











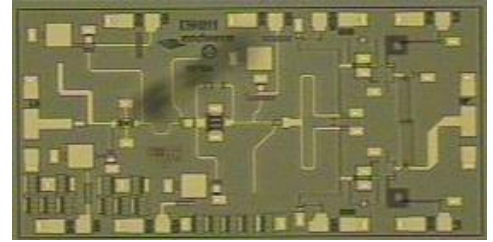


EWM4401ZZ

Features

-  Integrated I/Q Mixer with LO Driver Amp
-  RF & LO Frequency: 34 - 44 GHz
-  IF Bandwidth: 0 - 4.5 GHz
-  Both Direct Modulation & CW IF
-  Conversion Loss: 11 dB typical
-  LO Drive Level: 0 dBm
-  Input IP3: +27 dBm typical
-  LO/RF Rejection: 30 dB typical
-  Image Rejection: 20 dB typical
-  ESD Protection Gate Circuitry
-  100% RF and DC tested
-  Die size: 2.7 x 1.5 x 0.1 mm

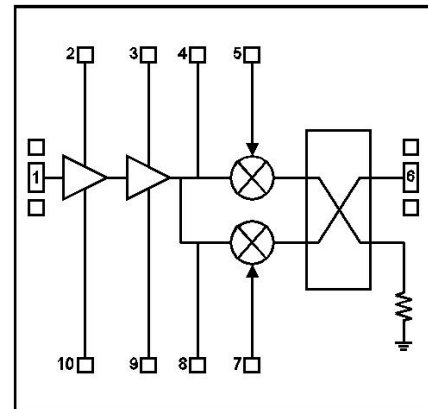
Device Photo



Description

The Endwave *EWM4401ZZ* is a 0.15 um GaAs pHEMT active mixer MMIC that can be used as a 38 GHz up or downconverter. With only 0 dBm of LO drive, the mixer typically provides 11 dB of conversion loss in either application. The mixer provides better than +27 dBm IIP3 in either applications and LO/RF isolation of 30 dB in an upconverter. 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 inspected visually using Mil-Std-883 Method 2010.

Block Diagram



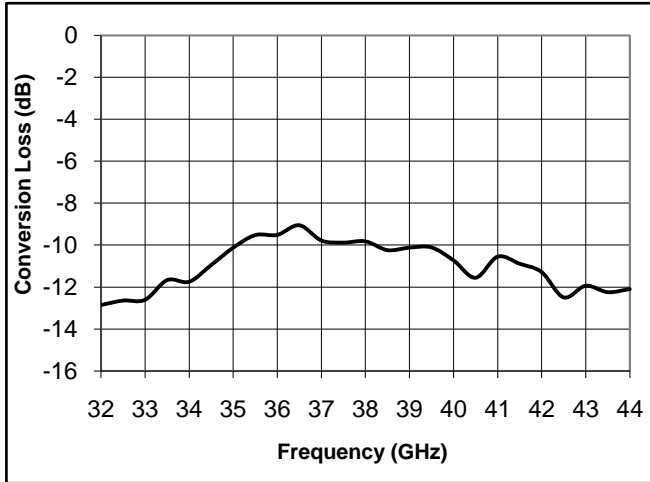
Electrical Characteristics (Temperature = +25 °C)

Parameter	Min.	Typ.	Max.	Units
Frequency Range, IF	0		4.5	GHz
Frequency Range, RF/LO	34		44	GHz
Conversion Loss ^(1,2)		11		dB
LO to RF Isolation		11		dB
LO to IF Isolation		30		dB
Input 3 rd -Order ^(1,2)		+27		dBm
Amplitude Balance		+/- 0.8		dB
Phase Balance		+/- 8		°
Image Rejection ⁽²⁾		20		dB
IF Return Loss		10		dB
LO Return Loss		10		dB
RF Return Loss		10		dB
Drain Bias Voltages (Vd1,2)		+4.4		V
Drain Bias Currents (Id1+Id2) @ 4.4V		120		mA
Gate Bias Voltages (Vg3)		-1.1		V

