

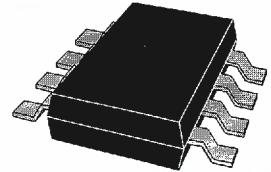
GaAs MMIC SPDT FET Switch With Integral Driver Non-Reflective DC-2.5 GHz



AK002M2-12

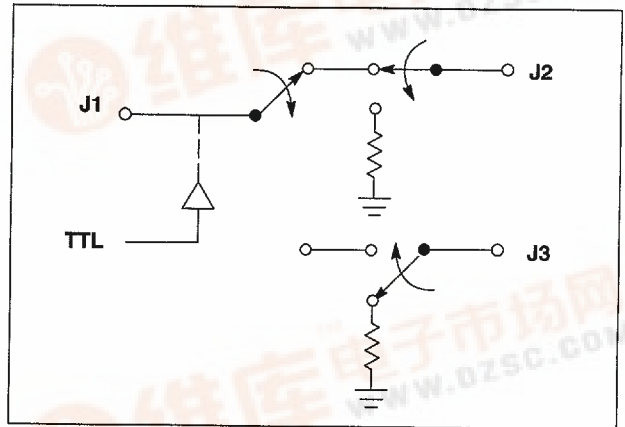
Features

- Plastic 8 Lead SOIC
- Low DC Power Consumption ~20 mW Per Arm
- Non Reflective
- Integral Driver +5V, -5V Bias Supplies; CMOS and TTL Compatible



Description

The GaAs SPDT non-reflective switch with integral driver is offered in the 8 lead SOIC package. These devices are useful as modulators as well as switches in instrumentation and telecommunications applications. The integral driver simplifies the external drive circuit, thus saving PC board space and reducing component count.



Electrical Specifications at 25°C⁶

Insertion Loss ¹	DC - 0.5 GHz	0.7	dB	Max
	DC - 1 GHz	0.8	dB	Max
	DC - 2 GHz	1.0	dB	Max
	DC - 2.5 GHz	1.1	dB	Max
Isolation	DC - 0.5 GHz	40	dB	Min
	DC - 1 GHz	30	dB	Min
	DC - 2 GHz	20	dB	Min
	DC - 2.5 GHz	18	dB	Min
VSWR (I/O) ²	DC - 0.5 GHz	1.3:1		Max
	DC - 2.5 GHz	1.6:1		Max

1. Insertion loss changes by 0.003 dB/°C.
2. VSWR for input and output.
3. Measured with 1 ns risetime pulse and 500 MHz bandwidth.
4. Bias voltage must be connected before TTL voltage is applied. Use of toggle switches or other similar components may produce voltage spikes which can cause irreversible damage to the device. To avoid voltage sequencing refer to the Application Note section, "Driver Protection Circuit: AK/AN Series."

⁵ Current increases from 4 mA to 5 mA at +85°C.

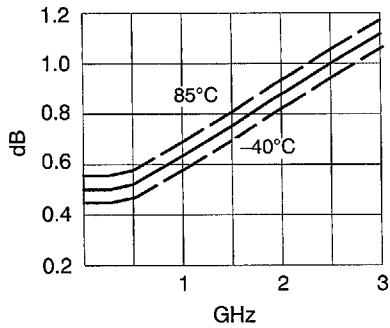
⁶ DC-300 kHz.

Operating Characteristics at 25°C

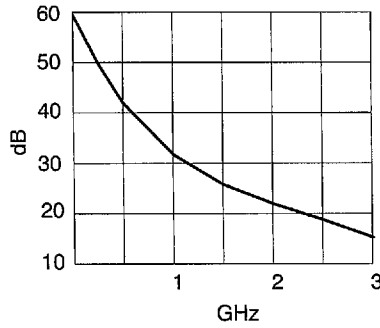
Impedance	50 Ohms Nominal		
Switching Characteristics			
RISE, FALL (10/90% or 90/10% RF)	10	ns	Typ
ON, OFF (50% CTL to 90/10% RF)	20	ns	Typ
Video Feedthru ³	30	mV	Typ
Input Power for 1 dB Compression			
0.5-2 GHz	+23	dBm	Typ
0.001 GHz	+15	dBm	Typ
Intermodulation Intercept Point for two-tone input power up to +13 dBm			
Intercept Points		IP2	IP3
0.5-2 GHz	+59	+37	dBm Typ
0.001 GHz	+48	+26	dBm Typ
Logic Drives (Volts)		Min	Max
Low (0)	0	0.5	Volts
High (1)	4	5	Volts
Bias Voltage ^{4,5}		+5V ± 0.5V @ 1 mA Typ	
		-5V ± 0.25V @ 4 mA Typ	



