










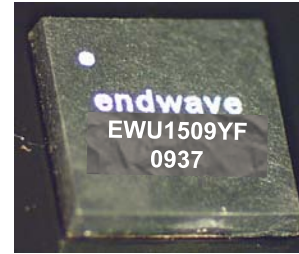


EWU1509YF

Features

-  Extremely high integration
-  Includes converter, LO amplifier, 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

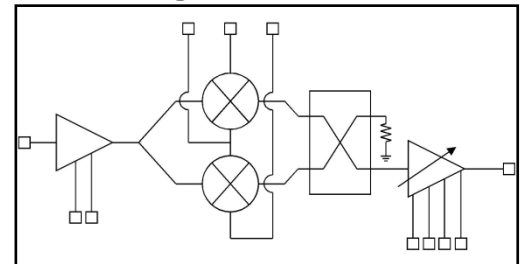
Device Photo



Description

The Endwave *EWU1509YF* is a highly integrated GaAs PHEMT MMIC upconverter that includes LO amplification, along with RF gain adjustability via a unique voltage variable attenuator. The device provides 18 dB of conversion gain with 15 dB of RF gain adjustability, while maintaining +30 dBm output third order intercept over all conditions with 0 dBm of LO input power. This device has integrated ESD Protection Bias Circuitry and 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.

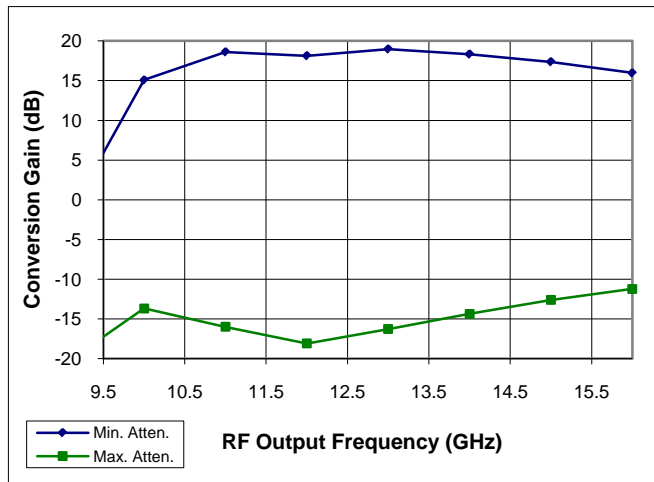
Block Diagram



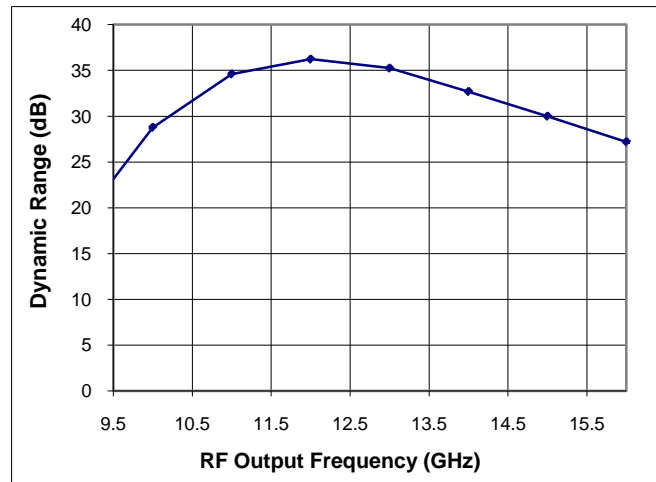
Electrical Characteristics (Temperature = +25°C)

