17.7 – 26.5 GHz GaAs MMIC Integrated Upconverter

EWU2609YF

May 2010 - Rev 2

Preliminary

Upconverters - Packaged

Features

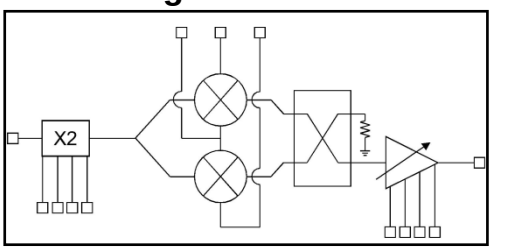
- Extremely high integration
- Includes converter, LO doubler, RF VGA
- IF bandwidth: 0 to 4 GHz
- Conversion gain: +18 dB, typical at max gain
- Output IP3: +30 dBm, typical
- LO leakage: -5 dBm, typical
- Low power consumption : +4.5V @ 500 mA
- 100% DC and RF tested
- HBM Class 1A - ESD Protection Bias Circuitry
- Package: 5 x 5 mm, 32 lead, plastic overmold QFN
- RoHS compliant

Device Photo

Description

The Endwave *EWU2609YF* is a highly integrated GaAs PHEMT MMIC upconverter that includes LO multiplication, along with RF gain adjustability via a unique voltage variable attenuator. The device provides 18 dB of conversion gain with 20 dB of RF gain adjustability, while maintaining +30 dBm output third order intercept over all conditions with 5 dBm of LO input power. This device has integrated ESD protection 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 per IPC-A-610.

Block Diagram



Electrical Characteristics (Temperature = +25°C)

Parameter	Min.	Typ.	Max.	Units
Frequency Range, IF	DC		4	GHz
Frequency Range, RF	17.7		26.5	GHz
Frequency Range, LO	6.85		15.25	GHz
Conversion Gain (at max gain)	15	18		dB
Dynamic Range (Vgc1,2 = 0 vs. -1.5V)		20		dBm
LO Leakage (RF port, all gain settings)		-5		dBc
LO Drive Power		+5		dBc
Output 3rd-Order Intercept (all gain settings)		+30		dBm
Noise Figure (at maximum gain)		16		dB
IF Return Loss		10		dB
LO Return Loss		10		dB
RF Return Loss		10		dB
Drain Bias Voltages (Vd1, Vd2, Vd3)		+4.5		V
Drain Bias Currents (Id1+Id2+Id3)		500		mA
Gate Bias Voltage (Vg3)		-1.2		V
Gate Bias Voltage (Vg4)		-0.6		V
Gate Control Voltage (Vgc1,2)	-1.5		0	V

