

DATA SHEET

AS172-73, AS172-73LF: PHEMT GaAs IC Transfer Switch 300 kHz–2 GHz

Features

- High linearity (50 dBm IP3 @ 0.9 GHz) @ 3 V
- Low insertion loss (0.4 dB @ 0.9 GHz)
- Isolation (20 dB @ 0.9 GHz)
- Simultaneous T/R switching
- Available lead (Pb)-free and RoHS-compliant MSL-1 @ 260 °C per JEDEC J-STD-020

Description

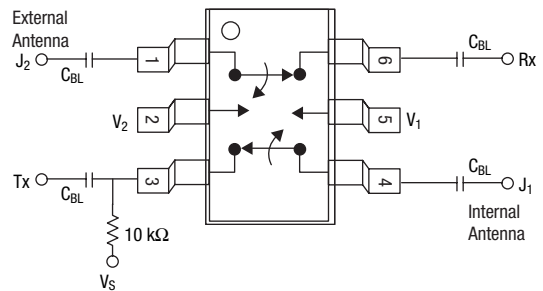
The AS172-73 is a PHEMT GaAs IC 4 port switch designed to combine T/R and antenna changeover switching capability within one device. This switch has two controls and is ideal for applications requiring low power consumption. The AS172-73 has excellent performance to 2 GHz, making it suitable for dual-band handset designs.

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



Pin Out

Positive Operation



DC blocking capacitors (C_{BL}) and biasing resistor must be supplied externally for positive voltage operation.
 $C_{BL} = 100$ pF for operation >500 MHz.

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

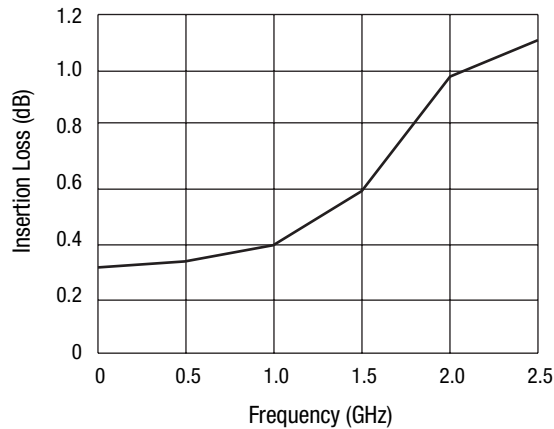
Parameter ⁽¹⁾	Frequency	Tx-J ₁ or Rx-J ₁			Unit
		Min.	Typ.	Max.	
Insertion Loss ⁽²⁾	300 kHz–0.5 GHz		0.30	0.4	dB
	300 kHz–1.0 GHz		0.40	0.5	dB
	300 kHz–2.0 GHz		0.95	1.2	dB
Isolation	300 kHz–0.5 GHz	23	25		dB
	300 kHz–1.0 GHz	16	18		dB
	300 kHz–2.0 GHz	11	13		dB
VSWR ⁽³⁾	300 kHz–1.0 GHz		1.1:1		
	300 kHz–2.0 GHz		1.4:1		

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.

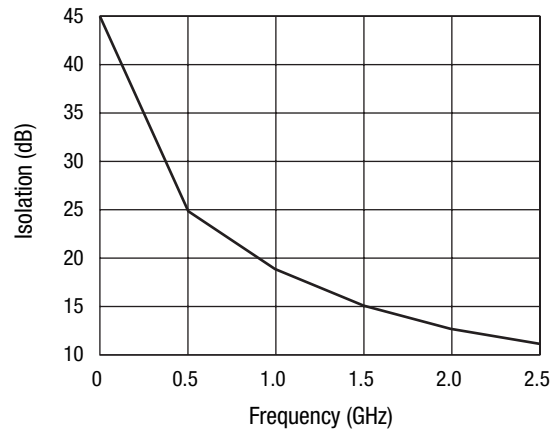
Operating Characteristics at 25 °C (0, 3 V)