Parameter	Min.	Typ.	Max.	Units
Frequency Range, IF	DC		4	GHz
Frequency Range, RF	10		15.4	GHz
Frequency Range, LO	6		19.4	GHz
Conversion Gain (at max gain)	15	18		dB
Dynamic Range ($V_{gc1,2} = 0$ vs. $-1.5V$)		15		dB
LO Leakage (RF port, all gain settings)		-5		dBm
LO Drive Power		0		dBc
Output 3 rd -Order Intercept (all gain settings)		+30		dBm
Noise Figure (at maximum gain)		17		dB
IF Return Loss		10		dB
LO Return Loss		10		dB
RF Return Loss		10		dB
Drain Bias Voltages (V_{d1}, V_{d2}, V_{d3})		+4.5		V
Drain Bias Currents ($I_{d1}+I_{d2}+I_{d3}$)		500		mA
Gate Bias Voltage (V_{g3})		-1.2		V
Gate Bias Voltage (V_{g4})		-0.6		V
Gate Control Voltage ($V_{gc1,2}$)	-1.5		0	V

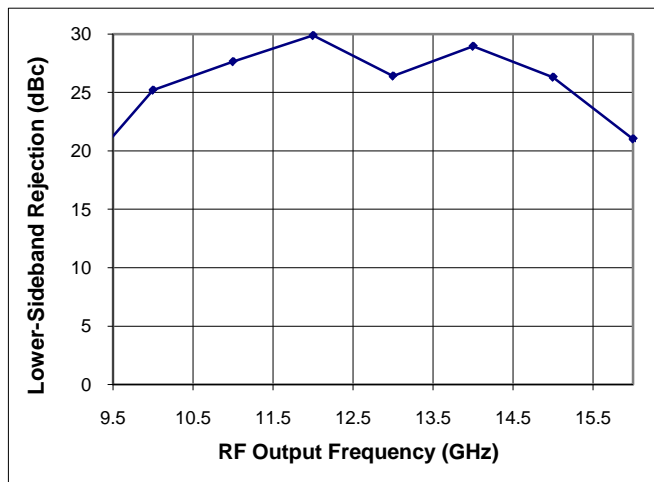
Conversion Gain
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid,
 $P_{LO}=0$ dBm at $F_{LO} = F_{RF} - F_{IF}$



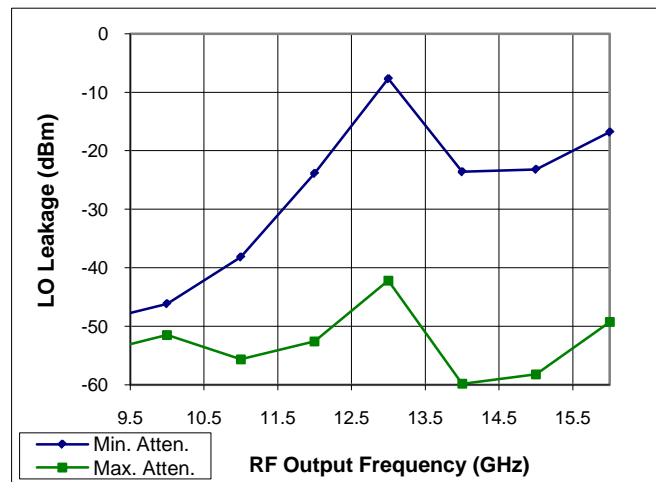
Dynamic Range
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid,
 $P_{LO}=0$ dBm at $F_{LO} = F_{RF} - F_{IF}$



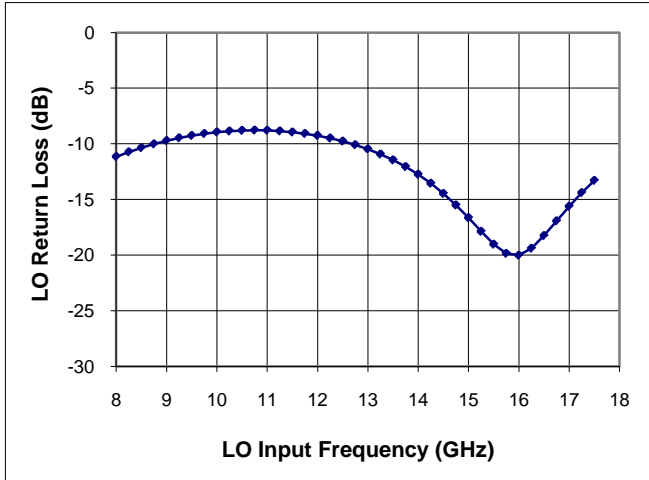
Lower-Sideband Rejection
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid,
 $P_{LO}=0$ dBm at $F_{LO} = F_{RF} - F_{IF}$



