

GaAs IC SP4T Non-Reflective Switch With Integral Driver DC–2 GHz



AK002M4-31

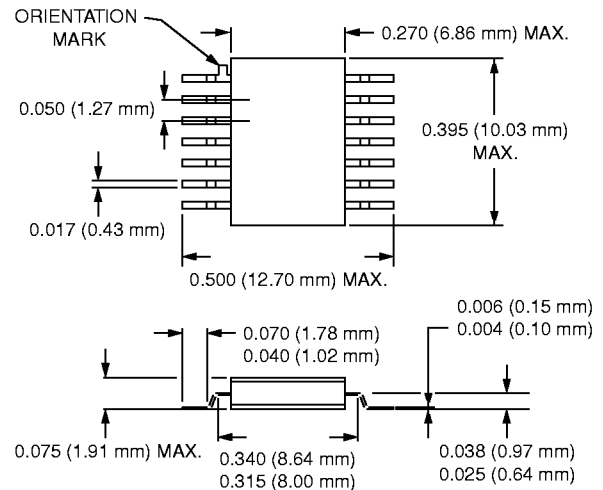
Features

- Integral Driver ±5 V Supply Voltages
- Individual Four Line Control
- 14 Lead Hermetic Surface Mount Package
- Capable of Meeting MIL-STD Requirements⁷

Description

The AK002M4-31 is a SP4T non-reflective FET MMIC switch. The switch consists of a GaAs SP4T chip with an integral translator. This unit is used in military switch filter banks, instruments and telecommunication applications. This unit requires four control lines.

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Electrical Specifications at 25°C

Parameter ¹	Frequency ⁶	Min.	Typ.	Max.	Unit
Insertion Loss ²	DC–0.5 GHz		1.0	1.1	dB
	0.5–1.0 GHz		1.2	1.4	dB
	1.0–2.0 GHz		1.5	1.7	dB
Isolation	DC–0.5 GHz	45	48		dB
	0.5–1.0 GHz	38	40		dB
	1.0–2.0 GHz	32	35		dB
VSWR (I/O)	DC–0.5 GHz		1.2:1	1.3:1	
	0.5–1.0 GHz		1.4:1	1.5:1	
	1.0–2.0 GHz		1.6:1	1.7:1	

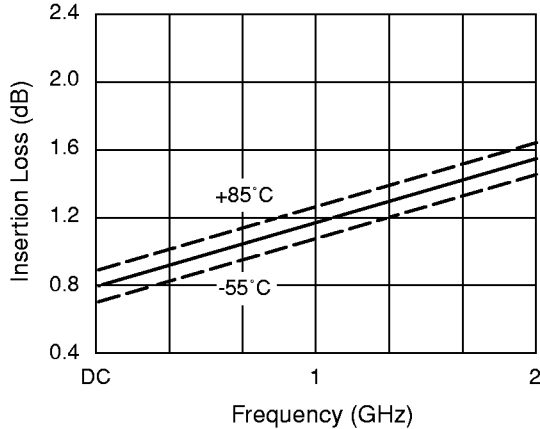
Operating Characteristics at 25°C

Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF)			15		ns
	On, Off (50% CTL to 90/10% RF)			35		ns
	Video Feedthru ³			30		mV
Input Power for 1 dB Compression		0.5–2 GHz		24		dBm
		0.001 GHz		16		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power 13 dBm	0.5–2 GHz		40		dBm
		0.02 GHz		29		dBm
Control Voltages	V _{Low}		0		0.5	V
	V _{High}		4		5.5	V
Bias Voltages ^{4,5}	+5 V @ 4 mA Typ.		+4.75		+5.25	V
	-5 V @ 16 mA Typ.		-4.75		-5.25	V

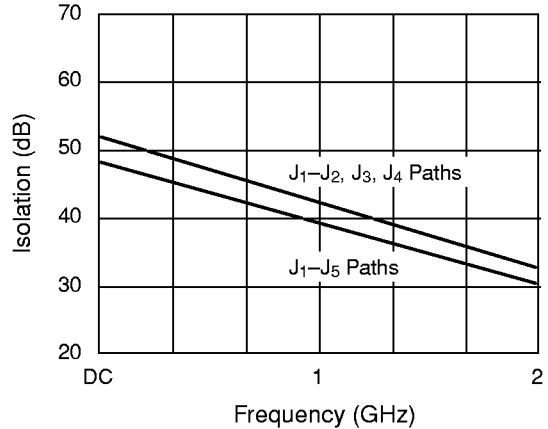
1. All measurements made in a 50 Ω system, unless otherwise specified.
 2. Insertion loss changes by 0.003 dB/°C.
 3. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.
 4. Bias voltage and ground must be connected before TTL voltage is applied.
 To avoid voltage sequencing refer to the Application Note section, "Driver Protection Circuit."

5. Current increases from 12 mA to 16 mA @ 85°C.
 6. DC = 300 kHz.
 7. See Quality/Reliability section.

Typical Performance Data



Insertion Loss vs. Frequency



Isolation vs. Frequency

Truth Table

Control Logic				Condition J ₁ to			
C ₂	C ₃	C ₄	C ₅	J ₂	J ₃	J ₄	J ₅
0	0	0	0	Ins. Loss	Ins. Loss	Ins. Loss	Ins. Loss
0	1	1	1	Ins. Loss	Isolation	Isolation	Isolation
1	0	1	1	Isolation	Ins. Loss	Isolation	Isolation
1	1	0	1	Isolation	Isolation	Ins. Loss	Isolation
1	1	1	0	Isolation	Isolation	Isolation	Ins. Loss
1	1	1	1	Isolation	Isolation	Isolation	Isolation

Absolute Maximum Ratings

Characteristic	Value
RF Input Power (RF In)	0.8 W > 500 MHz 0.2 W @ 50 MHz
Bias Voltage (V _B)	+7 V, -7 V
Control Voltage (V _C)	7 V
Operating Temperature (T _{OP})	-40°C to +90°C
Storage Temperature (T _{ST})	-65°C to +150°C
Thermal Resistance (Θ _{JC})	30°C/W

Pin Out

