MXD8621EC

SPDT Switch for 0.1~6.0GHz Application

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General Description

The MXD8621EC is a Single-Pole, Double-Throw (SPDT) for 0.1~6.0GHz application. Switching is controlled by an integrated GPIO interface with a single control pin.

No external DC blocking capacitors are required as long as no DC voltage is applied on any RF path.

The MXD8621EC is provided in a compact 1.1mm x 0.7mm x 0.377mm 6-lead DFN package that meets requirements for board-level assembly.

A functional block diagram and the pin configuration are shown in Figure 1.

Applications

- GSM/WCDMA/LTE Receive
- WLAN TRX

Features

- Broadband frequency range: 0.1 to 6.0 GHz
- Low insertion loss: 0.33 dB @ 2.7 GHz
  0.55 dB @ 6.0 GHz
- High isolation: 38dB @ 2.7 GHz
  30dB @ 6.0 GHz
- P0.1dB 29dBm
- No external DC blocking capacitors required
- Single GPIO control line with VDD voltage regulator:
  V_{DD}= 1.62 to 3.60 V
- Small, 6-Lead DFN, 400 um pitch (1.1mm x 0.7mmx 0.377 mm) package ，MSL1

Functional Block Diagram and Pin Function

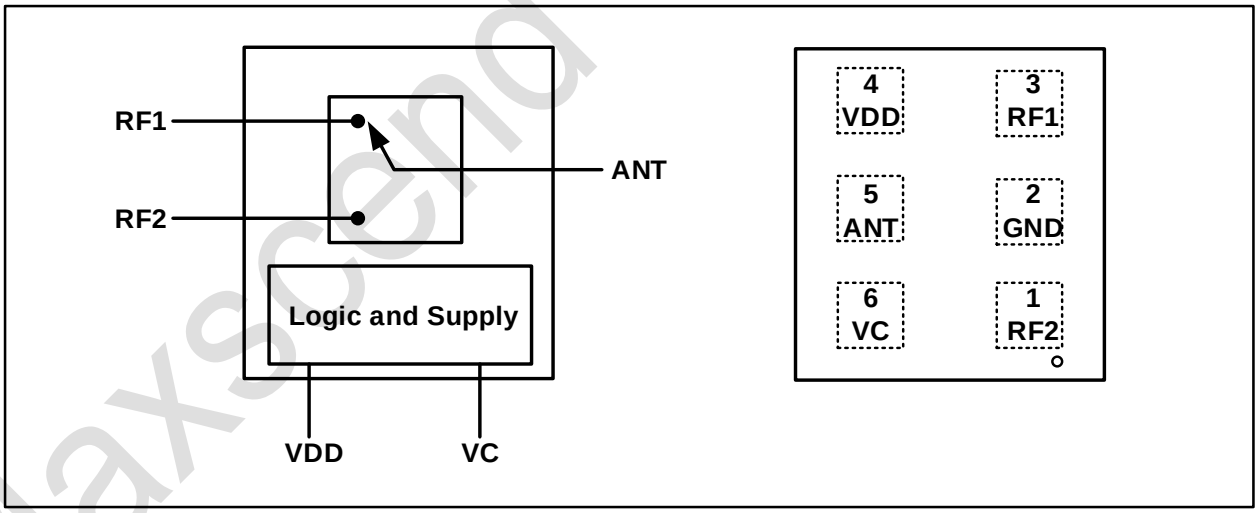

Figure 1 Functional Block Diagram and Pin-out (Top View)

