

DATA SHEET

AS002R2-12, AS002R2-12LF: GaAs IC SPDT Low-Loss Reflective Switch 300 kHz–2.5 GHz


Features

- Low insertion loss (0.5 dB @ 0.9 GHz)
- High isolation (35 dB @ 0.9 GHz)
- Low-power T/R switch
- Low-cost SOIC-8 plastic package
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

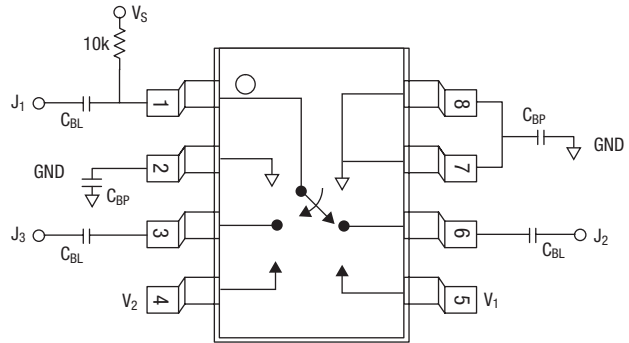
Description

The AS002R2-12 is a low-loss IC FET SPDT reflective general-purpose switch in a plastic SOIC-8 package for commercial low-cost, low-power applications. The switch operates with -5, 0 V or 0, +5 V when “floated” as shown in the Pin Out diagram.

NEW Skyworks offers lead (Pb)-free, RoHS (Restriction of Hazardous Substances)-compliant packaging.



Pin Out



External components shown are for positive voltage operation only.
 $C_{BL} = 100 \text{ pF}$, $C_{BP} = 1000 \text{ pF}$ for operation >500 MHz.

Electrical Specifications at 25 °C (0, -5 V)

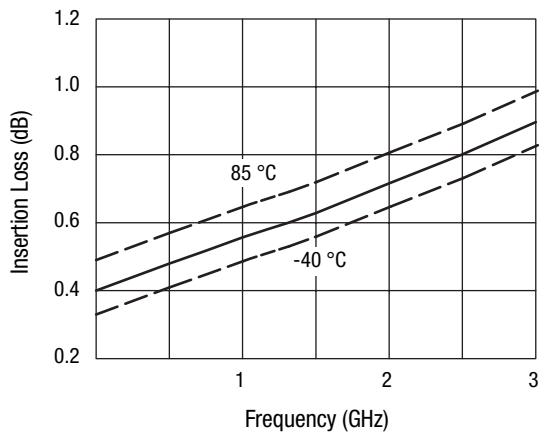
| Parameter ⁽¹⁾ | Frequency | Min. | Typ. | Max. | Unit |
|-------------------------------|-----------------|------|-------|-------|------|
| Insertion loss ⁽²⁾ | 300 kHz–0.5 GHz | | 0.4 | 0.5 | dB |
| | 300 kHz–1.0 GHz | | 0.5 | 0.6 | dB |
| | 300 kHz–2.0 GHz | | 0.7 | 0.8 | dB |
| | 300 kHz–2.5 GHz | | 0.8 | 0.9 | dB |
| Isolation | 300 kHz–0.5 GHz | 40 | 42 | | dB |
| | 300 kHz–1.0 GHz | 30 | 32 | | dB |
| | 300 kHz–2.0 GHz | 22 | 24 | | dB |
| | 300 kHz–2.5 GHz | 18 | 20 | | dB |
| VSWR ⁽³⁾ | 300 kHz–0.5 GHz | | 1.2:1 | 1.3:1 | |
| | 300 kHz–1.0 GHz | | 1.3:1 | 1.5:1 | |
| | 300 kHz–2.5 GHz | | 1.5:1 | 1.7:1 | |

1. All measurements made in a 50 Ω system, unless otherwise specified.
 2. Insertion loss changes by 0.003 dB/°C.
 3. Insertion loss state.

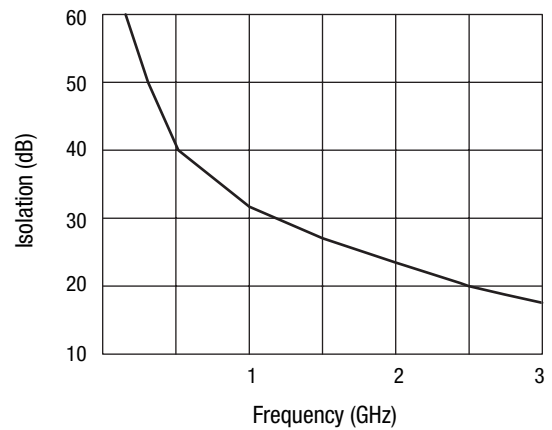
Operating Characteristics at 25 °C (0, -5 V)

