










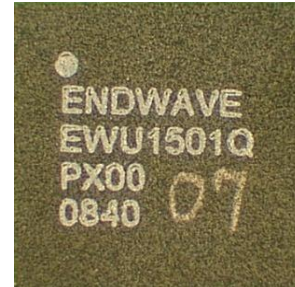


Features

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

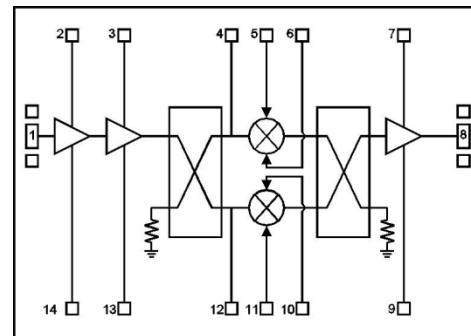
Device Photo



Description

The Endwave *EWU1501YH* is a highly integrated 0.15 μm GaAs pHEMT MMIC upconverter which provides 2 dB of conversion loss, +24 dBm input third order intercept 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.

Block Diagram



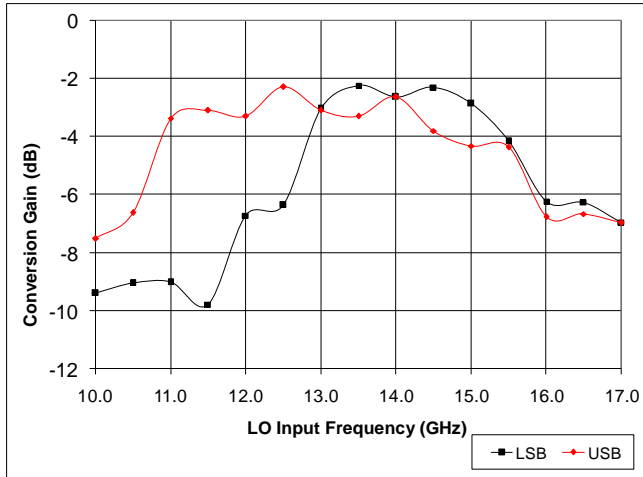
Electrical Characteristics (Temperature = +25 °C)

Parameter	Min.	Typ.	Max.	Units
Frequency Range, IF	0		3.5	GHz
Frequency Range, RF/LO	12		16	GHz
Conversion Loss (I&Q applied) ^(1,2)		3		dB
Sideband Rejection		35		dBc
LO to RF Isolation		38		dB
LO to IF Isolation		20		dB
Input 3 rd -Order Intercept		+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

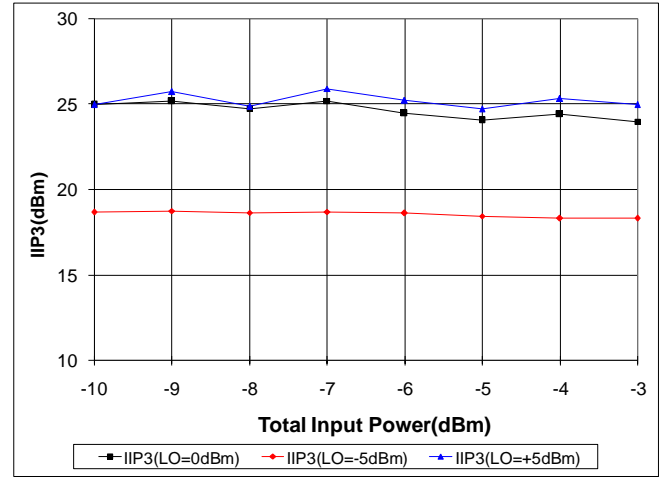
Note 1: I & Q applied with DC offset voltages to reduce LO leakage, LO = 0 dBm

Note 2: Mixer Gate Bias Vg3 = -1.0 volt

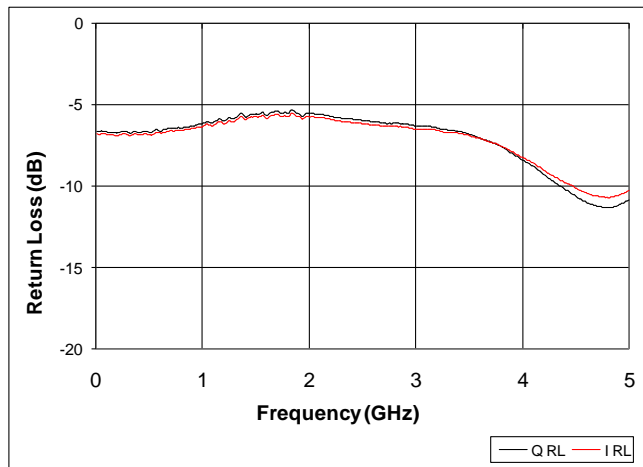
Conversion Gain vs. Lo Frequency with 1GHz IF Input