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Application Circuit

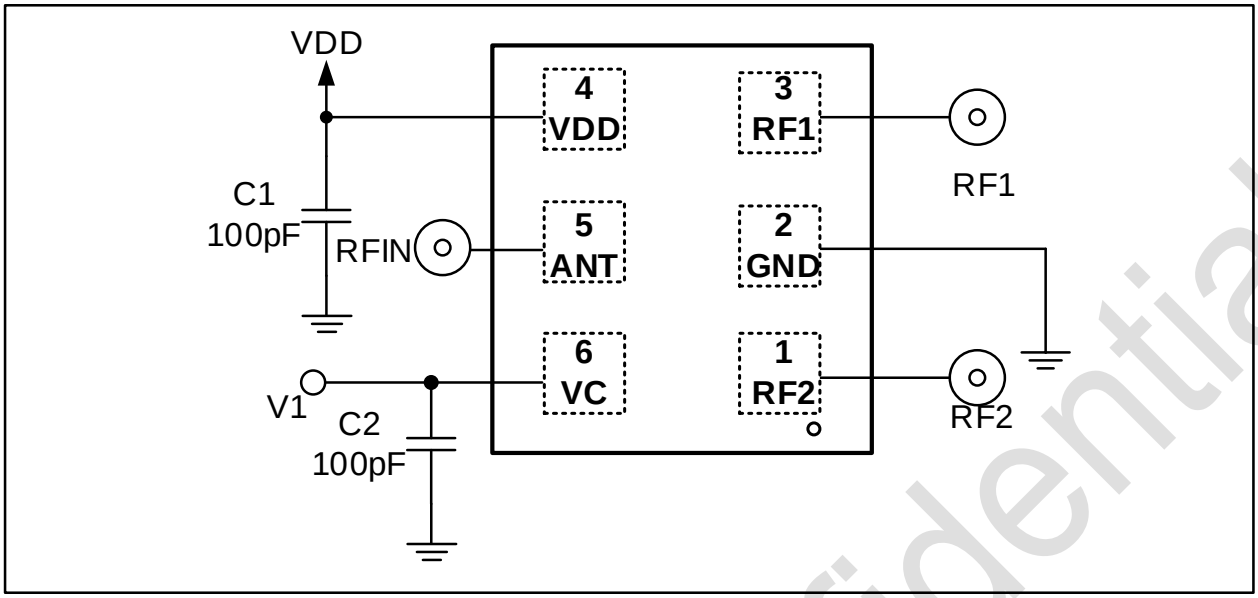

Figure 2 MXD8621EC Application Circuit

Table 1. Pin Description

Pin No.	Name	Description	Pin No.	Name	Description
1	RF2	RF I/O. Throw 1 of the switch.	6	VC	Logic Control
2	GND	Ground	5	ANT	Antenna
3	RF1	RF I/O. Throw 2 of the switch.	4	VDD	Supply

Truth Table

Table 2.

State	Active Path	VC
0	ANT to RF1	0
1	ANT to RF2	1

Note: "1" = 1.2 V to V_{DD} V. "0" = 0 V to +0.3 V.

Recommended Operation Range

Table 3.

Parameters	Symbol	Min	Typ	Max	Units
Operation Frequency	f1	0.1	-	6.0	GHz
Power supply	V_{DD}	1.62	1.8	3.60	V
Switch Control Voltage High	V_{CTL_H}	1.2	1.8	V_{DD}	V
Switch Control Voltage Low	V_{CTL_L}	0	0	0.3	V

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Specifications

Table 4.Electrical Specifications

Parameter	Symbol	Specification			Units	Test Condition
		Min.	Typical	Max.		
DC Specifications						
Supply voltage	V_{DD}	1.62	1.8	3.60	V	
Control voltage: Low High	 V_{CTL_L} V_{CTL_H}	 0 1.2	 0 1.8	 0.3 V_{DD}	 V V	
Current on VC pin	I_{CTL}			5	μA	
Supply current	I_{DD}		100	140	μA	V_{DD}= 1.8 V
DC supply turn-on/turn-off time	t_{on}			10	μs	Measured from 50% of final V_{DD} supply voltage to 90% of final RF power
RF path switching time	t_{sw}		130	200	ns	From one active state to another active state transition, measured from 50% of final control voltage to 90% of final RF power
Supply ripple	V_{PP}			50	mV_{pp}	
RF Specifications						
Insertion loss (RF1 or RF2 to ANT pin)	IL		0.28 0.30 0.33 0.40 0.55	0.35 0.40 0.45 0.50 0.65	dB dB dB dB dB	700 to 960 MHz 1710 to 2170 MHz 2170 to 2690 MHz 3600 to 3800 MHz 4800 to 6000 MHz
Isolation (ANT to RF1 or RF2)	ISO	50 42 35 31 27	56 45 38 34 30		dB dB dB dB dB	700 to 960 MHz 1710 to 2170 MHz 2170 to 2690 MHz 3600 to 3800 MHz 4800 to 6000 MHz
Isolation (RF1 to RF2)	ISO	49 41 34 30 26	55 44 37 33 29		dB dB dB dB dB	700 to 960 MHz 1710 to 2170 MHz 2170 to 2690 MHz 3600 to 3800 MHz 4800 to 6000 MHz
Input return loss (ANT to RF1 or RF2)	RL	13	20		dB	700 to 6000 MHz
Voltage Standing Wave Ratio, all ports	VSWR		1.25:1	1.5:1	-	Referenced to 50 Ω, 700 to 6000 MHz
0.1dB compression point（from antenna to RF1 and RF2）		29			dBm	700M to 6000MHz 25% duty pulse
2nd Harmonic (ANT to RF1 or RF2)	2fo		-62	-55	dBm	fo = 950 MHz, PIN = +26 dBm
3rd Harmonic (ANT to RF1 or RF2)	3fo		-62	-55	dBm	
2nd Intermodulation Distortion	IMD2		-103	-100	dBm	Two-tone test：f0=24dBm and f1= -15dBm at f0+1MHz
3rd Intermodulation Distortion	IMD3		-103	-100	dBm	

