

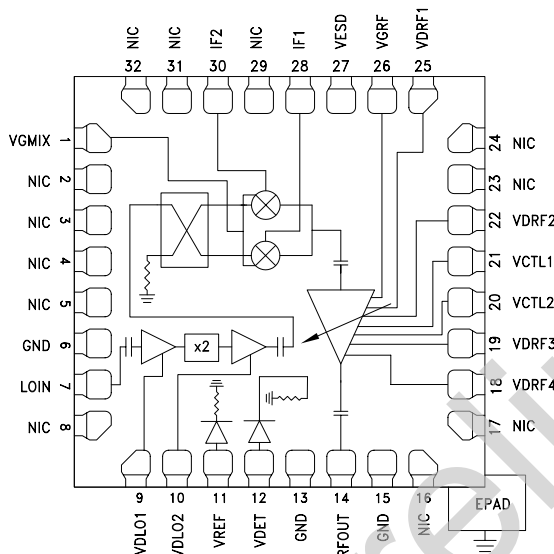
## GaAs MMIC I/Q UPCONVERTER 21 - 24 GHz

### Typical Applications

The HMC7912LP5E is ideal for:

- Point-to-Point and Point-to-Multi-Point Radios
- Military Radar, EW & ELINT
- Satellite Communications
- Sensors

### Functional Diagram



### Features

- Conversion Gain: 14 dB
- Sideband Rejection: 18 dBc
- Dynamic Range: 30 dB
- Output Third-Order Intercept (OIP3): 32 dBm
- x2 LO to RF Leakage: -35 dBm
- 32 Lead 5 mm x 5 mm SMT Package

### General Description

The HMC7912LP5E is a compact GaAs MMIC I/Q upconverter in a RoHS compliant Low Stress Injection Molded Plastic SMT package. This device provides a small signal conversion gain of 14 dB with 18 dBc of sideband rejection. The HMC7912LP5E utilizes a RF amplifier preceded by an I/Q mixer where the LO is driven by a driver amplifier. IF1 and IF2 mixer inputs are provided and an external 90° hybrid is needed to select the required sideband. The I/Q mixer topology reduces the need for filtering of the unwanted sideband. The HMC7912LP5E is a much smaller alternative to hybrid style single sideband upconverter assemblies and it eliminates the need for wire bonding by allowing the use of surface mount manufacturing techniques.

### Electrical Specifications, $T_A = +25^\circ\text{C}$ , $IF = 1000\text{ MHz}$ ,

$LO = 4\text{ dBm}$ ,  $VGMIX = -1.4\text{ V}$ ,  $VDRF = 5\text{ V}$ ,  $VDLO = 3.3\text{ V}$ ,  $VCTL = -6\text{ V}$ ,  $VESD = -5\text{ V}$ ,  $USB$  [1]

Parameter	Min.	Typ.	Max.	Units
RF Frequency Range	21		24	GHz
LO Frequency Range	8.5		14	GHz
IF Frequency Range	DC		3.5	GHz
LO Power	0		6	dBm
Conversion Gain	11	14		dB
Dynamic Range		30		dB
Sideband Rejection	14	18		dBc
Noise Figure at Maximum Gain		10		dB
Noise Figure at 20 dB Attenuation		22		dB
Output Third-Order Intercept (OIP3) at Max Gain	28	32		dBm
x2 LO to RF Leakage			-20	dBm
Total Supply Current (IDLO1 + IDLO2)		110		mA
Total Supply Current (IDRF1 + IDRF2 + IDRF3 + IDRF4)		225		mA

[1] Unless otherwise noted all measurements performed with upper sideband selected and external 90° hybrid at the IF ports.

[2] Adjust VGRF between -2 V and 0 V to achieve total typical RF drain current = 225mA.

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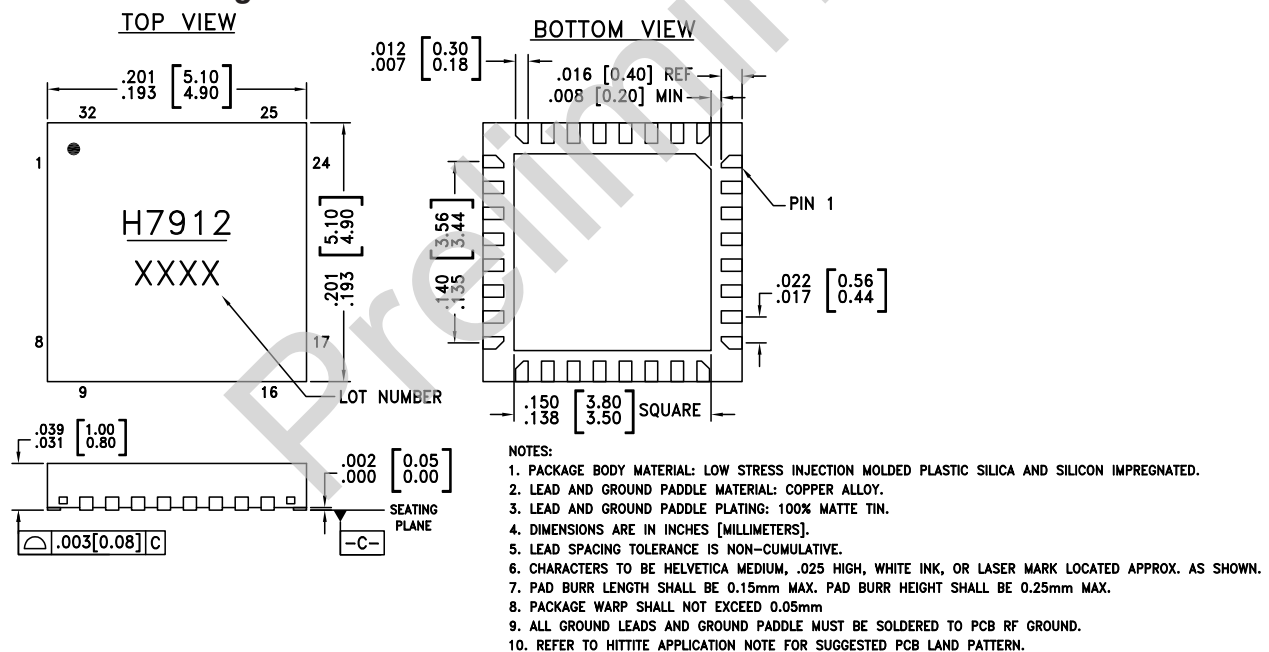
### Absolute Maximum Ratings

Drain Bias Voltage (VDRF)	5.5 V
Gate Bias Voltage (VGRF)	-3 V to 0 V
Drain Bias Voltage (VDLO)	5.5 V
Gain Control Voltage (VCTL)	TBD
Maximum Junction Temperature (to maintain 1 Million hours MTTF)	175 °C
Continuous P <sub>diss</sub> @ Maximum Junction Temperature = 175 °C (T = 85 °C) (derate= 125 mW/ °C above 85 °C)	1.7 W
Thermal Resistance (R <sub>TH</sub> ) (channel to die bottom)	47 °C/W
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to 125°C



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS

### Outline Drawing



### Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [2]
HMC7912LP5E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL3 [1]	H7912 XXXX

[1] Max peak reflow temperature of 260 °C

[2] 4-Digit lot number XXXX