

HBT GAIN BLOCK MMIC AMPLIFIER, 7 - 15 GHz

Typical Applications

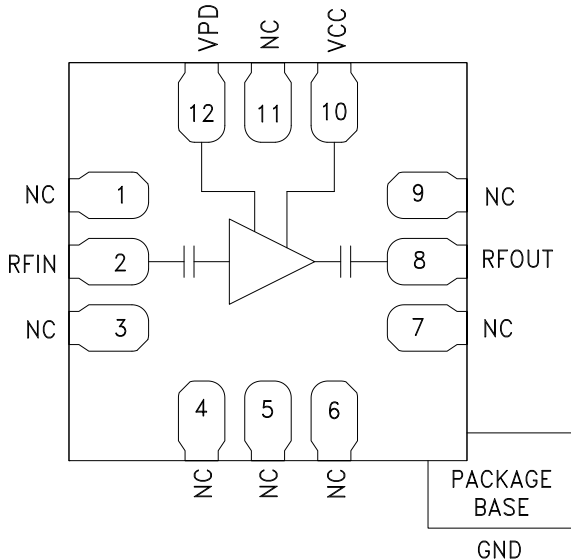
The HMC3653LP3BE is ideal for:

- Point-to-Point Radios
- Point-to-Multipoint Radios
- VSAT
- LO Driver for HMC Mixers
- Military EW & ECM

Features

- High Output IP3: +28 dBm
- Single Positive Supply: +5V
- Low Noise Figure: 4.0 dB ^[1]
- 12 Lead 3x3 mm SMT Package: 9mm²

Functional Diagram



General Description

The HMC3653LP3BE is a HBT Gain Block MMIC amplifier covering 7 GHz to 15 GHz and packaged in a 3x3 mm plastic QFN SMT package. This versatile amplifier can be used as a cascadable IF or RF gain stage in 50 Ohm applications. The HMC3653LP3BE delivers 15 dB gain, and +15 dBm output P1dB with only 4 dB noise figure.

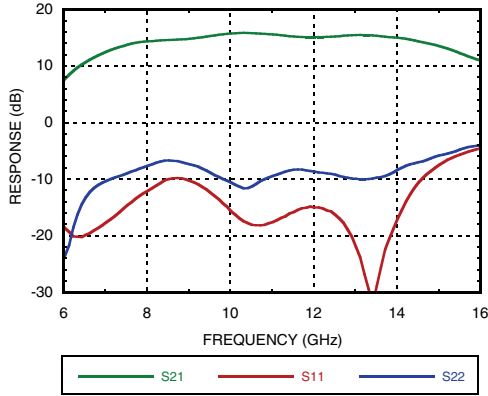
Electrical Specifications, $T_A = +25^\circ\text{C}$, $V_{cc} = 5\text{V}$, $V_{pd} = 5\text{V}$

Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range	7 - 9			9 - 14			14 - 15			GHz
Gain ^[1]	10.5	14		12	15		12	15		dB
Gain Variation Over Temperature		0.016			0.016			0.022		dB / °C
Input Return Loss		14			15			11		dB
Output Return Loss		8			8			7		dB
Output Power for 1 dB Compression (P1dB) ^[1]	13	16		12	15		10.5	13.5		dBm
Output Third Order Intercept (IP3) (Pout = 0 dBm per tone, 1 MHz spacing)		26			28			26		dBm
Noise Figure ^[1]		6			4			4		dB
I _{cc} (V _{pd} = 5V)		40	55		40	55		40	55	mA
I _{cc} (V _{pd} = 0V)		4	6		4	6		4	6	mA

