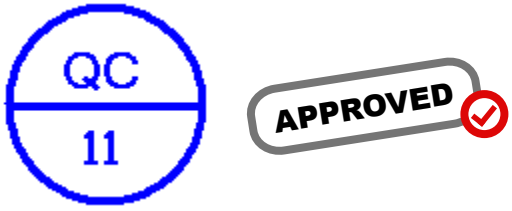
MXD8721

0.5-6.0GHz SPDT Switch



General Description

The MXD8721 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 MXD8721 SPDT switch is provided in a compact 1.0mm x 1.0mm x 0.45mm 6-lead QFN package. A functional block diagram is shown in Figure 1. The pin configuration and package are shown in Figure 2. Signal pin assignments and functional pin descriptions are provided in Table 1.

Applications

- WLAN 802.11 a/b/g/n networks
- WLAN repeaters
- ISM band radios
- Low power transmit receive systems

Features

- Broadband frequency range: 0.5 to 6.0 GHz
- Low insertion 0.35dB @ 2.45 GHz
- Low insertion 0.55dB @ 5.8 GHz
- High P0.1dB of 32dBm
- Small, QFN (6-pin, 1.0mm x 1.0mm x 0.45mm) package，MSL1

Functional Block Diagram and Pin Function

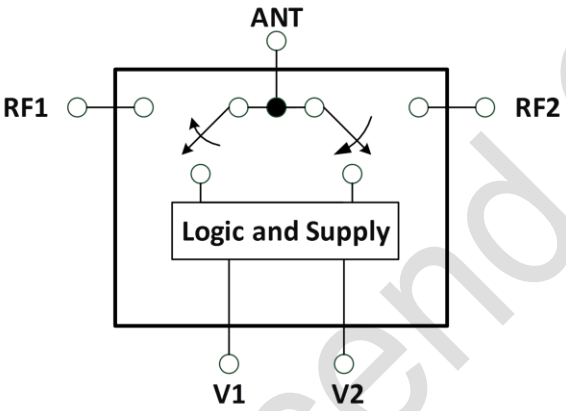


Figure 1.Functional Block Diagram

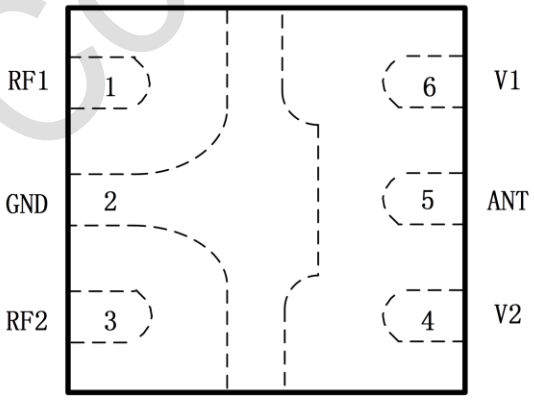


Figure 2.Pin-out (Top View)

Application Circuit

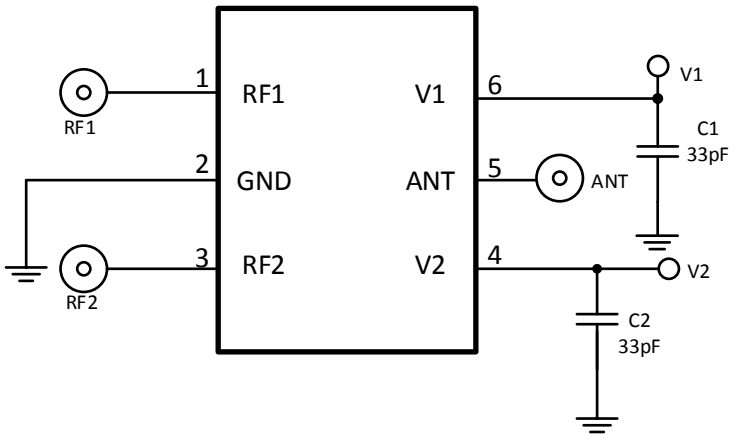


Figure 3. MXD8721 Application Circuit

Table 1. Pin Description

Pin No.	Name	Description	Pin No.	Name	Description
1	RF1	RF port 1	4	V2	DC control and supply voltage
2	GND	Ground	5	ANT	Antenna port
3	RF2	RF port 2	6	V1	DC control and supply voltage

Truth Table

Table 2.

Active Path	V1	V2
ANT to RF1	0	1
ANT to RF2	1	0

Note: "1" = 3.0V to 3.6 V. "0" = –0 V to +0.3 V.

Recommended Operation Range

Table 3.

