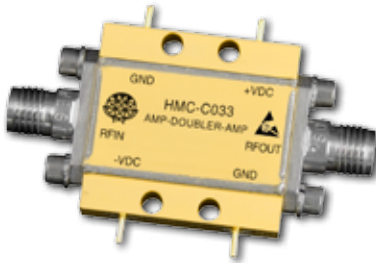




**GaAs MMIC x2 ACTIVE FREQUENCY  
MULTIPLIER MODULE, 24 - 33 GHz OUTPUT**

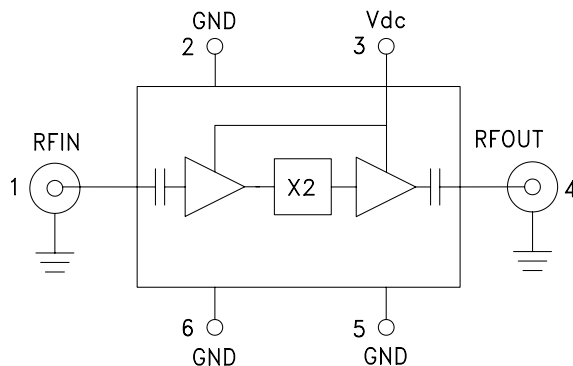


**Typical Applications**

The HMC-C033 is suitable for:

- Clock Generation Applications:  
SONET OC-192 & SDH STM-64
- Point-to-Point & VSAT Radios
- Military EW/Radar
- Space

**Functional Diagram**



**Features**

- High Output Power: +17 dBm
- Low Input Power Drive: 0 to +6 dBm
- 100 KHz SSB Phase Noise: -132 dBc/Hz
- Single Supply: +5V @ 81 mA
- Hermetically Sealed Module
- Field Replaceable 2.92mm Connectors
- 55 °C to +85 °C Operating Temperature

**General Description**

The HMC-C033 is a x2 active broadband frequency multiplier utilizing GaAs PHEMT technology in a miniature hermetic module. When driven by a 3 dBm signal, the multiplier provides +17 dBm typical output power from 24 to 33 GHz. The Fo and 3Fo isolations are >20 dBc and >30 dBc respectively at 28 GHz with respect to output signal level. This frequency multiplier features DC blocked I/O's, and is ideal for use in LO multiplier chains for Pt to Pt & VSAT Radios yielding reduced parts count vs. traditional approaches. The low additive SSB Phase Noise of -132 dBc/Hz at 100 kHz offset helps maintain good system noise performance.

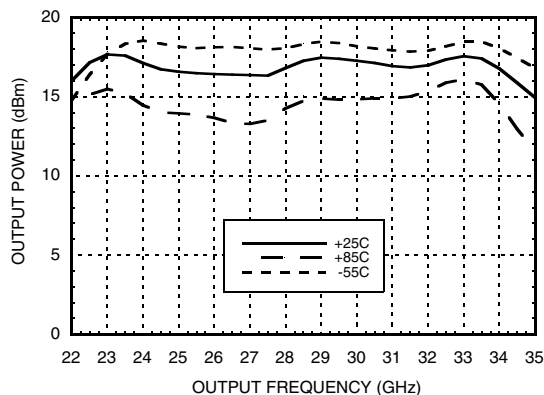
**Electrical Specifications,  $T_A = +25^\circ \text{C}$ ,  $V_{dc} = +5\text{V}$ , 3 dBm Drive Level**

| Parameter                                    | Min. | Typ.      | Max. | Units  |
|----------------------------------------------|------|-----------|------|--------|
| Frequency Range, Input                       |      | 12 - 16.5 |      | GHz    |
| Frequency Range, Output                      |      | 24 - 33   |      | GHz    |
| Output Power                                 | 14   | 17        |      | dBm    |
| Fo Isolation (with respect to output level)  |      | 20        |      | dBc    |
| 3Fo Isolation (with respect to output level) |      | 30        |      | dBc    |
| Input Return Loss                            |      | 13        |      | dB     |
| Output Return Loss                           |      | 20        |      | dB     |
| SSB Phase Noise (100 kHz Offset)             |      | -132      |      | dBc/Hz |
| Supply Current                               |      | 81        |      | mA     |

