











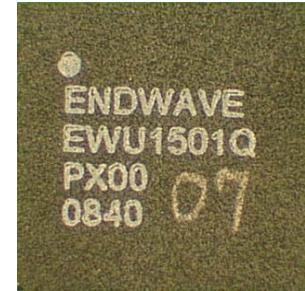


EWU1501YH

Features

-  Integrated I/Q Mixer with LO Driver Amp
-  RF & LO Frequency: 12 – 16 GHz
-  IF Bandwidth: 0 - 3.5 GHz
-  Conversion Gain: -3 dB, typical
-  LO Drive Level: 0 dBm, typical
-  Input IP3: +24 dBm, typical
-  LO/RF Isolation: 38 dB, typical
-  Image Rejection: 35 dB, typical
-  Package: 6 x 6 mm, 40 lead, plastic overmold QFN
-  100% RF and DC tested
-  Also available in bare die format
-  RoHS Compliant

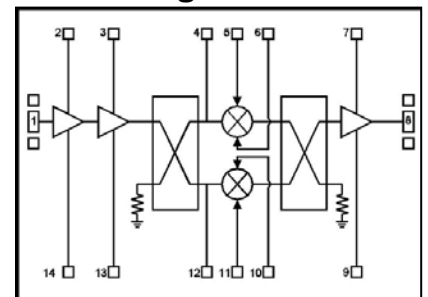
Device Photo



Description

The Endwave *EWU1501YH* is a highly integrated GaAs pHEMT MMIC upconverter which provides -3 dB of conversion gain, +24 dBm input IP3 and 35 dB image rejection with only 0 dBm of LO power. The balanced image reject mixer topology is driven by a 2 stage LO buffer amplifier. The I/Q mixer can be used as a single-sideband modulator or as an IF-RF converter with an external balun and is followed by a single stage, self-biased RF amplifier with an optional gate bias point for gain adjustment. The device can 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 to IPC-A-610.

Block Diagram



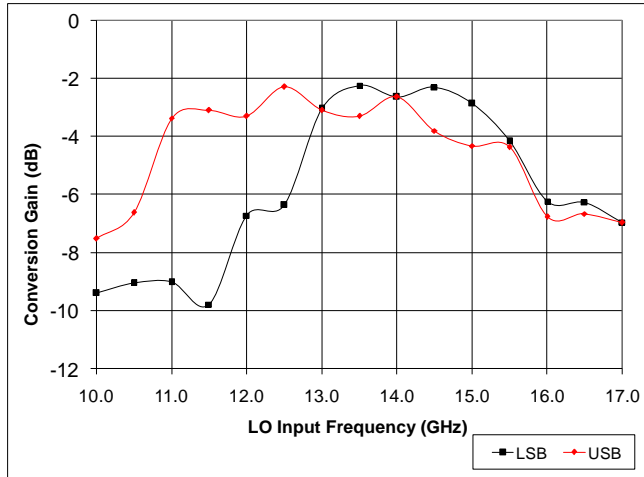
Electrical Characteristics (Temperature = +25 °C)

Parameter	Min.	Typ.	Max.	Units
Frequency Range, IF	0		3.5	GHz
Frequency Range, RF/LO	12		16	GHz
Conversion Gain(I&Q applied) ^(1,2)		-3		dB
Image Rejection		35		dBc
LO to RF Isolation		38		dB
LO to IF Isolation		20		dB
Input IP3		+24		dBm
Amplitude Balance			1	dB
Phase Balance			9	°
IF Return Loss		7		dB
LO Return Loss		8		dB
RF Return Loss		10		dB
Drain Bias Voltages (Vd1,2,3)		+4.2		V
Drain Bias Currents (Id1+Id2) @ 4.2V		130		mA
Drain Bias Current (Id3) @ 4.2V		68		mA