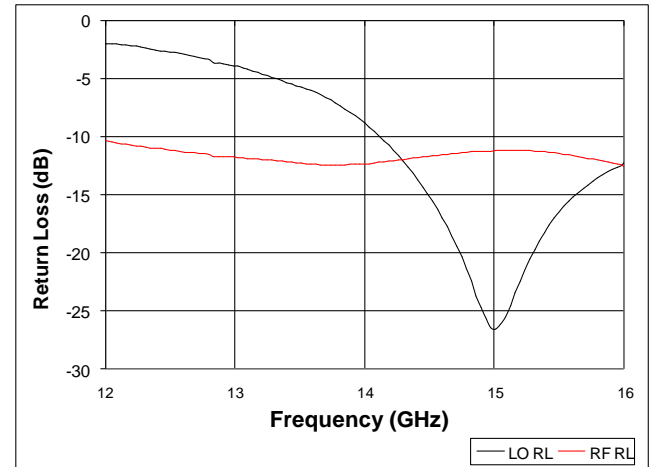
IIP3 vs. Input Power



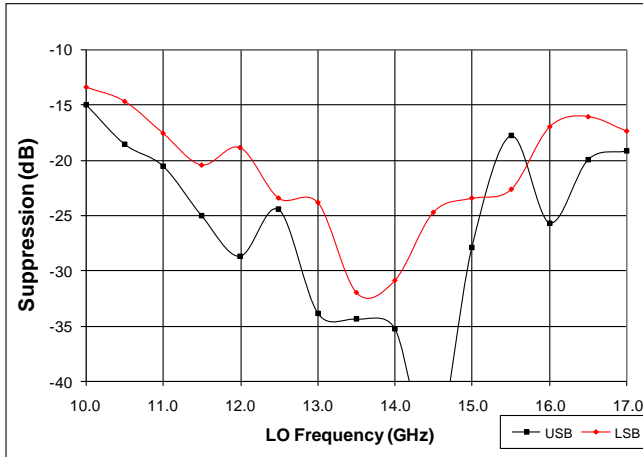
IF (IQ) Return Loss vs. Frequency



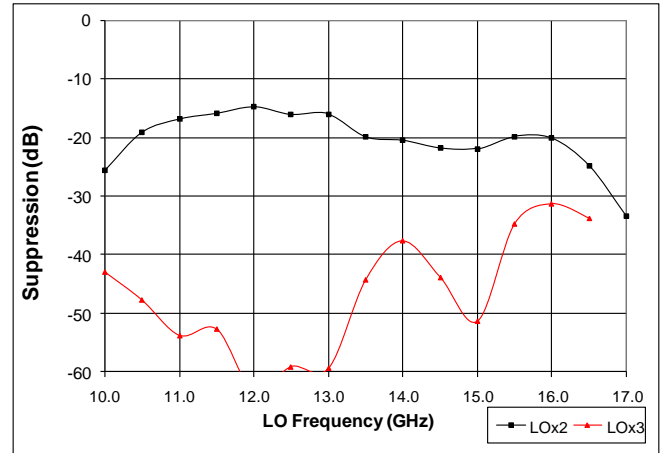
LO/RF Return Loss vs. Frequency



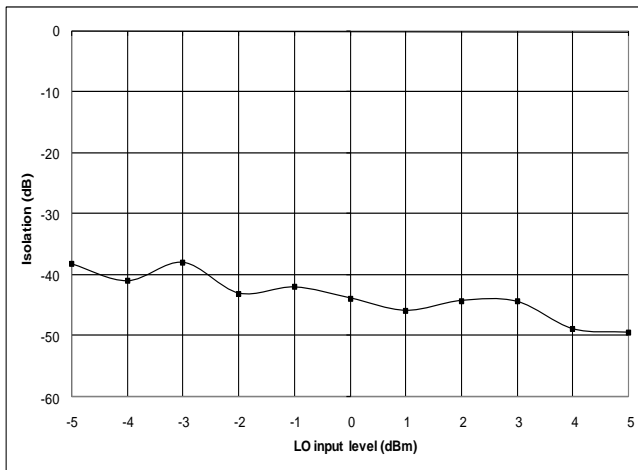
Sideband Suppression vs. LO Frequency with 1GHz IF



