M/A-COM Technology Solutions

3 Watt Cellular T/R and Antenna Changeover Switch
DC - 3.0 GHz

Rev. V5

Features

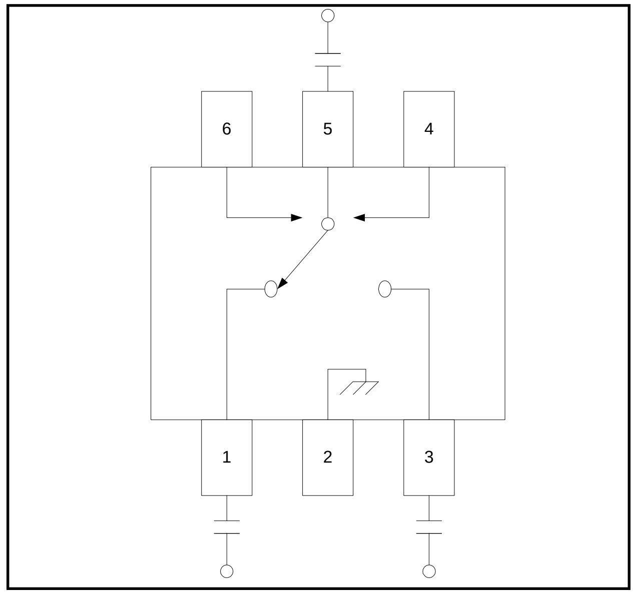
- Low Cost Plastic SOT-26 Package
- Low Insertion Loss: < 0.6 dB @ 1900 MHz
- Low Power Consumption: <20µA @ +3V
- Very High Intercept Point: 53 dBm IP3
- Both Positive and Negative 2.5 to 8 V Control
- For CDMA, W-CDMA, TDMA, GSM, PCS and DCS Applications

Description

M/A-COM's SW-425 is a GaAs monolithic switch in a low cost SOT-26 surface mount plastic package. The SW-425 is ideally suited for applications where very low power consumption (<10µA@5V), low intermodulation products and very small size are required. Typical applications include Internal/External antenna select switch for portable telephones and data radios. In addition, because of its low loss, good isolation and inherent speed, the SW-425 can be used as a conventional T/R switch or as an antenna diversity switch. The SW-425 can be used in power applications up to 3 watts in systems such as cellular PCS, CDMA, W-CDMA, TDMA, GSM and other analog/digital wireless communications systems.

The SW-425 is fabricated using M/A-COM's 0.5 micron gate length GaAs PHEMT process. The process features full chip passivation for increased performance and reliability.

Functional Diagram



Pin Configuration

Pin No.	Function	Pin No.	Function
1	RF1	4	VB
2	Ground	5	RF Common
3	RF2	6	VA

Ordering Information[1]

Part Number	Package
SW-425 PIN	Bulk Packaging
SW-425TR	1000 piece reel

1. Reference Application Note M513 for reel size information.

Truth Table

Mode (Control)	Control A	Control B	RFC - RF1	RFC - RF2
Positive[4]	0 ± 0.2 V +2.5 to +8 V	+2.5 to +8 V 0 ± 0.2 V	Off On	On Off
Positive/ Negative [3,4]	-Vc ± 0.2 V +Vc	+Vc -Vc ± 0.2 V	Off On	On Off
Negative[5]	0 ± 0.2 V -2.5 to -8 V	-2.5 to -8 V 0 ± 0.2 V	On Off	Off On

3. External DC blocking capacitors are required on all RF ports. 39 pF capacitors can be used for positive control voltage.
4. [-VCTL], VCTL < 8 V
5. If negative control is used, DC blocking capacitors are not required on RF ports.

Absolute Maximum Ratings [2]

Parameter	Absolute Maximum
Input Power (0.5—3.0 GHz) 3 V Control 5 V Control	 +36 dBm +38 dBm
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C

2. Exceeding any one or combination of these limits may cause permanent damage to this device.

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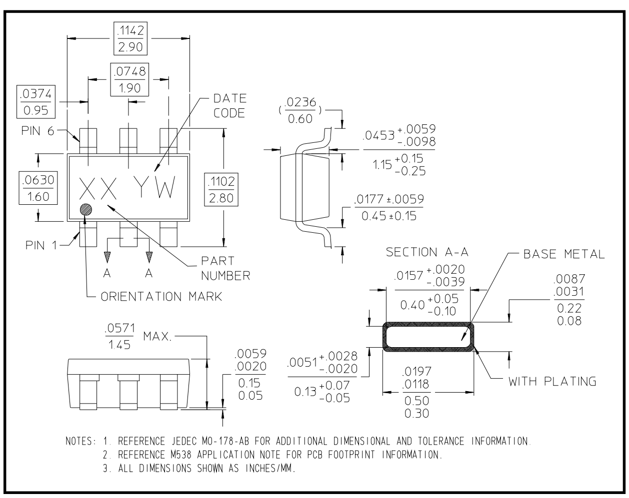
Electrical Specifications: T_A = +25°C