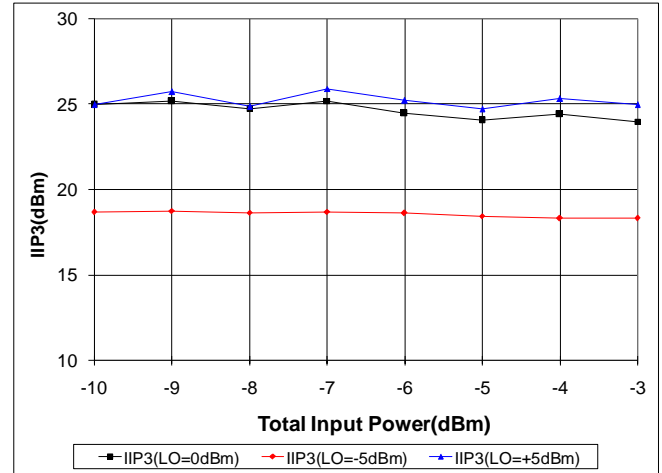
Note 1: I & Q applied with DC offset voltages to reduce LO leakage, LO = 0 dBm

Note 2: Mixer Gate Bias Vg3 = -1.0 volt

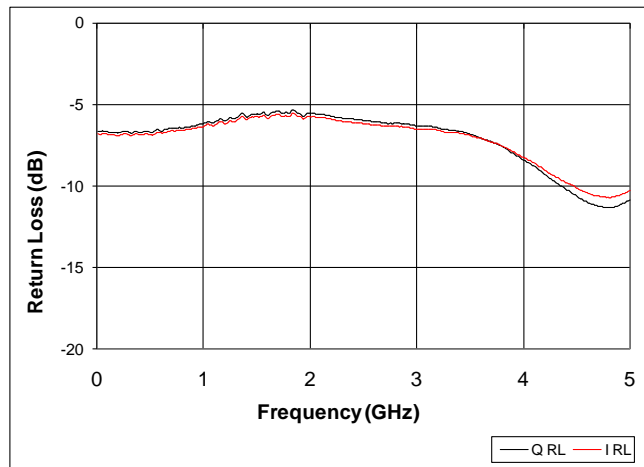
Conversion Gain vs. Lo Frequency with 1GHz IF Input



