SKYWORKS®

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
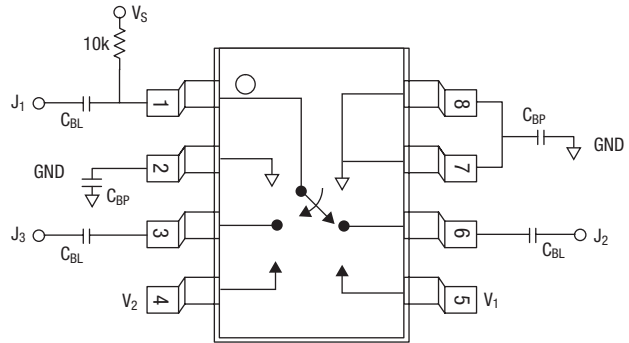
Description

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 pF, C_{BP} = 1000 pF for operation >500 MHz.

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

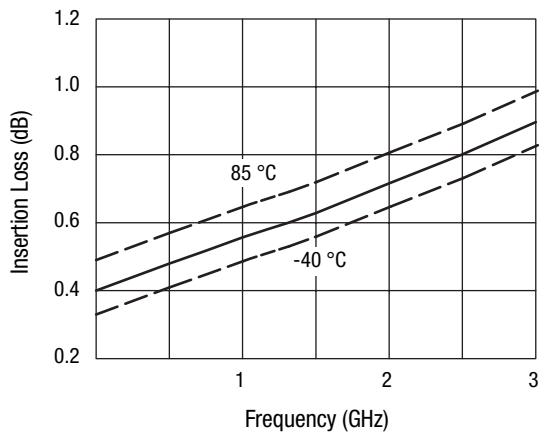| Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion loss[2]	300 kHz–0.5 GHz		0.4	0.5	dB
	300 kHz–1.0 GHz		0.5	0.6	dB
	300 kHz–2.0 GHz		0.7	0.8	dB
	300 kHz–2.5 GHz		0.8	0.9	dB
Isolation	300 kHz–0.5 GHz	40	42		dB
	300 kHz–1.0 GHz	30	32		dB
	300 kHz–2.0 GHz	22	24		dB
	300 kHz–2.5 GHz	18	20		dB
VSWR[3]	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.
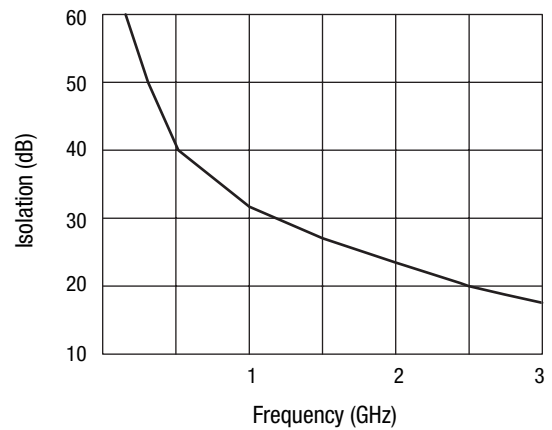3. Insertion loss state.

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

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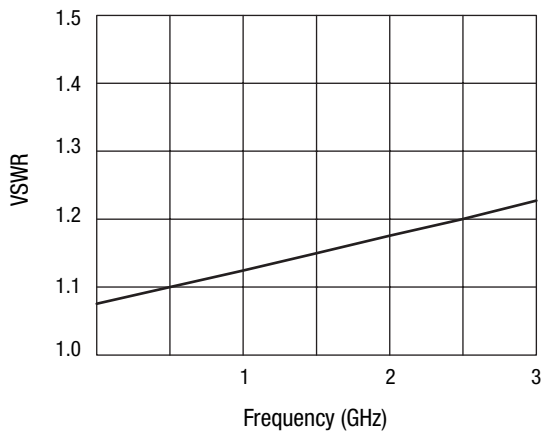
Truth Table

Negative Operation

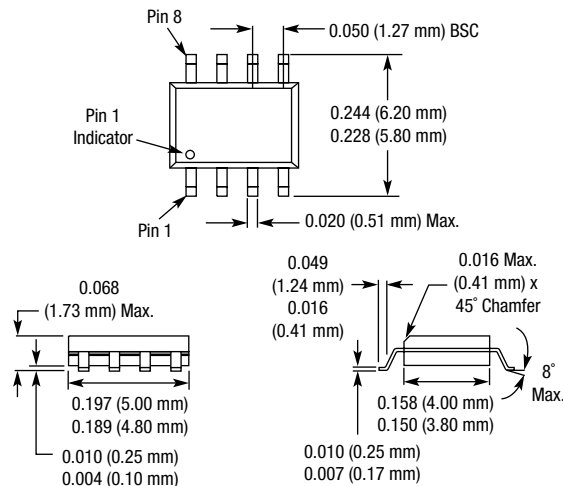| V₁	V₂	J₁–J₂	J₁–J₃
0	-5	Isolation	Insertion loss
-5	0	Insertion loss	Isolation

All other conditions not recommended.

Positive Operation

V₁	V₂	J₁–J₂	J₁–J₃
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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