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Absolute Maximum Ratings

Table 5. Maximum ratings

Parameters	Symbol	Minimum	Maximum	Units
Supply voltage	V_{DD}	+1.62	+3.7	V
Digital control voltage	V_{CTL}	0	+3.7	V
RF input power	P_{IN}		+30	dBm
Operating temperature	T_{OP}	–40	+85	℃
Storage temperature	T_{STG}	–55	+150	℃
Humidity Grade		MSL1		
Storage Cycle(package)		2		years
Electrostatic Discharge Human body model (HBM), Class 1C	ESD_HBM		1000	V
Machine Model (MM), Class A	ESD_MM		100	
Charged device model (CDM), Class III	ESD_CDM		500	

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.

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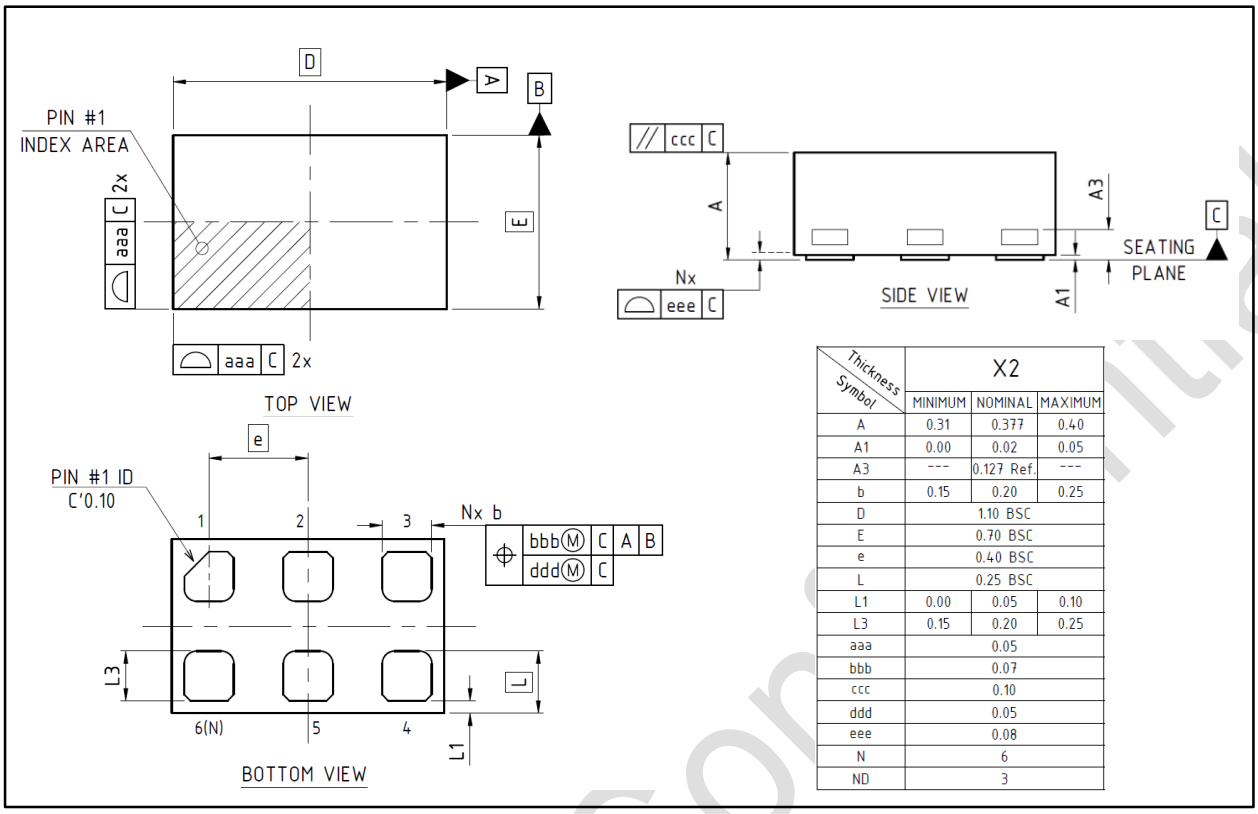
Package Outline Dimension



