# GaAs MMIC SPDT NON-REFLECTIVE SWITCH, DC - 18 GHz

## Features

High Isolation: >65 dB up to 6 GHz
>50 dB up to 18 GHz

Low Insertion Loss: 2 dB @ 8 GHz
2.8 dB @ 12 GHz

Fast Switching: 3 ns Rise/Fall Times

Non-Reflective Design

Hermetically Sealed Module

Field Replaceable SMA connectors

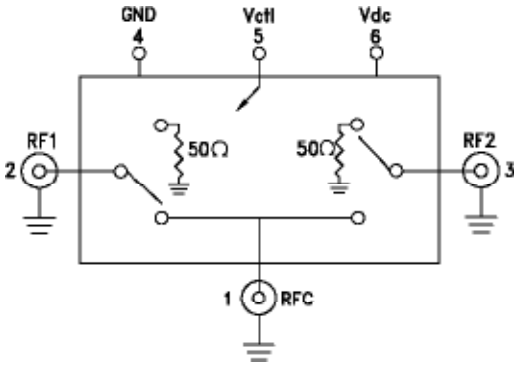
-55 to +85 °C Operating Temperature

## Typical Applications

The HMC-C058 is ideal for:

- Fiber Optics & Broadband Telecom
- Microwave Radio & VSAT
- Military Radios, Radar, & ECM
- Test Instrumentation

## Functional Diagram




## General Description

The HMC-C058 is a general purpose broadband high isolation non-reflective GaAs MESFET SPDT switch housed in a miniature hermetic module with field replaceable SMA connectors. Covering DC to 18 GHz, the switch offers high isolation and low insertion loss. The switch features >65 dB isolation up to 6 GHz and >50 dB isolation up to 18 GHz. A CMOS interface allows a single +5V bias voltage at very low DC currents.

## Electrical Specifications, $T_A$ = +25° C, With Vdc = +5V & 0/+5V Control, 50 Ohm System

| Parameter | | Frequency | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Insertion Loss | | DC - 6 GHz<br>DC - 10 GHz<br>DC - 18 GHz | | 1.6<br>2.0<br>3.0 | 2.4<br>2.8<br>5.5 | dB<br>dB<br>dB |
| Isolation | | DC - 6 GHz<br>DC - 10 GHz<br>DC - 18 GHz | 55<br>50<br>42 | 65<br>60<br>55 | | dB<br>dB<br>dB |
| Return Loss | "On State" | DC - 6 GHz<br>DC - 18 GHz | | 17<br>12 | | dB<br>dB |
| Return Loss RF1, RF2 | "Off State" | DC - 6 GHz<br>DC - 18 GHz | | 14<br>17 | | dB<br>dB |
| Input Power for 1 dB Compression | | 0.5 - 18 GHz | 24 | 27 | | dBm |
| Input Third Order Intercept<br>(Two-Tone Input Power= +7 dBm Each Tone) | | 0.5 - 18 GHz | | 46 | | dBm |
| Switching Characteristics<br>tRISE, tFALL (10/90% RF)<br>tON, tOFF (50% CTL to 10/90% RF) | | DC - 18 GHz | | 3<br>12 | | ns<br>ns |
| Switching Transients | | DC - 18 GHz | | 12 | | mVpp |



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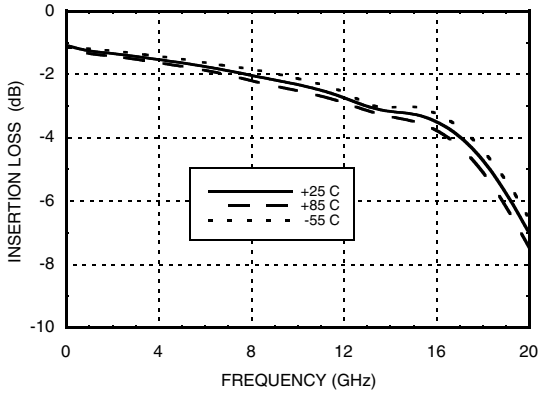
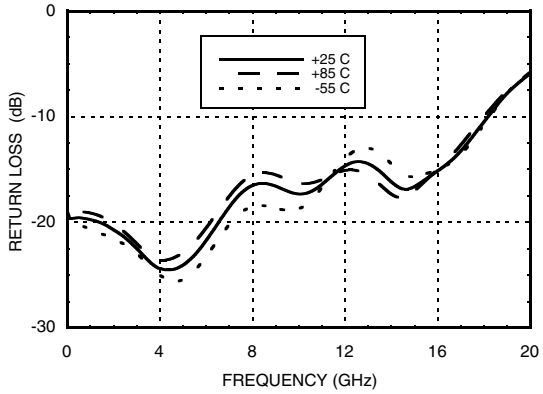
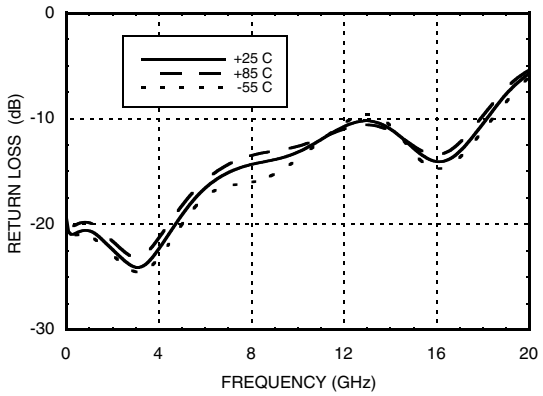
### Insertion Loss