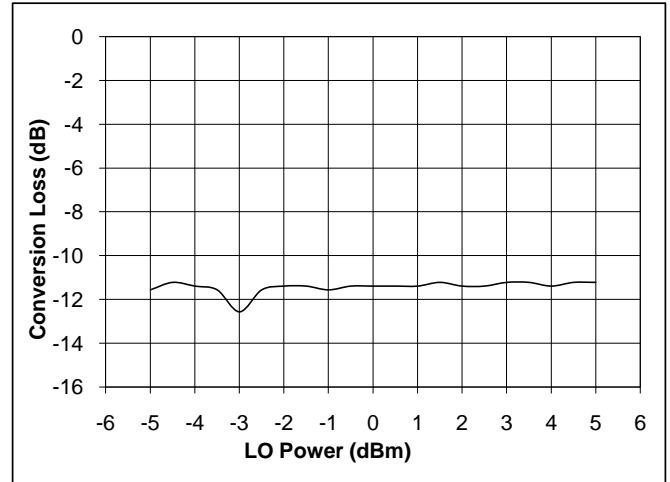
Note1: Measured as Upconverter; Note2: Measured as Downconverter

Measured Data As Upconverter

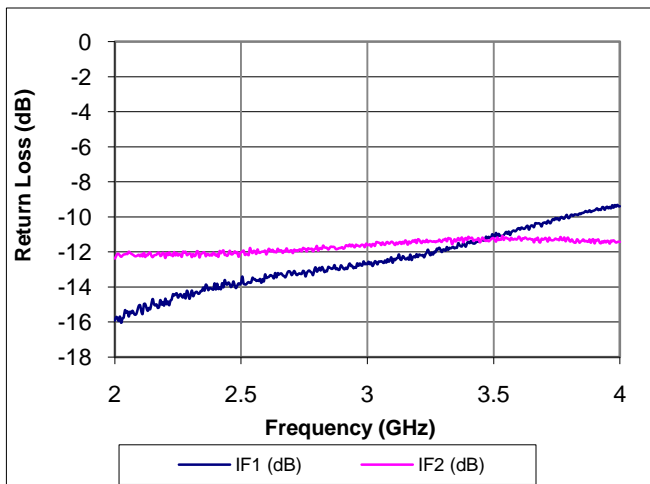
Conversion Loss vs . Frequency



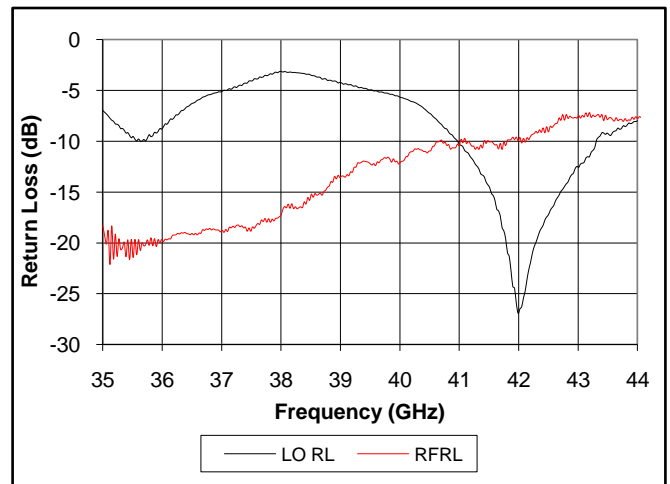
Conversion Loss vs. Lo Power
(LO: 36GHz; IF: -10dBm @ 3 GHz)