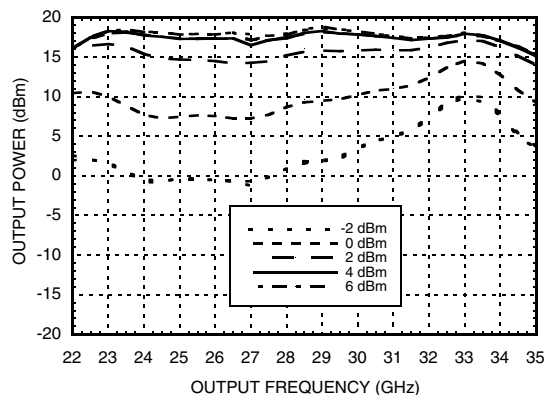


**GaAs MMIC x2 ACTIVE FREQUENCY  
MULTIPLIER MODULE, 24 - 33 GHz OUTPUT**

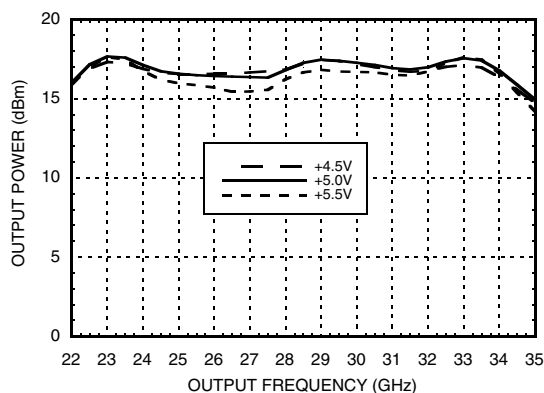
**Output Power vs.  
Temperature @ 3 dBm Drive Level**



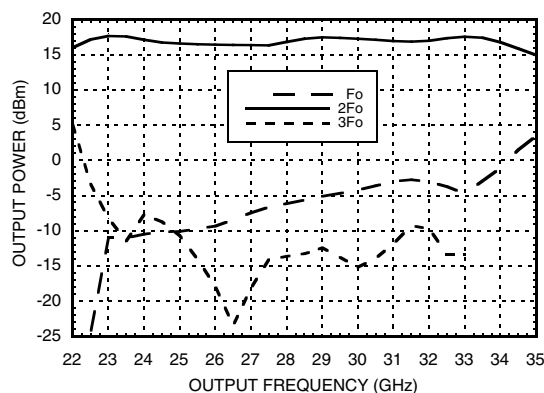
**Output Power vs. Drive Level**



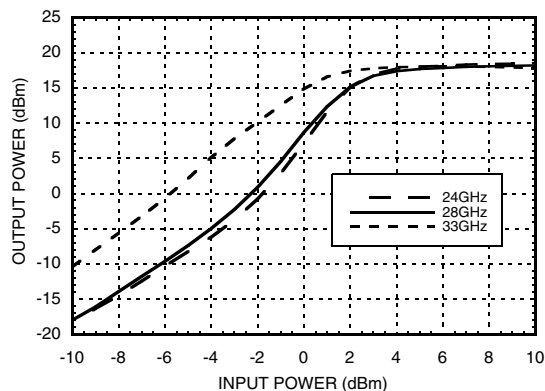
**Output Power vs.  
Supply Voltage @ 3 dBm Drive Level**



**Isolation @ 3 dBm Drive Level**



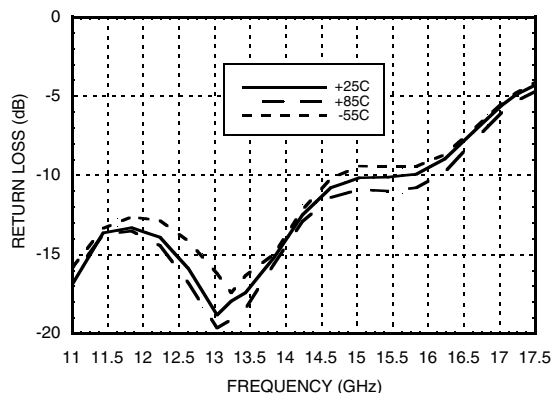
**Output Power vs. Input Power**



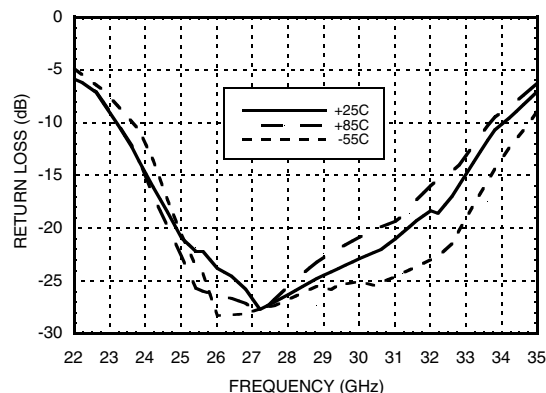


## GaAs MMIC x2 ACTIVE FREQUENCY MULTIPLIER MODULE, 24 - 33 GHz OUTPUT

**Input Return Loss vs.  
Temperature @ 0 dBm Drive Level**



**Output Return Loss vs.  
Temperature @ 0 dBm Drive Level**



### Absolute Maximum Ratings

|                           |                |
|---------------------------|----------------|
| RF Input (Vdc = +5V)      | +13 dBm        |
| Bias Supply Voltage (Vdc) | +6 Vdc         |
| Storage Temperature       | -65 to +150 °C |
| Operating Temperature     | -55 to +85 °C  |

### Typical Supply Current vs. Vdd

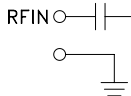
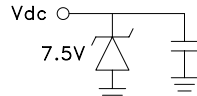
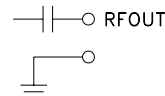
| Vdd (Vdc) | Idd (mA) |
|-----------|----------|
| 4.5       | 81       |
| 5.0       | 81       |
| 5.5       | 81       |

Note:  
Multiplier will operate over full voltage range shown above.



