

## 0.5~6.0GHz SPDT Switch

### Description

The MXD8723 is a CMOS silicon-on-insulator (SOI), single-pole, double-throw (SPDT) switch. The high linearity and ruggedness performance and extremely low insertion loss makes the device an ideal choice for WLAN applications such as 802.11 a/b/g/n.

The MXD8723 SPDT switch is provided in a compact 1.0mm x 1.0mm x 0.45mm 6-lead QFN package. A functional block diagram, pin configuration and package are shown in Figure 1. Signal pin assignments and functional pin descriptions are provided in Table 1

### Applications

- WLAN 802.11a/b/g/n networks
- WLAN repeaters
- ISM band radios
- Low power transmitting and receiving systems

### Features

- Broadband frequency range: 0.5 to 6.0GHz
- Low insertion 0.40dB @2.45GHz
- Low insertion 0.70dB @5.80GHz
- Input 0.1dB compression point: 32dBm
- Small, QFN (6-pin, 1.0mm x 1.0mm x 0.45mm) package, MSL1

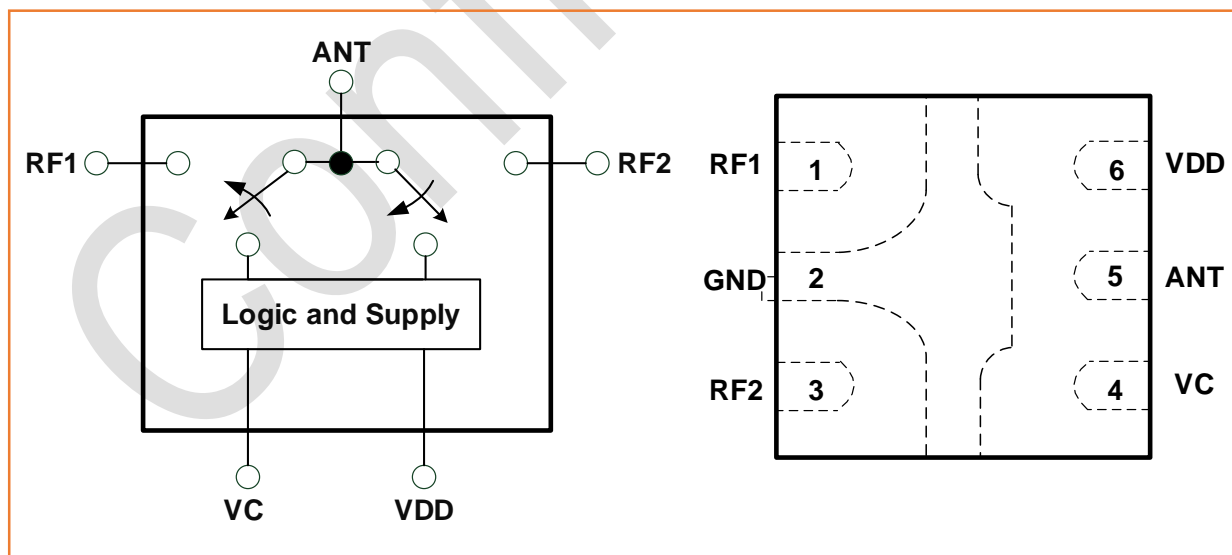


Figure 1 Functional Block and Pin Configuration

## Function Characteristics

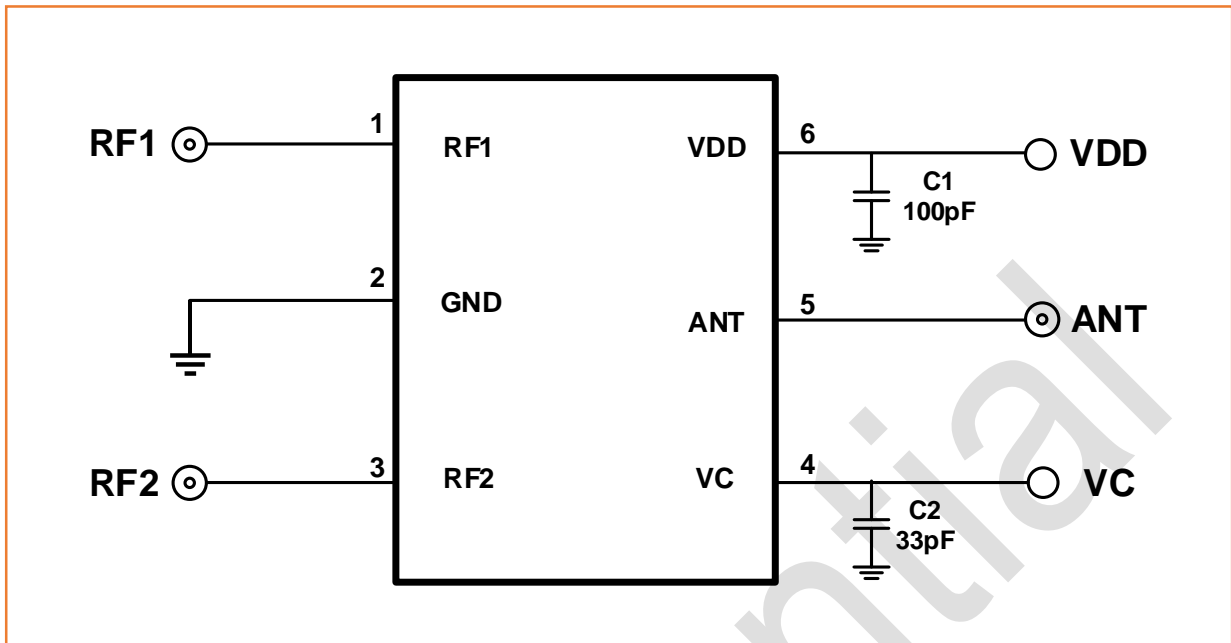


Figure 2 Application Schematic

Table 1 Pin Descriptions

No.	Name	Description	No.	Name	Description
1	RF1	RF Port 1	4	VC	Logic Control Voltage
2	GND	Ground	5	ANT	Antenna Port
3	RF2	RF Port 2	6	VDD	Power Supply Voltage

Table 2 VC Truth Table for RF Channel Operating Mode

VC	RF Channel Operating Mode
High	ANT to RF1 On
Low	ANT to RF2 On

## Electrical Characteristics

Table 3 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
DC Supply Voltage	$V_{DD}$	-0.3	3.8	V
Control Pin Voltage	$V_C$	-0.3	3.8	V
RF Max Input Power (CW, $Z_0=50\Omega$ , $T_A=25^\circ\text{C}$ )	$P_{IN}$		33	dBm
Device Operating Temperature	$T_{OP}$	-40	90	$^\circ\text{C}$
Device Storage Temperature	$T_{STG}$	-55	150	$^\circ\text{C}$
Electrostatic Discharge				
Human Body Model (HBM), All Pins	$V_{ESD(HBM)}$	1000		V
Charged Device Model (CDM), All Pins	$V_{ESD(CDM)}$	500		V

