

# GaAs IC SP4T Non-Reflective Switch With Driver 20 MHz–2 GHz



AE002M4-05, AE002M4-78

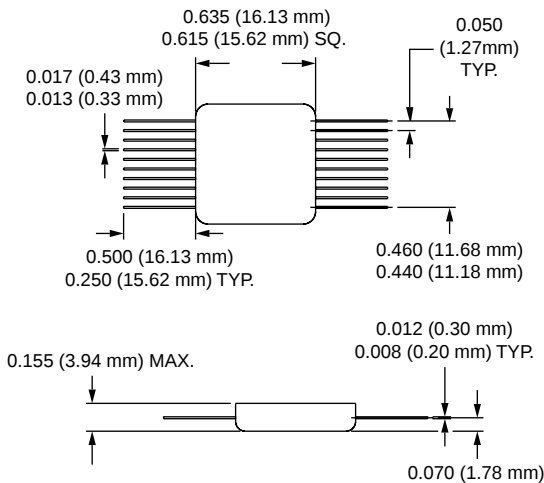
## Features

- Single 5 V Supply Voltage
- Non-Reflective All Ports
- Two Line Control
- Capable of Meeting MIL-STD Requirements<sup>4</sup>

## Description

The AE002M4-05 is a SP4T non-reflective FET MMIC switch. This switch consists of a GaAs SP4T chip and a silicon CMOS driver. It operates with 5 V bias and two line logic control. This unit is used in military switched filter banks, instruments and telecommunication applications. The AE002M4-78 is the gullwing version for surface mount applications.

-05



## Electrical Specifications at 25°C

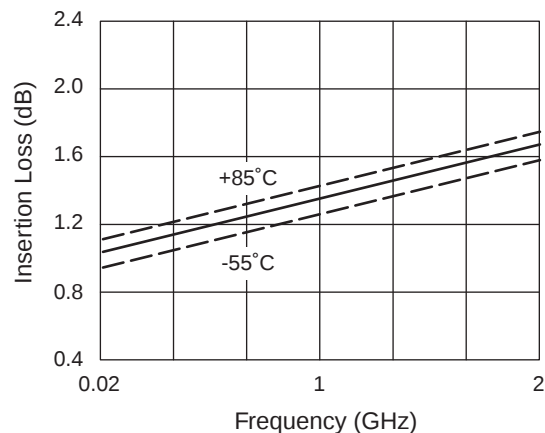
| Parameter <sup>1</sup>      | Frequency    | Min. | Typ.  | Max.  | Unit |
|-----------------------------|--------------|------|-------|-------|------|
| Insertion Loss <sup>2</sup> | 0.02–0.5 GHz |      | 1.3   | 1.5   | dB   |
|                             | 0.50–1.0 GHz |      | 1.4   | 1.6   | dB   |
|                             | 1.00–2.0 GHz |      | 1.7   | 1.9   | dB   |
| Isolation                   | 0.02–0.5 GHz | 55   | 58    |       | dB   |
|                             | 0.50–1.0 GHz | 50   | 52    |       | dB   |
|                             | 1.00–2.0 GHz | 40   | 44    |       | dB   |
| VSWR (I/O)                  | 0.02–0.5 GHz |      | 1.2:1 | 1.3:1 |      |
|                             | 0.50–1.0 GHz |      | 1.4:1 | 1.5:1 |      |
|                             | 1.00–2.0 GHz |      | 1.6:1 | 1.7:1 |      |

