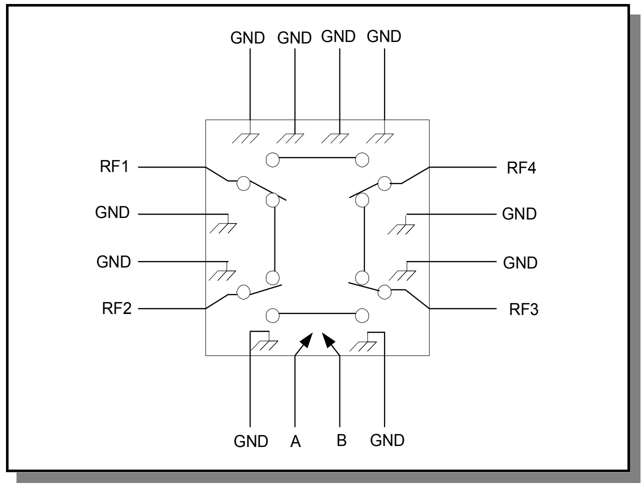
GaAs Transfer Switch, DC-3.0 GHz

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

Functional Block Diagram



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.

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.

Ordering Information

Part Number	Package
SW-283-PIN	Bulk Packaging

Note: Reference Application Note M513 for reel size information.
Note: Die quantity varies.

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

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Electrical Specifications: T_A = 25°C, Z_0 = 50Ω [1,2]

Parameter	Test Conditions	Frequency	Units	Min	Typ	Max
Insertion Loss	—	DC - 3 GHz DC - 2 GHz DC - 1 GHz DC - 0.5 GHz	dB dB dB dB	— — — —	— — — —	2.1 1.8 1.3 1.0
VSWR	—	DC - 3 GHz DC - 2 GHz DC - 1 GHz DC - 0.5 GHz	Ratio Ratio Ratio Ratio	— — — —	— — — —	1.9:1 1.7:1 1.3:1 1.25:1
Isolation	—	DC - 3 GHz DC - 2 GHz DC - 1 GHz DC - 0.5 GHz	dB dB dB dB	20 25 40 45	— — — —	— — — —
Trise, Tfall Ton, Toff Transients	10/90% or 90/10% RF 50% CTL to 90/10% RF In-Band	— — —	nS nS mV	— — —	2 4 30	— — —
1 dB Compression	Control Voltage 0/-5 VDC Control Voltage 0/-8 VDC	0.5 - 3 GHz 0.05 GHz 0.5 - 3 GHz 0.05 GHz	dBm dBm dBm dBm	— — — —	+27 +21 +33 +26	— — — —
IP_2	For two-tone Input power up to +13 dBm	0.5 - 3 GHz 0.05 GHz	dBm dBm	— —	+68 +62	— —
IP_3	For two-tone Input power up to +13 dBm	0.5 - 3 GHz 0.05 GHz	dBm dBm	— —	+50 +45	— —
Control Voltages	V_{IN} Low: 0 to –0.2V V_{IN} High: -5V @ 10 μA Typ to –8V	— —	— —	— —	— —	5 μA 200 μA

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 [3,4]

Parameter	Absolute Maximum
Input Power 0.05 GHz 0.5 - 3.0 GHz	 +27 dBm +34 dBm
Control Voltage	-8.5 V ≤ Vc ≤ +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.

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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.

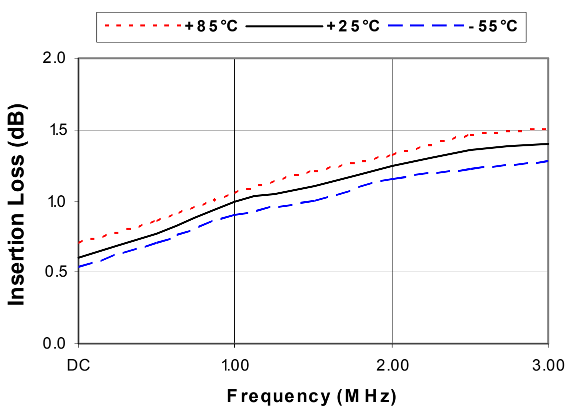
Truth Table (Switch)

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

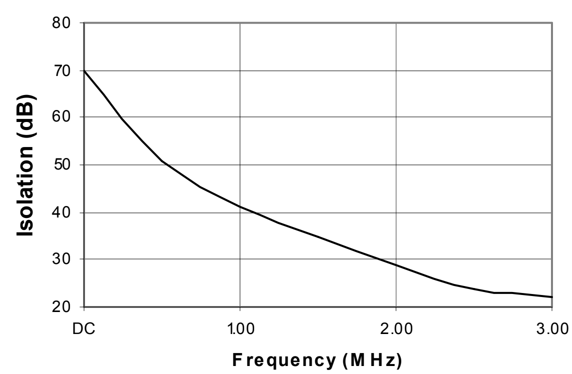
Low = 0.0V, High = -5.0V

Typical Performance Curves

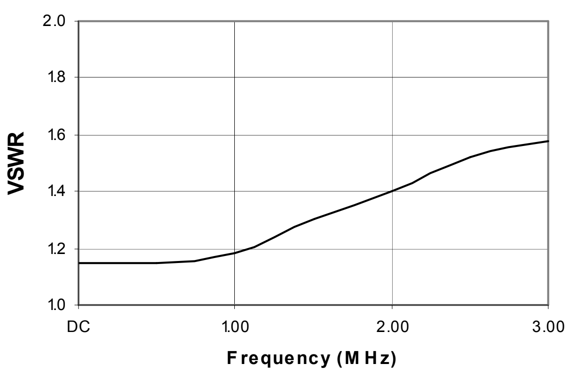
Insertion Loss vs. Frequency



Isolation vs. Frequency



VSWR vs. Frequency



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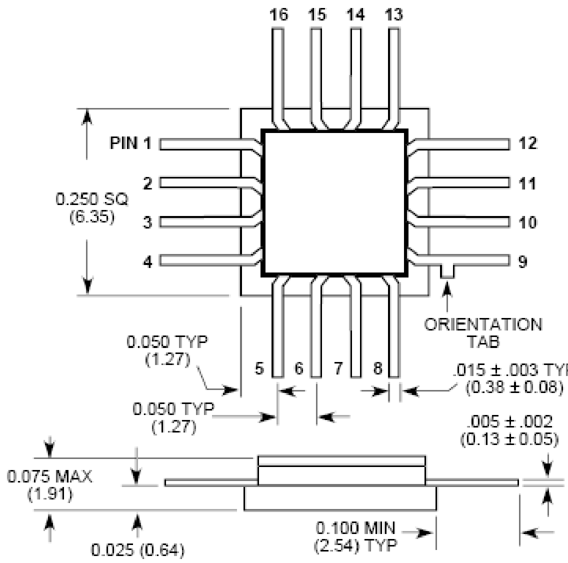
Lead-Free, CR-4 Ceramic Package†



Bottom of case is AC ground.
Dimensions in ( ) are in mm.
Unless Otherwise Noted: .xxx = ±0.010 (.xx = ±0.25)
.xx = ±0.02 (.x = ±0.5)

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

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