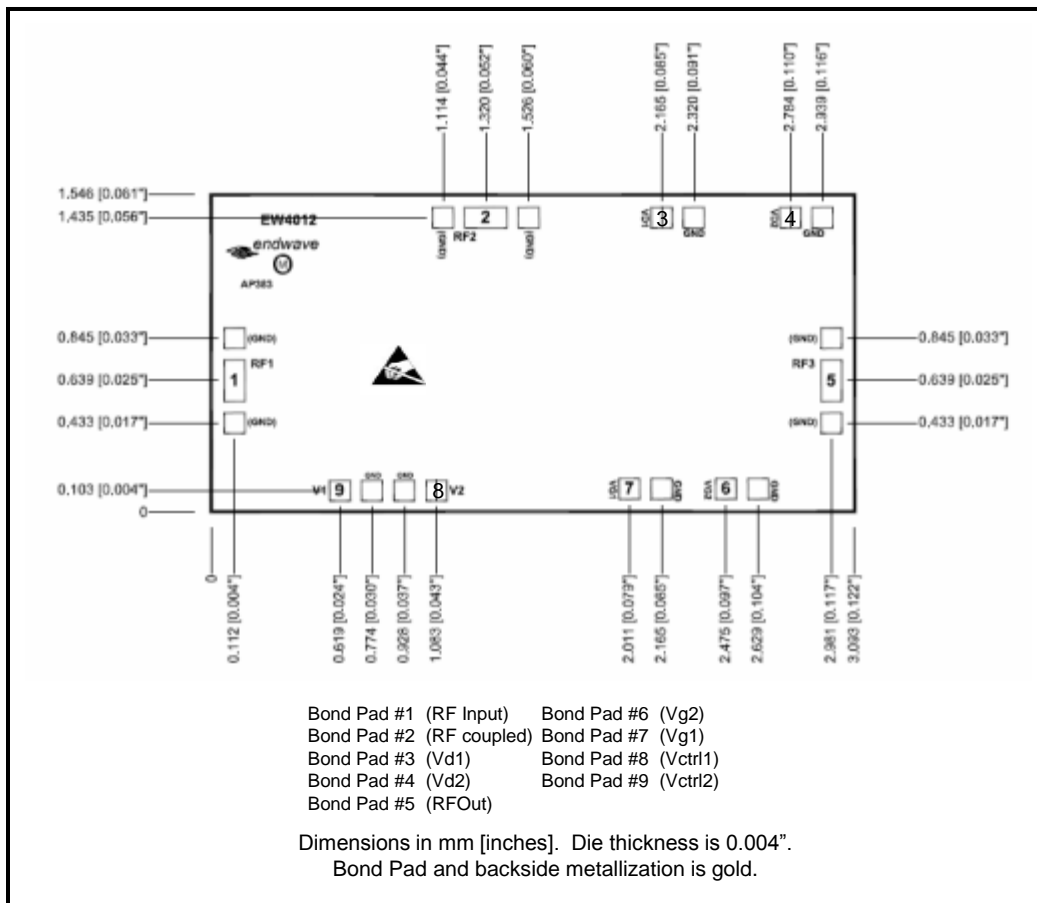
OIP3 vs. Frequency
(Vd = +4.4 V and Id = 66 mA)



Assembly Drawing



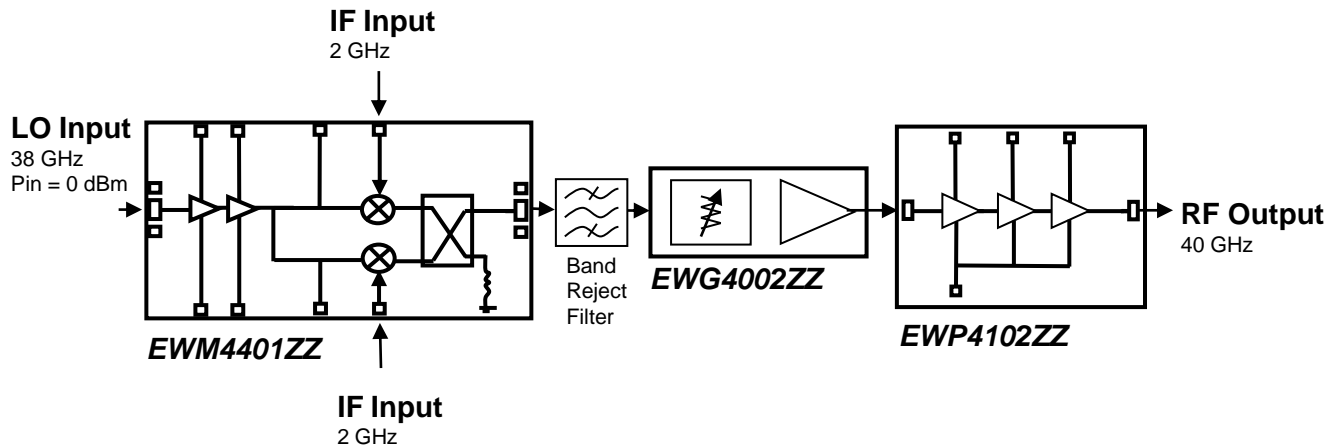
Outline Drawing



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

EWG4002ZZ

Description

RoHs Compliant bare die in waffle or gel packs