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**

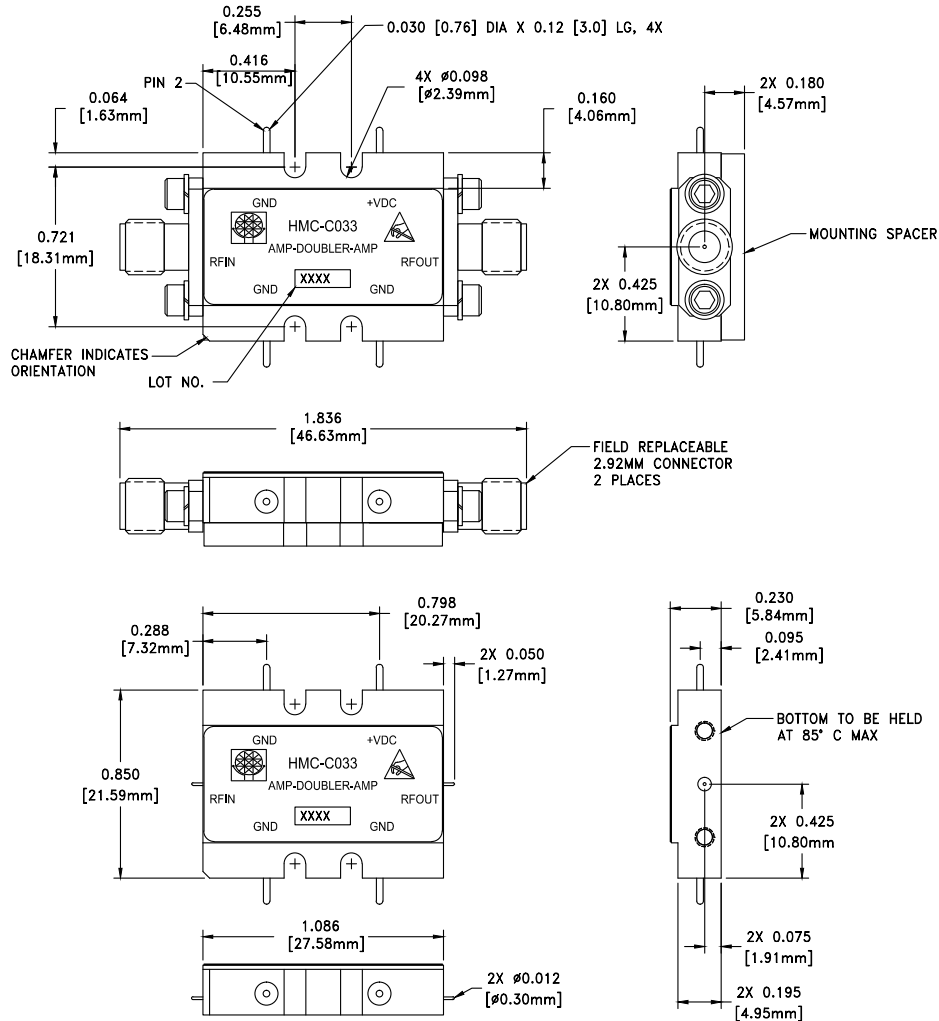
### Pin Description

| Pin Number | Function            | Description                                                                                                         | Interface Schematic                                                                   |
|------------|---------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1          | RFIN and RF Ground  | Pin is AC coupled and matched to 50 Ohms. RFIN uses a female 2.92mm field replaceable connector.                    |  |
| 2, 5, 6    | GND                 | One of these pins must be connected to power supply ground.                                                         |  |
| 3          | Vdc                 | Power supply voltage for the amplifier includes a 7.5V zener diode for over voltage and negative voltage protection |  |
| 4          | RFOUT and RF Ground | Pin is AC coupled and matched to 50 Ohms. RFOUT uses a female 2.92mm field replaceable connector.                   |  |



**GaAs MMIC x2 ACTIVE FREQUENCY  
MULTIPLIER MODULE, 24 - 33 GHz OUTPUT**

**Outline Drawing**



VIEW SHOWN WITH CONNECTORS AND MOUNTING SPACER REMOVED

**Package Information**

|                    |              |
|--------------------|--------------|
| Package Type       | C-10         |
| Package Weight [1] | 18.7 gms [2] |
| Spacer Weight      | 3.3 gms [2]  |

[1] Includes the connectors

[2] ±1 gms Tolerance

**NOTES:**

1. PACKAGE, LEADS, COVER MATERIAL: KOVAR™
2. FINISH: GOLD PLATE OVER NICKEL PLATE
3. ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]
4. TOLERANCES:
  - 4.1 .XX = ±0.02
  - 4.2 .XXX = ±0.010
5. FIELD REPLACEABLE 2.92mm CONNECTORS  
TENSOLITE 231CCSF OR EQUIVALENT