

## Features

- Small Ceramic Package, 0.250" Sq.
- Fast Switching Speed, 4 ns Typical
- Ultra Low DC Power Consumption
- 50 Ohm Nominal Impedance
- MIL-STD-883 screening available
- Lead-Free CR-4 Package
- 260°C Reflow Compatible
- RoHS\* Compliant

## Description

M/A-COM's SW-283-PIN is a GaAs MMIC transfer switch packaged in lead-free, surface mount CR-4 ceramic style packages. SW-283-PIN offers low insertion loss, high isolation, and fast switching. This ceramic switch platform has a common footprint for all three designs. The CR-4 package is hermetically sealed, making this switch ideal for space, military radios, and other environmentally harsh applications.

Typical applications include synthesizer switching, transmit/receive switching, switch matrices and filter banks in systems such as radio and cellular equipment, PCM, GPS, and fiber optic modules.

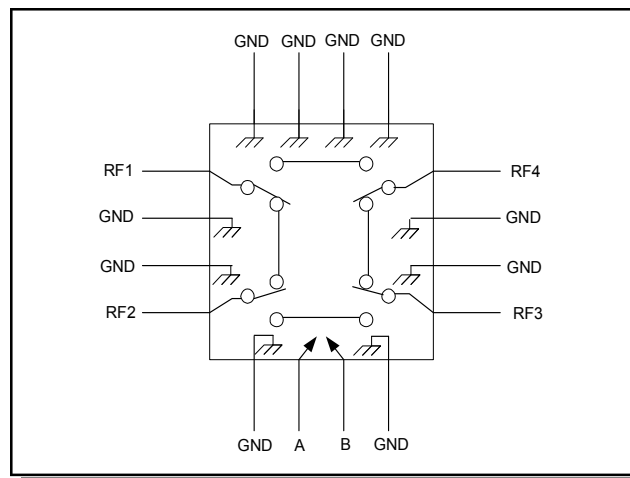
The SW-283-PIN transfer switch contains a monolithic GaAs MMIC which is fabricated using a 1.0 micron MESFET process.

## Ordering Information

Part Number	Package
SW-283-PIN	Bulk Packaging

Note: Reference Application Note M513 for reel size information.

## Functional Block Diagram



## Pin Configuration

Pin No.	Function	Pin No.	Function
1	RF1	9	RF3
2	GND	10	GND
3	GND	11	GND
4	RF2	12	RF4
5	GND	13	GND
6	A	14	GND
7	B	15	GND
8	GND	16	GND

The metal bottom of the case must be connected to RF and DC ground.

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

**Electrical Specifications:  $T_A = 25^\circ\text{C}$ ,  $Z_0 = 50\Omega$  <sup>1,2</sup>**

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Insertion Loss	—	DC - 3 GHz	dB	—	—	2.1
		DC - 2 GHz	dB	—	—	1.8
		DC - 1 GHz	dB	—	—	1.3
		DC - 0.5 GHz	dB	—	—	1.0
VSWR	—	DC - 3 GHz	Ratio	—	—	1.9:1
		DC - 2 GHz	Ratio	—	—	1.7:1
		DC - 1 GHz	Ratio	—	—	1.3:1
		DC - 0.5 GHz	Ratio	—	—	1.25:1
Isolation	—	DC - 3 GHz	dB	20	—	—
		DC - 2 GHz	dB	25	—	—
		DC - 1 GHz	dB	40	—	—
		DC - 0.5 GHz	dB	45	—	—
Trise, Tfall Ton, Toff Transients	10/90% or 90/10% RF 50% CTL to 90/10% RF In-Band	—	nS	—	2	—
		—	nS	—	4	—
		—	mV	—	30	—
1 dB Compression	Control Voltage 0/-5 VDC	0.5 - 3 GHz	dBm	—	+27	—
		0.05 GHz	dBm	—	+21	—
	Control Voltage 0/-8 VDC	0.5 - 3 GHz	dBm	—	+33	—
		0.05 GHz	dBm	—	+26	—
IP <sub>2</sub>	For two-tone Input power up to +13 dBm	0.5 - 3 GHz	dBm	—	+68	—
		0.05 GHz	dBm	—	+62	—
IP <sub>3</sub>	For two-tone Input power up to +13 dBm	0.5 - 3 GHz	dBm	—	+50	—
		0.05 GHz	dBm	—	+45	—
Control Voltages	V <sub>IN</sub> Low: 0 to -0.2V V <sub>IN</sub> High: -5V @ 10 $\mu$ A Typ to -8V	— —	— —	— —	— —	5 $\mu$ A 200 $\mu$ A

1. All specifications apply with 50 ohm impedance connected to all RF ports with 0 and -5 VDC control voltages.
2. Faster switching speed can be achieved with enhanced driver waveform.

