DATA SHEET

AS188-92, AS188-92LF: PHEMT GaAs IC High-Linearity Positive Control SPDT Switch 300 kHz–2 GHz

Features

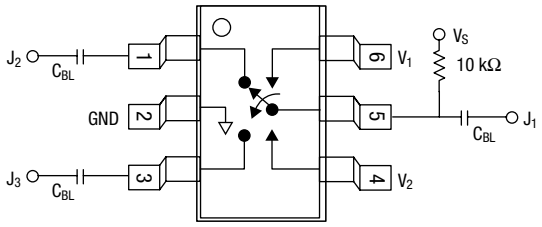
- High linearity (50 dBm IP3 @ 0.9 GHz) @ 3 V
- Low insertion loss (0.35 dB @ 0.9 GHz)
- 3 V operation
- Ultraminiature SC-70 6-lead package
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

The AS188-92 is a PHEMT GaAs FET IC high-linearity SPDT switch in a SC-70 6-lead plastic package. This switch has been designed for use where extremely high linearity, low insertion loss and ultraminiature package size are required. It can be controlled with positive, negative or a combination of both voltages. Some standard implementations include antenna changeover, T/R and diversity switching over 2 W. The AS188-92 switch can be used in many analog and digital wireless communication systems including cellular, GSM and DECT applications.

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

Pin Out



DC blocking capacitors (C_{BL}) must be supplied externally.
C_{BL} = 100 pF for operating frequency >500 MHz.

Electrical Specifications at 25 °C (0, 3 V)

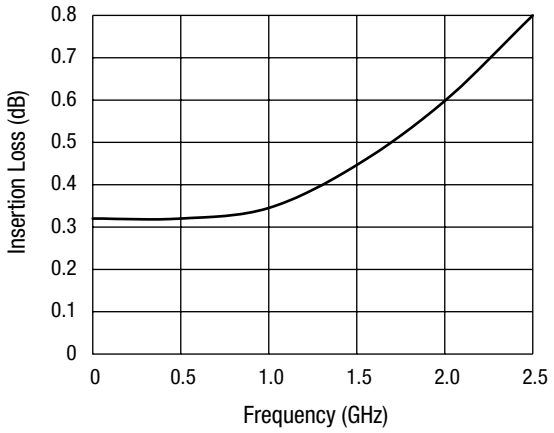
Parameter[1]	Frequency	Min.	Typ.	Max.	Unit
Insertion loss[2]	300 kHz–0.5 GHz		0.35	0.4	dB
	300 kHz–1.0 GHz		0.35	0.5	dB
	300 kHz–2.0 GHz		0.55	0.7	dB
Isolation	300 kHz–0.5 GHz	23	26		dB
	300 kHz–1.0 GHz	18	22		dB
	300 kHz–2.0 GHz	13	17		dB
VSWR[3]	300 kHz–1.0 GHz		1.3:1	1.5:1	dB
	300 kHz–2.0 GHz		1.3:1	1.5:1	dB

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.

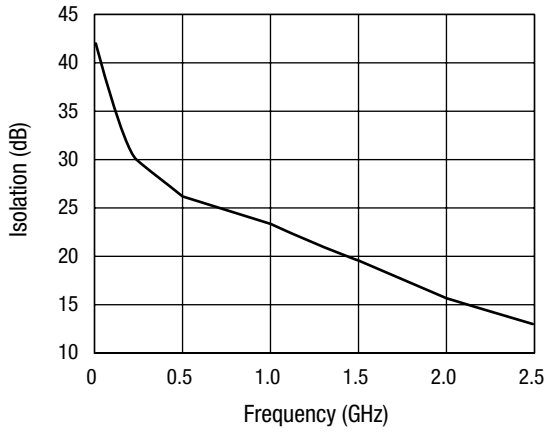
Operating Characteristics at 25 °C (0, 3 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			60		ns
On, off	50% CTL to 90/10% RF			100		ns
Video feedthru	T_{RISE} = 1 ns, BW = 500 MHz			50		mV
Input Power for 1 dB compression		0.9 GHz		33		dBm
Intermodulation intercept point (IP3)	For two-tone input power 17 dBm	0.9 GHz		50		dBm
Thermal resistance				25		°C/W
Control voltages	V_{LOW} = 0 to 0.2 V @ 20 µA max. V_{HIGH} = 3 V @ 100 µA max. to 5 V @ 200 µA max. $V_S = V_{HIGH} \pm 0.2$ V					

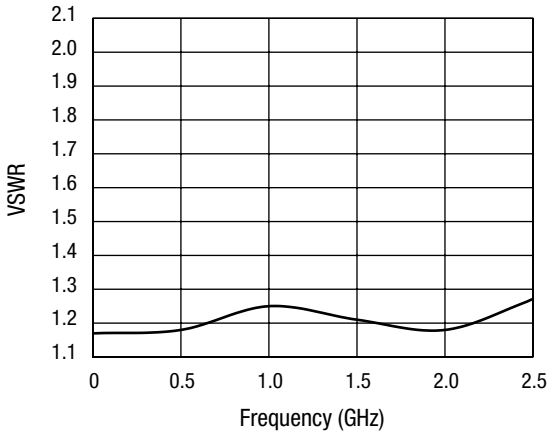
Typical Performance Data (0, 3 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Absolute Maximum Ratings

Characteristic	Value
RF input power	6 W max. > 900 MHz 0/7 V control
Control voltage	-0.2 V, +7 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.

Truth Table

V_1	V_2	J_1–J_2	J_1–J_3
0	V_{HIGH}	Isolation	Insertion loss
V_{HIGH}	0	Insertion loss	Isolation

All other conditions not recommended.
V_{HIGH} = 3 to 5 V ($V_S = V_{HIGH} \pm 0.2$ V).

SC-70 6-Lead