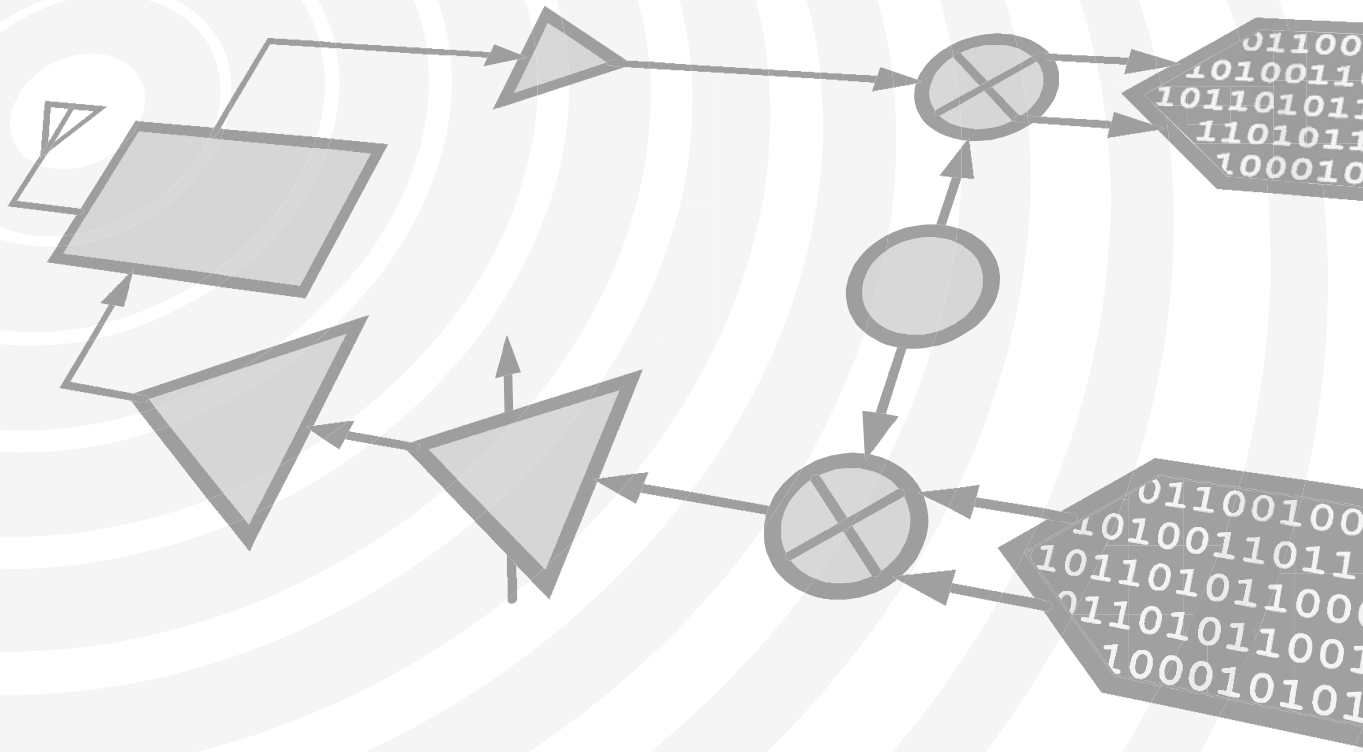
ANALOG DEVICES

Hittite
MICROWAVE PRODUCTS
FROM ANALOG DEVICES

Analog Devices Welcomes Hittite Microwave Corporation

NO CONTENT ON THE ATTACHED DOCUMENT HAS CHANGED



www.analog.com

www.hittite.com

THIS PAGE INTENTIONALLY LEFT BLANK

Hittite MICROWAVE CORPORATION v04.0709

RoHS EARTH FRIENDLY

HMC188MS8 / 188MS8E

GaAs MMIC SMT PASSIVE FREQUENCY DOUBLER, 1.25 - 3.0 GHz INPUT

Typical Applications

The HMC188MS8 / HMC188MS8E is suitable for:

