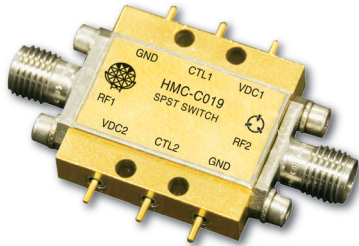


HIGH ISOLATION SPST SWITCH MODULE, DC - 20.0 GHz

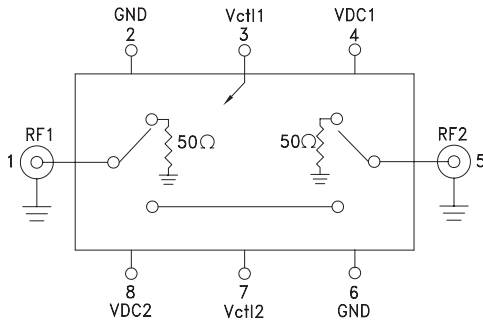


Typical Applications

The HMC-C019 is ideal for:

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

Functional Diagram



Features

- High Isolation: 100 dB up to 4 GHz
65 dB up to 20 GHz
- Low Insertion Loss: 3.5 dB @ 10 GHz
4.0 dB @ 16 GHz
- Fast Switching RF Pulse Modulator
- Non-Reflective Topology
- Hermetically Sealed Module
- Field Replaceable SMA connectors
- 55 to +85 °C Operating Temperature

General Description

The HMC-C019 is a high speed, high isolation GaAs MESFET SPST switch housed in a miniature hermetic module with field replaceable SMA connectors. Covering DC to 20 GHz, the switch features 100 dB isolation up to 4 GHz and 65 dB isolation up to 20 GHz. CMOS interface allows a positive +5V bias voltage at very low DC currents. This non-reflective switch exhibits very fast switching speeds, with very low switching transients making it ideal for high speed RF pulse modulation applications.

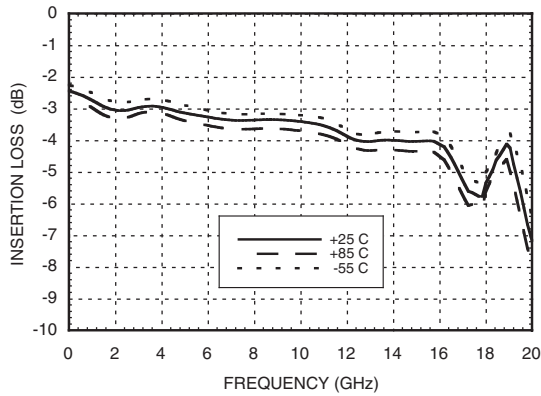
Electrical Specifications

$T_A = +25^\circ \text{C}$, With VDC1, VDC2 = +5V & 0/+5V Control, 50 Ohm System

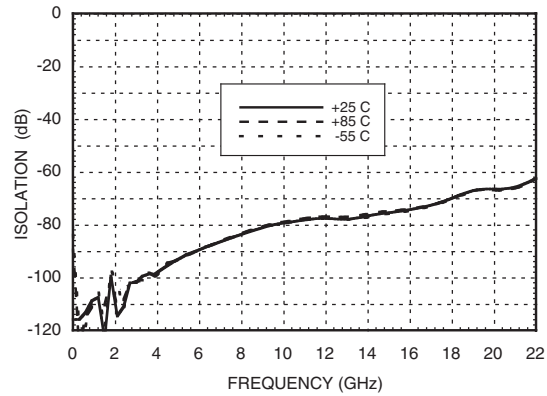
| Parameter | Frequency | Min. | Typ. | Max. | Units |
|---|----------------|------|------|------|-------|
| Insertion Loss | DC - 4.0 GHz | | 3.0 | 3.3 | dB |
| | DC - 16.0 GHz | | 4.0 | 4.5 | dB |
| | DC - 20.0 GHz | | 6.0 | 8.0 | dB |
| Isolation | DC - 4.0 GHz | 90 | 100 | | dB |
| | DC - 10.0 GHz | 75 | 80 | | dB |
| | DC - 16.0 GHz | 70 | 75 | | dB |
| | DC - 20.0 GHz | 60 | 65 | | dB |
| Return Loss RF1 & RF2 "On State & Off State" | DC - 12.0 GHz | | 12 | | dB |
| | DC - 20.0 GHz | | 8 | | dB |
| Input Power for 1 dB Compression | 0.5 - 20.0 GHz | 20 | 23 | | dBm |
| Input Third Order Intercept (Two-Tone Input Power= +7 dBm Each Tone) | 0.5 - 10.0 GHz | | 45 | | dBm |
| | 0.5 - 20.0 GHz | | 43 | | dBm |
| Switching Characteristics tRISE, tFALL (10/90% RF) tON, tOFF (50% CTL to 10/90% RF) | DC - 20 GHz | | 2.5 | | ns |
| | | | 8.5 | | ns |
| | | | | | |
| Switching Transients | DC - 20 GHz | | 20 | | mVpp |