Parameters	Symbol	Min	Typ	Max	Units
Operation Frequency	f1	0.5	-	6.0	GHz
Switch Control Voltage High	$V_{CTL\ H}$	3.0	3.3	3.6	V
Switch Control Voltage Low	$V_{CTL\ L}$	0	0	0.3	V

Specifications

Table 4.Electrical Specifications

Parameter	Symbol	Specification			Units	Test Condition
		Min.	Typical	Max.		
DC Specifications						
Control voltage: Low High	 V_{CTL_L} V_{CTL_H}	 0 3.0	 0 3.3	 0.3 3.6	 V V	
Control current	I_{CTL}		35	80	μA	V_{CTL} = 3.3 V
RF Specifications						
Insertion loss	IL		0.35 0.55	0.50 0.75	dB dB	0.5 to 3.0 GHz 3.0 to 6.0 GHz
Isolation	ISO	30 25	32 30		dB dB	0.5 to 3.0 GHz 3.0 to 6.0 GHz
Return loss	$\|S_{11}\|$		25 20		dB dB	0.5 to 3.0 GHz 3.0 to 6.0 GHz
Input 0.1 dB compression point	$P_{0.1dB}$		+32		dBm	0.8 to 6.0 GHz, ANT to RF1 and RF2
Switching on time			200		ns	50% VCTL to 90% RF
Switching off time			200		ns	50% VCTL to 10% RF

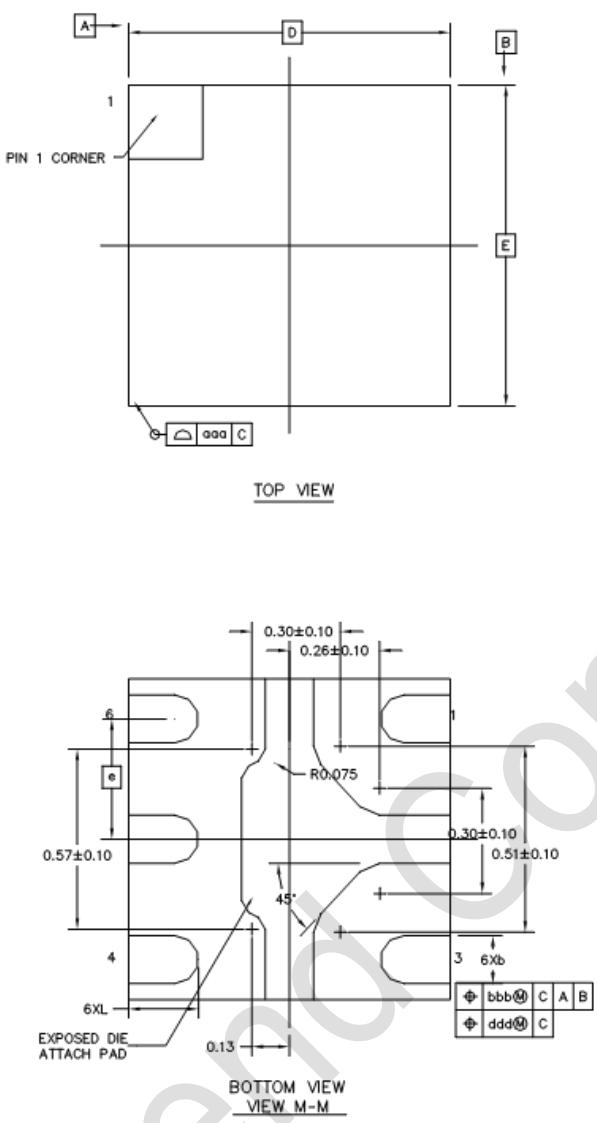
Absolute Maximum Ratings

Table 5. Maximum ratings

Parameters	Symbol	Minimum	Maximum	Units
Control voltage	V_{CTL}	-0.3	+4.5	V
RF input power	P_{IN}		+32.5	dBm
Operating temperature	T_{OP}	–35	+90	℃
Storage temperature	T_{STG}	–55	+150	℃
Electrostatic Discharge Human body model (HBM), Class 1C Machine Model (MM), Class A Charged device model (CDM), Class III	 ESD_HBM ESD_MM ESD_CDM		 1000 100 500	 V

Note: 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.

