

GaAs IC SPDT Switch Non-Reflective DC–18 GHz



AS018M2-00

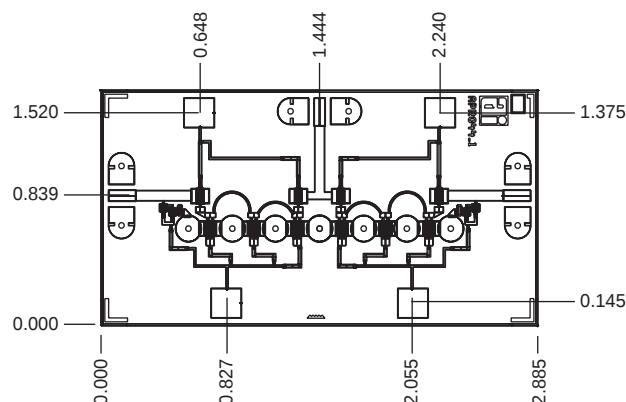
Features

- Broadband, DC–18 GHz
- High Isolation, Low Loss, Fast Switching
- 100% On-Wafer RF and DC Testing
- 100% Visual Inspection to MIL-STD-883 MT 2010

Description

The AS018M2-00 GaAs SPDT matched MMIC FET switch chip is ideal for applications requiring low loss, high isolation and/or broadband operation. The GaAs MMIC employs three shunt and two series FETs per arm for low loss, high isolation switching together with a 50 Ω load which is switched into the high isolation arm for low return loss. Power consumption is very low, typically 75 μ A at -5 V. While recommended for operation up to 18 GHz, the switch performs well through 22 GHz.

Chip Outline



Dimensions indicated in mm.

All DC (V) pads are 0.1 x 0.1 mm and RF In, Out pads are 0.07 mm wide.
Chip thickness = 0.1 mm.

Electrical Specifications at 25°C

Parameter ¹	2 GHz Typ.	10 GHz Typ.	18 GHz Typ.	2, 10 and 18 GHz		Unit
				Min.	Max.	
Insertion Loss ²	1.5	2.8	2.2		3.0	dB
Isolation	82	57	50	48		dB
Input Return Loss	17	8.5	12.5	7		dB
Output Return Loss	16	10.5	16	9		dB

Operating Characteristics at 25°C

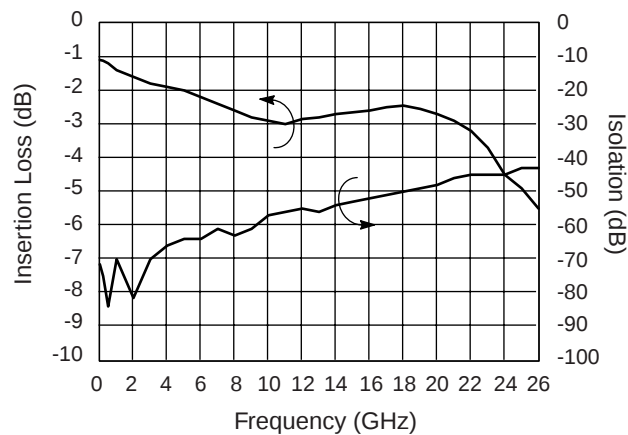
Parameter ¹	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF)			3		ns
	On, Off (50% CTL to 90/10% RF)			6		ns
	Video Feedthru ³			20		mV
Input Power for 1 dB Compression	0/-5 V	0.5–18 GHz		24		dBm
		0.001 GHz		16		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power +13 dBm	0.5–18 GHz		46		dBm
		0.001 GHz		35		dBm
Control Voltages	V _{Low} = 0 to -0.2 V @ 20 μ A Max. V _{High} = -3 V to -6 V @ 250 μ A Max.					

1. All measurements made in a 50 Ω system, unless otherwise specified.

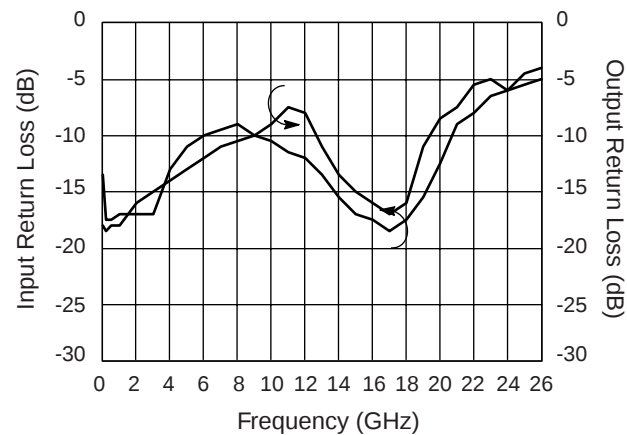
2. Insertion loss changes 0.003 dB/°C.

3. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.

Typical Performance Data



Insertion Loss and Isolation vs. Frequency



Return Loss vs. Frequency

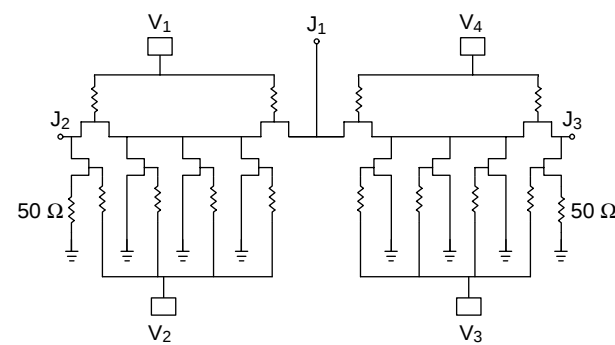
Truth Table

V ₁	V ₂	V ₃	V ₄	J ₁ -J ₂	J ₁ -J ₃
0	-5	0	-5	Low Loss	Isolation
-5	0	-5	0	Isolation	Low Loss

Absolute Maximum Ratings

Characteristic	Value
RF Input Power (RF In)	1 W
Control Voltage (V _C)	+0.2 V, -7 V
Operating Temperature (T _{OP})	-55°C to +125°C
Storage Temperature (T _{ST})	-65°C to +150°C
Thermal Resistance (Θ _{JC})	83°C/W

Circuit Schematic



Chip Layout