**HIGH ISOLATION SPST SWITCH
MODULE, DC - 20.0 GHz**

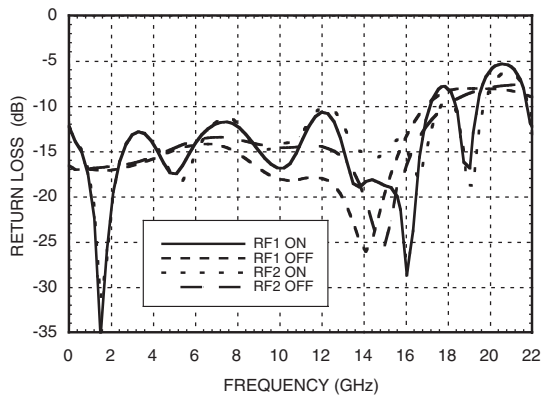
Insertion Loss



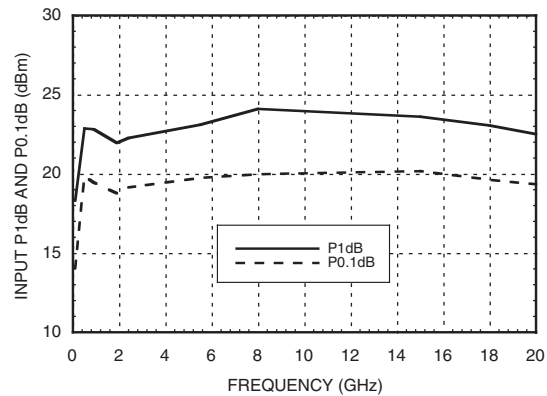
Isolation



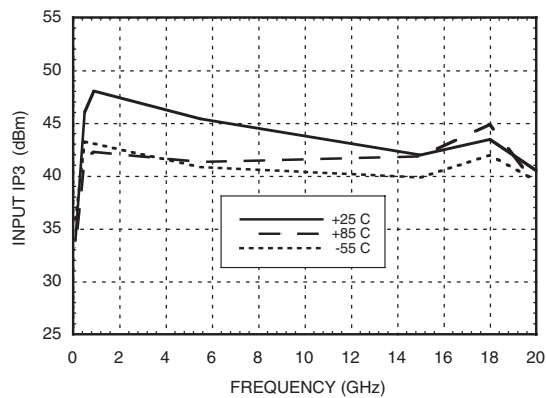
Return Loss



0.1 and 1dB Input Compression Point



Input Third Order Intercept Point



**HIGH ISOLATION SPST SWITCH
MODULE, DC - 20.0 GHz**

Absolute Maximum Ratings

| | |
|--------------------------------------|--------------------|
| RF Input Power | +27 dBm |
| Supply Voltage (VDC1, VDC2) | +7 Vdc |
| Control Voltage Range (Vctl1, Vctl2) | -0.5V to Vdd +0.5V |
| Hot Switch Power Level | +23 dBm |
| Storage Temperature | -65 to +150 °C |
| Operating Temperature | -55 to +85 °C |



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**

Control Voltages Vctl1 & Vctl2

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

Truth Table

| Control Input (Vctl1 & Vctl2) | RF1 to RF2 Path |
|-------------------------------|-----------------|
| High | On |
| Low | Off |