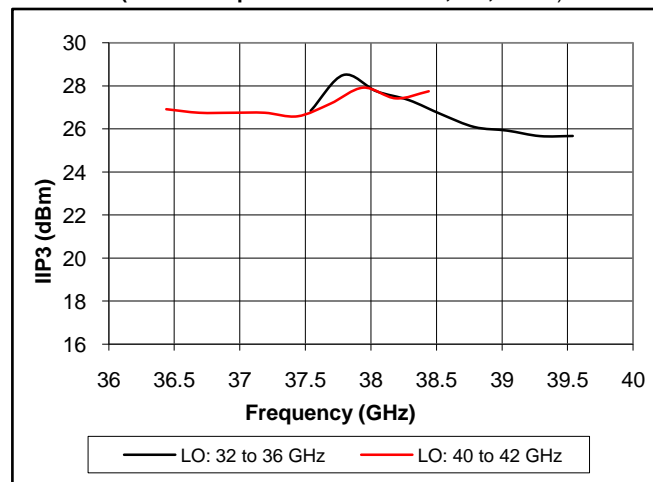
IF Return Loss vs. Frequency



LO and RF Return Loss vs. Frequency

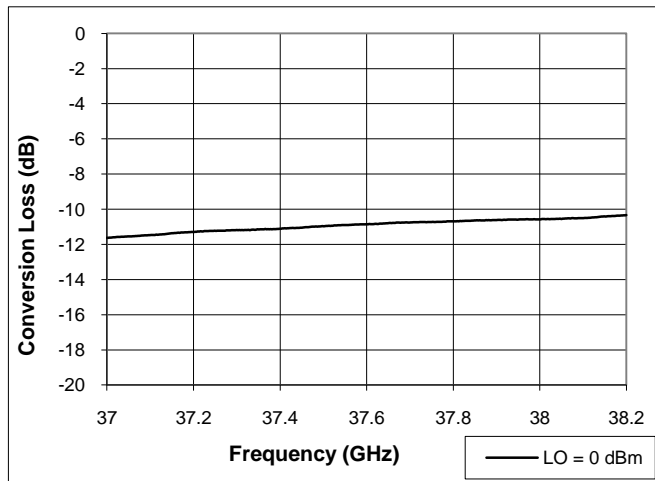


IIP3 vs. Frequency
(IF: -4 dBm per tone @ 3.55 GHz; LO; 3 dBm)

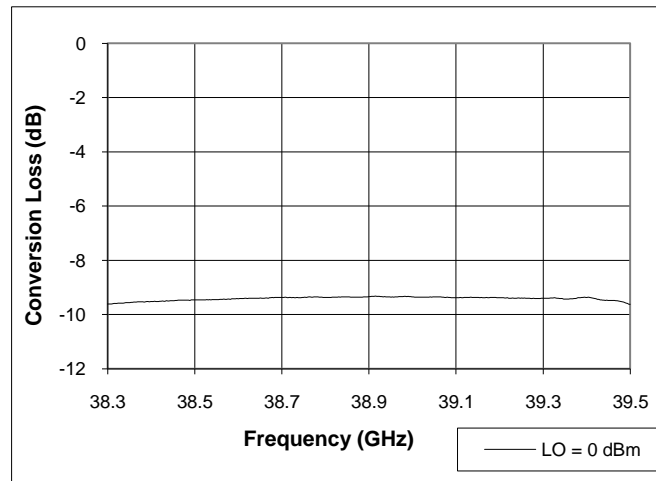


Mixers – I/Q Up/Downconverter - Chip

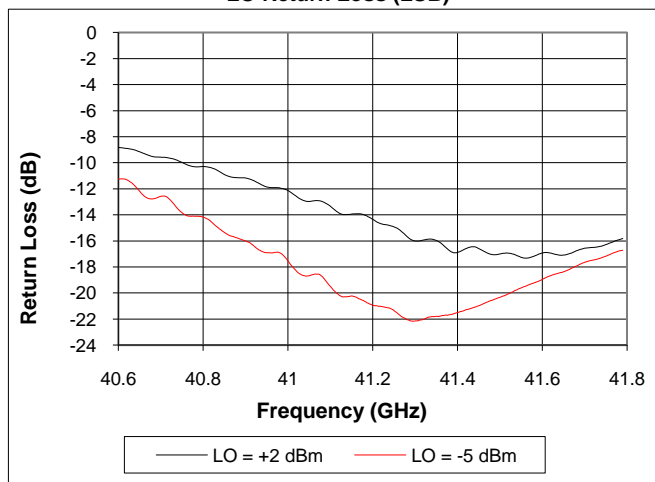
USB Downconverter Conversion Loss



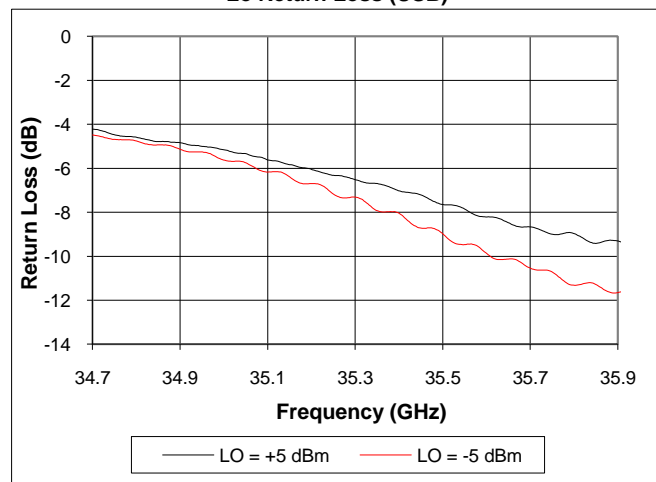
LSB Downconverter Conversion Loss



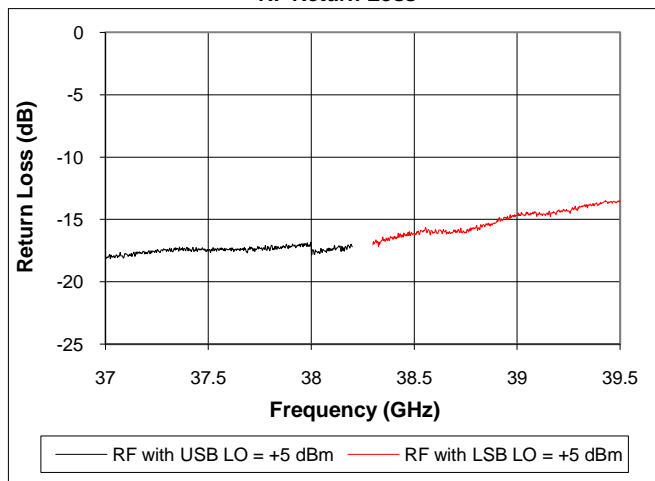
LO Return Loss (LSB)



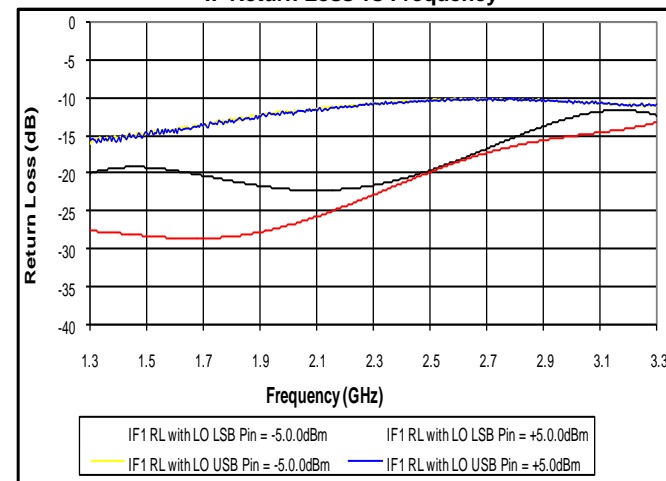
Lo Return Loss (USB)