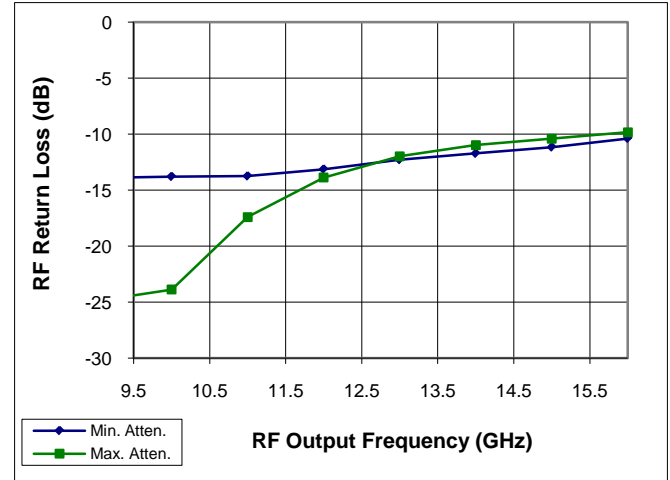
LO Leakage
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid,
 $P_{LO}=0$ dBm at $F_{LO} = F_{RF} - F_{IF}$



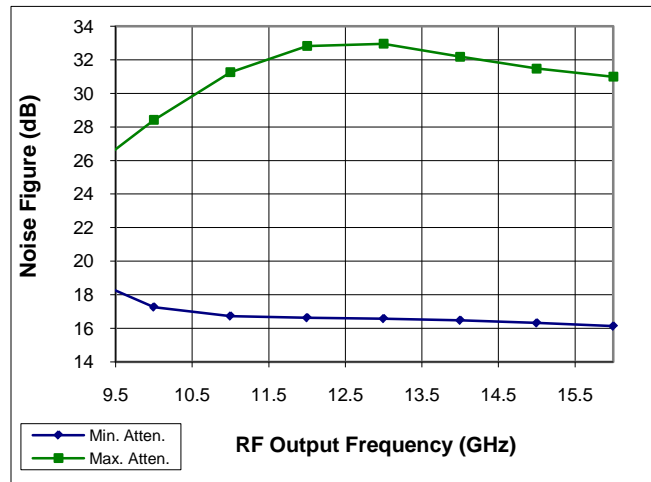
LO Return Loss
VG3=-1.2V, P_{LO}=0 dBm



RF Return Loss
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid,
P_{LO}=0 dBm at F_{LO} = F_{RF} - F_{IF}



Noise Figure
VG3=-1.2V, IF=2 GHz from external 180-degree hybrid,
P_{LO}=0 dBm at F_{LO} = F_{RF} - F_{IF}