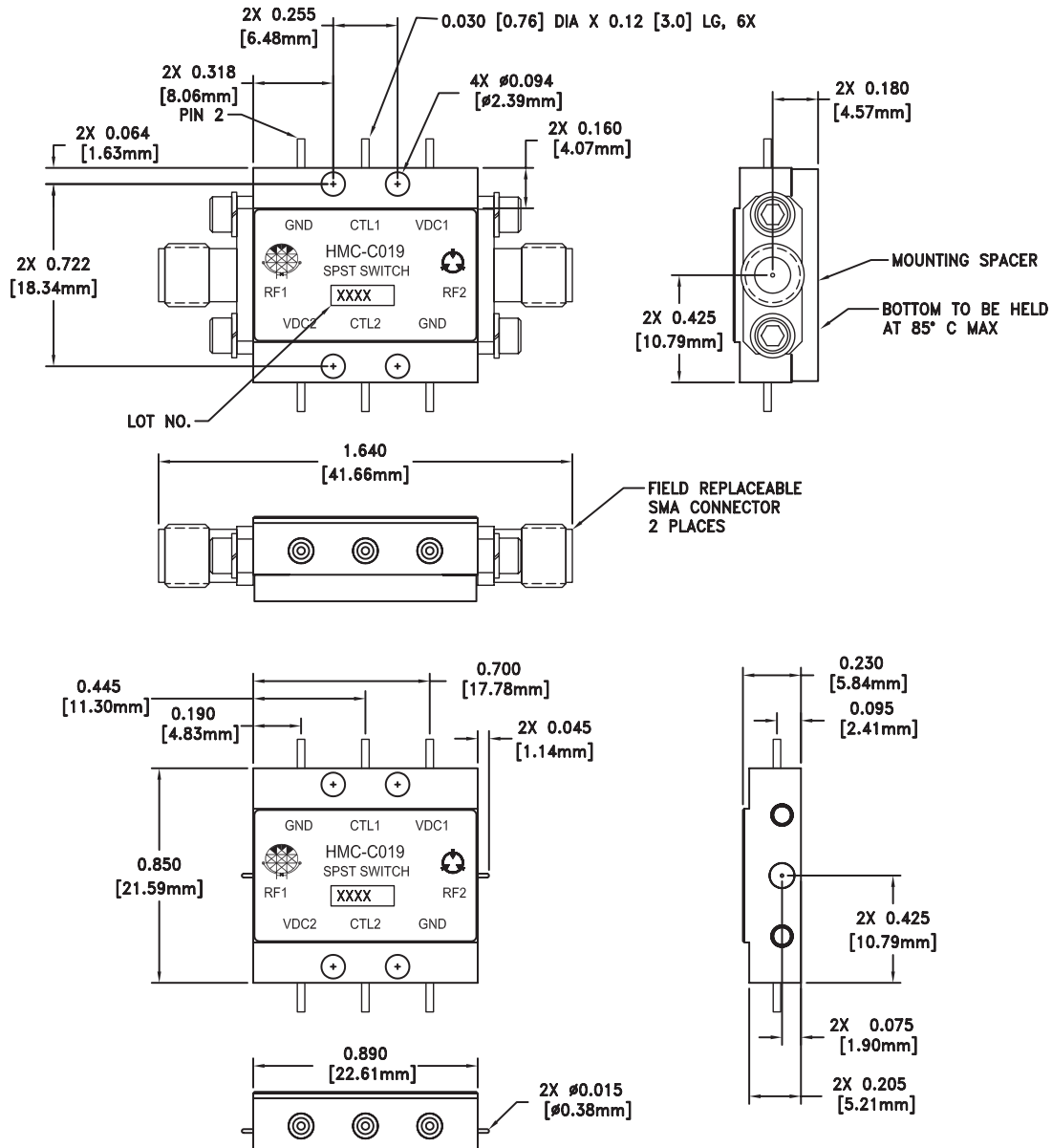
Bias Voltage & Current

| V _{DC} Range = +5 Vdc ± 10% | |
|--------------------------------------|--------------------------------|
| VDC1 & VDC2 (Vdc) | I _{DC} (Typ.) (mA) |
| +5.0 | 2.8 |

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

**HIGH ISOLATION SPST SWITCH
MODULE, DC - 20.0 GHz**

Outline Drawing

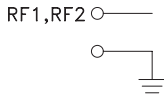

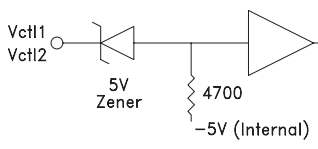


NOTES:

1. PACKAGE, LEADS, COVER MATERIAL: KOVAR™
2. BRACKET MATERIAL: ALUMINUM
3. PLATING: ELECTROLYTIC GOLD 50 MICROINCHES MIN., OVER ELECTROLYTIC NICKEL 75 MICROINCHES MIN.
4. DIMENSIONS ARE IN INCHES [MILLIMETERS].
5. TOLERANCES .005 [0.13] UNLESS OTHERWISE SPECIFIED
6. FIELD REPLACEABLE SMA CONNECTORS. TENSOLITE 5602-5CCSF OR EQUIVALENT.

**HIGH ISOLATION SPST SWITCH
MODULE, DC - 20.0 GHz**

Pin Descriptions

| Pin Number | Function | Description | Interface Schematic |
|------------|--------------|--|--|
| 1, 5 | 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. |  |
| 2, 6 | GND | Power supply ground. |  |
| 3, 7 | Vctl1, Vctl2 | CMOS interface, control voltages per table. Requires active pullup to +5V. | <p>(Internal Driver)</p>  |
| 4, 8 | VDC1, VDC2 | Supply voltage (+5V ±10%) | |

**HIGH ISOLATION SPST SWITCH
MODULE, DC - 20.0 GHz**

Notes: