GaAs MMIC SPST FET Switch Chip DC–6 GHz

Alpha

AS006L1-00, AS006M1-00, AS006R1-00

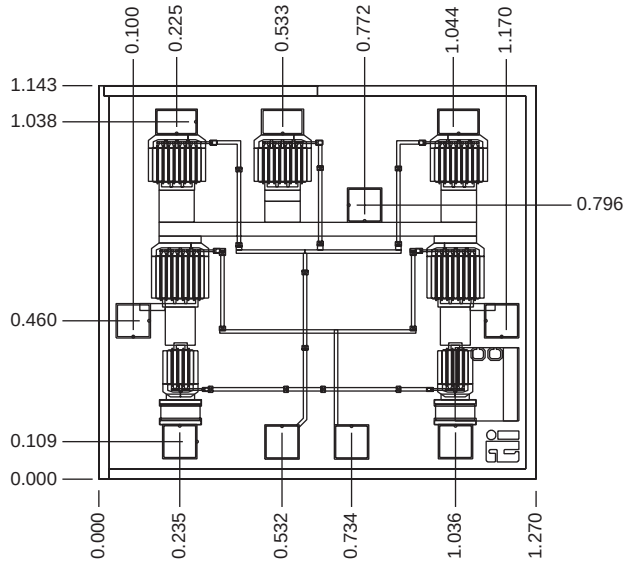
Features

- Multiple Use Options
- Excellent Intermodulation Products/Temperature Stability
- 100% On-Wafer DC Testing
- 100% Visual Inspection of MIL-STD-883 MT 2010

Description

This group of GaAs MMIC SPST FETs are designed for applications up to 6 GHz where high isolation, low loss and low distortion performance is critical, especially radio and cellular telephone switching requirements in which low DC consumption is desired. The chip can be selectively bonded to optimize the low loss or high isolation feature with a non-reflective option.

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

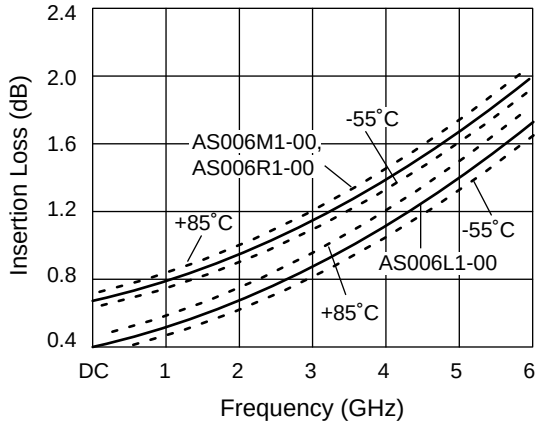
Parameter[1]	Frequency[4]	AS006L1-00		AS006M1-00		AS006R1-00		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Insertion Loss[2]	DC–1.0 GHz		0.6		1.0		1.0	dB
	DC–2.0 GHz		0.8		1.1		1.1	dB
	DC–4.0 GHz		1.2		1.5		1.5	dB
	DC–6.0 GHz		1.7		2.0		2.0	dB
Isolation	DC–1.0 GHz	45		60		55		dB
	DC–2.0 GHz	40		57		50		dB
	DC–4.0 GHz	35		52		45		dB
	DC–6.0 GHz	30		45		35		dB
VSWR (I/O)	DC–1.0 GHz		1.2:1		1.2:1		1.2:1	
	DC–2.0 GHz		1.3:1		1.3:1		1.3:1	
	DC–4.0 GHz		1.5:1		1.5:1		1.3:1	
	DC–6.0 GHz		1.8:1		1.8:1		1.8:1	