## Operating Characteristics at 25°C

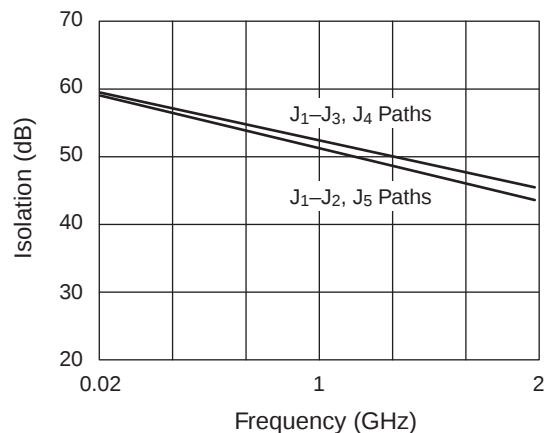
| Parameter                             | Condition                        | Frequency | Min. | Typ.    | Max. | Unit |
|---------------------------------------|----------------------------------|-----------|------|---------|------|------|
| Switching Characteristics             | Rise, Fall (10/90% or 90/10% RF) |           |      | 15      |      | ns   |
|                                       | On, Off (50% CTL to 90/10% RF)   |           |      | 50      |      | ns   |
|                                       | Video Feedthru <sup>3</sup>      |           |      | 30      |      | mV   |
| Input Power for 1 dB Compression      | 5 V (7 V)                        | 0.5–2 GHz |      | 24 (28) |      | dBm  |
|                                       |                                  | 0.001 GHz |      | 16 (20) |      | dBm  |
| Intermodulation Intercept Point (IP3) | For Two-tone Input Power 13 dBm  | 0.5–2 GHz |      | 46      |      | dBm  |
|                                       |                                  | 0.02 GHz  |      | 35      |      | dBm  |
| Control Voltages                      | V <sub>Low</sub>                 |           | 0    |         | 0.8  | V    |
|                                       | V <sub>High</sub>                |           | 2.0  |         | 5.5  | V    |
| Supply Voltages                       | 5 V @ 50 $\mu$ A Typ.            |           |      |         |      |      |
|                                       | 7 V @ 100 $\mu$ A Typ.           |           |      |         |      |      |

1. All measurements made in a 50  $\Omega$  system, unless otherwise specified.  
2. Insertion loss changes by 0.003 dB/°C.  
3. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.  
4. See Quality/Reliability section.

Typical Performance Data



Insertion Loss vs. Frequency



Isolation vs. Frequency

Truth Table

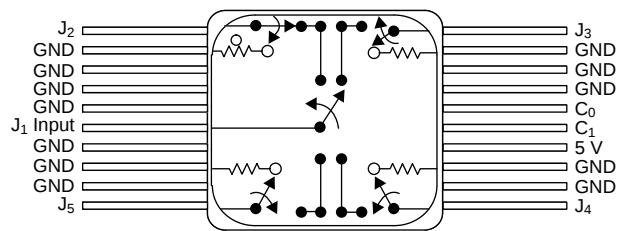
| Control Logic  |                | Condition J <sub>1</sub> to |                |                |                |
|----------------|----------------|-----------------------------|----------------|----------------|----------------|
| C <sub>0</sub> | C <sub>1</sub> | J <sub>2</sub>              | J <sub>3</sub> | J <sub>4</sub> | J <sub>5</sub> |
| 0              | 0              | Isolation                   | Isolation      | Isolation      | Ins. Loss      |
| 0              | 1              | Isolation                   | Ins. Loss      | Isolation      | Isolation      |
| 1              | 0              | Isolation                   | Isolation      | Ins. Loss      | Isolation      |
| 1              | 1              | Ins. Loss                   | Isolation      | Isolation      | Isolation      |

Absolute Maximum Ratings

| Characteristic                           | Value                                       |
|------------------------------------------|---------------------------------------------|
| RF Input Power (RF In)                   | 2 W > 500 MHz 0/7 V<br>0.5 W @ 50 MHz 0/7 V |
| Bias Voltage (V <sub>B</sub> )           | 7.0 V                                       |
| Control Voltage (V <sub>C</sub> )        | ≤ 7.0 V                                     |
| Operating Temperature (T <sub>OP</sub> ) | -55°C to +125°C                             |
| Storage Temperature (T <sub>ST</sub> )   | -65°C to +150°C                             |
| Thermal Resistance (Θ <sub>JC</sub> )    | 25°C/W                                      |

Do not allow control voltage to exceed bias voltage.

Pin Out



-78