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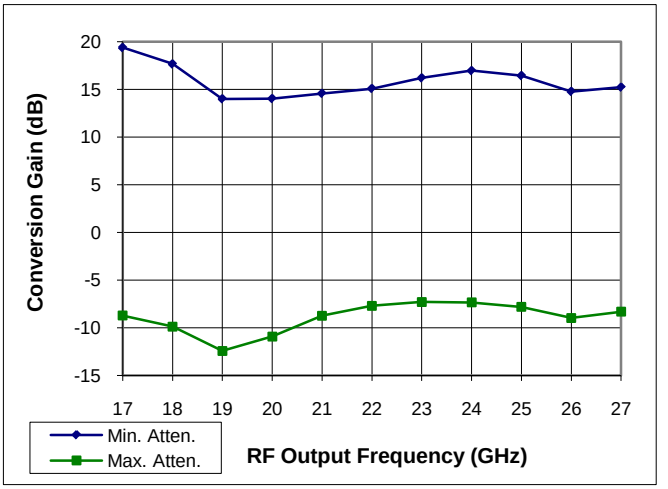
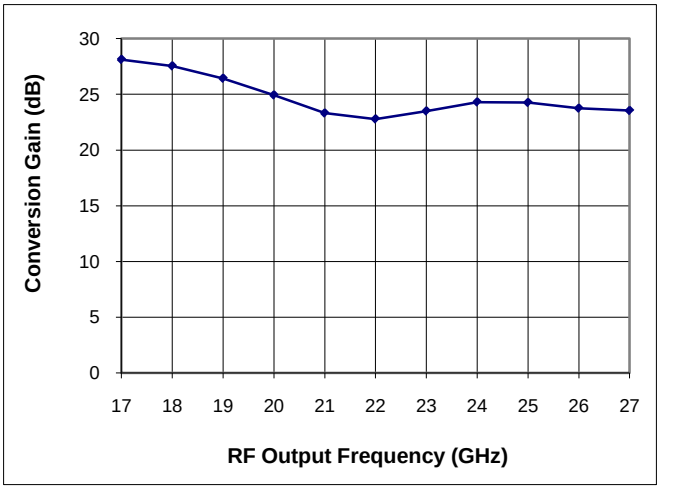
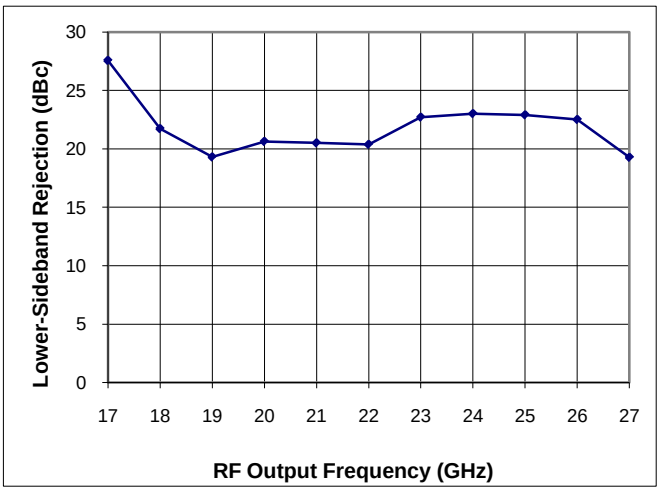
Conversion Gain
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid, P_{LO}=+5 dBm at $F_{LO} = F_{RF} - F_{IF}$



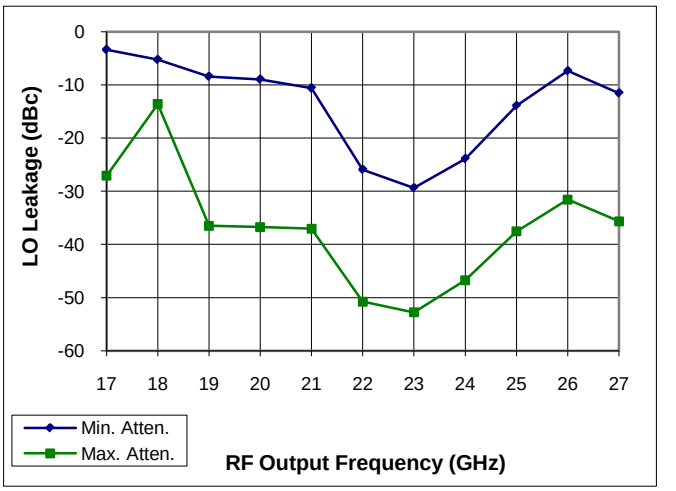
Dynamic Range
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid, P_{LO}=+5 dBm at $F_{LO} = F_{RF} - F_I$



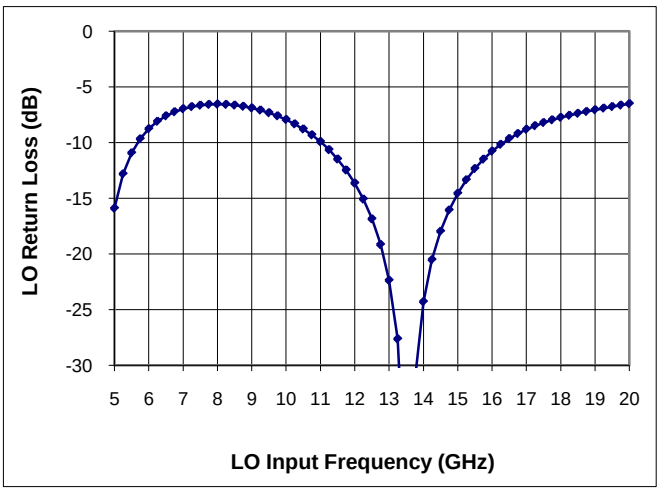
Lower-Sideband Rejection
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid, P_{LO}=+5 dBm at $F_{LO} = F_{RF} - F_{IF}$