- Wireless Local Loop
- LMDS, VSAT, and Point-to-Point Radios
- UNII & HiperLAN
- Test Equipment

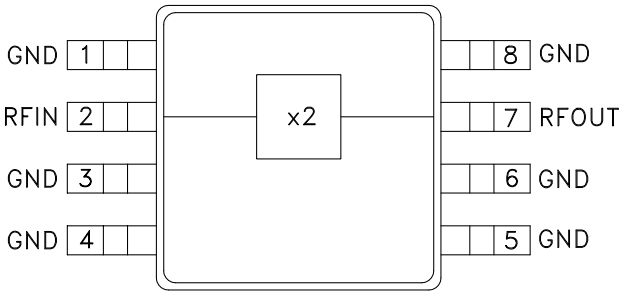
Features

Conversion Loss: 15 dB

Fo, 3Fo, 4Fo Isolation: 45 dB

Input Drive Level: 10 to 20 dBm

Functional Diagram



General Description

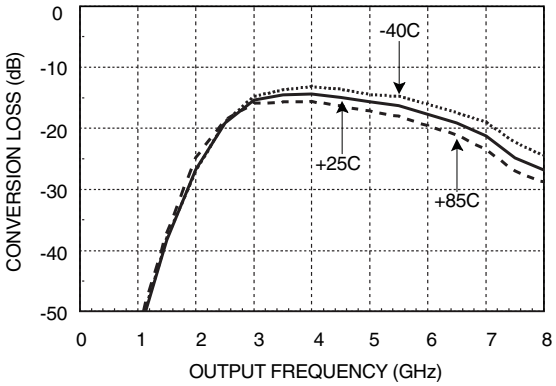
The HMC188MS8 & HMC188MS8E are miniature frequency doublers in plastic 8-lead MSOP packages. The suppression of undesired fundamental and higher order harmonics is 45 dB typical with respect to input signal levels. The doubler uses the same diode/balun technology used in Hittite MMIC mixers. The doubler is ideal for high volume applications where frequency doubling of a lower frequency is more economical than directly generating a higher frequency. The passive Schottky diode doubler technology contributes no measurable additive phase noise onto the multiplied signal.

Electrical Specifications, T_A = +25° C, As a Function of Drive Level

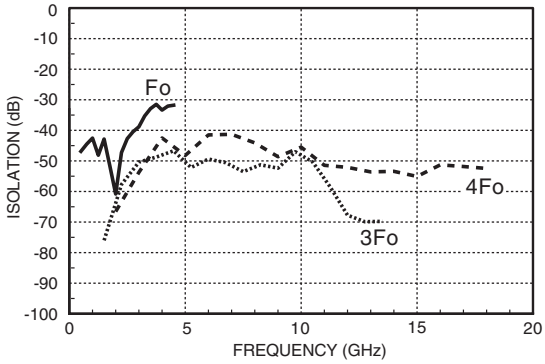
	Input = +10 dBm			Input = +15 dBm			Input = +20 dBm			
Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range, Input	1.75 - 2.75			1.5 - 2.5			1.25 - 3.0			GHz
Frequency Range, Output	3.5 - 5.5			3.0 - 5.0			2.5 - 6.0			GHz
Conversion Loss		19	22		15	18		16	19	dB
FO Isolation (with respect to input level)				35	45					dB
3FO Isolation (with respect to input level)				43	50					dB
4FO Isolation (with respect to input level)				38	45					dB