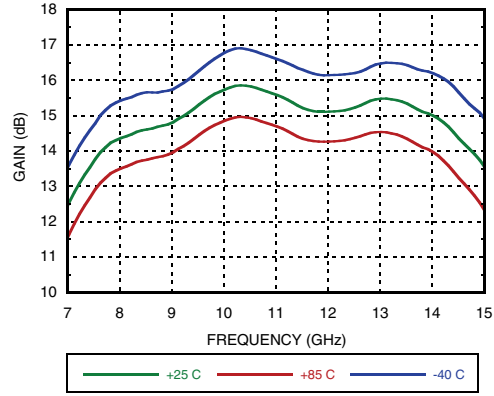
[1] Board loss subtracted out

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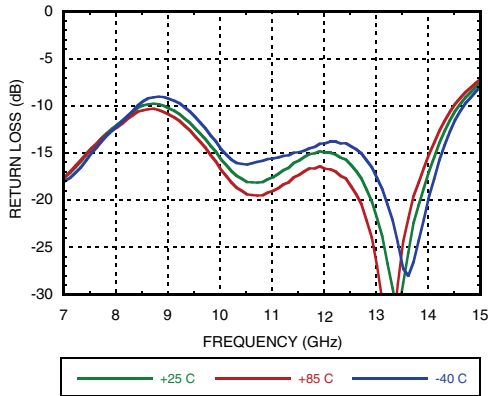
Gain & Return Loss