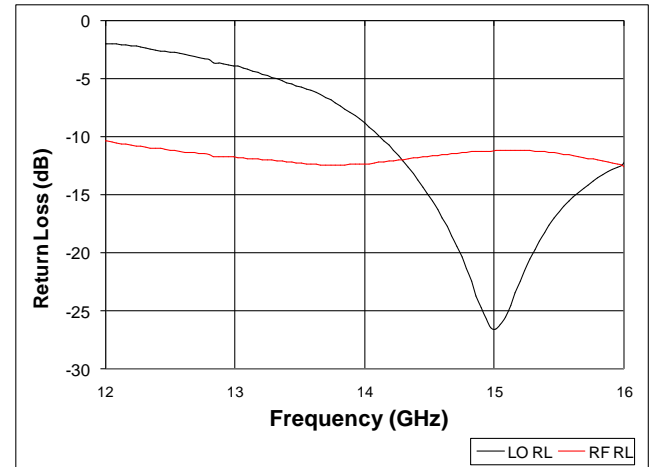
IIP3 vs. Input Power



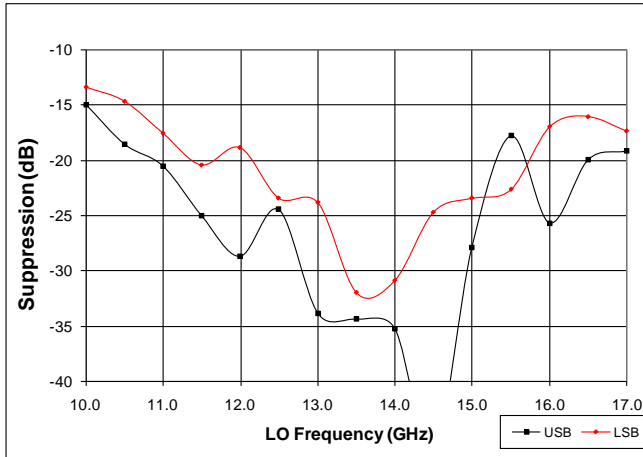
IF (IQ) Return Loss vs. Frequency



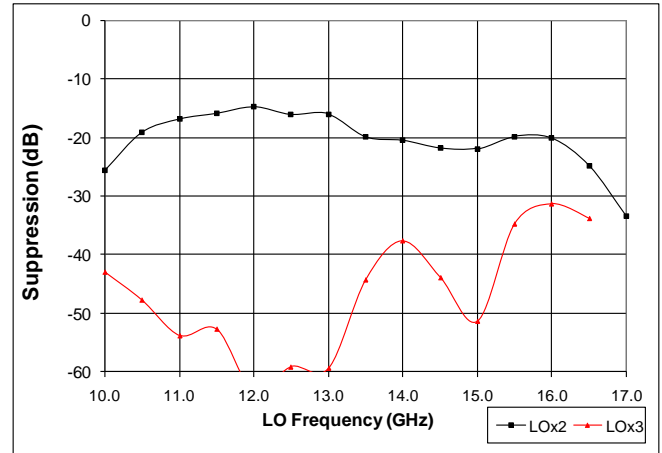
LO/RF Return Loss vs. Frequency



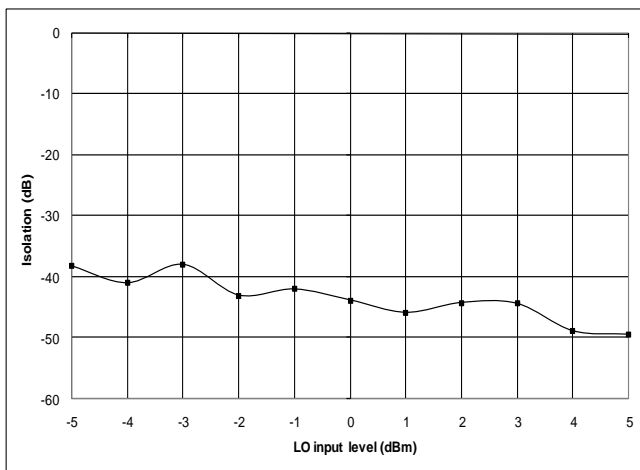
Sideband Suppression vs. LO Frequency with 1GHz IF