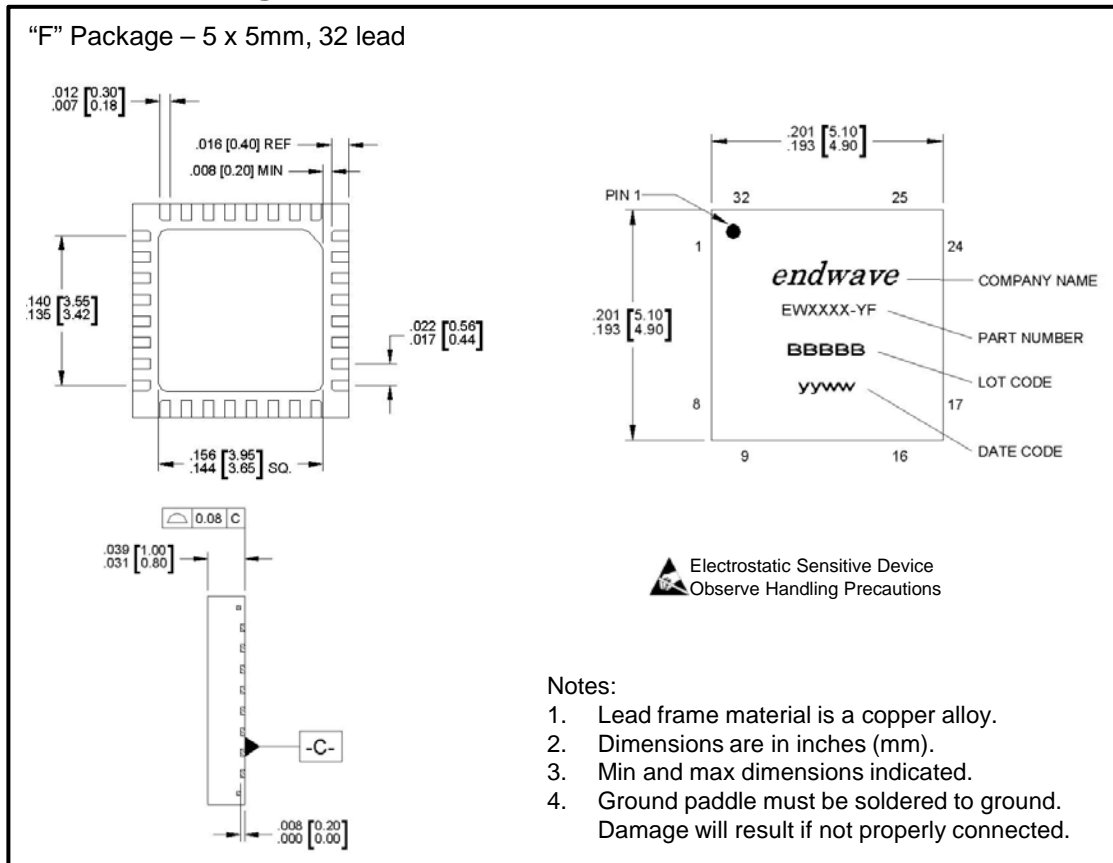
DC & RF Pinout

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.

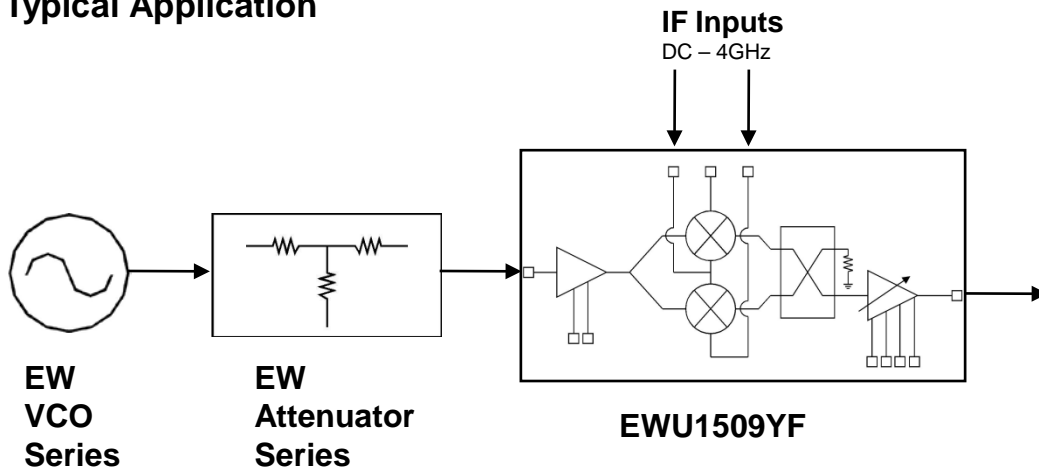
Outline Drawings



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
EWU1509YF	RoHS compliant, 5 x 5mm, 32 lead, QFN "F" package
EWU1509YF-EV	EWU1509YF on an Evaluation Board