

Typical Applications

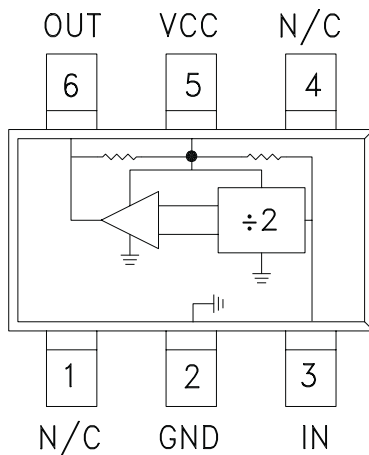
Prescaler for DC to C Band PLL Applications:

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

Features

- Ultra Low SSB Phase Noise: -148 dBc/Hz
- Single-Ended I/O's
- Output Power: -3 to -9 dBm
- Single DC Supply: +3V @ 42 mA
- 9 mm² Ultra Small Package: SOT26

Functional Diagram



General Description

The HMC432 & HMC432E are low noise Divide-by-2 Static Dividers utilizing InGaP GaAs HBT technology in ultra small surface mount SOT26 plastic packages. This device operates from DC (with a square wave input) to 8.0 GHz input frequency with a single +3.0V DC supply. Single-ended inputs and outputs reduce component count and cost. The low additive SSB phase noise of -148 dBc/Hz at 100 kHz offset helps the user maintain good system noise performance.

Electrical Specifications, $T_A = +25^\circ \text{C}$, 50 Ohm System, $V_{CC} = +3V$

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	$F_{in} = 1 \text{ to } 7 \text{ GHz}$ $F_{in} = 7 \text{ to } 8 \text{ GHz}$	-12 -4	-15 -8	+12 +10	dBm
Output Power	$F_{in} = 4 \text{ GHz}$ $F_{in} = 8 \text{ GHz}$	-6 -12	-3 -9		dBm dBm
Reverse Leakage	RF Output Terminated, $F_{in} = 4 \text{ GHz}$, $P_{in} = 0 \text{ dBm}$		-30		dBm
SSB Phase Noise (100 kHz offset)	$P_{in} = 0 \text{ dBm}$, $F_{in} = 4 \text{ GHz}$		-148		dBc/Hz
Output Transition Time	$P_{in} = 0 \text{ dBm}$, $F_{out} = 882 \text{ MHz}$		145		ps
Supply Current (I_{CC})	$V_{CC} = 3.0 \text{ V}$		42		mA

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



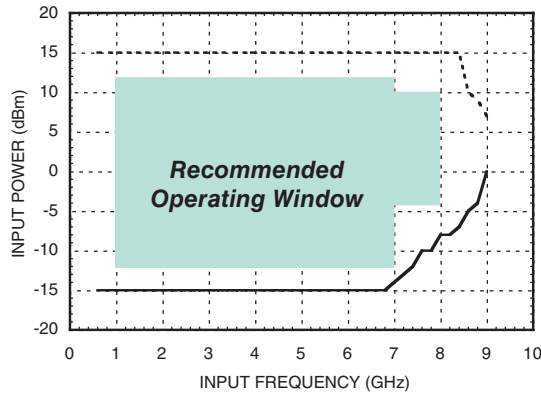
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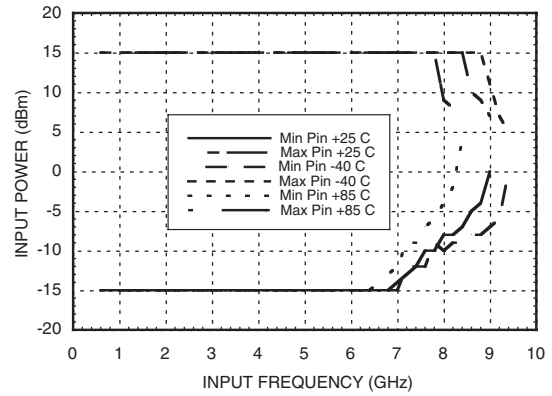
HMC432 / 432E