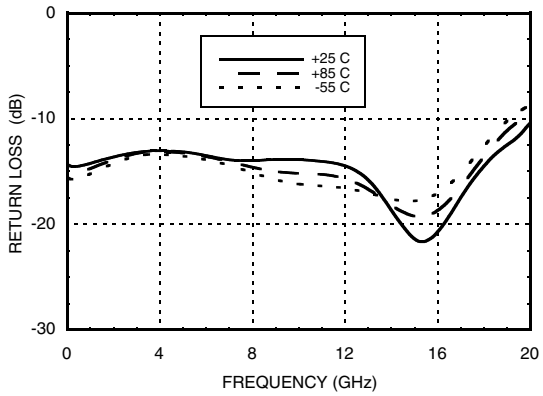

### Return Loss RFC



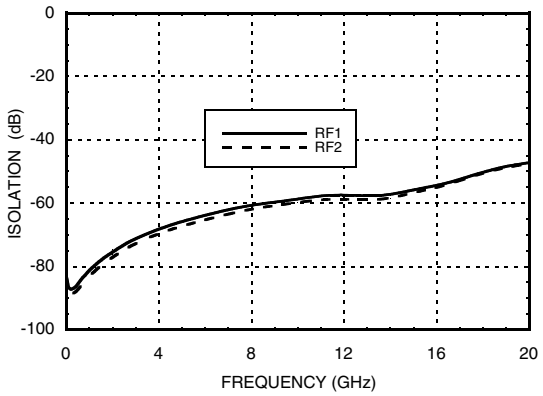

### Return Loss RF1, RF2 On



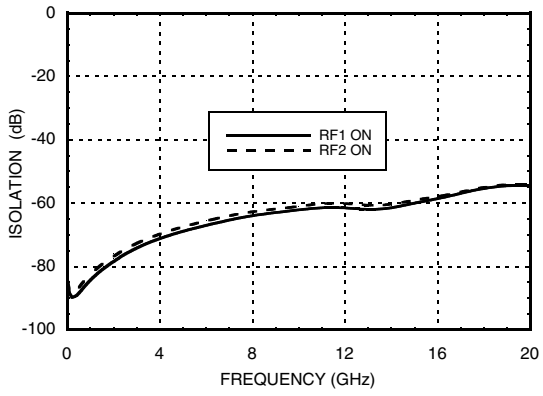

### Return Loss RF1, RF2 Off




### Isolations




### Isolation Between Ports RF1 and RF2





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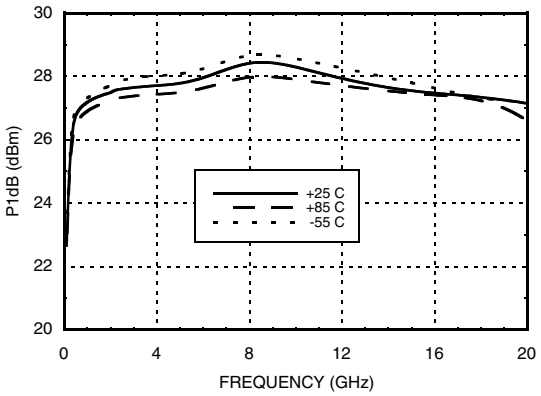
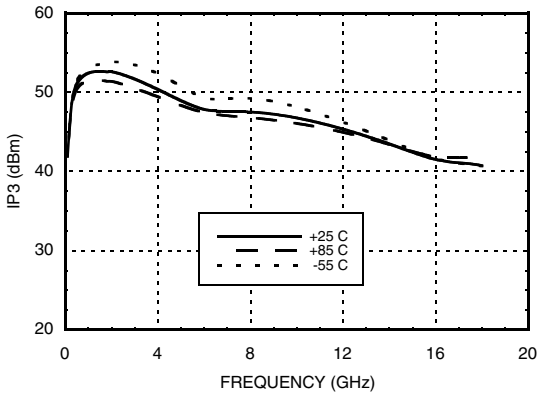
### Input P1dB Compression Point




### Input Third Order Intercept Point




### Absolute Maximum Ratings

| | |
|---|---|
| RF Input Power | +30 dBm |
| Supply Voltage (Vdc) | +7 V |
| Control Voltage Range (Vctl) | -0.5V to Vdc +0.5V |
| Hot Switch Power Level | +27 dBm |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +85 °C |

ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS

### Control Voltages

| State | Bias Condition |
|---|---|
| High | +3.5 to Vdc @ 1 mA Typ. |
| Low | 0 to +1.5V @ 20 µA Typ. |

