10 - 19 GHz GaAs MMIC Variable Gain Amplifier

EWG1501ZZ

September 2009 – Rev 1

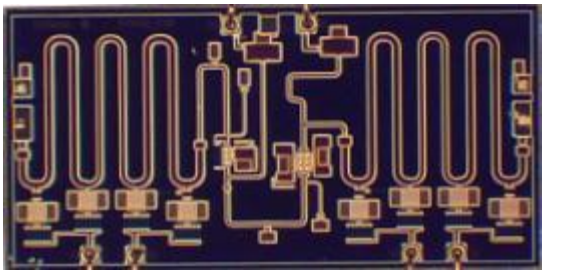
Production

Variable Gain Amplifier - Chip

Features

- Integrated VVA and RF Amp
- RF Bandwidth: 10 - 19 GHz
- Maximum Gain: 12 dB typical
- Dynamic Range: 50 dB typical
- Output IP3: +22 dBm (max gain)
- Output P1dB: +17 dBm (max gain)
- 100% RF and DC tested
- Die Size: 3.0 x 1.5 x 0.1 mm

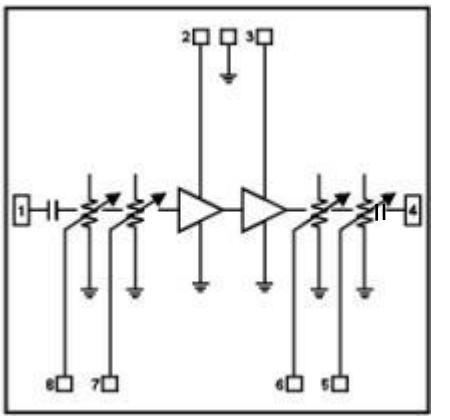
Device Photo



Description

The Endwave *EWG1501ZZ* is a highly integrated 0.15um GaAs pHEMT variable gain amplifier MMIC which provides 12 dB of gain and 50 dB dynamic range with +22 dBm output IP3 at minimum attenuation. The high dynamic range is achieved through the use of voltage variable attenuators surrounding a fixed gain amplifier. The chip 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	10		19	GHz
Gain (Max for Vctrl 1, 2 = -1.5 V)		12		dB
Dynamic Range (Gmax – Gmin)		50		dB
Input Return Loss (over dynamic range)		8		dB
Output Return Loss (over dynamic range)		8		dB
Output IP3 (minimum attenuation)		22		dBm
Gain Control Voltage [1](Vctrl 1, 2)	-2		0	V
Drain Bias Voltages (Vd 1, 2)		4.2		V
Drain Bias Currents (Id1 + Id2)		120		mA

Note 1: Min gain for Vctrl1 = Vctrl2 = 0 volts

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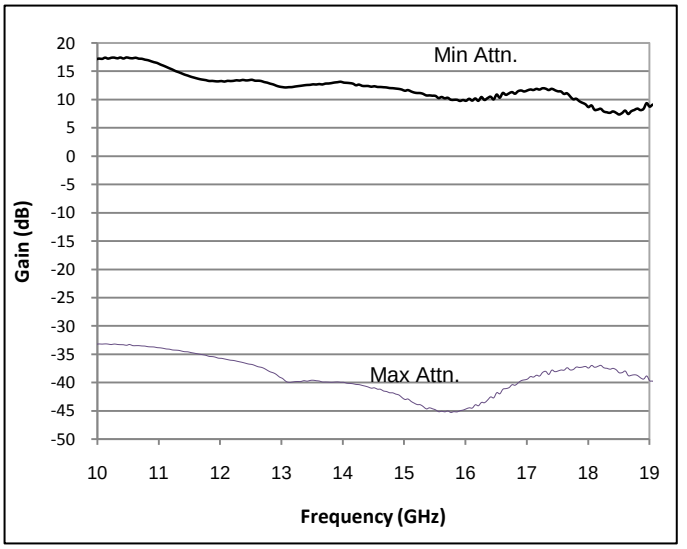
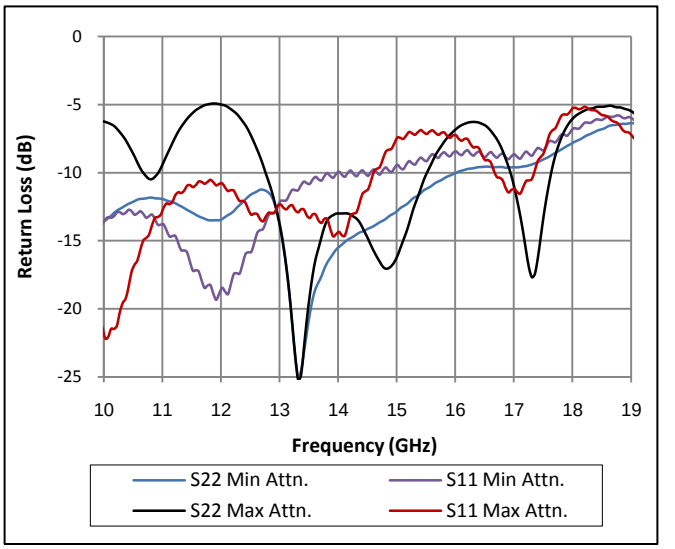
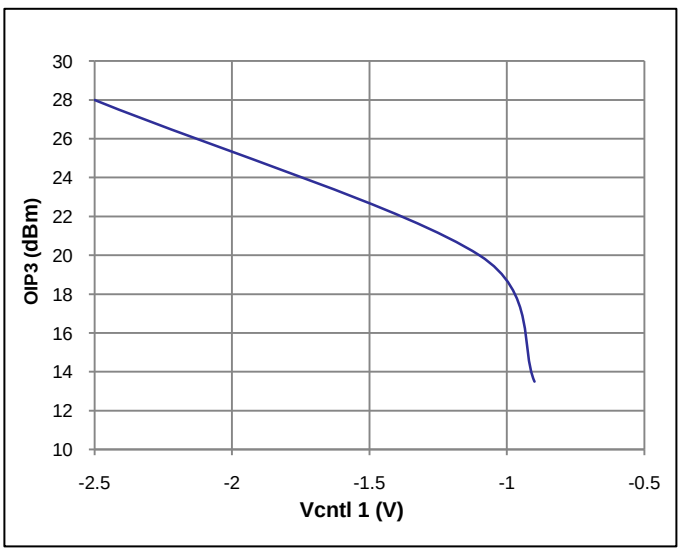
Variable Gain vs. Frequency
(Vd = +4.2 V and Id = 120 mA)