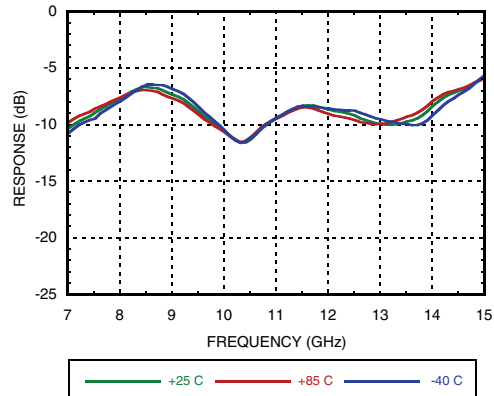
Gain vs. Temperature



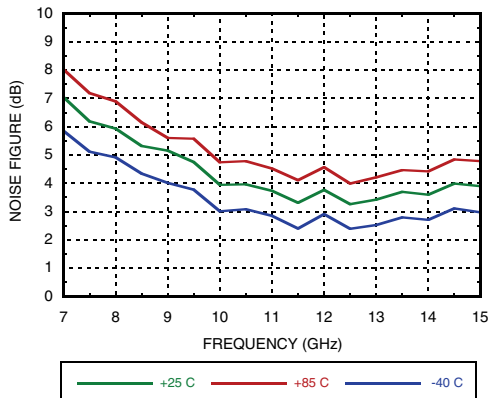
Input Return Loss vs. Temperature



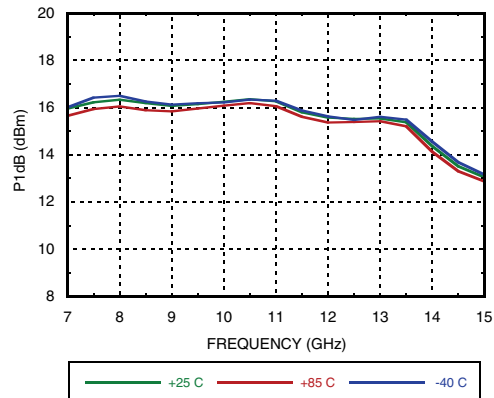
Output Return Loss vs. Temperature



Noise Figure vs. Temperature

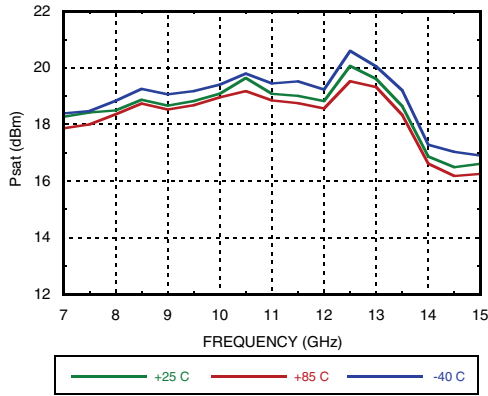


P1dB vs. Temperature

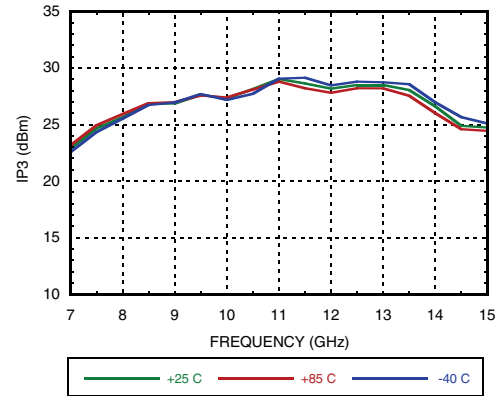


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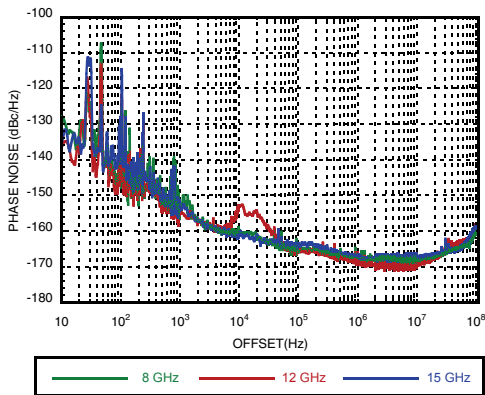
Psat vs. Temperature