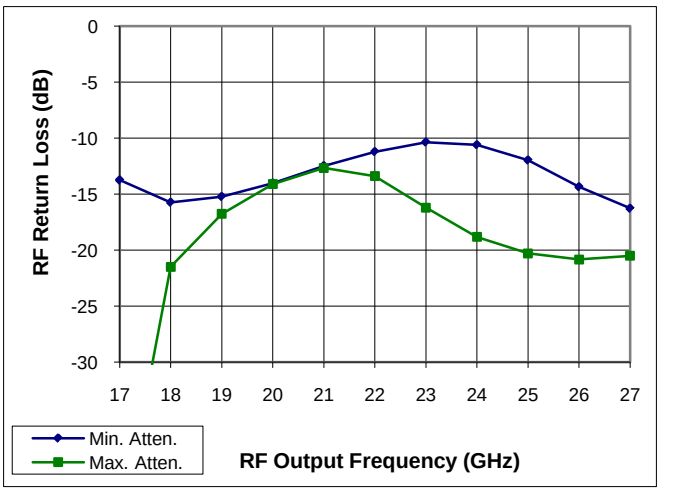
LO Leakage
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid, P_{LO}=+5 dBm at $F_{LO} = F_{RF} - F_{IF}$



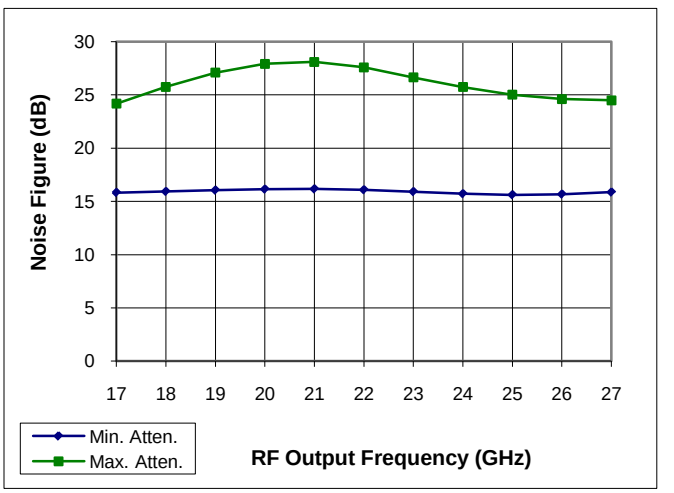
LO Return Loss
VG3=-1.2V, P_{LO}=+5 dBm



RF Return Loss
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid, P_{LO}=+5 dBm at $F_{LO} = F_{RF} - F_{IF}$



Noise Figure
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid, P_{LO}=+5 dBm at $F_{LO} = F_{RF} - F_{IF}$



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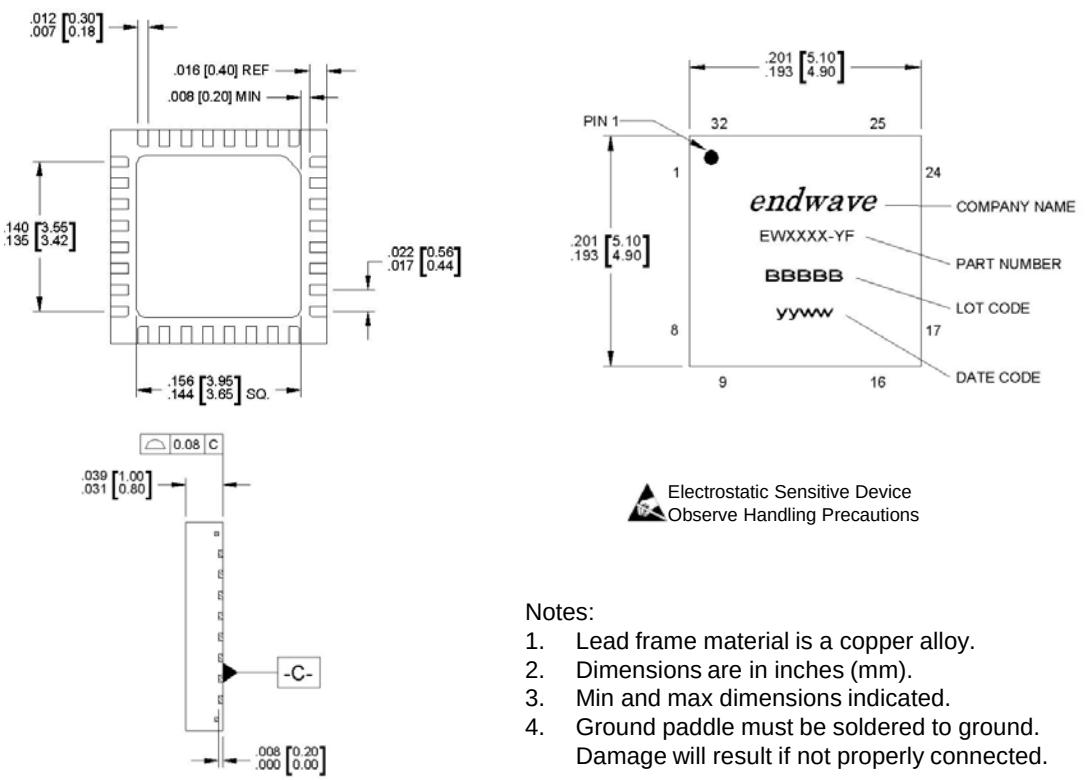
DC & RF Pinout