Parameter	Test Conditions	Units	Min	Typ	Max
Insertion Loss	DC - 1 GHz 1 - 2 GHz 2 - 3 GHz	dB dB dB	— — —	0.4 0.55 0.7	0.5 0.65 0.8
Isolation	DC - 1 GHz 1 - 2 GHz 2 - 3 GHz	dB dB dB	18 13 10	20 15 12	— — —
VSWR	DC - 3 GHz	Ratio	—	1.2:1	1.4:1
P1dB (3 V supply)	500 MHz - 3 GHz	dBm	32	34	—
P1dB (5 V supply)	500 MHz - 3 GHz	dBm	34	36	—
Input IP2	Two-Tone, 5 MHz spacing, +10 dBm (+13 dBm total) V_{CTL} = 3 V 0.9 GHz	dBm	62	70	—
Input IP3	Two-Tone, 5 MHz spacing, +10 dBm (+13 dBm total) V_{CTL} = 3 V 0.9 GHz	dBm	48	53	—
2nd Harmonics	Pin 30 dBm [V_{CTL}] = 3 V Pin 33 dBm [V_{CTL}] = 5 V	dBc dBc	65 65	70 75	— —
3rd Harmonics	Pin 30 dBm [V_{CTL}] = 3 V Pin 33 dBm [V_{CTL}] = 5 V	dBc dBc	45 65	48 75	— —
Trise, Tfall	10% to 90% RF, 90% to 10% RF	ns	—	60	—
Ton, Toff	50% Control to 90% RF, Control to 10% RF	ns	—	20	—
Transients	In-Band	mV	—	20	—
Gate Leakage Current	V_{CTL} = 3 V	µA	—	10	20

SOT-26



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.

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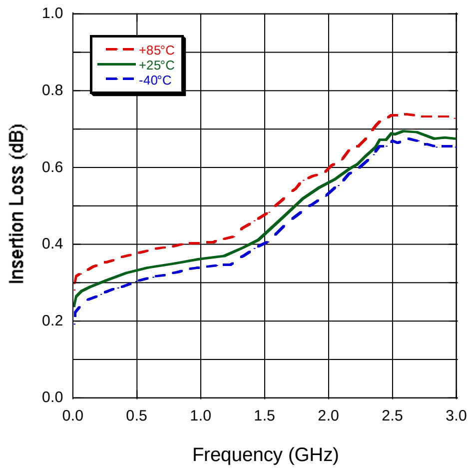
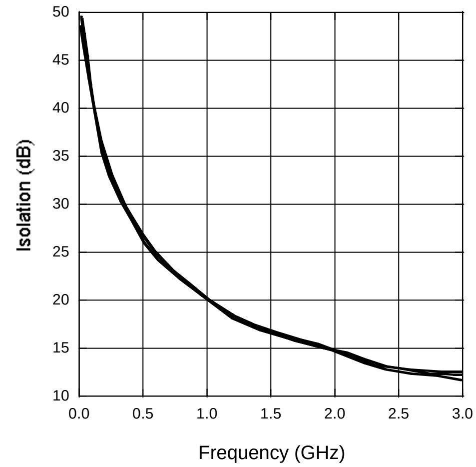
Typical Performance Curves

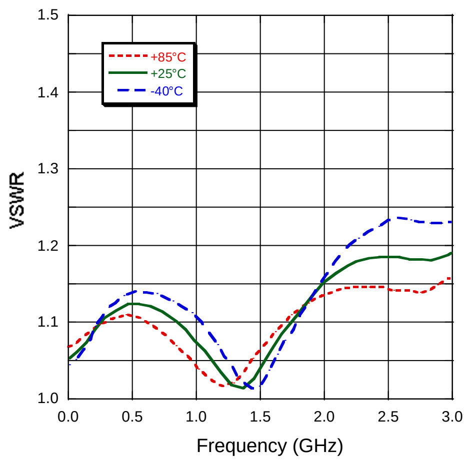
Insertion Loss



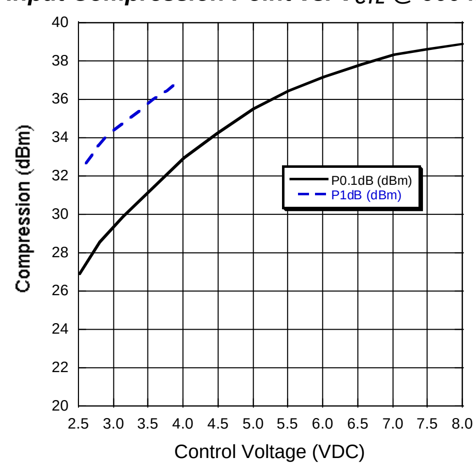
Isolation



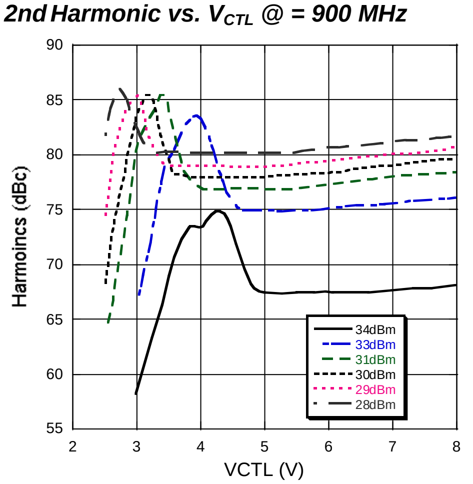
VSWR



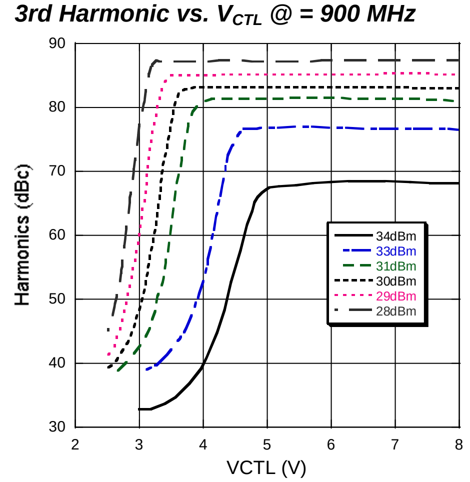
Input Compression Point vs. V_{CTL} @ 900 MHz



2nd Harmonic vs. V_{CTL} @ = 900 MHz



3rd Harmonic vs. V_{CTL} @ = 900 MHz



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