GaAs IC SPDT Switch Chip With Integral Driver DC–6 GHz

Alpha

AK006R2-00, AK006M2-00

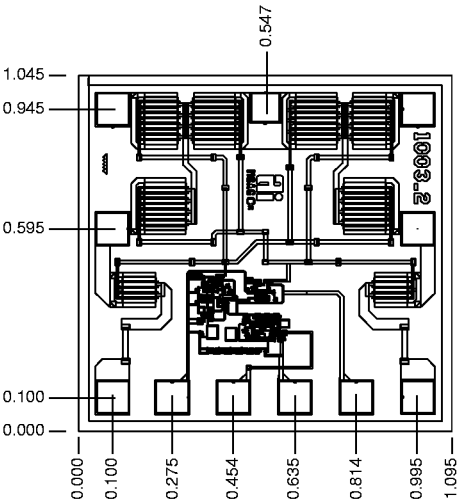
Features

- On-Chip Integral Driver
- Non-Reflective or Reflective Option
- Fully Passivated

Description

This pair of SPDT switches with integral drivers are designed for applications up to 6 GHz. The driver simplifies the external circuit, saving PCB space and 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 bonding pads are 0.1 x 0.1 mm.
Chip thickness = 0.2 mm.

Electrical Specifications at 25°C

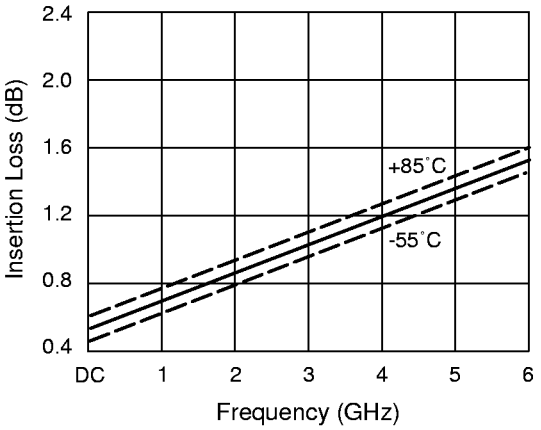
Parameter[1]	Frequency[6]	AK006R2-00		AK006M2-00[1]		Unit
		Min.	Max.	Min.	Max.	
Insertion Loss[2]	DC–1.0 GHz		0.6		0.8	dB
	DC–2.0 GHz		0.8		0.9	dB
	DC–4.0 GHz		1.3		1.3	dB
	DC–6.0 GHz		1.7		1.8	dB
Isolation	DC–1.0 GHz	52		55		dB
	DC–2.0 GHz	47		50		dB
	DC–4.0 GHz	32		35		dB
	DC–6.0 GHz	22		25		dB
VSWR (I/O)	DC–1.0 GHz		1.2:1		1.2:1	
	DC–2.0 GHz		1.3:1		1.3:1	
	DC–4.0 GHz		1.5:1		1.5:1	
	DC–6.0 GHz		1.6:1		1.6:1	

Operating Characteristics at 25°C

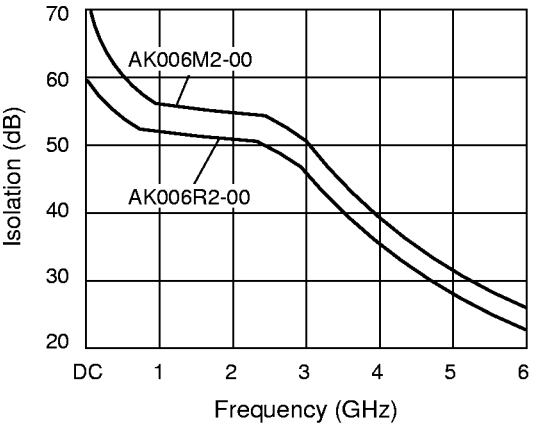
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF)			10		ns
	On, Off (50% CTL to 90/10% RF)			20		ns
	Video Feedthru[3]			20		mV
Input Power for 1 dB Compression	0/-5 V	0.5–6 GHz		23		dBm
	0/-8 V	0.001 GHz		15		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power 13 dBm	0.5–6 GHz		37		dBm
		0.001 GHz		26		dBm
Control Voltages	V_{Low}		0		0.5	V
	V_{High}		4		5.0	V
Bias Voltages[4,5]	+5 V ± 0.5 V @ 1 mA Typ.					
	-5 V ± 0.25 V @ 4 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. The 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 4 mA to 5mA @ 85°C.
6. DC = 300 kHz.

Typical Performance Data

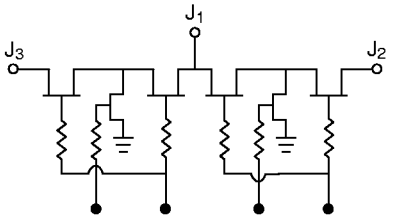


Insertion Loss vs. Frequency

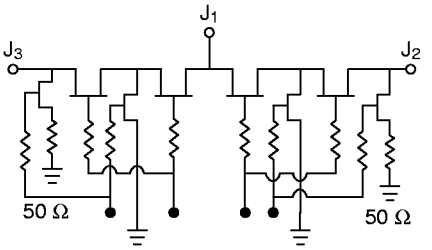


Isolation vs. Frequency

Truth Table and Bonding Options



AK006R2-00 Reflective



AK006M2-00 Non-Reflective

Option	J_1–J_2	J_1–J_3	TTL	A	B, C	D	E	F, G
AK006R2-00	Ins. Loss	Isolation	1	J_1	GND	J_2	J_3	NC
	Isolation	Ins. Loss	0					
AK006M2-00	Ins. Loss	Isolation	1	J_1	GND	J_2	J_3	GND
	Isolation	Ins. Loss	0					

NC = no connection.
GND = ground.

Absolute Maximum Ratings

Characteristic	Value
RF Input Power (RF In)	0.5 W > 500 MHz 0.1 W @ 50 MHz
Bias Voltage (V_B)	+7.0 V, -6.0 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

Chip Layout