HMC433 / 433E

v04.0410

SMT GaAs HBT MMIC DIVIDE-BY-4, DC - 8 GHz

Typical Applications

Prescaler for DC to C Band PLL Applications:

- UNII, Point-to-Point & VSAT Radios
- 802.11a & HiperLAN WLAN
- Fiber Optic
- Cellular / 3G Infrastructure

Features

Ultra Low SSB Phase Noise: -150 dBc/Hz

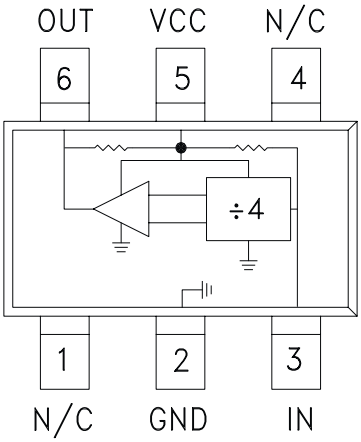
Single-Ended I/O's

Output Power: -2 to -3.5 dBm

Single DC Supply: +3V @ 53 mA

9 mm² Ultra Small Package: SOT26

Functional Diagram



General Description

The HMC433(E) is a low noise Divide-by-4 Static Divider utilizing InGaP GaAs HBT technology in ultra small surface mount SOT26 plastic packages. This device operates from DC (with a square wave input) to 8 GHz input frequency with a single +3V DC supply. Single-ended inputs and outputs reduce component count and cost. The low additive SSB phase noise of -150 dBc/Hz at 100 kHz offset helps the user maintain good system noise performance.

Electrical Specifications, T_A = +25° C, 50 Ohm System, Vcc= +3V

Parameter	Conditions	Min.	Typ.	Max.	Units
Maximum Input Frequency		8	8.5		GHz
Minimum Input Frequency	Sine Wave Input. [1]		0.2		GHz
Input Power Range	Fin= 1 to 6 GHz Fin= 6 to 8 GHz	-12 -3		+12 +10	dBm dBm
Output Power	Fin= 4 GHz Fin= 8 GHz	-5.0 -6.5	-2.0 -3.5		dBm dBm
Reverse Leakage	RF Output Terminated, Fin= 4 GHz, Pin= 0 dBm		-25		dBm
SSB Phase Noise (100 kHz offset)	Pin= 0 dBm, Fin= 4 GHz		-150		dBc/Hz
Output Transition Time	Pin= 0 dBm, Fout= 882 MHz		120		ps
Supply Current (Icc)	Vcc= +3.0V		53	71	mA

1. Divider will operate down to DC for square-wave input signal.

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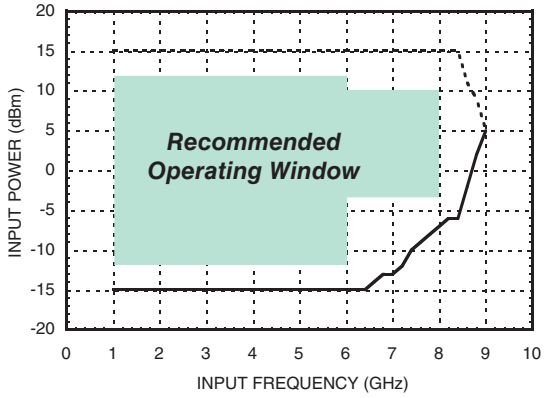
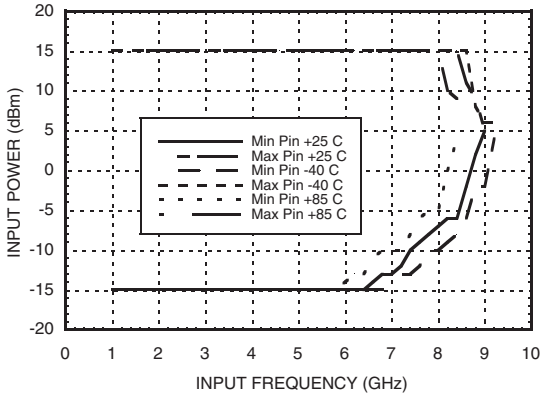
RoHS✓ EARTH FRIENDLY