RF Return Loss



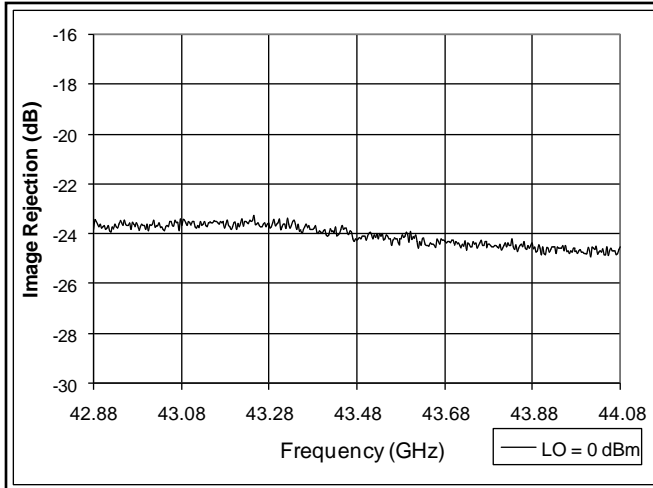
IF Return Loss vs Frequency



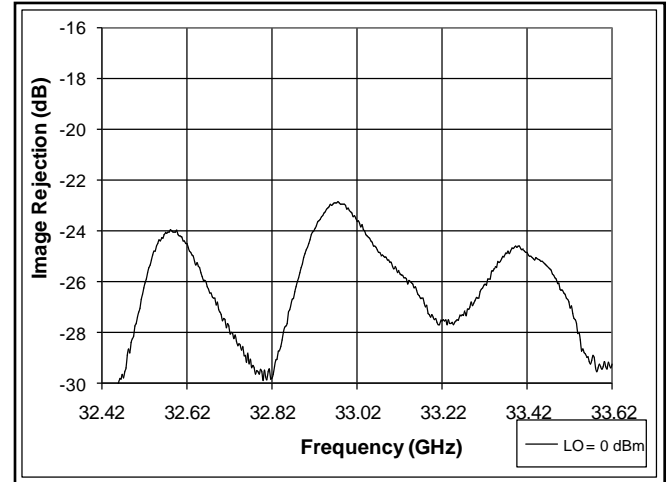
Mixers – I/Q Up/Downconverter - Chip

Measured Data As Downconverter