SMT GaAs HBT MMIC DIVIDE-BY-2, DC - 8.0 GHz

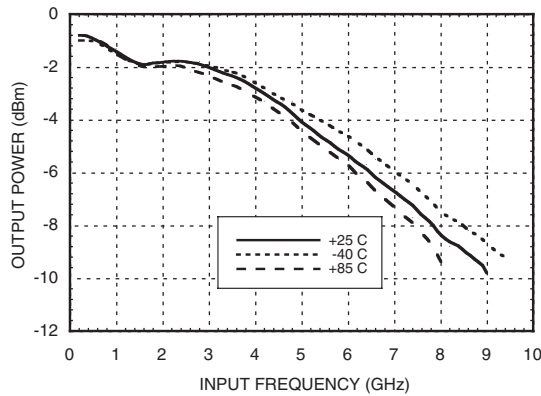
Input Sensitivity Window, T= 25 °C



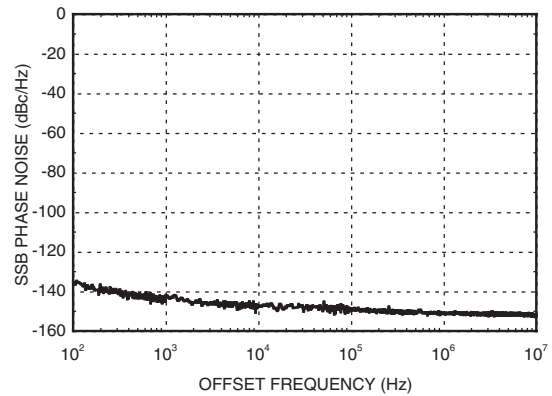
Input Sensitivity Window vs. Temperature



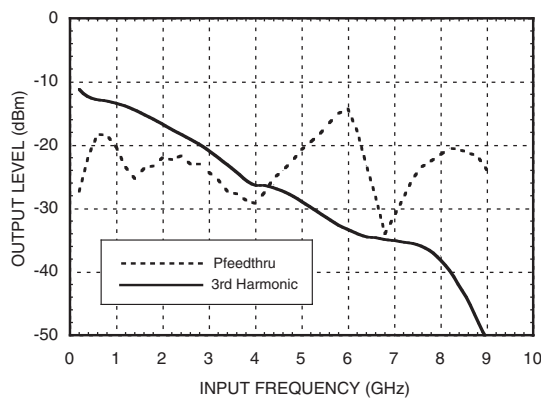
Output Power vs. Temperature



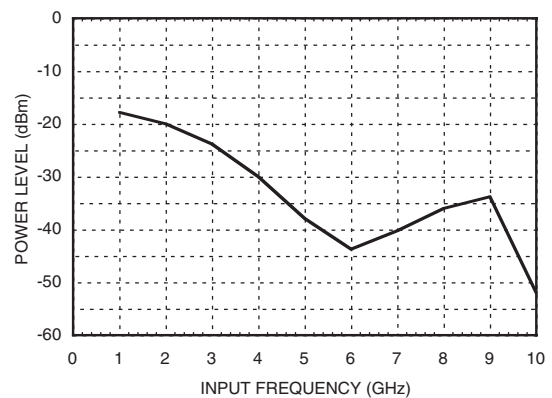
SSB Phase Noise Performance, Pin= 0 dBm, T= 25 °C



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



Reverse Leakage, Pin= 0 dBm, T= 25 °C





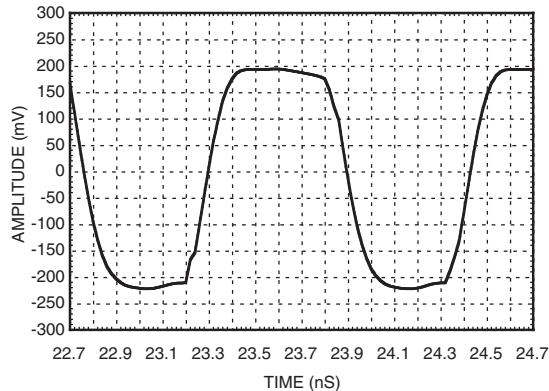
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HMC432 / 432E

SMT GaAs HBT MMIC DIVIDE-BY-2, DC - 8.0 GHz

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



Absolute Maximum Ratings

RF Input (Vcc= +3.0V)	+15 dBm
Vcc	+3.5V
Maximum Channel Temperature	135 °C
Continuous P _{diss} (T=85 °C) (derate 4.44mW/°C above 85 °C)	222 mW
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