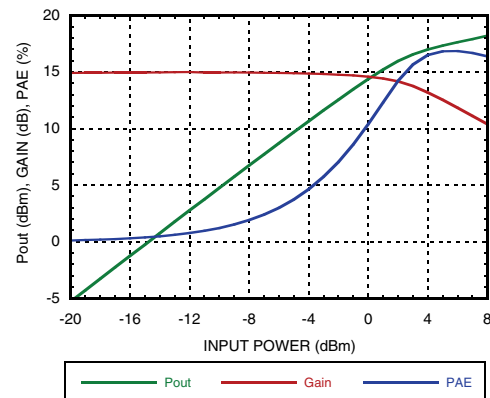
Output IP3 vs Temperature



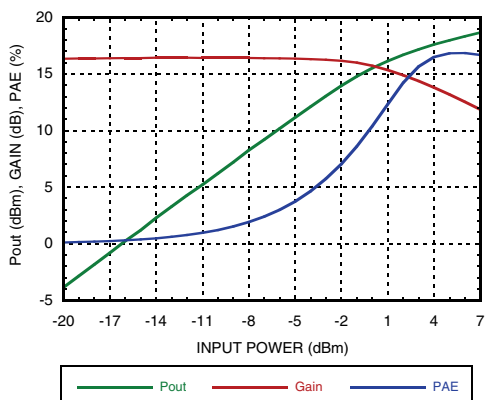
Phase Noise @ Pin=0 dBm



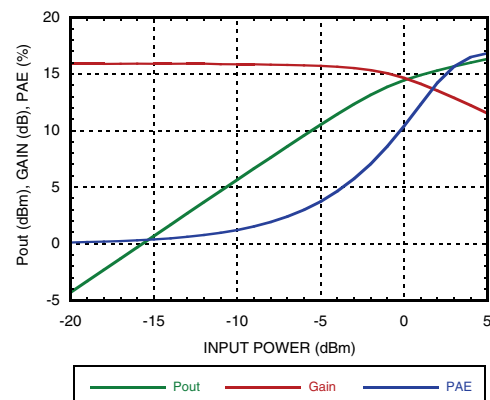
Power Compression @ 8 GHz



Power Compression @ 11 GHz

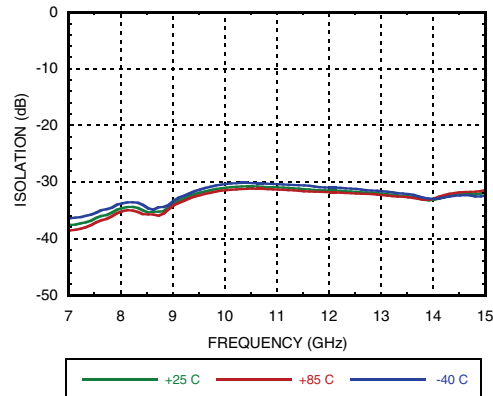


Power Compression @ 14 GHz



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Reverse Isolation



Absolute Maximum Ratings

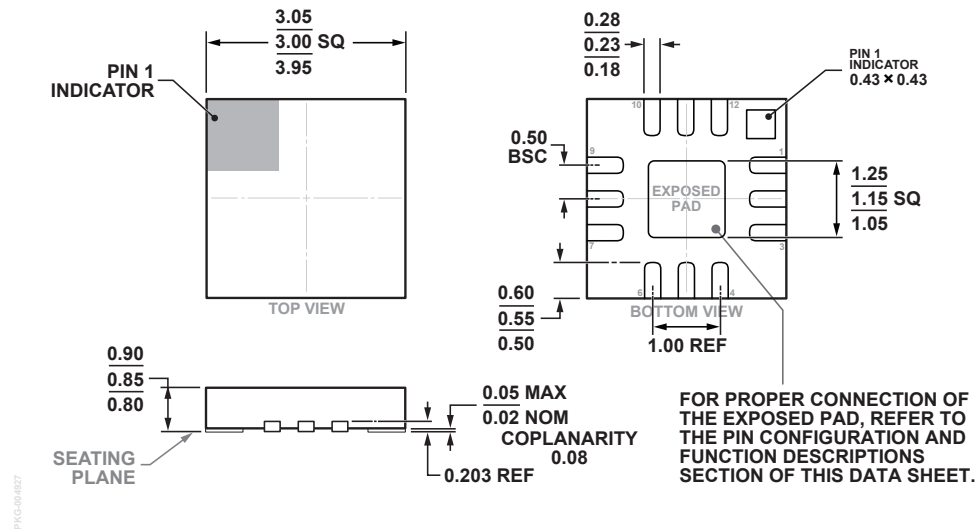
Drain Bias Voltage	6 Vdc
RF Input Power (RFIN)	+12 dBm
Channel Temperature	150 °C
Continuous P _{diss} (T=85 °C) (derate 7.87 mW/ °C Above +85 °C)	512 mW
Thermal Resistance (channel to ground paddle)	127 °C/W
Storage Temperature	-65 to 150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A



ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

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Outline Drawing



12-Lead Lead Frame Chip Scale Package [LFCSP]
3 mm × 3 mm Body and 0.85 mm Package Height
(CP-12-10)

Dimensions shown in millimeters

Package Information

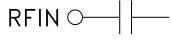
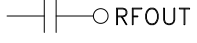
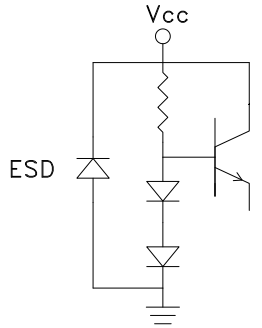
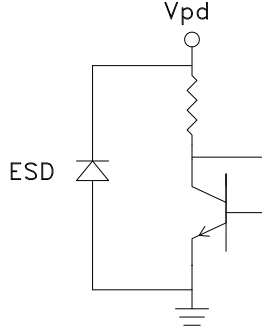
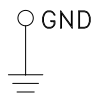
Part Number	Package Body Material	Lead Finish	MSL Rating [2]	Package Marking [1]
HMC3653LP3BE	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1	H3653 XXXX

[1] 4-Digit lot number XXXX

[2] Max peak reflow temperature of 260 °C

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Pin Descriptions

Pid Number	Function	Description	Interface Schematic
1, 3, 4, 5, 6, 7, 9, 11	NC	No connection necessary. These pins may be connected to RF/DC ground. Performance will not be affected.	
2	RFIN	This pin is AC coupled and matched to 50 Ohms.	RFIN 
8	RFOUT	This pin is AC coupled and matched to 50 Ohms.	 RFOUT
10	Vcc	Power supply voltage for the amplifier	
12	Vpd	Power Control Pin for proper control bias	
GND Paddle	GND	Ground Paddle must be connected to RF/DC ground.	

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Application Circuit