SMT GaAs HBT MMIC DIVIDE-BY-4, DC - 8 GHz

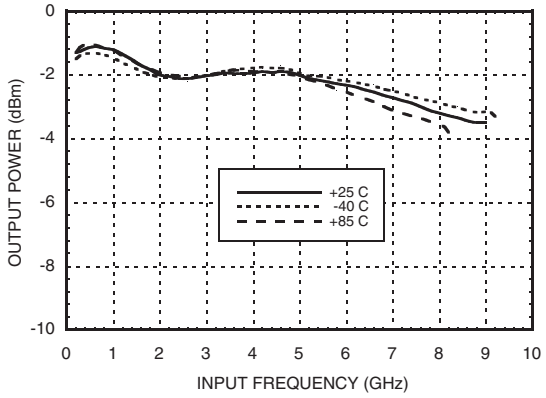
Input Sensitivity Window, T= 25 °C



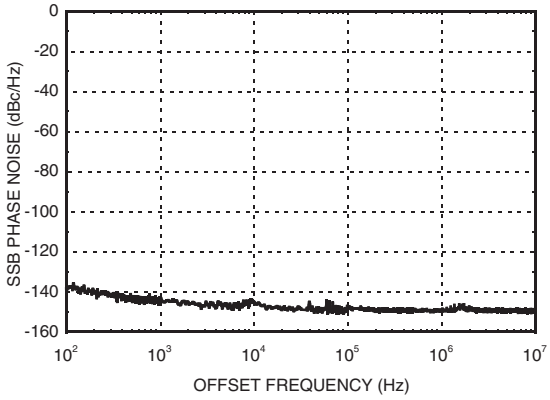
Input Sensitivity Window vs. Temperature



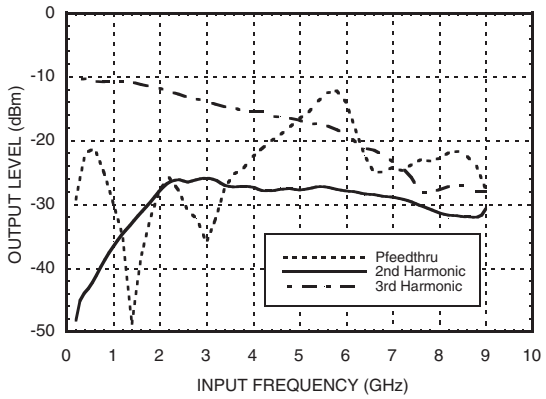
Output Power vs. Temperature



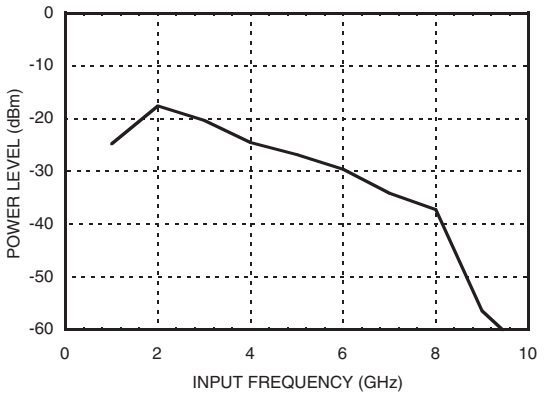
SSB Phase Noise Performance, Pin= 0 dBm, T= 25 °C



Output Harmonic Content, Pin= 0 dBm, T= 25 °C



Reverse Leakage, Pin= 0 dBm, T= 25 °C



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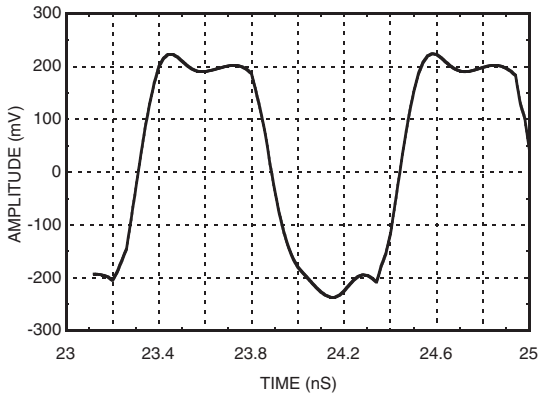
Output Voltage Waveform,
Pin= 0 dBm, Fout= 882 MHz, T= 25 °C



Absolute Maximum Ratings

RF Input Power (Vcc = +3V)	15 dBm
Nominal +3V Supply to GND	-0.3V to +3.5V
Max Peak Flow Temperature	260 °C
Storage Temperature	-65 to +125 °C

Reliability Information

Junction Temperature to Maintain 1 Million Hour MTTF	135 °C
Nominal Junction Temperature (T = 85 °C)	99 °C
Thermal Resistance (Junction to GND Paddle, 3V Supply)	83 °C/W
Operating Temperature	-40 to +85 °C

DC blocking capacitors are required at RF input and RF output ports. Choose value for lowest frequency of operation.