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



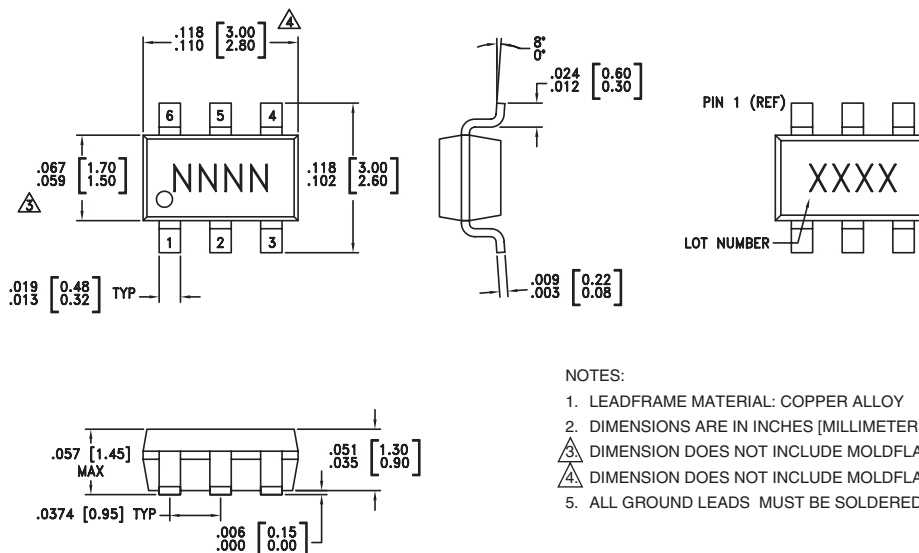
**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Typical Supply Current vs. Vcc

Vcc (V)	I _{cc} (mA)
2.70	34
3.0	42
3.30	50

Note: Divider will operate over full voltage range shown above

Outline Drawing



NOTES:

1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking ^[3]
HMC432	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 ^[1]	H432 XXXX
HMC432E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 ^[2]	432E XXXX


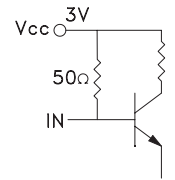
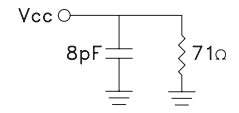
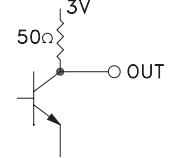
[1] Max peak reflow temperature of 235 °C

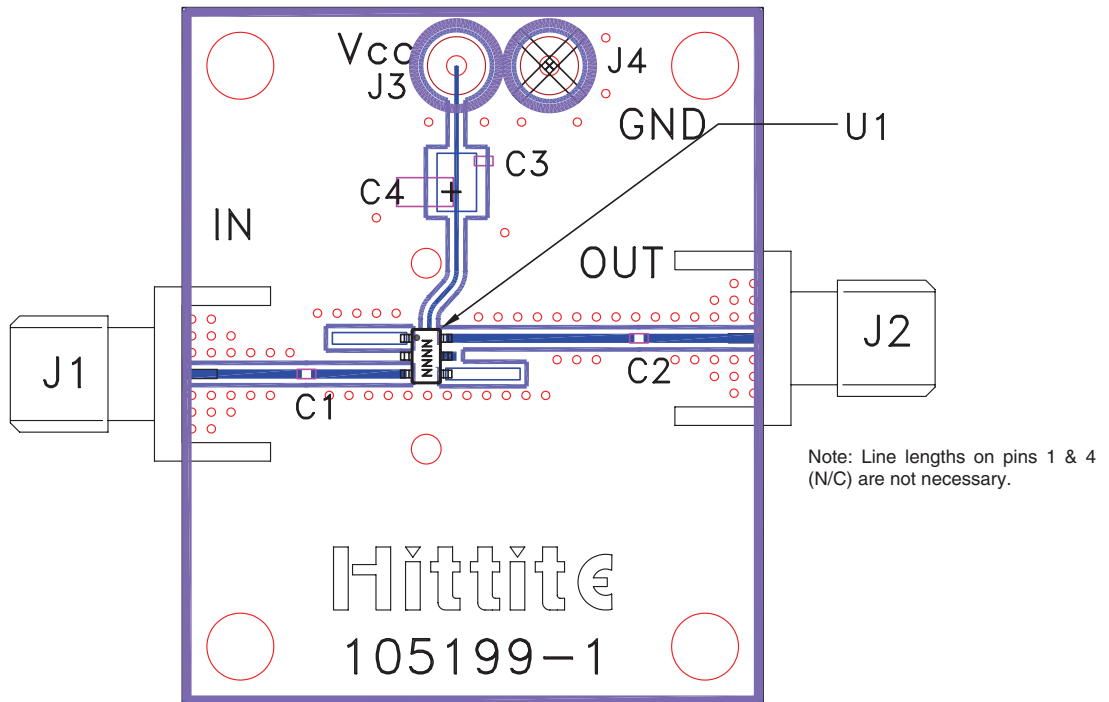
[2] Max peak reflow temperature of 260 °C

