

## GaAs MMIC SMT FREQUENCY DOUBLER 0.85 - 2.0 GHz INPUT

FEBRUARY 1998

### Features

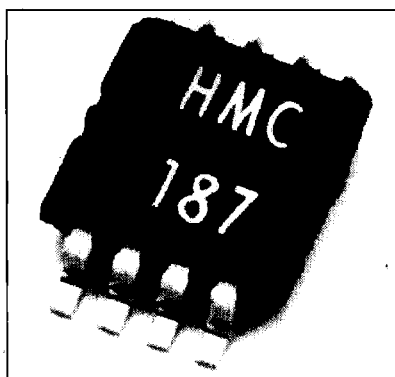
CONVERSION LOSS: 16 dB

Fo, 3Fo, 4Fo ISOLATION: 40 dB

INPUT DRIVE LEVEL: 10 to 20 dBm

### General Description

The HMC187MS8 is a miniature frequency doubler in a plastic 8-lead MSOP package. The suppression of the undesired fundamental and higher order harmonics is typically 40 to 50 dB with respect to input signal levels. The doubler uses same diode/balun structures 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.



Frequency  
Doublers

### Electrical Performance, 50 Ohm system -40 to +85 deg C

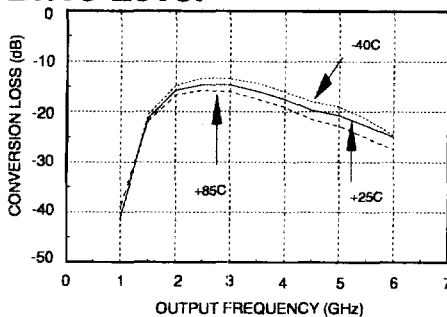
| Typical Electrical Performance vs. Drive Level |           |          |          |       |
|------------------------------------------------|-----------|----------|----------|-------|
|                                                | 10 dBm    | 15 dBm   | 20 dBm   | Units |
| Input Frequency Range                          | 1.25-1.75 | 1.0-1.75 | 0.85-2.0 | GHz   |
| Output Frequency Range                         | 2.5-3.5   | 2.0-3.0  | 1.7-4.0  | GHz   |
| Conversion Loss                                | 20        | 15       | 16       | dB    |

| Performance for Input Signals in the 1.0 - 1.75 GHz Band (+15dBm Drive) |     |     |     |       |
|-------------------------------------------------------------------------|-----|-----|-----|-------|
|                                                                         | Min | Typ | Max | Units |
| Fo Isolation (with respect to input level)                              | 35  | 45  |     | dB    |
| 3Fo Isolation (with respect to input level)                             | 46  | 52  |     | dB    |
| 4Fo Isolation (with respect to input level)                             | 33  | 40  |     | dB    |

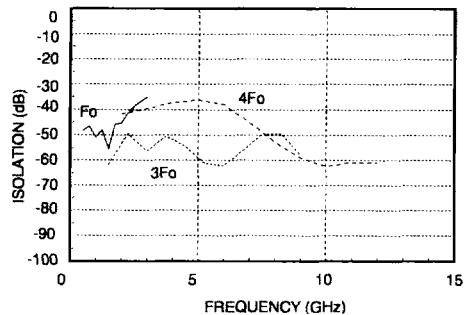
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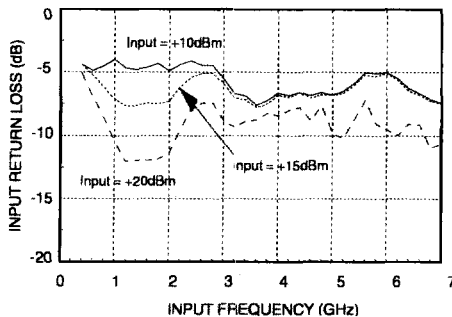
### Conversion Loss @ +15 dBm Drive Level



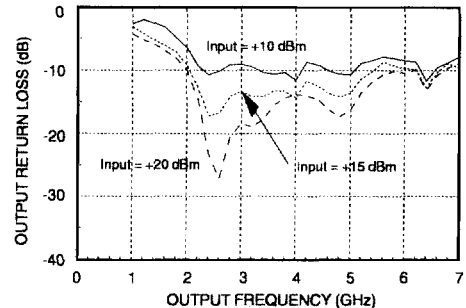
### Isolation @ +15 dBm Drive Level



### Input Return Loss vs. Drive Level

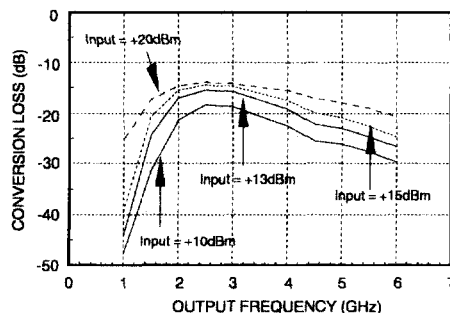


### Output Return Loss vs. Drive Level



**Note:** Output return loss measured at  $2f_0$ , with +10 dBm, +15 dBm, and +20 dBm drive levels on input of doubler.

### Conversion Loss vs. Drive Level



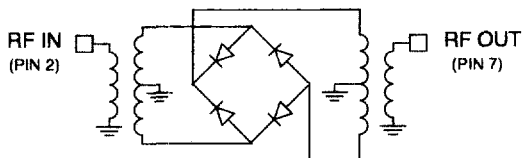
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Doubblers

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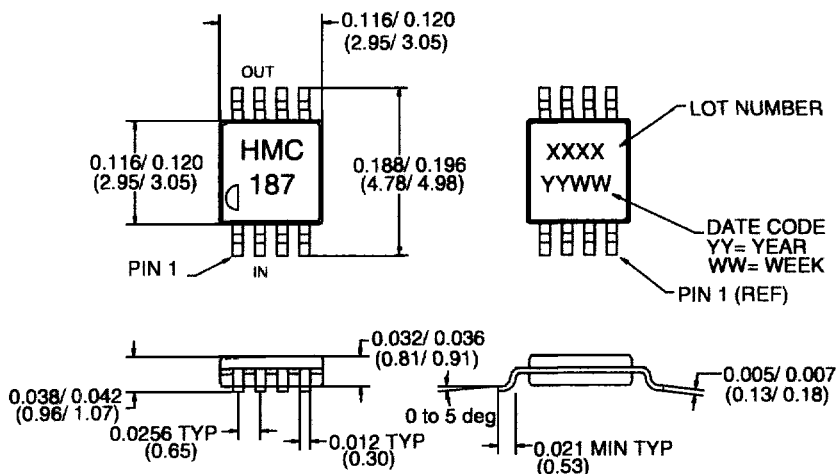
### Schematic



### Absolute Maximum Ratings

|                       |                    |
|-----------------------|--------------------|
| Input Drive           | +27 dBm            |
| Storage Temperature   | -65 to +150 deg. C |
| Operating Temperature | -40c to +85 deg. C |

### Outline Drawing



1. MATERIAL:  
A) PACKAGE BODY - LOW STRESS INJECTION-MOLDED PLASTIC, SILICA & SILICONE IMPREGNATED.  
B) LEADFRAME MATERIAL: COPPER ALLOY
2. PLATING: LEAD - TIN SOLDER PLATE
3. DIMENSIONS ARE IN INCHES (MILLIMETERS). UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE  $\pm 0.005$  ( $\pm 0.13$ ).
4. ALL UNLABELED LEADS ARE GROUND.