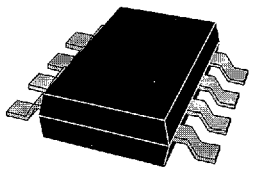
GaAs MMIC SPST FET Switch With Integral Driver Non–Reflective DC–2.5 GHz

Alpha

AK002M1–12

Features

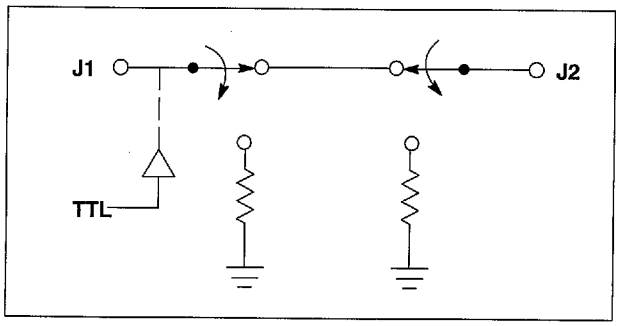


- Integral Driver +5V, –5V; CMOS and TTL Compatible
- Low DC Power Consumption ~ 20 mW
- Plastic 8 Lead SOIC
- Non–Reflective

Description

The GaAs SPST non–reflective chip is offered in the 8 lead plastic SOIC package for surface mounting. The device has an "on chip" driver that is CMOS/TTL compatible and draws only 4 mA.

These devices are useful as modulators as well as switches in commercial applications. The integral driver simplifies the external drive circuit saving PC board space and reducing component count.



Electrical Specifications at 25°C[7]

Insertion Loss[1]	DC – 1 GHz	0.9	dB	Max
	DC – 2 GHz	1.1	dB	Max
	DC – 2.5 GHz	1.2	dB	Max
Isolation	DC – 1 GHz	37	dB	Min
	DC – 2 GHz	30	dB	Min
	DC – 2.5 GHz	25	dB	Min
VSWR (I/O)[2]	DC – 1 GHz	1.3:1	dB	Max
	DC – 2 GHz	1.5:1	dB	Max
	DC – 2.5 GHz	1.7:1	dB	Max

1. Insertion loss changes by 0.003 dB/°C.
2. VSWR for Input and Output.
3. Measured in 500 MHz Bandwidth with 1 ns risetime pulse.
4. Bias voltage and ground 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.
5. Bias voltage sequence can be avoided by use of protection circuit. Refer to the Application Note, "Driver Protection Circuit: AK/AN Series."
6. Current increase from 4 mA to 5 mA at +85°C.
7. 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				
Control Voltages (Vdc)				
0.5–2 GHz		20	dBm	Typ
0.001 GHz		12	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	**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[6]			

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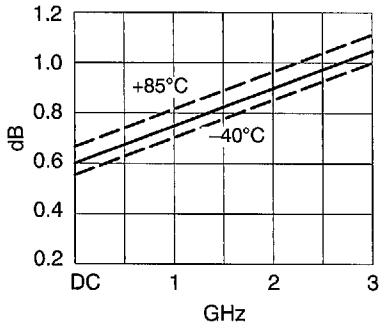
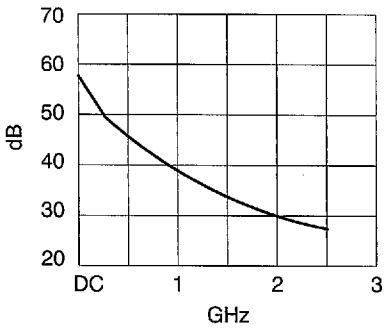
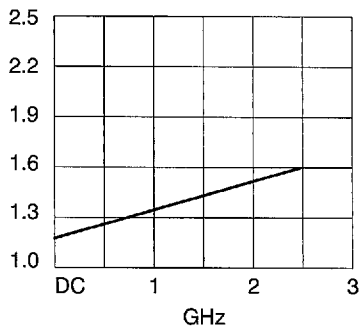
Typical Performance Data



Insertion Loss vs. Frequency

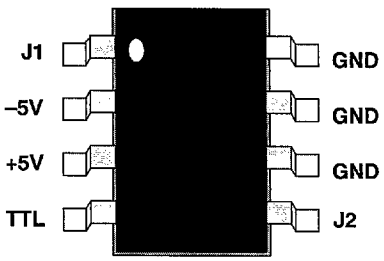


Isolation vs. Frequency



VSWR vs. Frequency

Pin Out



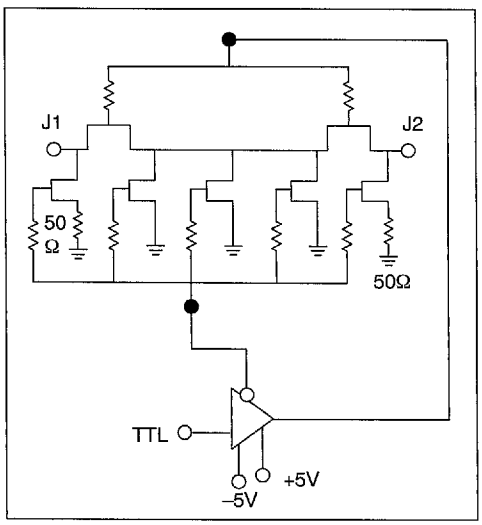
Absolute Maximum Ratings

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
0	Isolation
1	Insertion Loss

Switch Schematic



RF GaAs MMIC Products in Metal Packages

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