### Notice

Exposure to maximum rating conditions for extended periods may reduce device reliability. There is no damage to device with only one parameter set at the limit and all other parameters set at or below their nominal value. Exceeding any of the limits listed here may result in permanent damage to the device.

Table 4 Recommended Operating Conditions

Parameter	Symbol	MIN	TYP	MAX	Unit
Operating Frequency	$F_0$	0.5		6.0	GHz
DC Supply Voltage	$V_{DD}$	2.5	3.3	3.6	V
Control Voltage High	$V_{CH}$	1.5	1.8	3.6	V
Control Voltage Low	$V_{CL}$	0	0	0.3	V

Table 5 Nominal Operating Parameters

Parameter	Symbol	Specification			Unit	Condition
		MIN	TYP	MAX		
Nominal Conditions	$V_{DD}=3.3V$ , $V_{CH}=1.8V$ , $V_{CL}=0V$ , $P_{IN}=0dBm$ , $Z_0=50\Omega$ , $T_A=25^\circ C$ Unless Otherwise Stated					
<b>DC Performances</b>						
DC Supply Current	$I_{DD}$		30	70	$\mu A$	
Current on VC	$I_C$			5	$\mu A$	
<b>Timing Performances</b>						
RF Path Switching Time	$T_{SW}$		300	500	ns	50% of final VC voltage to 10%/90% of final RF power
Startup Time	$T_{ON}$			10	$\mu s$	50% of final VDD voltage to 90%/10% of final RF power
<b>RF Performances</b>						
Insertion Loss	IL		0.40 0.70	0.60 0.90	dB	$F_0=2.45GHz @0dBm$ $F_0=5.80GHz @0dBm$
Isolation	ISO	30 20	35 30		dB	$F_0=2.45GHz @0dBm$ $F_0=5.80GHz @0dBm$
Input 0.1dB Compression Point	$P_{0.1dB}$		32		dBm	$F_0=2.45GHz$ , 20% DC
Voltage Standing Wave Ratio	VSWR		1.5:1	2.0:1		$F_0=0.5$ to 6.0GHz
2nd Order Harmonic	$2F_0$	75 75	85 85		dBc	$F_0=0.8$ to 2.7GHz @20dBm $F_0=4.8$ to 6.0GHz @20dBm
3rd Order Harmonic	$3F_0$	76 76	88 88		dBc	$F_0=0.8$ to 2.7GHz @20dBm $F_0=4.8$ to 6.0GHz @20dBm
3rd Order Input Intercept Point(RF1/RF2)	IIP3	50 50	58 58		dBm	$F_0=2.45GHz @17dBm/$ tone $\Delta f=1MHz$ $F_0=5.80GHz @17dBm/$ tone $\Delta f=1MHz$
Error Vector Magnitude	EVM		2.5 2.5		%	802.11a, 54Mbps, $P_{in} \leq +27dBm$ 802.11g, 54Mbps, $P_{in} \leq +27dBm$