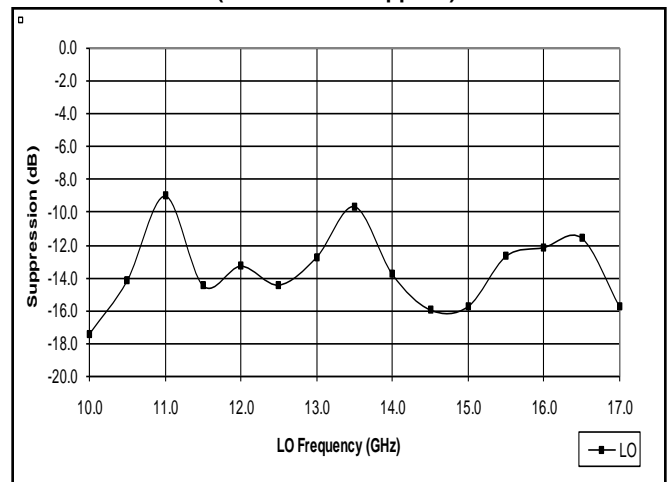
LO Harmonics at RF Output with 1GHz IF



LO-RF Isolation at 15 GHz
I and Q Offsets Optimized for LO Cancellation



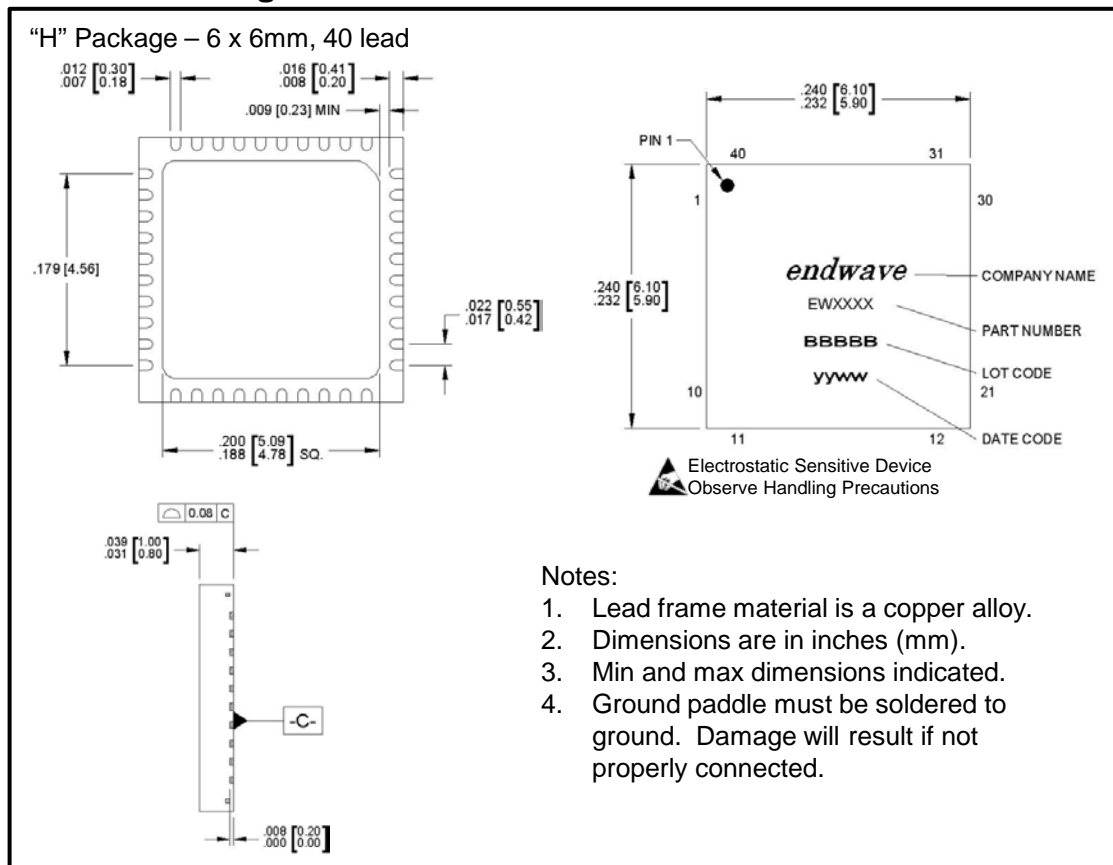
LO to RF Isolation with 1GHz IF
(No Correction Applied)



DC & RF Pinout

Pin Number	Function
2, 4, 8, 10, 12, 20-23, 27, 28, 30-32, 39, 40	No Connection
1, 3, 29	No Connection (Vg2, Vg1, Vg4 optional)
5, 7, 14, 16, 18, 24, 26, 33, 35, 37, paddle	Ground
6	LO Input
25	RF Output
34	IF (I) Input1 – to be matched with Q1
36	IF (Q) Input 1 – to be matched with I1
17	IF (I) Input 2 – to be matched with Q2
15	IF (Q) Input 2 – to be matched with I2
9, 11, 19	Amplifier Drain Bias Vd1, Vd2, Vd3
13, 38	Mixer Gate Bias Vg3

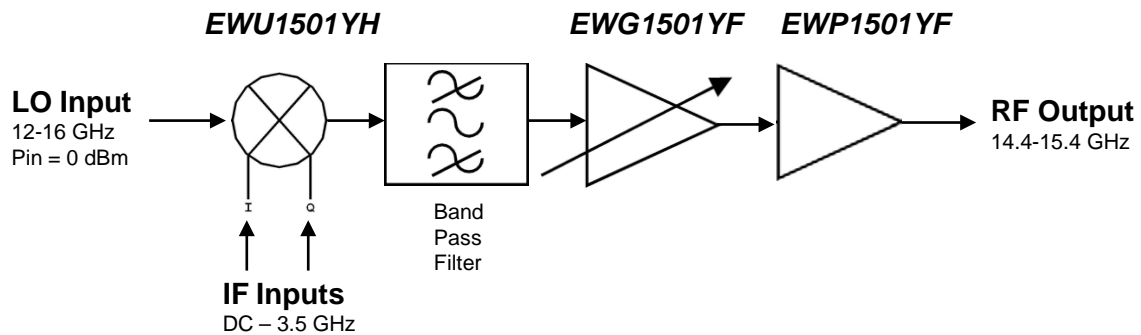
Outline Drawing



Absolute Maximum Ratings

IF Input Power	+20 dBm
LO Input Power	+20 dBm
Supply Voltage (Vd1, 2, 3)	+5.5 V
Supply Gate Voltage (Vg1, Vg2, and Vg3)	-5 to 0 V
Supply Current (Id1+ Id2)	250 mA
Supply Current (Id3)	135 mA
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
EWU1501YH	RoHS compliant, 6 x 6mm, 40 lead, QFN "H" Package
EWU1501YH-EV	EWU1501YH on an Evaluation Board
EWU1501ZZ	RoHS compliant bare die in wafer or gel packs
EWU1501ZZ-EV	EWU1501ZZ in a connectorized test fixture