[3] 4-Digit lot number XXXX

For price, delivery, and to place orders, please contact Hittite Microwave Corporation:
 20 Alpha Road, Chelmsford, MA 01824 Phone: 978-250-3343 Fax: 978-250-3373
 Order On-line at www.hittite.com

Pin Description

Pin Number	Function	Description	Interface Schematic
1, 4	N/C	No Connection	
2	GND	Pin must connect to RF/DC ground.	
3	IN	RF input must be DC blocked.	
5	Vcc	Supply voltage 3V ± 0.3V.	
6	OUT	Divided output must be DC blocked.	

Evaluation PCB

List of Materials for Evaluation PCB 105675 [1]

Item	Description
J1 - J2	PCB Mount SMA RF Connector
J3 - J4	DC Pin
C1 - C2	100 pF Capacitor, 0402 Pkg.
C3	1000 pF Capacitor, 0402 Pkg.
C4	10 µF Tantalum Capacitor, 1206 Pkg.
U1	HMC432 / HMC432E Divide-by-2
PCB [2]	105199 Eval Board

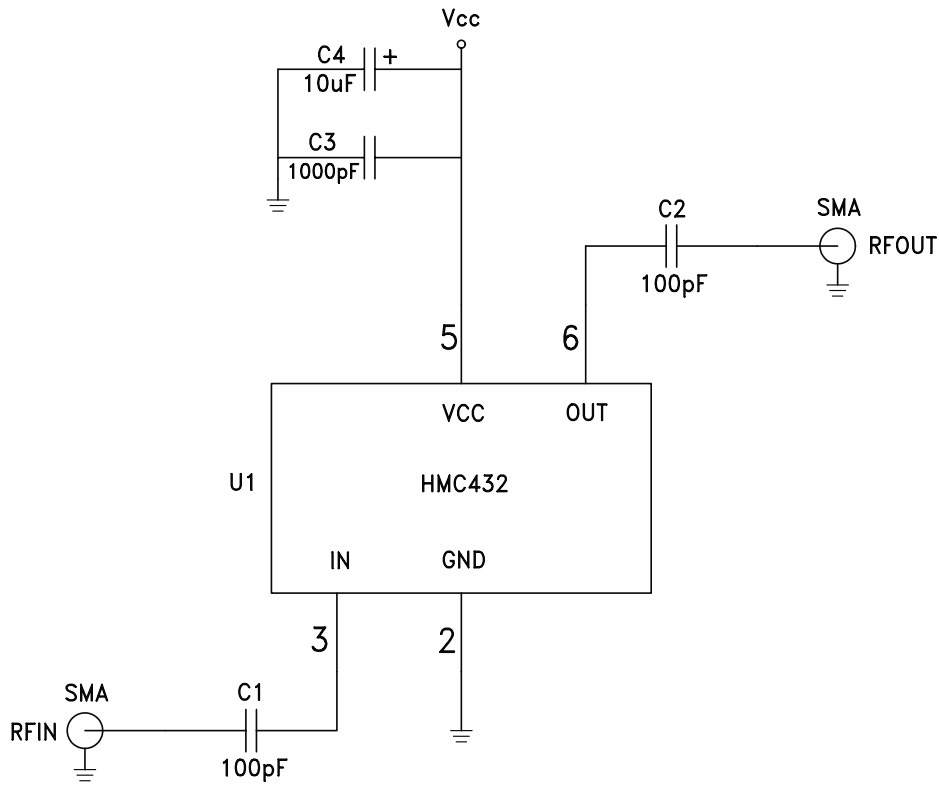
[1] Reference this number when ordering complete evaluation PCB

[2] Circuit Board Material: Rogers 4350

The circuit board used in the final application should use RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation circuit board shown is available from Hittite upon request.



Application Circuit



Note:

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