



MXD8636

SP3T Switch for 0.1~3G Application



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General Description

The MXD8636 is a Single Pole, Triple-Throw (SP3T) antenna switch. The low insertion loss achieved by the MXD8636 make it an ideal choice for main/diversity receiving commonly used in LTE-based handsets, data cards, and tablets that use antenna diversity solutions.

Switching is controlled by two CMOS/TTL-compatible control voltage inputs (V1 and V2). Depending on the logic voltage level applied to the control pins, the ANT pin is connected to one of three switched RF outputs (RF1 to RF2) using a low insertion loss path, while the paths between the ANT pin and the other RF pins are in a high isolation state. No external blocking capacitors are required on the RF paths unless VDC is externally applied.

The MXD8636 is manufactured in a compact, 12-pin 2.0 x 2.0 mm, Quad Flat No-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

- WCDMA band and mode switching
- Antenna switch for multimode systems
- 802.11 b/g/n WLANs

Features

- Broadband frequency range: 0.1 to 3.0 GHz
- Low insertion loss: 0.5 dB typical @ 2.5 GHz
- High isolation: >27 dB @ 2.5 GHz
- No external DC blocking capacitors requires
- Small QFN (12-pin, 2.0 x 2.0 mm) package

Functional Block Diagram and Pin Function

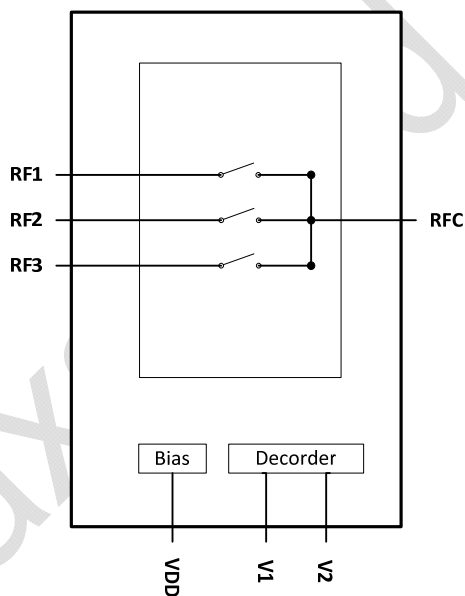


Figure 1. Functional Block Diagram

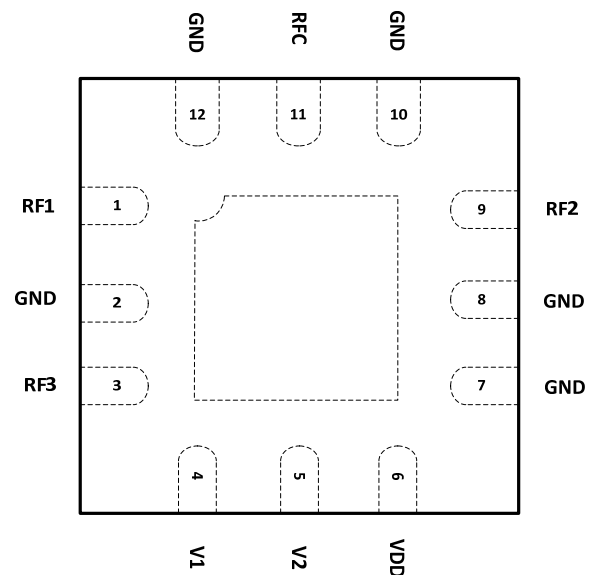


Figure 2. Pin Diagram

Application Circuit

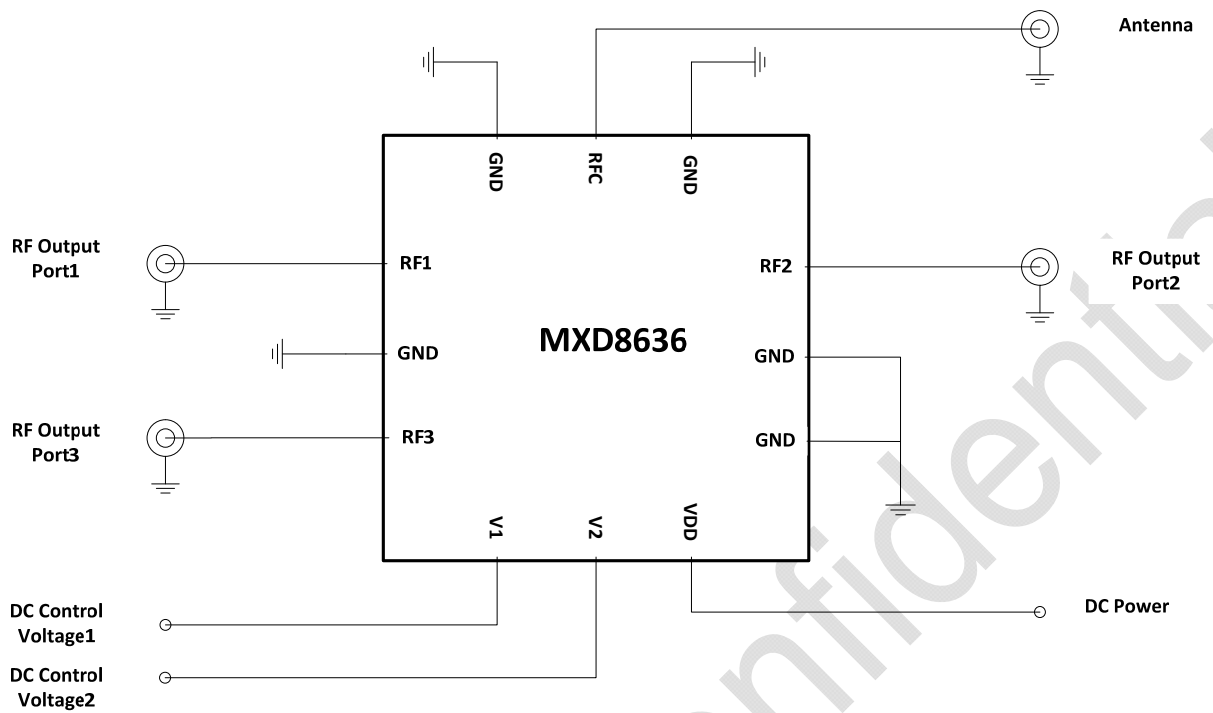


Figure 3. MXD8636 Evaluation Board Schematic

Table 1. Pin Description

Pin No.	Name	Description	Pin No.	Name	Description
1	RF1	RF I/O path 1	7	GND	Ground
2	GND	Ground	8	GND	Ground
3	RF3	RF I/O path 3	9	RF2	RF I/O path 2
4	V1	DC control voltage 1	10	GND	Ground
5	V2	DC control voltage 2	11	RFC	RF common port
6	VDD	DC supply	12	GND	Ground

Note: Bottom ground paddles must be connected to ground.

Table 2. Truth Table

Control pins		Switched RF Outputs		
V1	V2	RF1	RF2	RF3
0	0		Isolation	
0	1	Insertion Loss	Isolation	Isolation
1	0	Isolation	Insertion Loss	Isolation
1	1	Isolation	Isolation	Insertion Loss

Note: "1" = 1.0 V to 3.0 V. "0" = 0 V to +0.3 V.

Recommended Operation Range
Table 3.

Parameters	Symbol	Min	Typ	Max	Units
Operation Frequency	f1	0.1	-	3.0	GHz
Power supply	VDD	2.0	2.8	3.0	V
Switch Control Voltage (H)	V _H	1.0	1.8	3.0	V
Switch Control Voltage (L)	V _L	0	0	0.3	V