# Package Outline Dimensions

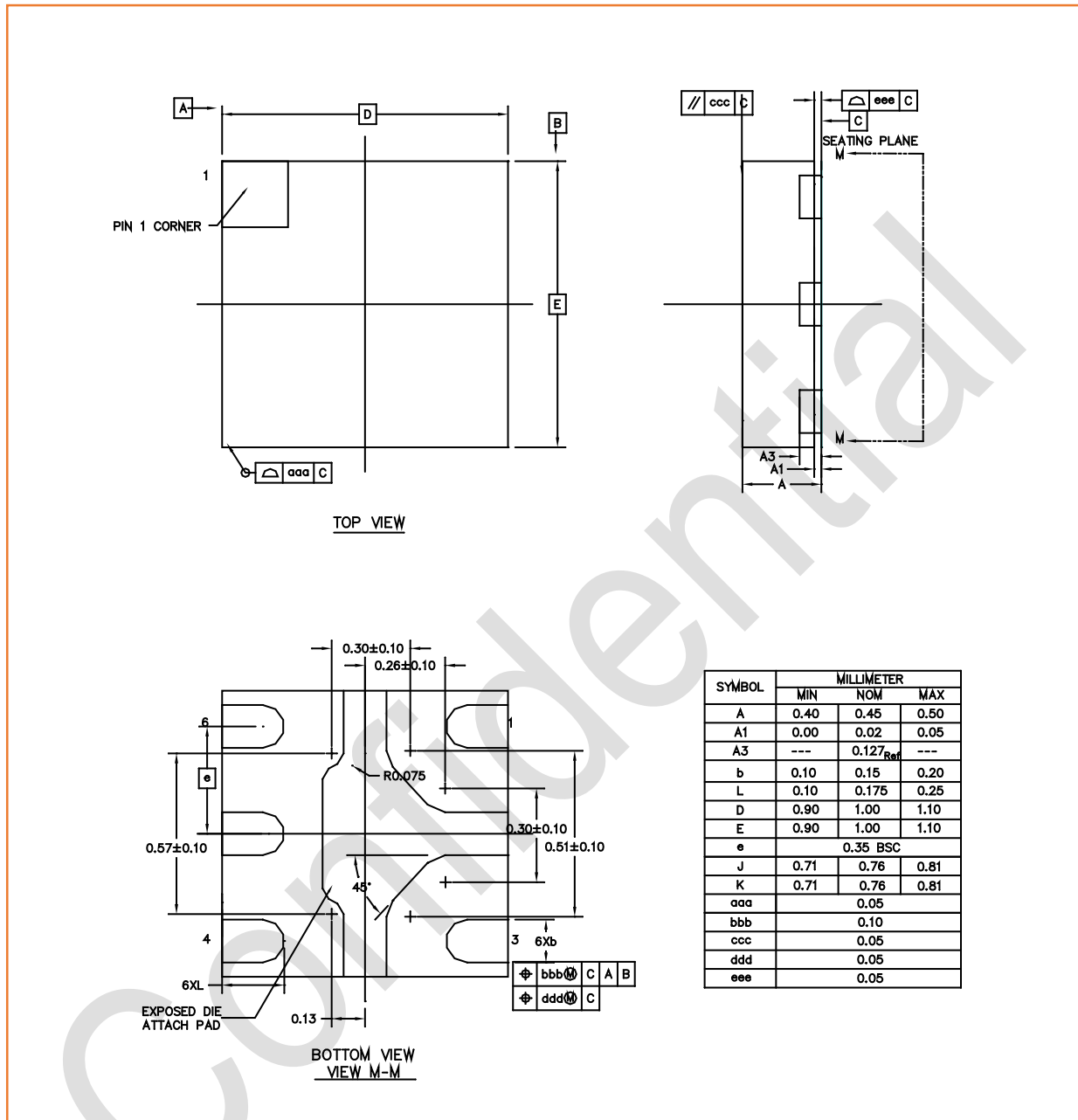


Figure 3 Package Outline Dimensions

## Marking Specification

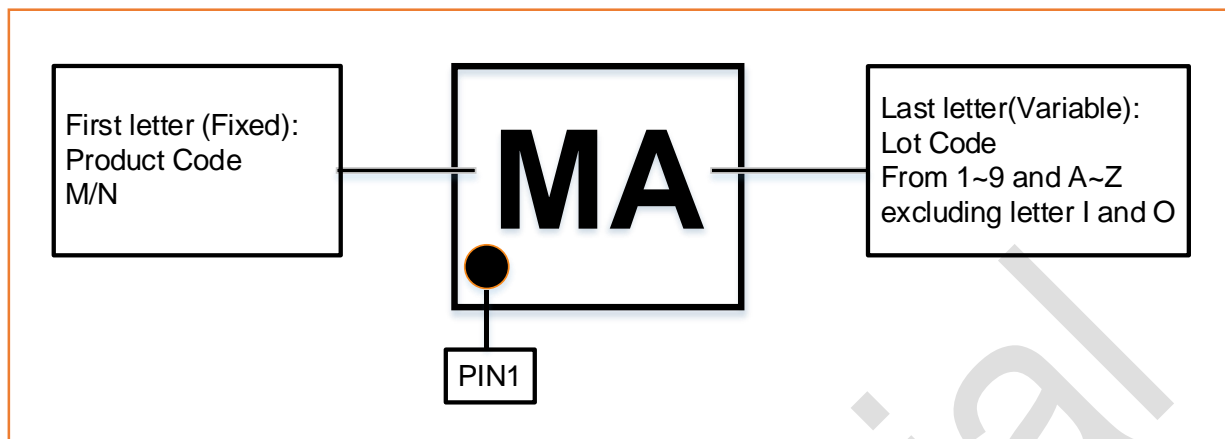


Figure 4 Marking Specification(Top View)