Thickness / Symbol	X2		
	MINIMUM	NOMINAL	MAXIMUM
A	0.31	0.377	0.40
A1	0.00	0.02	0.05
A3	---	0.127 Ref.	---
b	0.15	0.20	0.25
D		1.10 BSC	
E		0.70 BSC	
e		0.40 BSC	
L		0.25 BSC	
L1	0.00	0.05	0.10
L3	0.15	0.20	0.25
aaa		0.05	
bbb		0.07	
ccc		0.10	
ddd		0.05	
eee		0.08	
N		6	
ND		3	

Figure 3. Package outline dimension

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Marking Specification

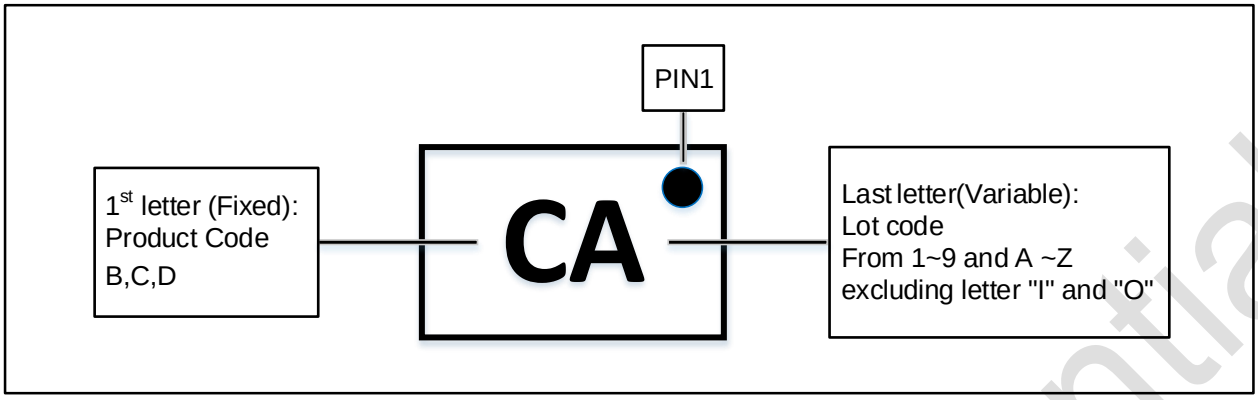

Figure 4 Marking specification (Top View)

