

GaAs SP4T Absorptive Switch, DC-3.0 GHz

Rev. V6

Electrical Specifications: $T_A = 25^\circ\text{C}^{1,2}$

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Insertion Loss	—	DC - 0.5 GHz	dB	—	1.0	1.3
		DC - 1.0 GHz	dB	—	1.2	1.4
		DC - 2.0 GHz	dB	—	1.2	1.6
		DC - 3.0 GHz	dB	—	1.4	1.8
Isolation	—	DC - 0.5 GHz	dB	50	60	—
		DC - 1.0 GHz	dB	40	50	—
		DC - 2.0 GHz	dB	30	40	—
		DC - 3.0 GHz	dB	25	35	—
VSWR	RFC, RF1 - RF4 (On)	DC - 0.5 GHz	Ratio	—	1.6:1	—
		DC - 1.0 GHz	Ratio	—	1.6:1	—
		DC - 2.0 GHz	Ratio	—	1.6:1	—
		DC - 3.0 GHz	Ratio	—	1.6:1	—
VSWR	RF1 - RF4 (Off)	DC - 0.5 GHz	Ratio	—	1.3:1	—
		DC - 1.0 GHz	Ratio	—	1.5:1	—
		DC - 2.0 GHz	Ratio	—	1.9:1	—
		DC - 3.0 GHz	Ratio	—	2.4:1	—
Trise, Tfall	10% to 90%	—	ns	—	50	—
Ton, Toff	50% Control to 90% / 10% RF	—	ns	—	150	—
Transients	In-Band (peak-peak)	—	mV	—	50	—
1 dB Compression	Input Power	0.05 GHz	dBm	—	+20	—
		0.5 GHz to 3 GHz	dBm	—	+27	—
IP3	Two-Tone Input Power up to +5 dBm	0.05 GHz	dBm	—	+35	—
		0.5 GHz to 3 GHz	dBm	—	+46	—
IP2	Two-Tone Input Power up to +5 dBm	0.05 GHz	dBm	—	+45	—
		0.5 GHz to 3 GHz	dBm	—	+60	—
Vcc	—	—	V	4.5	5.0	5.5
Vee	—	—	V	-8.0	—	-5.0
Icc	Vcc = 4.5 to 5.5 V Vctl = 0 to 0.8V, or Vcc – 2.1V to Vcc	—	mA	—	0.2	4.0
Iee	Vee = -5.0V to -8.0V	—	mA	—	0.1	1.0

1. All specifications apply when operated with bias voltages of +5V for Vcc and –5V for Vee.
2. When DC blocks are used, a 10K ohm return to GND is required on the RFC port.

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Absolute Maximum Ratings^{3,4,5}

Parameter	Absolute Maximum
Max Input Power 0.05 GHz 0.5 - 3.0 GHz ⁵	+27 dBm +34 dBm
V_{CC}	$-0.5V \leq V_{CC} \leq +7.0V$
V_{EE}	$-8.5V \leq V_{EE} \leq +0.5V$
$V_{CC} - V_{EE}$	$-0.5V \leq V_{CC} - V_{EE} \leq 14.5V$
V_{in} ⁶	$-0.5V \leq V_{in} \leq V_{CC} + 0.5V$
Operating Temperature	$-40^{\circ}C$ to $+85^{\circ}C$
Storage Temperature	$-65^{\circ}C$ to $+150^{\circ}C$

- Exceeding any one or combination of these limits may cause permanent damage to this device.
- M/A-COM does not recommend sustained operation near these survivability limits.
- When the input power is applied to the terminated port, the absolute maximum is +30 dBm.
- Standard CMOS TTL interface, latch-up will occur if logic signal is applied prior to power supply.

Handling Procedures

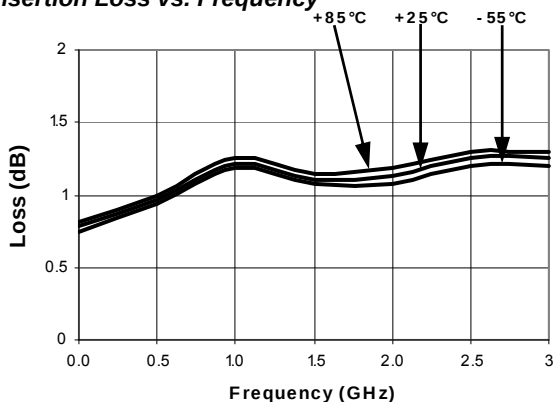
Please observe the following precautions to avoid damage:

