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

Alpha

AK002M4-00

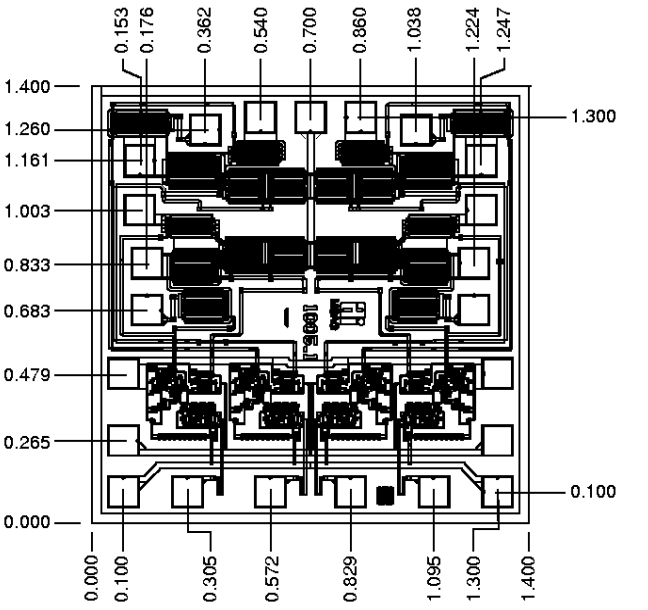
Features

- On-Chip Integral Driver
- Non-Reflective, All Unused Ports
- Fully Passivated

Description

The AK002M4-00 GaAs IC FET SP4T switch with integral driver is designed for applications up to 6 GHz. The driver simplifies the external driver circuit, thus saving PC board space and reducing component count. The chip is a rugged .008" thick, and has a fully passivated surface allowing for ease of handling for MCM assemblies. Ti/W/Au gate metal makes this product ideal for commercial, SatCom and military applications. All devices are 100% tested on-wafer and inspected to MIL-STD-883 MT 2010. Element evaluation can be performed to MIL-PRF-38534 Class H or K on request.

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

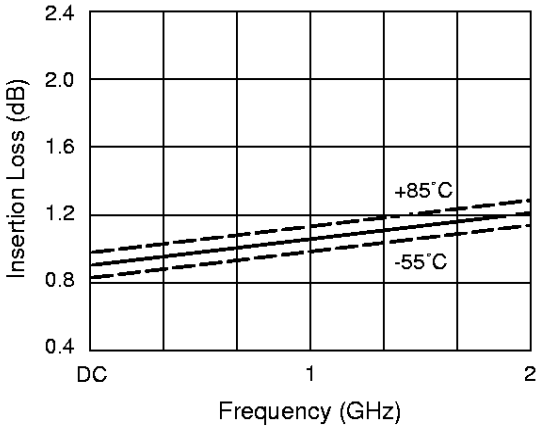
Parameter[1]	Frequency[6]	Min.	Typ.	Max.	Unit
Insertion Loss[2]	DC–0.5 GHz DC–1.0 GHz DC–2.0 GHz		0.8 1.0 1.2	1.0 1.1 1.3	dB dB dB
Isolation I/O	DC–0.5 GHz DC–1.0 GHz DC–2.0 GHz	55 50 40	58 52 44		dB dB dB
VSWR	DC–1.0 GHz DC–2.0 GHz		1.3:1 1.5:1	1.4:1 1.6:1	

Operating Characteristics at 25°C

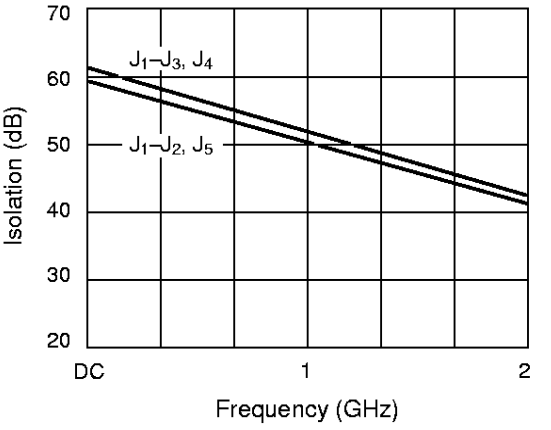
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF) On, Off (50% CTL to 90/10% RF) Video Feedthru[3]			15 35 30		ns ns mV
Input Power for 1 dB Compression		0.5–2 GHz 0.001 GHz		24 16		dBm dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power 13 dBm	0.5–2 GHz 0.02 GHz		40 29		dBm dBm
Control Voltages	V_{Low} V_{High}			0 4	0.5 5.5	V V
Supply Voltages[4, 5]	+5 V ± 0.25 V @ 4 mA Typ. -5 V ± 0.25 V @ 16 mA Typ.					

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 16 mA to 20 mA @ 85°C.
6. DC = 300 kHz.

Typical Performance Data



Insertion Loss vs. Frequency



Isolation vs. Frequency

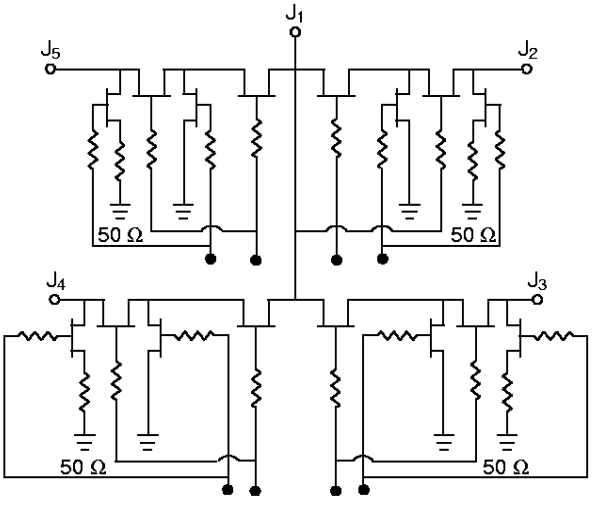
Truth Table

Control Logic				Condition J_1 to			
C_2	C_3	C_4	C_5	J_2	J_3	J_4	J_5
0	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

Absolute Maximum Ratings

Characteristic	Value
RF Input Power (RF In)	0.8 W > 500 MHz 0.2 W @ 50 MHz
Bias Voltage (V_B)	+7.0 V, -7.0 V
Control Voltage (V_C)	7.0 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

Switch Schematic



Chip Layout