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

Conversion Loss @ +15 dBm Drive Level

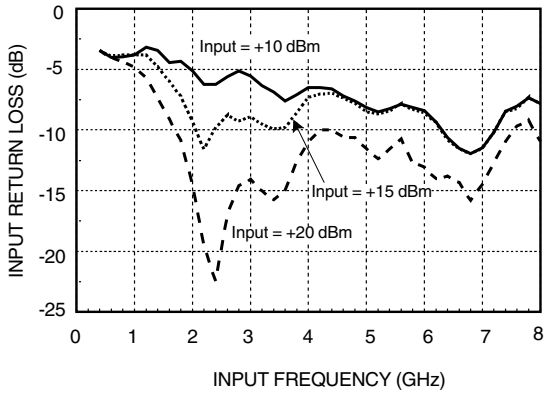


Isolation @ +15 dBm Drive Level*

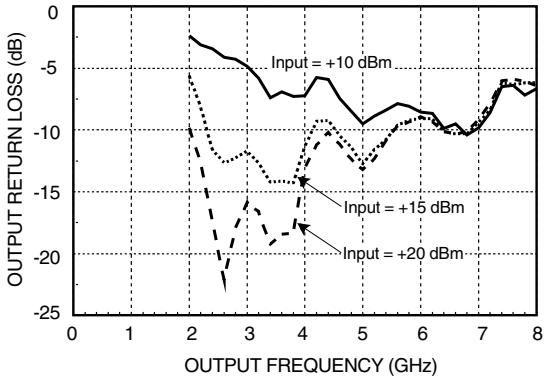


*With respect to input level

Input Return Loss vs. Drive Level

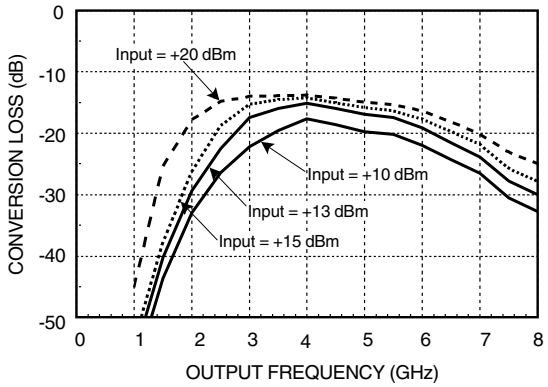


Output Return Loss vs. Drive Level



Note: Output return loss measured at 2fo, with +10dBm, +15 dBm, and +20 dBm drive levels on input of doubler.

Conversion Loss vs. Drive Level



Absolute Maximum Ratings

Input Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-40 to +85 °C
ESD Sensitivity (HBM)	Class 1A

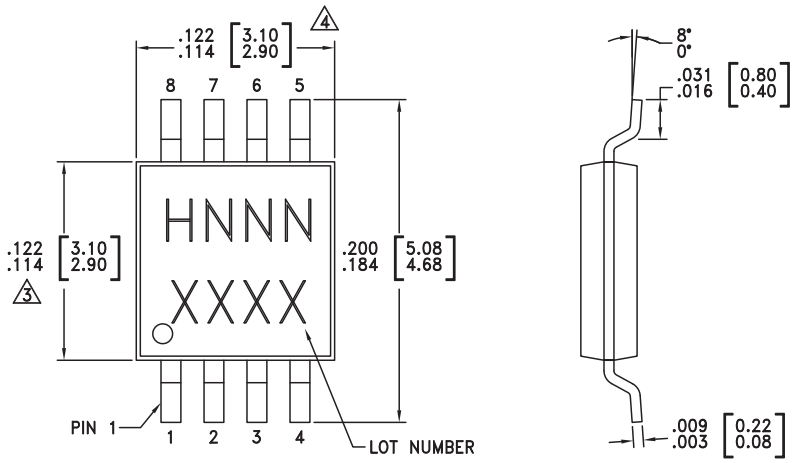
ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