Pin Number	Function
1-5, 15, 16, 20, 21, 23, 24, 30, 31, 32	No Connection
6, 8, 17, 19, 25, 27, 29	Ground
7	RF Output
9	V_{GC1}
10	V_{GC2}
11	V_{G4} (Note 2)
12	V_{D3} (Note 2)
13	V_{D2} (Note 2)
14	V_{D1} (Note 2)
18	LO Input
22	V_{G3} (mixer bias)
26	IF Input2 (Note 1)
28	IF Input1 (Note 1)

Note 1: DC inputs may be applied to provide LO or image suppression enhancement.
Note 2: Place 100pF bypass chip capacitor as close as possible to the pin.

Outline Drawings

"F" Package – 5 x 5mm, 32 lead

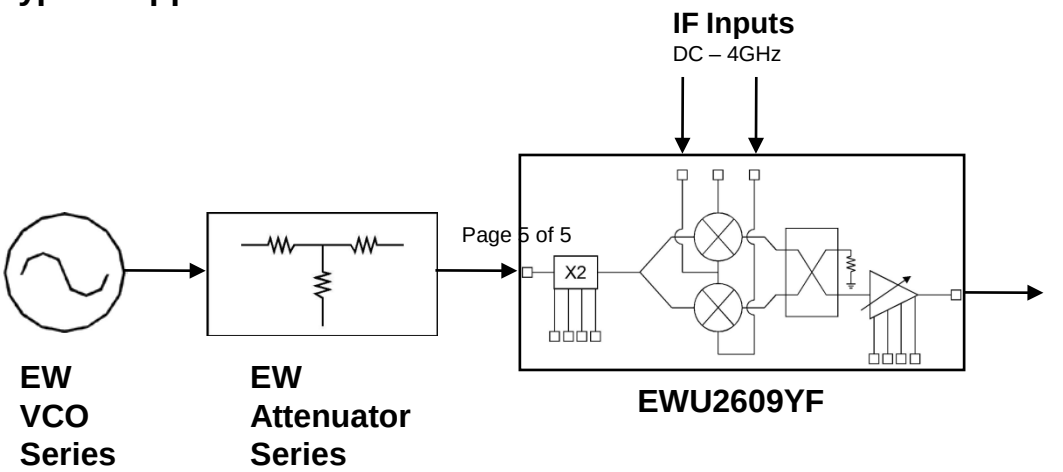


Notes:
1. Lead frame material is a copper alloy.
2. Dimensions are in inches (mm).
3. Min and max dimensions indicated.
4. Ground paddle must be soldered to ground. Damage will result if not properly connected.

Absolute Maximum Ratings

IF Input Power	+10 dBm
LO Input Power	+15 dBm
Supply Voltage (Vd1, 2, 3)	+5.5 V
Supply Current (Id total)	700 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
EWU2609YF	RoHS compliant, 5 x 5mm, 32 lead, QFN “F” package
EWU2609YF-EV	*EWU2609YF* on an Evaluation Board

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