Static Sensitivity

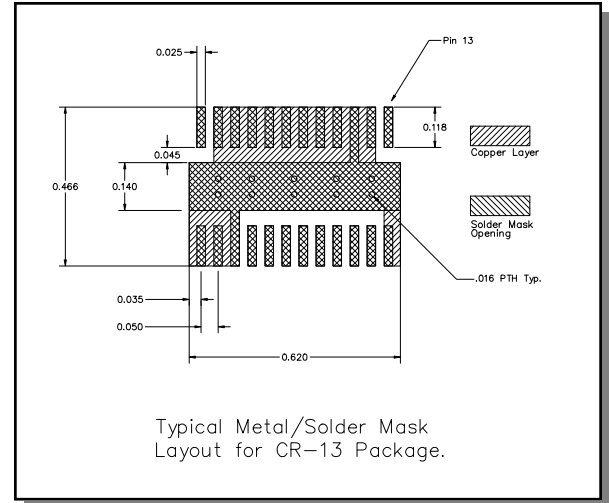
Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Typical Performance Curves

Insertion Loss vs. Frequency



Recommended PCB Configuration

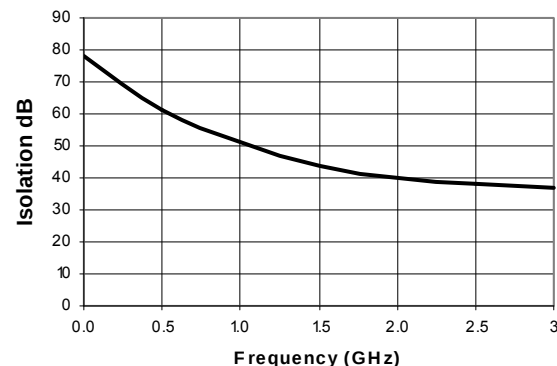


Truth Table (Switch)

TTL Control Inputs				Condition of Switch			
				RF Common to Each RF Port			
C1	C2	C3	C4	RF1	RF2	RF3	RF4
1	0	0	0	On	Off	Off	Off
0	1	0	0	Off	On	Off	Off
0	0	1	0	Off	Off	On	Off
0	0	0	1	Off	Off	Off	On

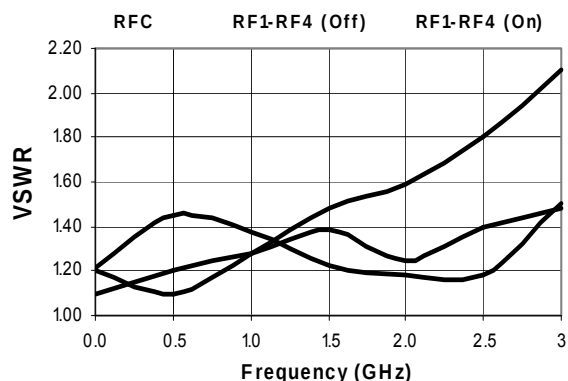
0 = TTL Low; 1 = TTL High

Isolation vs. Frequency

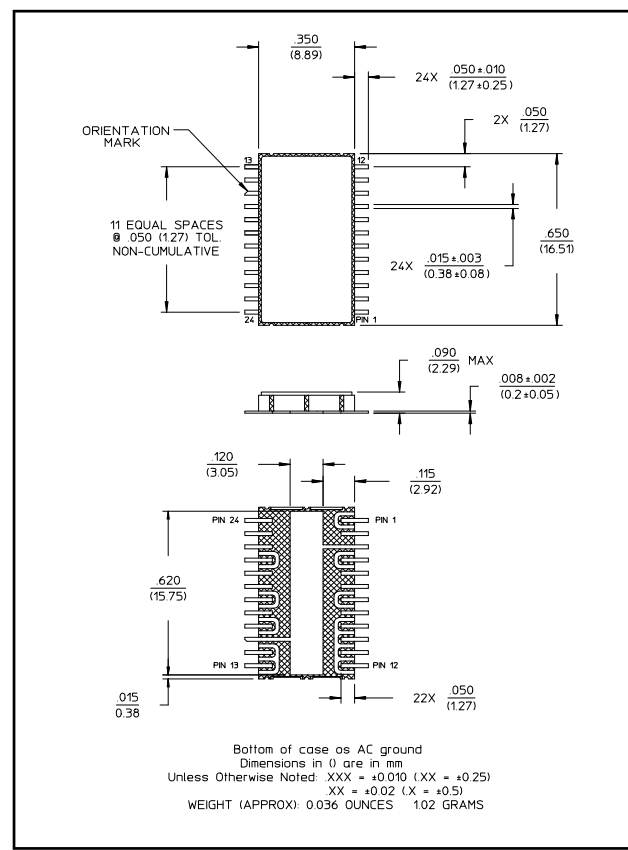


Typical Performance Curves

VSWR vs. Frequency



Lead-Free, CR-14 Ceramic Package[†]



[†] Reference Application Note M538 for lead-free solder reflow recommendations.