### Truth Table

| Control Input | Signal Path State | |
|---|---|---|
| Vctl | RFC to RF1 | RFC to RF2 |
| High | On | Off |
| Low | Off | On |

### Bias Voltage & Current

| Vdc Range = +5 Vdc ± 10% | |
|---|---|
| Vdc (V) | Idc (Typ.) (mA) |
| +5.0 | 1.4 |

*(Bias current increases with switching rate to 15 - 20 mA.)*





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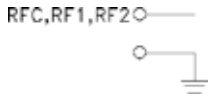
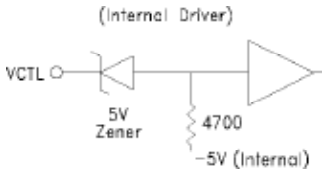
## Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|---|---|---|---|
| 1, 2, 3 | RFC, RF1, RF2 | RF connector, SMA female, field replaceable. These pins are DC coupled and matched to 50 Ohms. DC blocking capacitors are required if external RF line potential is not equal to 0V. |   |
| 4 | GND | Power supply ground. |   |
| 5 | Vctl | CMOS interface, control voltages per table. Requires active pullup to +5V ($V_{dc}$). |   |
| 6 | Vdc | Supply voltage | |





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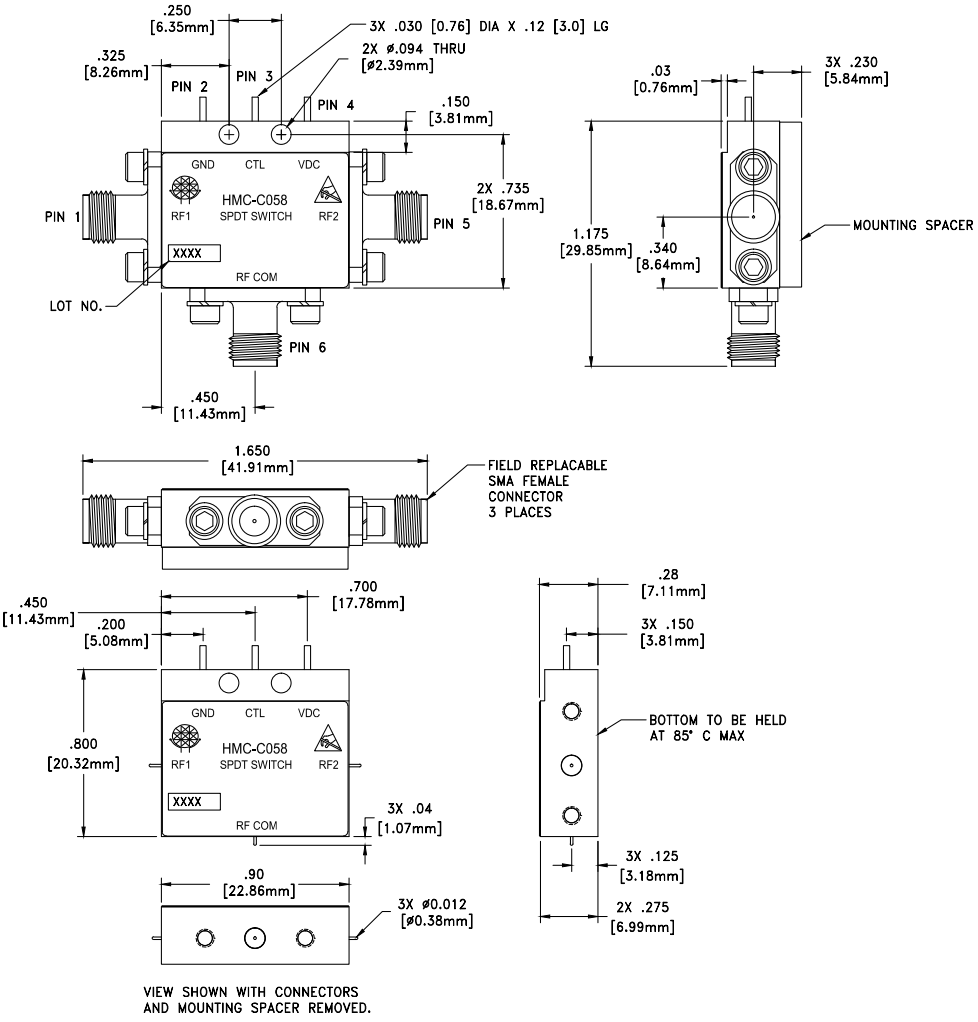
## Outline Drawing




## Package Information

| | |
|---|---|
| Package Type | C-14 |

NOTES:

1. PACKAGE, LEADS, COVER MATERIAL: KOVAR ™
2. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN., OVER ELECTROLYTIC NICKEL 75 MICROINCHES MIN.
3. SPACER MATERIAL: NICKEL PLATED ALUMINUM
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. TOLERANCES ±0.010 [0.25] UNLESS OTHERWISE SPECIFIED
6. FIELD REPLACEABLE SMA CONNECTORS. TENSOLITE 5602-5CCSF OR EQUIVALENT.





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**Notes:**





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