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching characteristics						
Rise, fall	10/90% or 90/10% RF			50		ns
On, off	50% CTL to 90/10% RF			100		ns
Video feedthru	$T_{RISE} = 1 \text{ ns}$, $BW = 500 \text{ MHz}$			50		mV
Input Power for 1 dB compression	$V_{CTL} = 0/3 \text{ V}$	0.5–2 GHz		34		dBm
Intermodulation intercept point (IP3)	For two-tone input power 15 dBm $V_{CTL} = 0/3 \text{ V}$	0.5–2 GHz		50		dBm
2nd harmonic	30 dBm	1 GHz		-72		dBc
3rd harmonic	30 dBm	1 GHz		-65		dBc
Thermal resistance				25		°C/W
Control voltages	$V_{LOW} = 0 \text{ to } 0.2 \text{ V @ } 20 \mu\text{A max.}$ $V_{HIGH} = 3 \text{ V @ } 100 \mu\text{A max. to } 5 \text{ V @ } 200 \mu\text{A max.}$ $V_S = V_{HIGH} \pm 0.2 \text{ V}$					

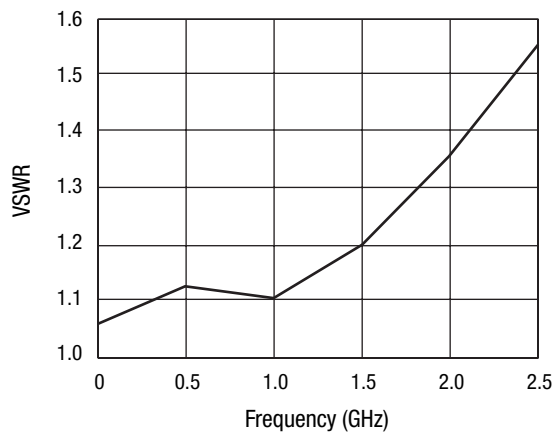
Typical Performance Data (0, 3 V)



Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency

Absolute Maximum Ratings

Characteristic	Value
RF input power	2 W > 500 MHz 0/7 V control
Control voltage	-0.2 V, +8 V
Operating temperature	-40 °C to +85 °C
Storage temperature	-50 °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

Negative Operation

V ₁	V ₂	Tx-J ₂ , Rx-J ₁	Tx-J ₁ , Rx-J ₂
0	-3	Insertion loss	Isolation
-3	0	Isolation	Insertion loss

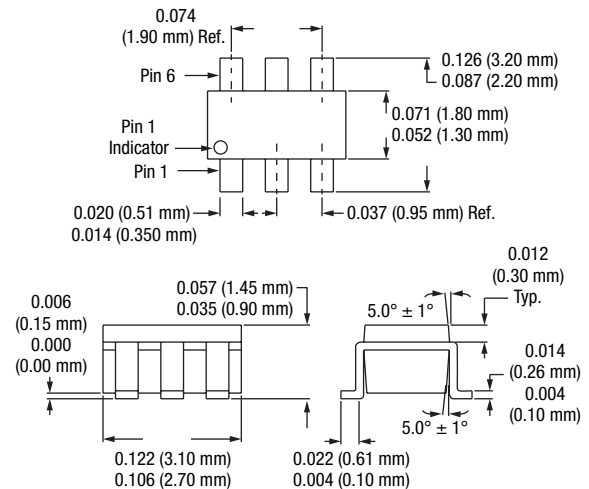
All other conditions not recommended.

Positive Operation

V ₁	V ₂	Tx-J ₂ , Rx-J ₁	Tx-J ₁ , Rx-J ₂
V _{HIGH}	0	Insertion loss	Isolation
0	V _{HIGH}	Isolation	Insertion loss
All other conditions		Not recommended	

All other conditions not recommended.
V_{HIGH} = 3 to 8 V (V_S = V_{HIGH} ± 0.2 V).

SOT-6



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