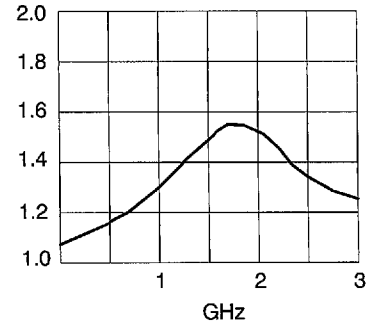
Typical Performance Data



Insertion Loss vs. Frequency

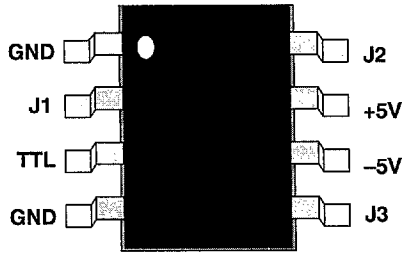


Isolation vs. Frequency



VSWR vs. Frequency

Pin Out



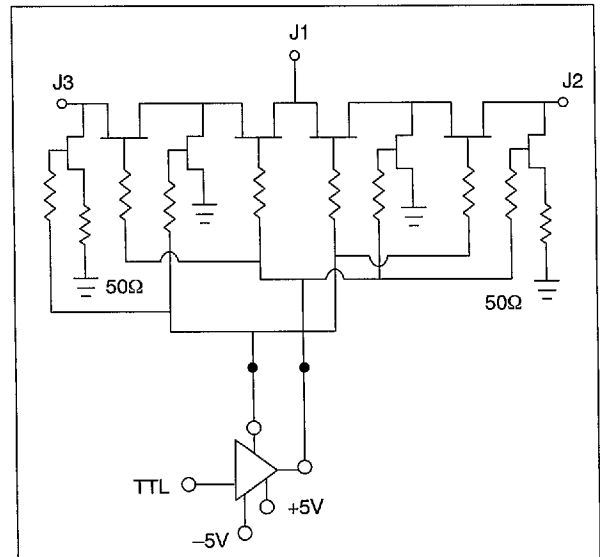
Absolute Maximum Ratings

- RF Input Power: 0.5W > 500 MHz
0.1W @ 50 MHz
- Bias Voltages: +7V, -7V
- Control Voltage: +7V
- Operating Temperature: -40 to +85°C
- Storage Temperature: -65 to 150°C
- θ_{JC}: 30°C/W

Truth Table

TTL	J1 – J2	J1 – J3
1	Insertion Loss	Isolation
0	Isolation	Insertion Loss

Switch Schematic



RF GaAs MMIC Products in Metal Packages

Numerical Index

Part Number	Page	Part Number	Page	Part Number	Page
AD004T2-00	2-44	AK006R2-01	2-30	AS006M1-01	2-8
AD004T2-11	2-44	AK006R2-10	2-30	AS006M1-10	2-8
AE002M2-29	2-74	AK006R2-00	2-28	AS006M2-00	2-16
AE002M4-05	2-42	AK402D4-11	2-64	AS006M2-01	2-22
AH002R2-11	2-26	AK402D4-31	2-68	AS006M2-10	2-22
AK002D2-11	2-70	AN002M2-29	2-72	AS006R1-00	2-4
AK002D4-11	2-62	AN002M4-31	2-38	AS006R2-00	2-16
AK002D4-31	2-66	AN002M4-05	2-40	AS006R2-01	2-20
AK002M4-00	2-36	AS002M4-00	2-34	AS006R2-10	2-20
AK002M4-31	2-38	AS004L1-08	2-6	AS406M2-01	2-24
AK004L1-11	2-12	AS004L1-11	2-6	AS406R2-01	2-24
AK004M1-11	2-14	AS004L2-11	2-18	AT001D3-11	2-60
AK004M2-11	2-32	AS004M1-08	2-8	AT001D4-31	2-56
AK004R2-11	2-30	AS004M1-11	2-8	AT001D6-31	2-58
AK006L1-00	2-10	AS004M2-08	2-22	AT002D8-31	2-54
AK006L1-01	2-12	AS004M2-11	2-22	AT002N5-00	2-49
AK006L1-10	2-12	AS004R2-08	2-20	AT002N5-01	2-49
AK006M1-00	2-10	AS004R2-11	2-20	AT002N5-10	2-49
AK006M1-01	2-14	AS006L1-00	2-4	AT002N5-11	2-49
AK006M1-10	2-14	AS006L1-01	2-6	AT002S3-11	2-52
AK006M2-01	2-32	AS006L1-10	2-6	AT004N3-11	2-46
AK006M2-10	2-32	AS006L2-00	2-18	AT006N3-00	2-46
AK006M2-00	2-28	AS006L2-01	2-18	AT006N3-10	2-46
AK006R1-00	2-10	AS006M1-00	2-4	AT006N3-01	2-46