Tape and Reel Dimensions

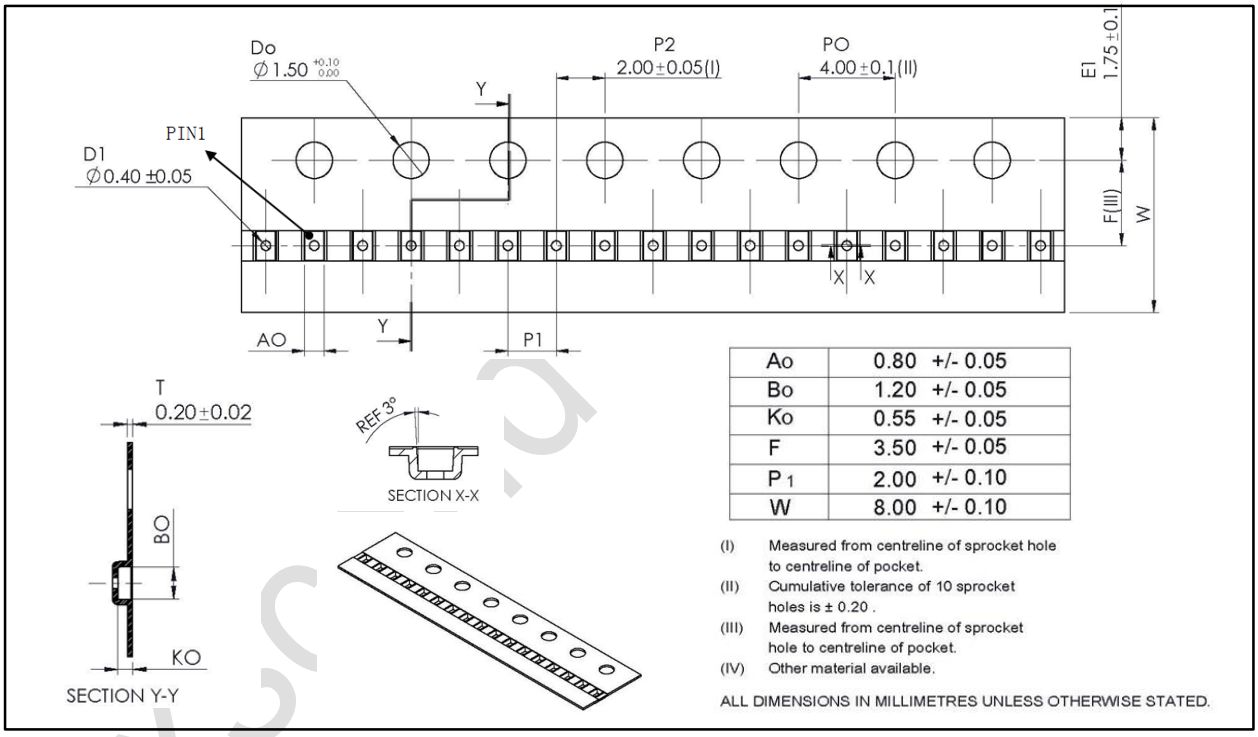

Figure 5 Tape and reel dimensions

Minimum packing Quantity

The minimum packing quantity of this device is 10000.

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Reflow Chart

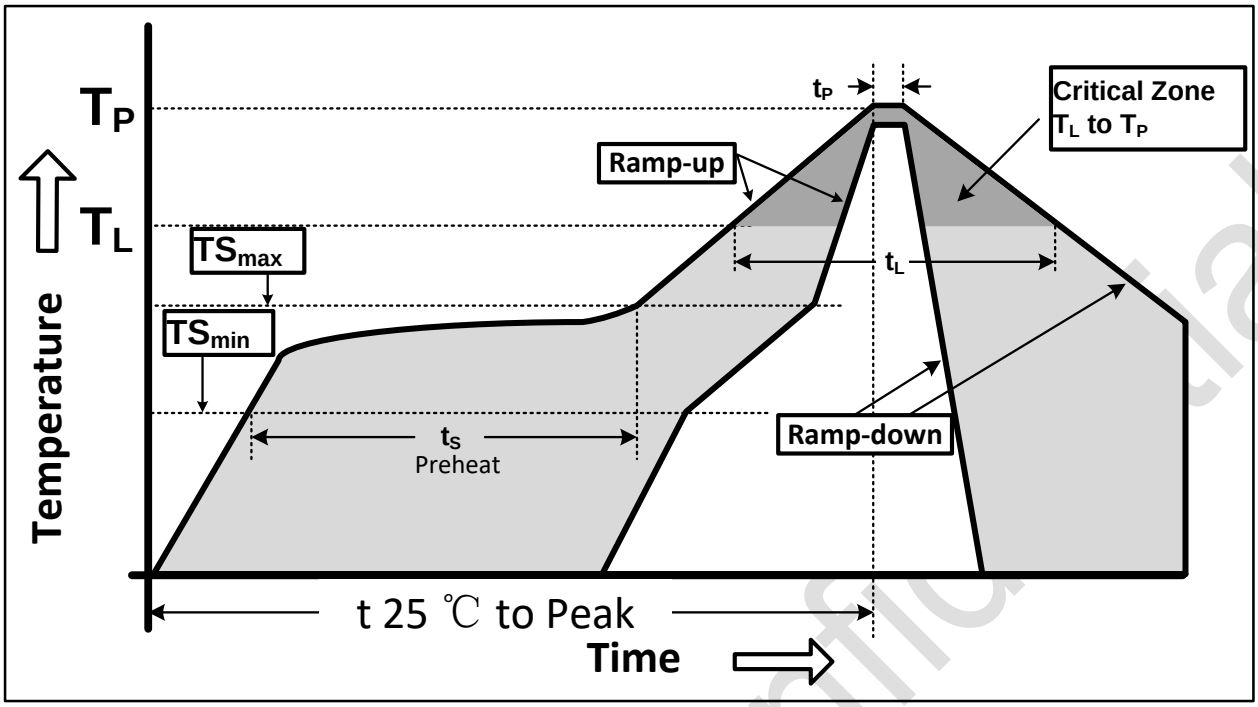

Figure 6. Recommended Lead-Free Reflow Profile

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.

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