## Absolute Maximum Ratings <sup>3,4</sup>

Parameter	Absolute Maximum
Input Power 0.05 GHz 0.5 - 3.0 GHz	+27 dBm +34 dBm
Control Voltage	-8.5 V $\leq$ V <sub>c</sub> $\leq$ +5 V
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. M/A-COM does not recommend sustained operation near these survivability limits.

## Handling Procedures

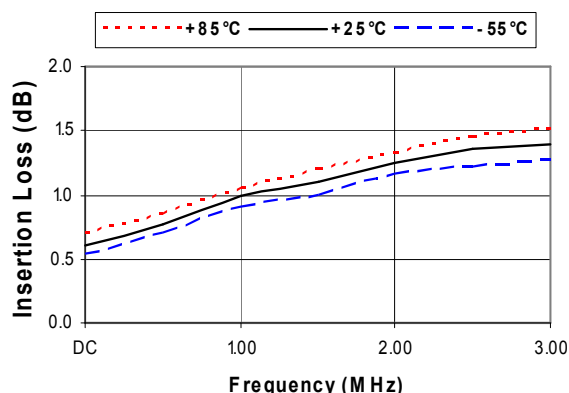
Please observe the following precautions to avoid damage:

## 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*

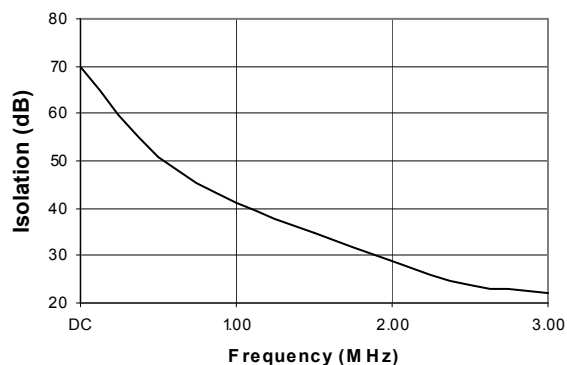


## Truth Table (Switch)

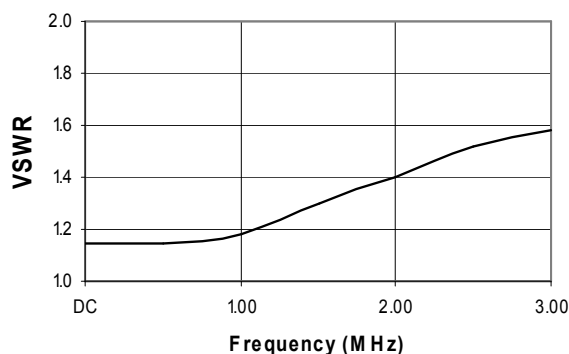
Control Input		Condition of Switch			
A	B	RF1- RF2	RF2- RF3	RF1- RF4	RF3- RF4
HI	LOW	OFF	ON	ON	OFF
LOW	HI	ON	OFF	OFF	ON

Low = 0.0V, High = -5.0V

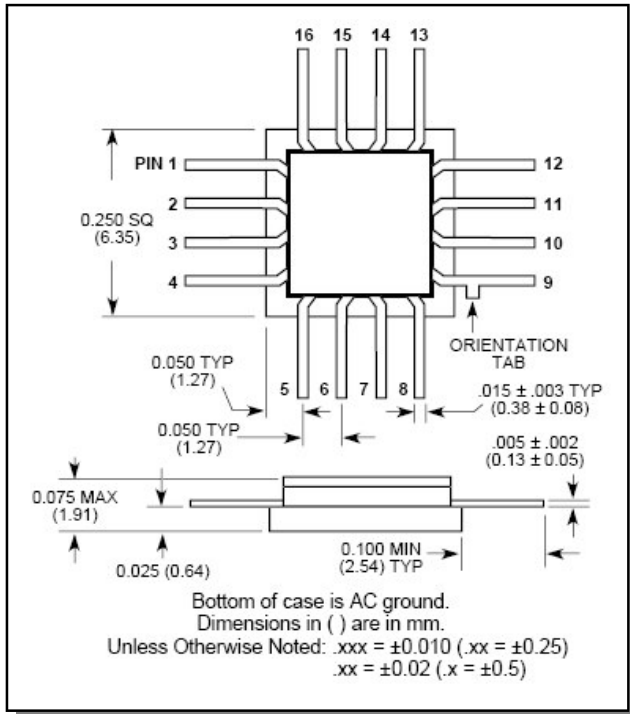
*Isolation vs. Frequency*



*VSWR vs. Frequency*



## Lead-Free, CR-4 Ceramic Package<sup>†</sup>



<sup>†</sup> Reference Application Note M538 for lead-free solder reflow recommendations.