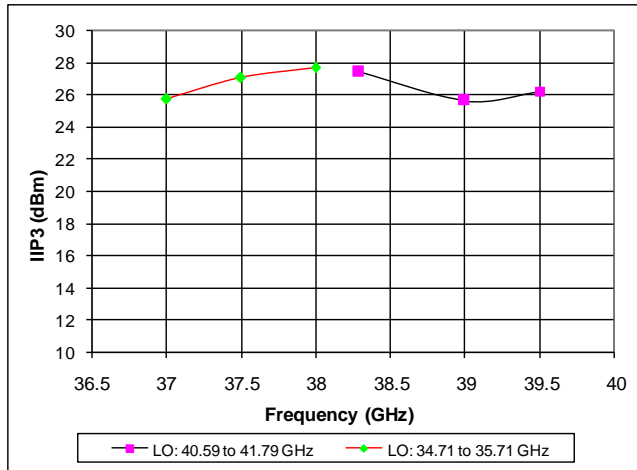
LSB Image Rejection



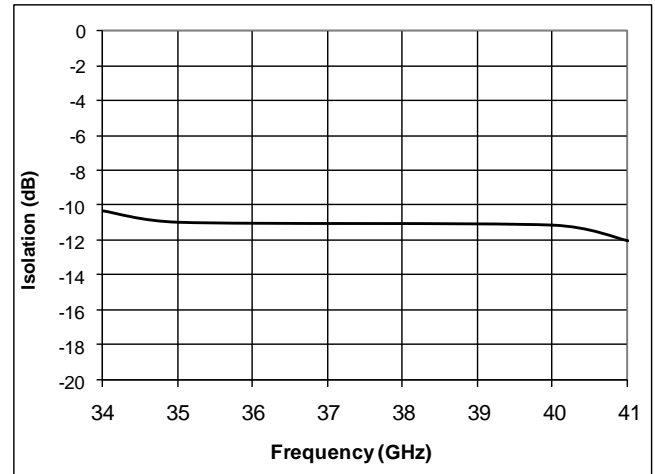
USB Image Rejection

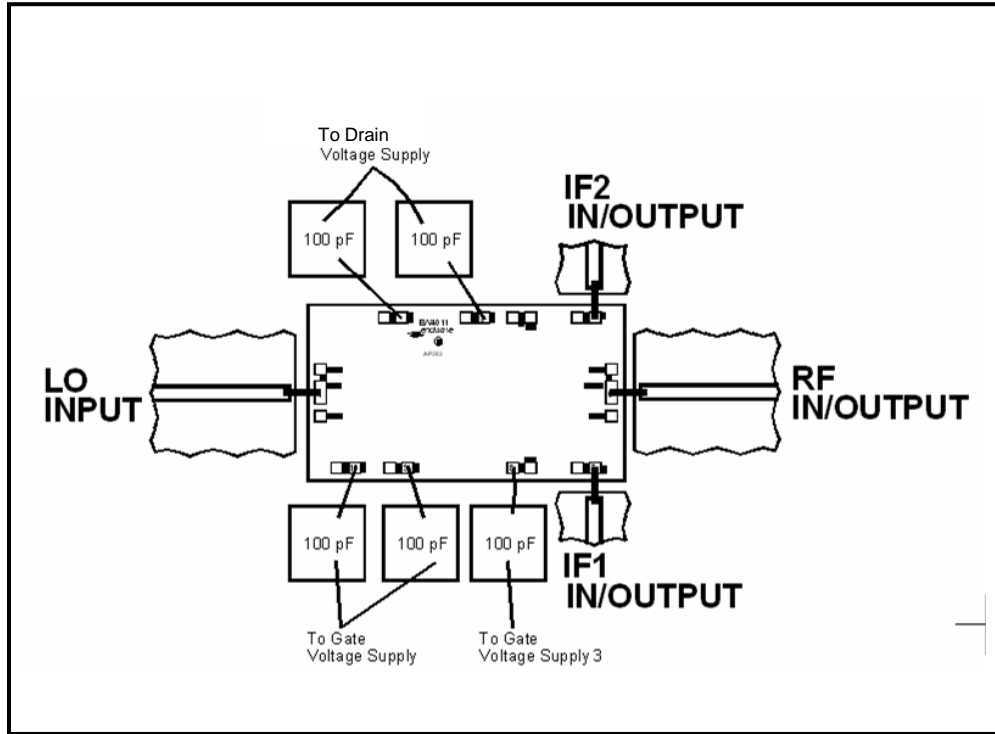


IIP3 vs Frequency
(RF @ -20 dBm per tone: LO @ +5 dBm)