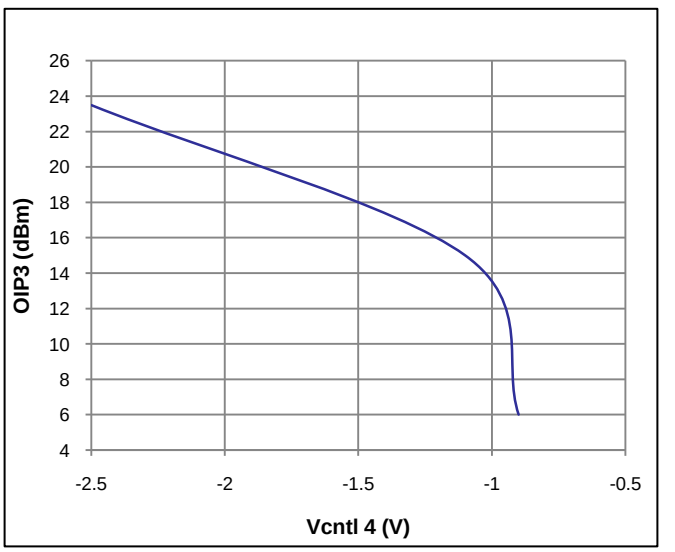
Return Loss vs. Frequency
(Vd = +4.2 V and Id = 120 mA)



OIP3 vs. Vcntrl1
(Vd = +4.2 V and Id = 120 mA; -5 dBm/tone Pin @ 15.4 GHz;
Vcntrl2 = Vcntrl3 = Vcntrl4 = -2.5V)



OIP3 vs. Vcntrl 4
(Vd = +4.2 V and Id = 120 mA; -15.2 dBm/tone Pin @ 13 GHz;
Vcntrl1 = Vcntrl2 = Vcntrl3 = -2.5V)