Operating Characteristics at 25°C

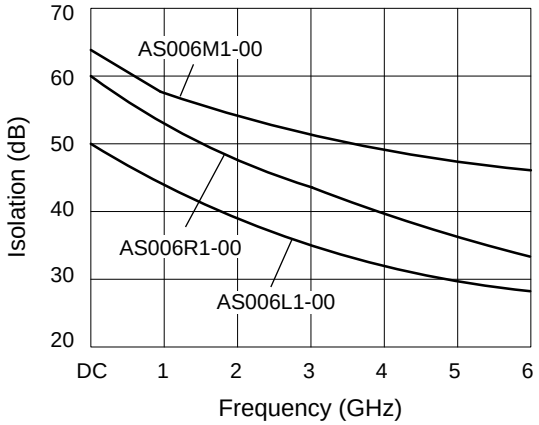
Parameter	Condition	Frequency	Min.	Typ.	Max.	Unit
Switching Characteristics	Rise, Fall (10/90% or 90/10% RF)			3		ns
	On, Off (50% CTL to 90/10% RF)			6		ns
	Video Feedthru[3]			20		mV
Input Power for 1 dB Compression	0/-5 V (0/-8 V)	0.5–6 GHz		24 (30)		dBm
		0.001 GHz		16 (20)		dBm
Intermodulation Intercept Point (IP3)	For Two-tone Input Power 13 dBm	0.5–6 GHz		46		dBm
	0/-8 V	0.001 GHz		35		dBm
Control Voltages	V_{Low} = 0 to -0.2 V @ 20 µA Max.					
	V_{High} = -5 V @ 50 µA to -9 V @ 200 µA Max.					

1. All measurements made in a 50 Ω system, unless otherwise specified.
2. Insertion loss changes 0.003 dB/°C.
3. Video feedthru measured with 1 ns risetime pulse and 500 MHz bandwidth.
4. DC = 300 kHz.

Typical Performance Data

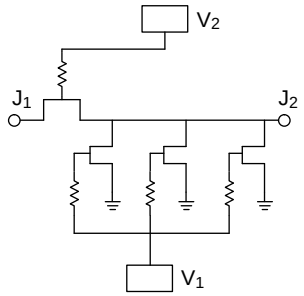


Insertion Loss vs. Frequency

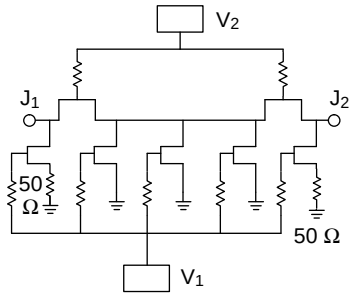


Isolation vs. Frequency

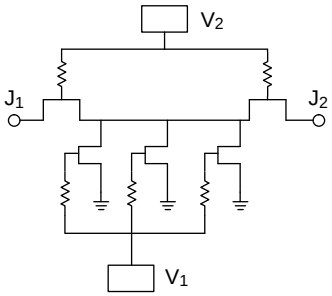
Truth Table and Bonding Options



A. Bonded as Low Loss Reflective Switch



B. Bonded as High Isolation Non-Reflective Switch



C. Bonded as High Isolation Reflective Switch

Option	J_1–J_2	A	B	C	D	E	V_1	V_2
AS006L1-00 (A)	Isolation	J_1	J_2	NC	NC	NC	0	-5
	Insertion Loss	J_1	J_2	NC	NC	NC	-5	0
AS006M1-00 (B)	Isolation	J_1	NC	J_2	GND	GND	0	-5
	Insertion Loss	J_1	NC	J_2	GND	GND	-5	0
AS006R1-00 (C)	Isolation	J_1	NC	J_2	NC	NC	0	-5
	Insertion Loss	J_1	NC	J_2	NC	NC	-5	0

Absolute Maximum Ratings

Characteristic	Value
RF Input Power (RF In)	2 W > 500 MHz 0/-8 V 0.5 W @ 50 MHz 0/-8 V
Control Voltage (V_C)	+0.2 V, -10 V
Operating Temperature (T_{OP})	-55 to +125°C
Storage Temperature (T_{ST})	-65 to +150°C
Thermal Resistance (Θ_{JC})	25°C/W

Chip Layout