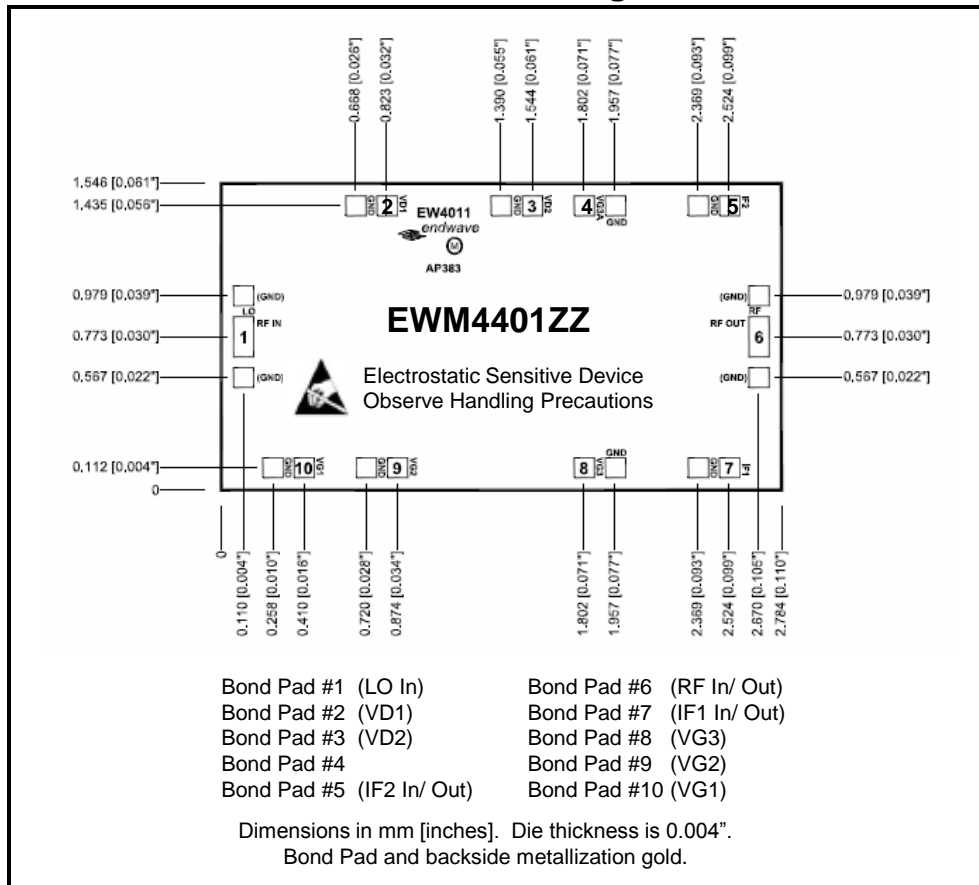


LO to RF Isolation (LO drive = +5 dBm)





Outline Drawing

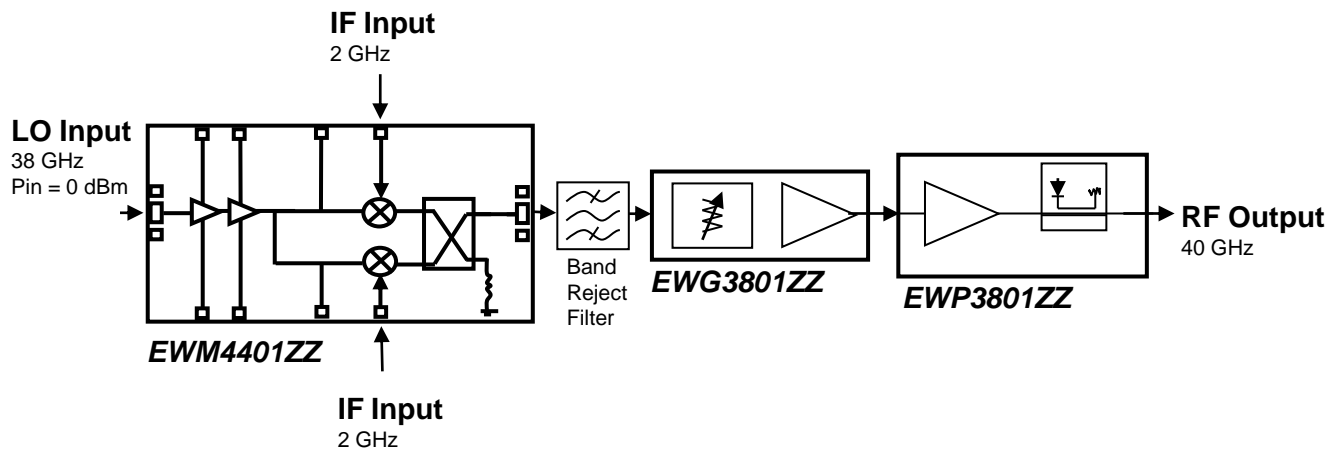


Mixers – I/Q Up/Downconverter - Chip

Absolute Maximum Ratings

IF Input Power	+5 dBm per each Input
LO Input Power	+15 dBm
Supply Voltage (Vd1, 2)	+5.5 V
Supply Current (Id1, 2)	200 mA
Supply Gate Voltage	-2.5V to 0V
Storage Temperature	-65 to +150 C
Operating Temperature	-40 to +85 C
Channel Temperature	175 C

Typical Upconverter 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
<i>EWM4401ZZ</i>	RoHs Compliant bare die in wafer or gel packs