| Parameter | Condition | Frequency | Min. | Typ. | Max. | Unit |
|---------------------------------------|-------------------------------------------------------------------------------------------------------|-----------|------|------|------|------|
| Switching characteristics | | | | | | |
| Rise, fall | 10/90% or 90/10% RF | | | 3 | | ns |
| On, off | 50% CTL to 90/10% RF | | | 6 | | ns |
| Video feedthru | T _{RISE} = 1 ns, BW = 500 MHz | | | 15 | | mV |
| Input power for 1 dB compression | | 0.5–2 GHz | | 24 | | dBm |
| | | 0.05 GHz | | 16 | | dBm |
| Intermodulation intercept point (IP3) | For two-tone input power 13 dBm | 0.5–2 GHz | | 46 | | dBm |
| Thermal resistance | | | | 25 | | °C/W |
| Control voltages | V _{LOW} = 0 to -0.2 V @ 20 μA max. V _{HIGH} = -5 V @ 50 μA to -8 V @ 200 μA max. | | | | | |

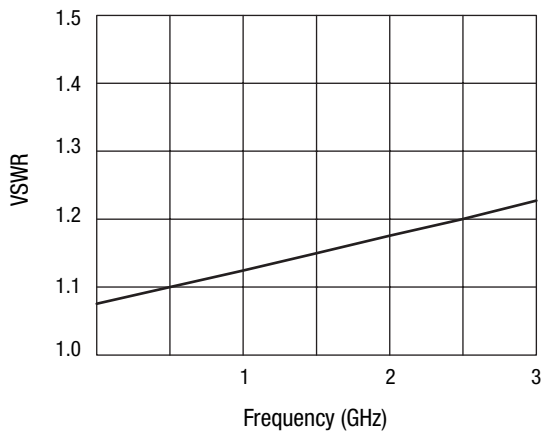
Typical Performance Data (0, -5 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Truth Table

Negative Operation

| V ₁ | V ₂ | J ₁ -J ₂ | J ₁ -J ₃ |
|----------------|----------------|--------------------------------|--------------------------------|
| 0 | -5 | Isolation | Insertion loss |
| -5 | 0 | Insertion loss | Isolation |

All other conditions not recommended.

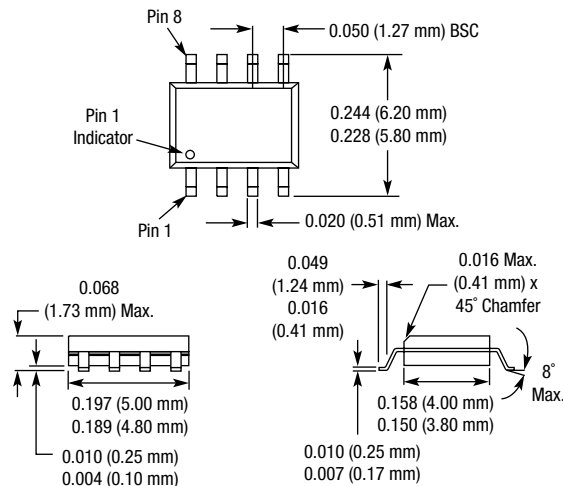
Positive Operation

| V ₁ | V ₂ | J ₁ -J ₂ | J ₁ -J ₃ |
|-------------------|-------------------|--------------------------------|--------------------------------|
| V _{HIGH} | 0 | Isolation | Insertion loss |
| 0 | V _{HIGH} | Insertion loss | Isolation |

All other conditions not recommended.

V_{HIGH} = 5 to 8 V (V_S = V_{HIGH} ± 0.2 V).

SOIC-8



Absolute Maximum Ratings

| Characteristic | Value |
|-----------------------|-----------------------------------------------|
| RF input power | 2 W > 500 MHz 0/-8 V 0.5 W @ 50 MHz 0/-8 V |
| Control voltage | +0.2 V, -8 V |
| Operating temperature | -40 °C to +85 °C |
| Storage temperature | -65 °C to +150 °C |

Performance is guaranteed only under the conditions listed in the specifications table and is not guaranteed under the full range(s) described by the Absolute Maximum specifications. Exceeding any of the absolute maximum/minimum specifications may result in permanent damage to the device and will void the warranty.

CAUTION: Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions must be employed at all times.

Recommended Solder Reflow Profiles

Refer to the [“Recommended Solder Reflow Profile”](#) Application Note.

Tape and Reel Information

Refer to the [“Discrete Devices and IC Switch/Attenuators Tape and Reel Package Orientation”](#) Application Note.

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