Package Outline Dimension



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.40	0.45	0.50
A1	0.00	0.02	0.05
A3	---	0.127 Ref	---
b	0.10	0.15	0.20
L	0.10	0.175	0.25
D	0.90	1.00	1.10
E	0.90	1.00	1.10
e	0.35 BSC		
J	0.71	0.76	0.81
K	0.71	0.76	0.81
aaa	0.05		
bbb	0.10		
ccc	0.05		
ddd	0.05		
eee	0.05		

Figure 4. Package outline dimension

Marking Specification

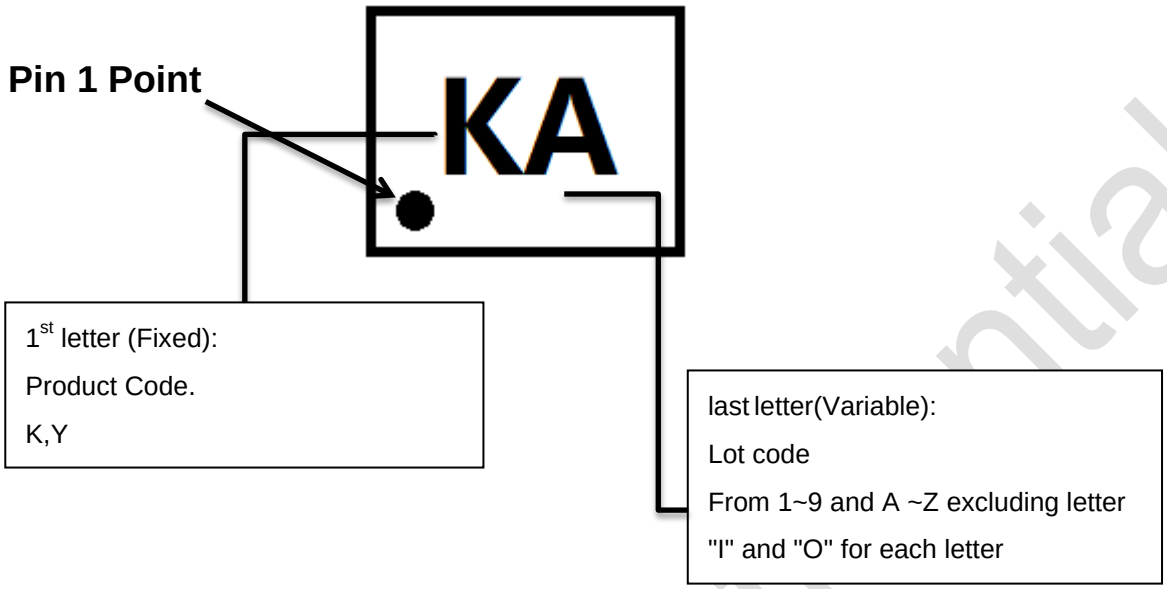
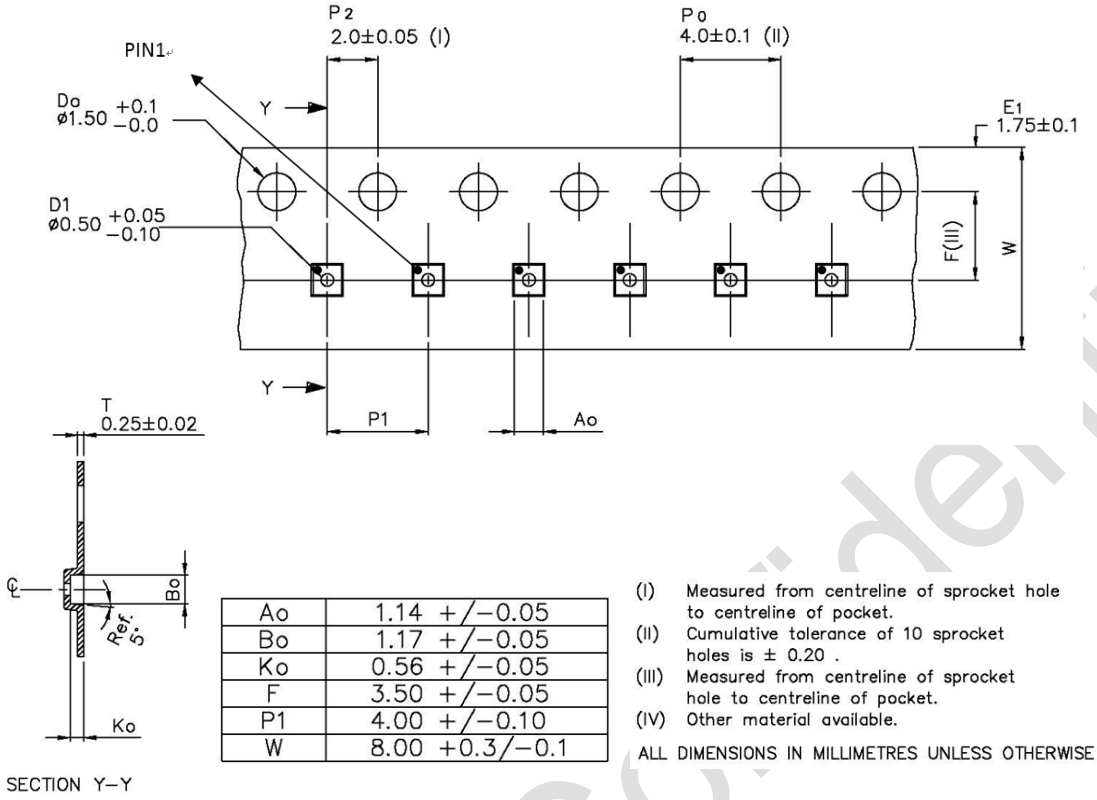