Specifications
Table 4. Electrical Specifications

Parameter	Symbol	Specification			Units	Test Condition (Note 2)
		Min.	Typical	Max.		
DC Specifications						
Supply voltage	VDD	2.0	2.8	3.0	V	
Supply current	IDD		22	35	μA	
Control current	ICTL		2		μA	VCTL = 1.8 V
Turn-on switching time	Ton		2		μs	50% of final control voltage to 90% of final RF power, switching between RF1/2/3
RF Specifications						
Insertion loss (RFC pin to RF1/2/3 pins)	IL		0.40	0.45	dB	0.8 to 1.0 GHz
			0.45	0.55	dB	1.0 to 2.2 GHz
			0.5	0.60	dB	2.2 to 3.0 GHz
Isolation (RFC pin to RF1/2/3 pins)	ISO	32	35		dB	0.8 to 1.0 GHz
		28	30		dB	1.0 to 2.2 GHz
		23	25		dB	2.2 to 3.0 GHz
Input return loss (RFC pin to RF1/2/3 pins)	RL		-20		dB	0.8 to 3.0 GHz
0.1 dB Compression Point (ANT pin to RF1/2/3 pins)	P _{0.1dB}		+28		dBm	0.1 GHz to 3 GHz

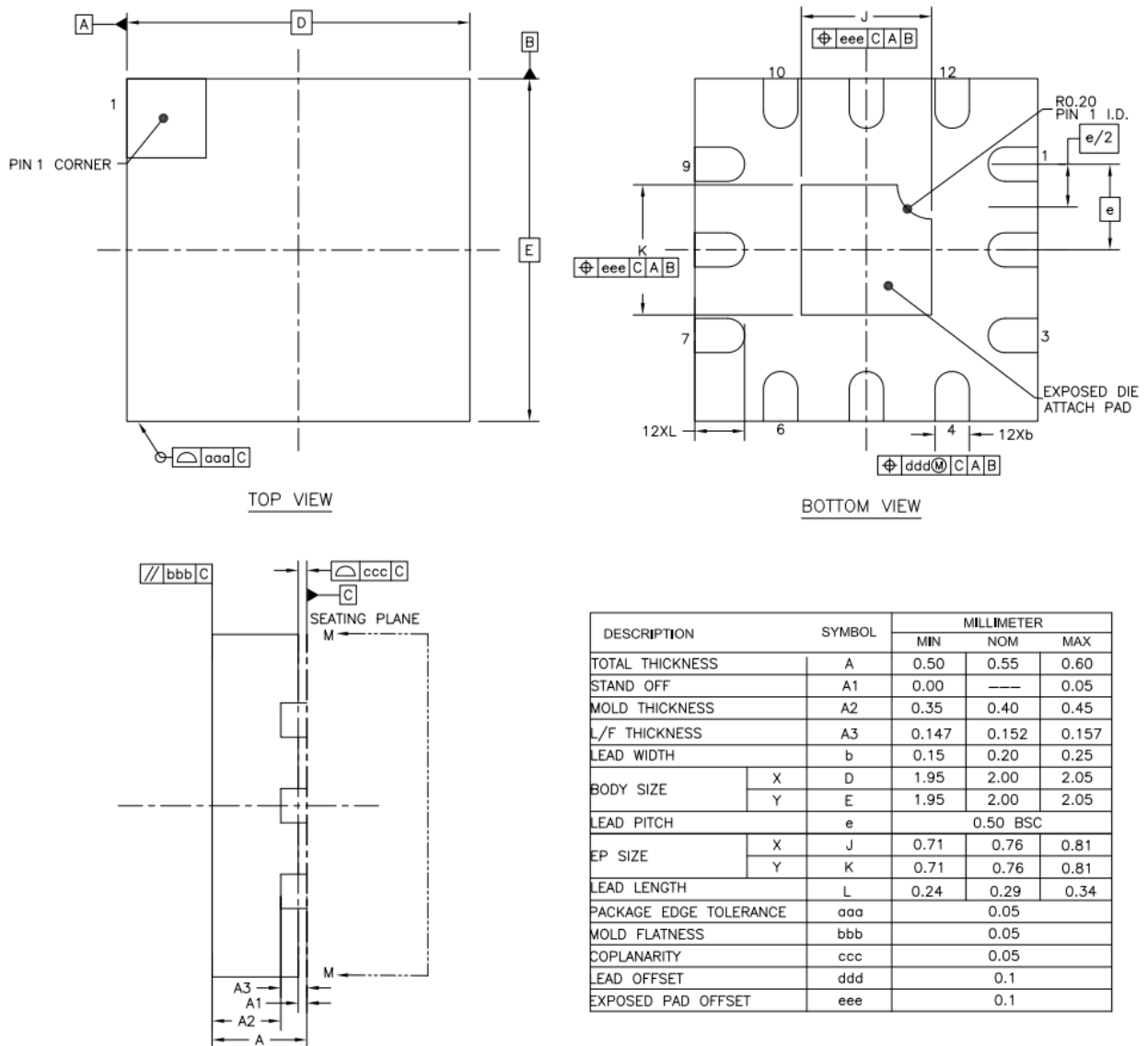
Absolute Maximum Ratings

Table 5 Maximum ratings

Parameters	Symbol	Minimum	Maximum	Units
Supply voltage	V_{DD}	+2.5	+3.0	V
Control voltage (V1 and V2)	V_{CTL}	-0.5	+3.0	V
RF input power (RF1 to RF3)	P_{IN}		+28	dBm
Operating temperature	T_{OP}	-40	+85	°C
Storage temperature	T_{STG}	-55	+150	°C
Human Body Mode	HBM		1000	V
Machine Mode	MM		100	V
Charged Device Mode	CDM		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


Figure 4. package outline dimension

Reflow Chart

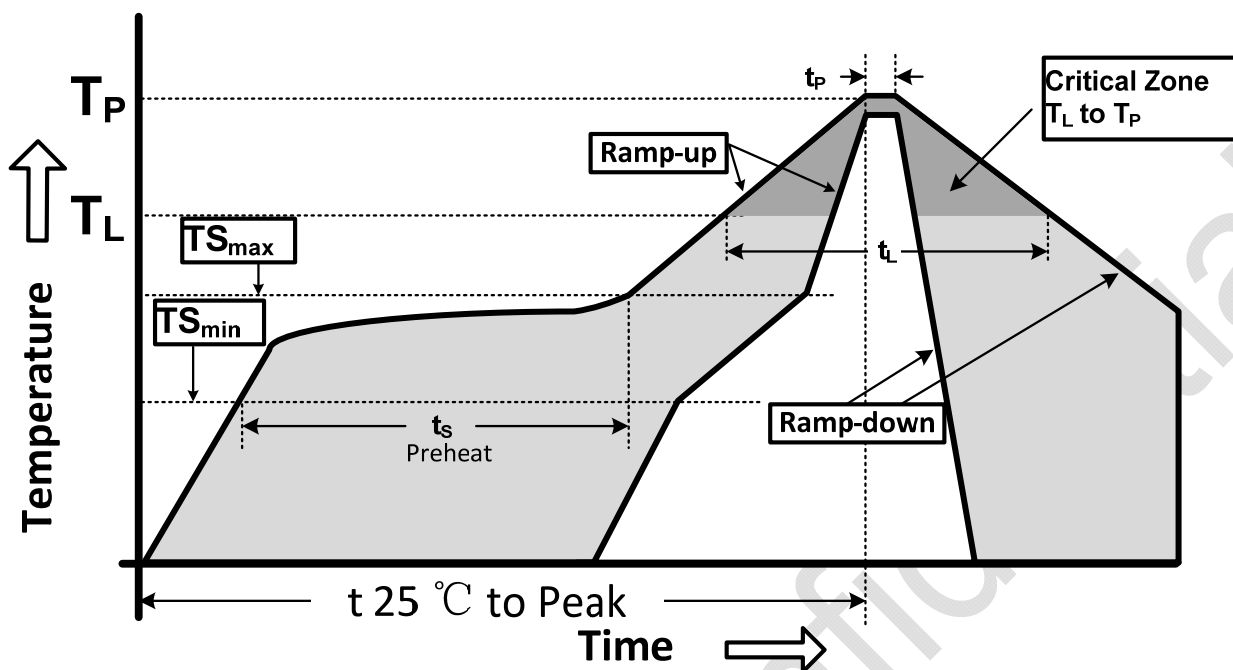


Figure 5. Recommended Lead-Free Reflow Profile

Table 6 Reflow condition

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