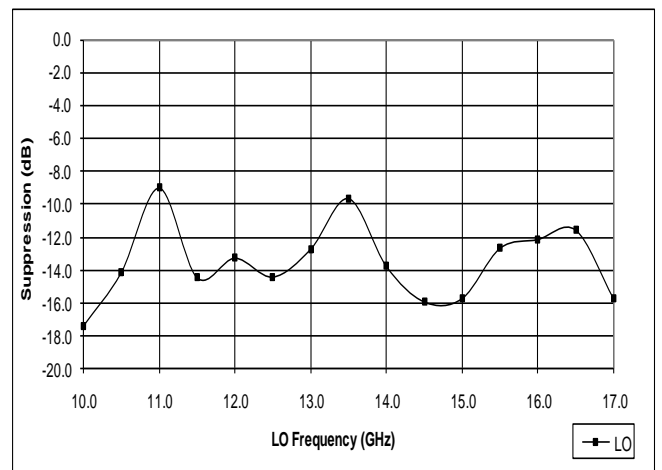
LO Harmonics at RF Output with 1GHz IF



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



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

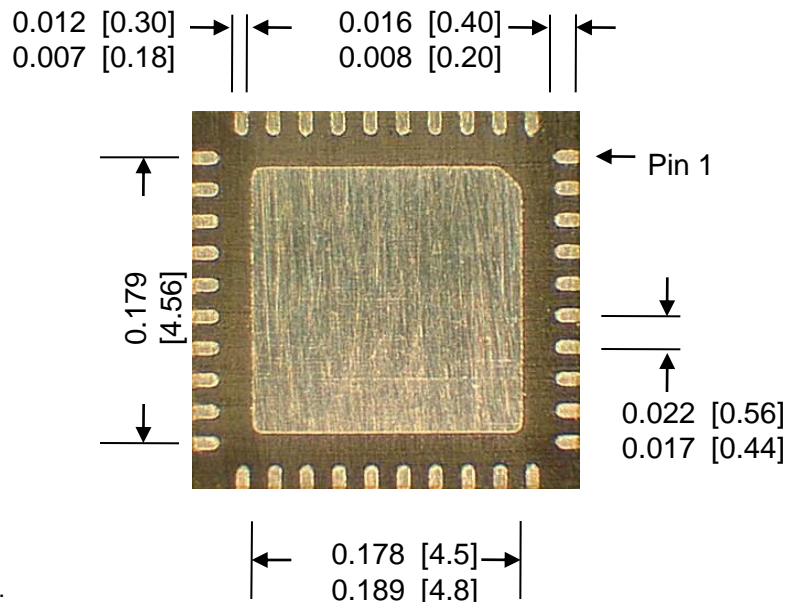


DC & RF Pinout

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

“H” Package – 6 x 6 mm size, 40 lead



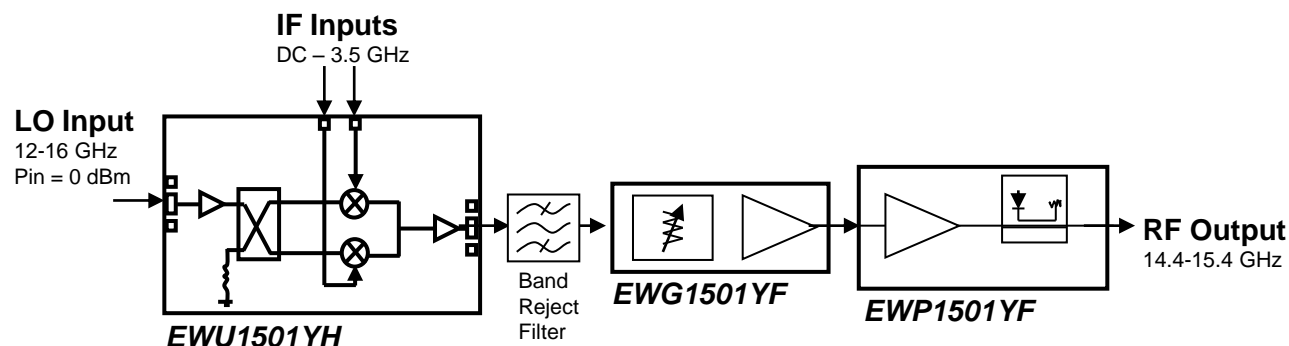
Notes:

1. Leadframe material is a copper alloy.
2. Dimensions are in inches (millimeters).
3. Min and max dimensions shown.
4. Ground paddle must be soldered to ground. Damage will result if not properly connected.

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	6x 6 mm QFN RoHS compliant SMT Package
EWU1501ZZ	Bare die in waffle packs