Figure 5. Marking specification (Top View)

Tape and Reel Dimensions



Ao	1.14 +/−0.05
Bo	1.17 +/−0.05
Ko	0.56 +/−0.05
F	3.50 +/−0.05
P1	4.00 +/−0.10
W	8.00 +0.3/−0.1

(I) Measured from centreline of sprocket hole to centreline of pocket.
(II) Cumulative tolerance of 10 sprocket holes is ± 0.20 .
(III) Measured from centreline of sprocket hole to centreline of pocket.
(IV) Other material available.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

Figure 6. Tape and reel dimensions

Reflow Chart

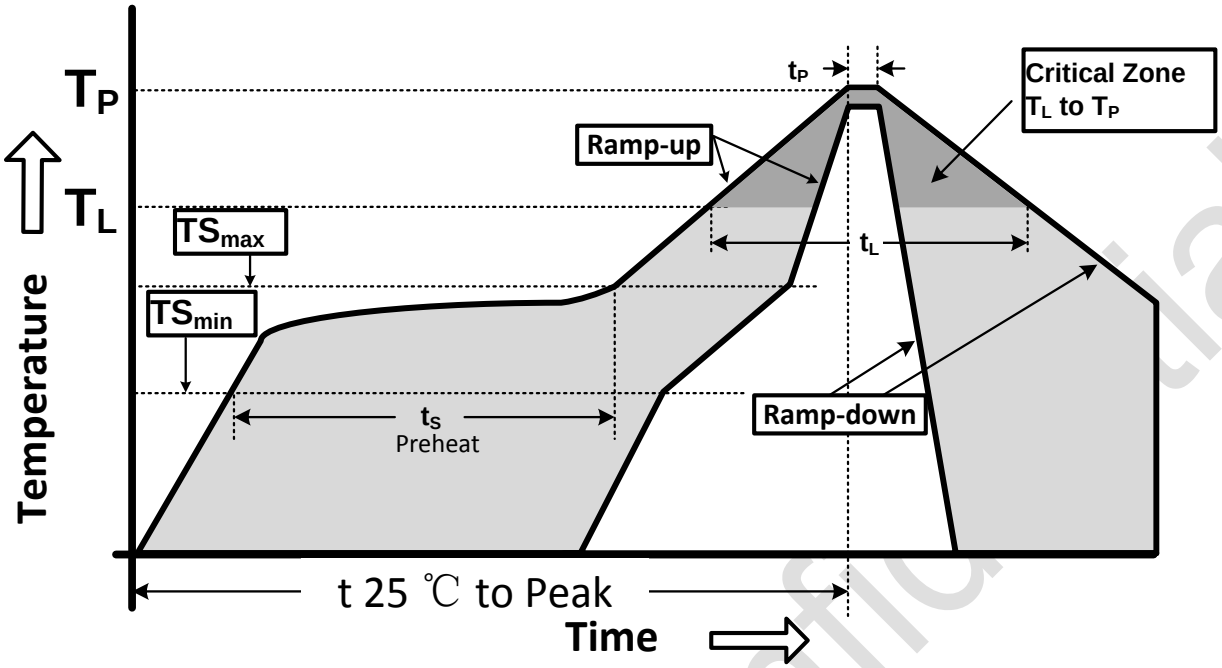


Figure 7. Recommended Lead-Free Reflow Profile

Table 6.

Profile Parameter	Lead-Free Assembly, Convection, IR/Convection
Ramp-up rate（TS_{max} to T_p）	3℃/second max.
Preheat temperature（TS_{min} to TS_{max}）	150℃ to 200℃
Preheat time（t_s）	60 - 180 seconds
Time above TL , 217℃（t_L）	60 - 150 seconds
Peak temperature（T_p）	260℃
Time within 5℃ of peak temperature(t_p)	20 - 40 seconds
Ramp-down rate	6℃/second max.
Time 25℃ to peak temperature	8 minutes max.

ESD Sensitivity

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

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.