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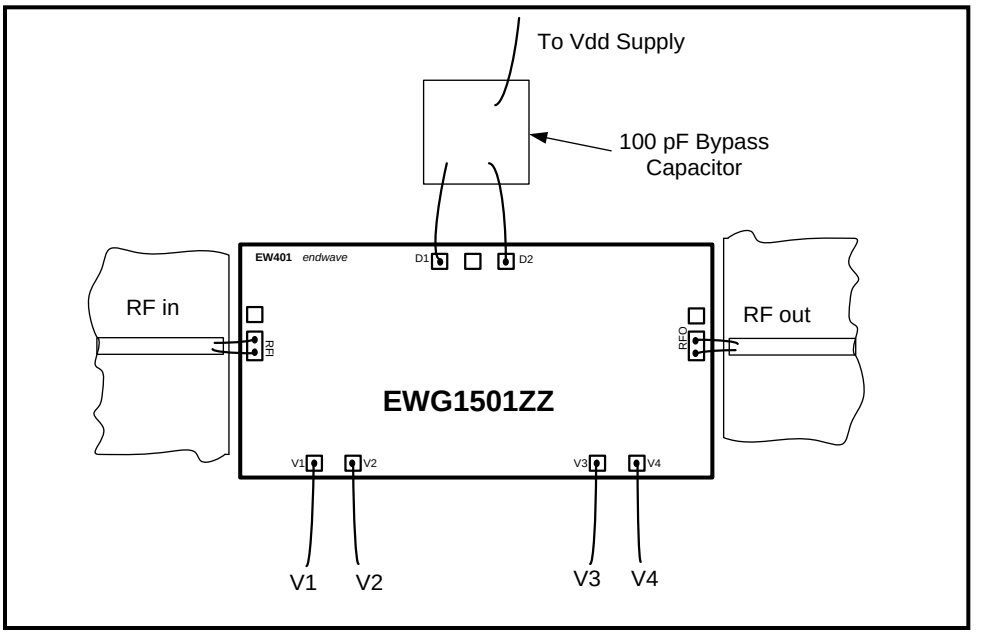
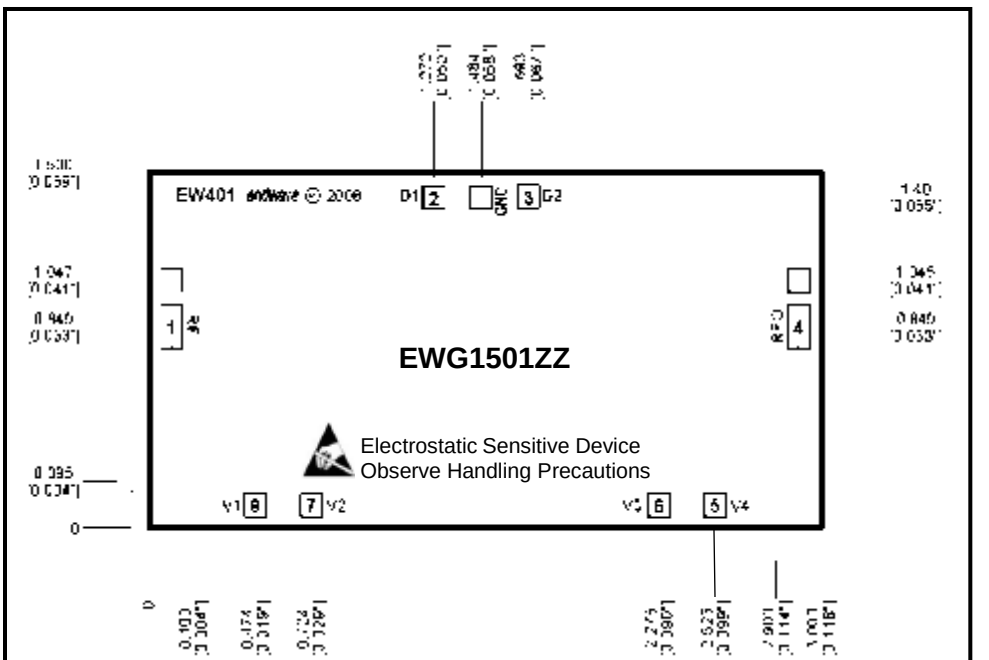
Assembly Drawing



Outline Drawing



Bond Pad #1 (RF In)	Bond Pad #5 (Attn cntrl V4)
Bond Pad #2 (Vdd1)	Bond Pad #6 (Attn cntrl V3)
Bond Pad #3 (Vdd2)	Bond Pad #7 (Attn cntrl V2)
Bond Pad #4 (RF Out)	Bond Pad #8 (Attn cntrl V1)

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

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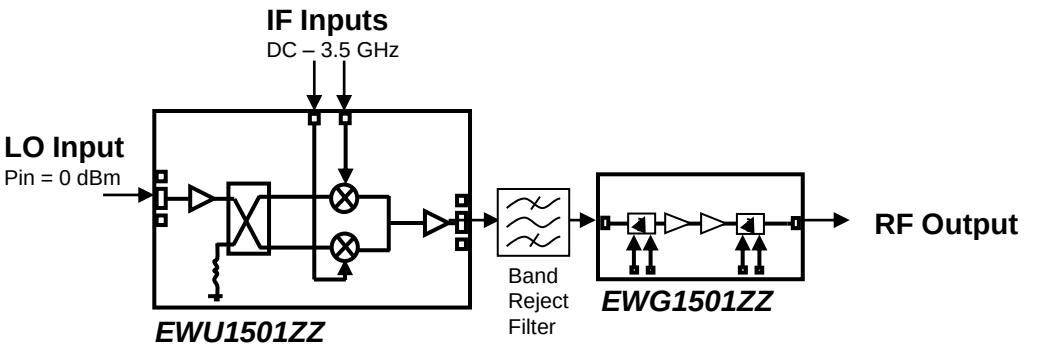
Absolute Maximum Ratings

RF Input Power (max gain)	+18 dBm
Supply Voltage (Vd1, 2)	+5.5V
Supply Current (Id1+ Id2)	240 mA
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
EWG1501ZZ	RoHs Compliant bare die in waffle or gel packs