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

Typical Supply Current vs. Vcc

Vcc (V)	Icc (mA)
2.70	42
3.0	53
3.30	63

Note: Divider will operate over full voltage range shown above

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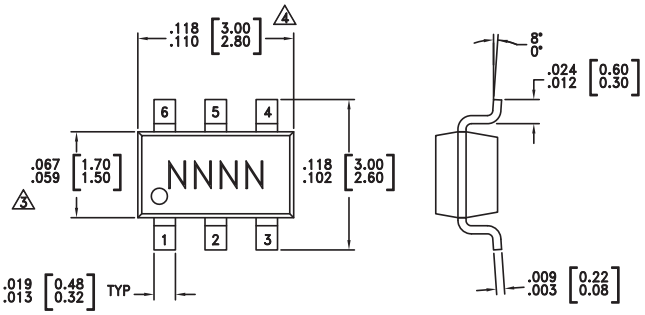
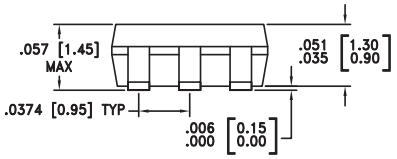
Outline Drawing





NOTES:

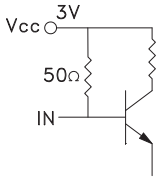
1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS]
3. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
4. PAD BURR LENGTH SHALL BE 0.15mm MAXIMUM. PAD BURR HEIGHT SHALL BE 0.05mm MAXIMUM.
5. PACKAGE WARP SHALL NOT EXCEED 0.05mm.
6. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF GROUND.
7. REFER TO HITTITE APPLICATION NOT FOR SUGGESTED LAND PATTERN.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC433	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H433 XXXX
HMC433E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	433E XXXX

[1] Max peak reflow temperature of 235 °C
[2] Max peak reflow temperature of 260 °C
[3] 4-Digit lot number XXXX

Pin Description

Pin Number	Function	Description	Interface Schematic
1, 4	N/C	The pins are not connected internally; however, all data shown herein was measured with these pins connected to RF/DC ground externally.	
2	GND	Pin must connect ro RF/DC ground.	
3	IN	RF input must be DC blocked.	

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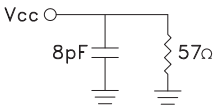
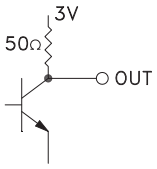
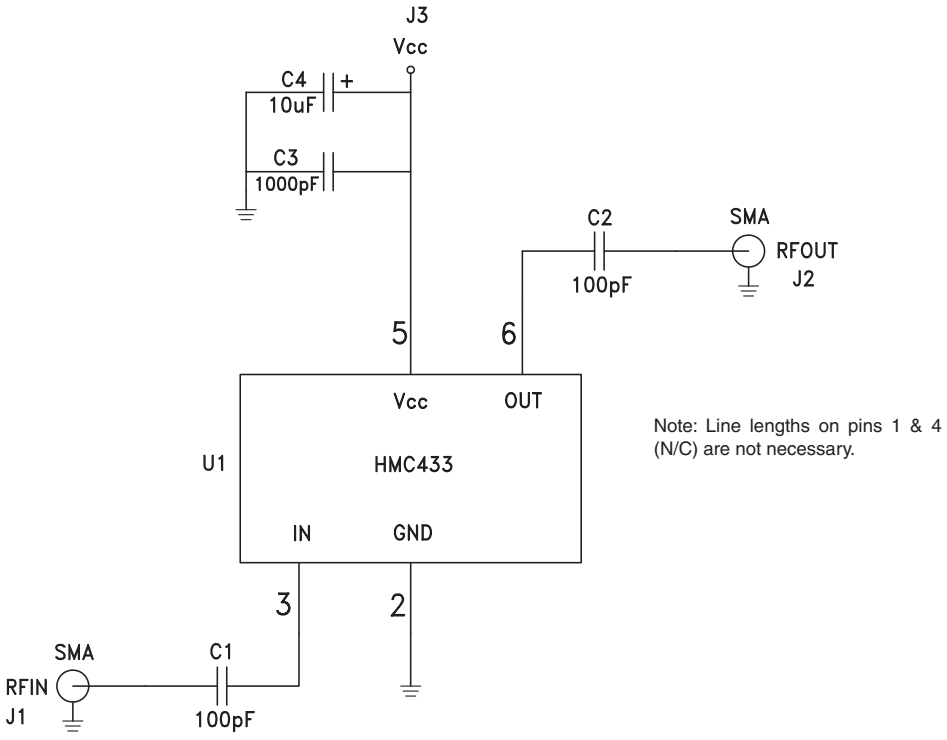
Pin Description *(Continued)*

Pin Number	Function	Description	Interface Schematic
5	Vcc	Supply voltage 3V ± 0.3V.	
6	OUT	Divided output must be DC blocked.	

Application Circuit



Note: Line lengths on pins 1 & 4 (N/C) are not necessary.

Note:

DC blocking capacitor values (C1, C2) and DC decoupling capacitor values (C3, C4) are chosen for lowest frequency of operation.

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