## Tape and Reel Dimensions

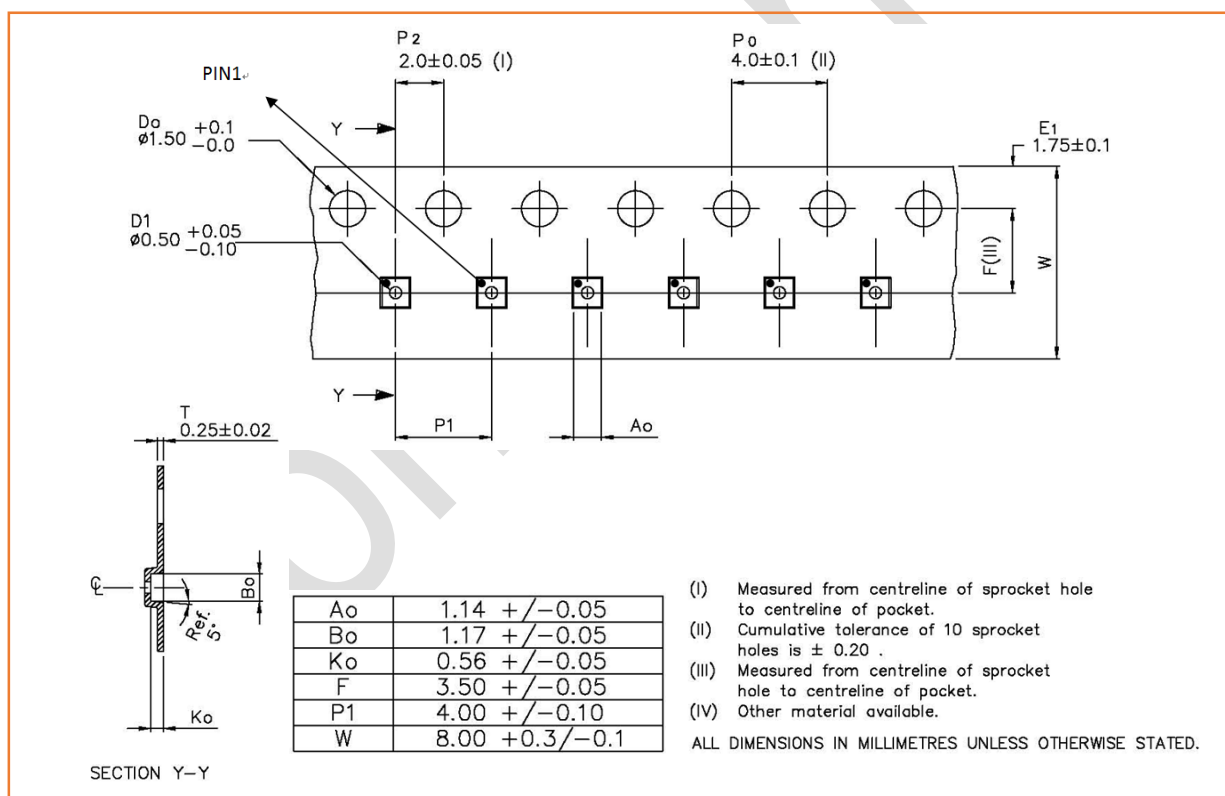


Figure 5 Tape and Reel Dimensions

## Minimum Packing Quantity

The Minimum packing quantity of this device is 5000

## Reflow Chart

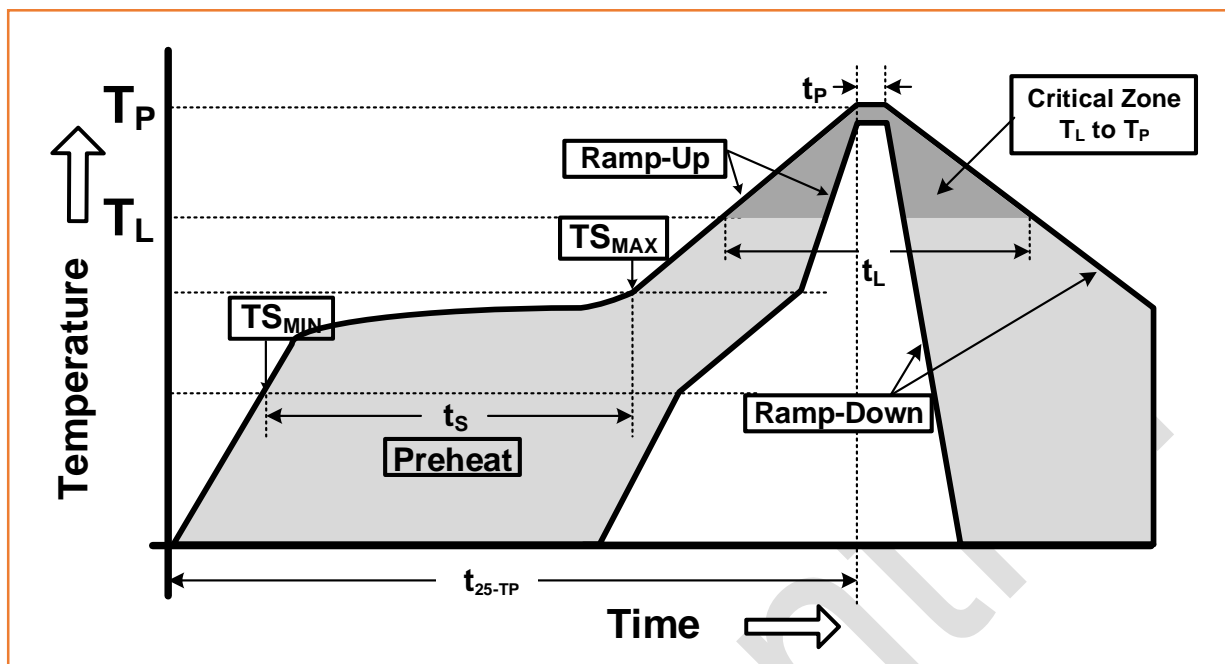


Figure 6 Recommended Lead-Free Reflow Profile

Table 6 Reflow Chart Parameters

Reflow Profile	Parameter
Preheat Temperature( $TS_{MIN}$ to $TS_{MAX}$ )	150°C to 200°C
Preheat Time( $t_s$ )	60 to 180 Seconds
Ramp-Up Rate( $TS_{MAX}$ to $T_P$ )	3°C/s MAX
Time Above $T_L$ 217°C( $t_L$ )	60 to 150 Seconds
Peak Temperature ( $T_P$ )	260°C
Time within 5°C of Peak Temperature( $t_p$ )	20 to 40 Seconds
Ramp-Down Rate( $TS_{MAX}$ to $T_P$ )	6°C/s MAX
Time for 25°C to Peak Temperature( $t_{25-TP}$ )	8 Minutes MAX

## ESD Sensitivity

Integrated circuits are ESD sensitive and can be damaged by static electric charge. Proper ESD protection techniques should be applied when devices are operated.

## RoHS Compliant

This product does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE), and are considered RoHS compliant.

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