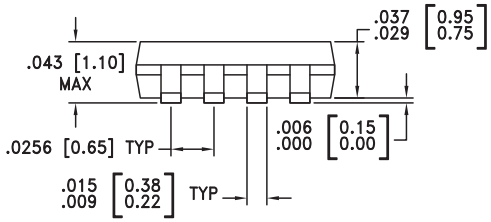
MICROWAVE CORPORATION v04.0709

HMC188MS8 / 188MS8E

GaAs MMIC SMT PASSIVE FREQUENCY DOUBLER, 1.25 - 3.0 GHz INPUT

Outline Drawing





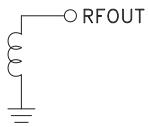
NOTES:
1. LEADFRAME MATERIAL: COPPER ALLOY
2. DIMENSIONS ARE IN INCHES [MILLIMETERS].
3. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.15mm PER SIDE.
4. DIMENSION DOES NOT INCLUDE MOLDFLASH OF 0.25mm PER SIDE.
5. ALL GROUND LEADS MUST BE SOLDERED TO PCB RF GROUND.

Package Information

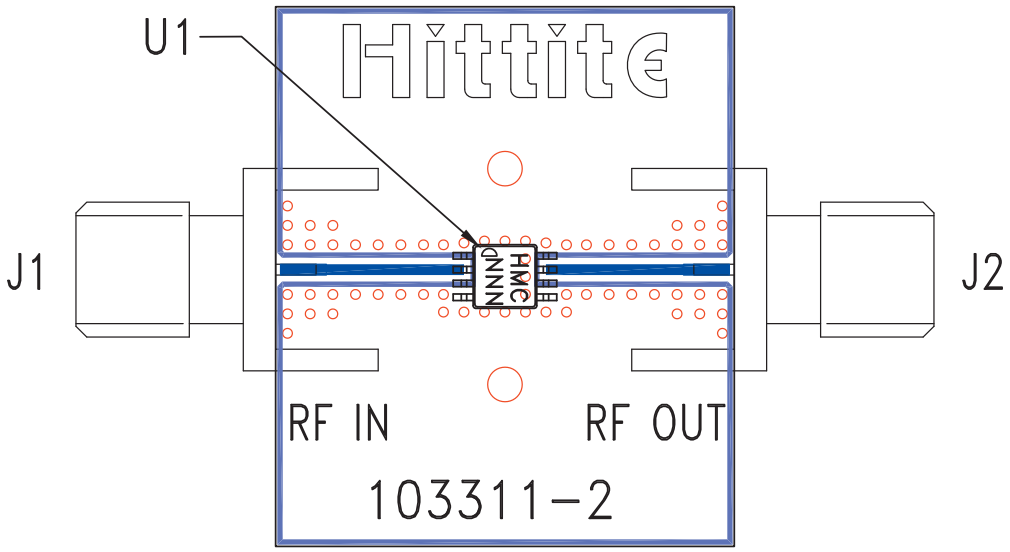
Part Number	Package Body Material	Lead Finish	MSL Rating	Package Marking [3]
HMC188MS8	Low Stress Injection Molded Plastic	Sn/Pb Solder	MSL1 [1]	H188 XXXX
HMC188MS8E	RoHS-compliant Low Stress Injection Molded Plastic	100% matte Sn	MSL1 [2]	H188 XXXX

[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, 3 - 6, 8	GND	All ground leads must be soldered to PCB RF/DC ground.	
2	RFIN	Pin is DC coupled and matched to 50 Ohms from 1.25 to 3.0 GHz	
7	RFOUT	Pin is DC coupled and matched to 50 Ohms from 2.5 to 6.0 GHz	

Evaluation PCB



List of Materials for Evaluation PCB 103313 [1]

Item	Description
J1 - J3	PCB Mount SMA Connector
C1	1,000 pF Capacitor, 0603 Pkg.
U1	HMC188MS8 / HMC188MS8E x4 Active Multiplier
PCB [2]	104610 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 be generated with proper RF circuit design techniques. Signal lines should have 50 ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. The evaluation circuit board shown is available from Hittite upon request.

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.