



FM8638

0.1 to 3.0GHz SP3T SWITCH

PRODUCT DESCRIPTION

The FM8638 is a CMOS silicon-on-insulator (SOI), single-pole, triple-throw (SP3T) transmitting and receiving switch. The high linearity performance and low insertion loss makes the device an ideal choice for GSM/WCDMA/LTE handset and data card applications.

The FM8638 SP3T switch is provided in a compact QFN 9-pin 1.15mm x 1.15mm x 0.45mm 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.

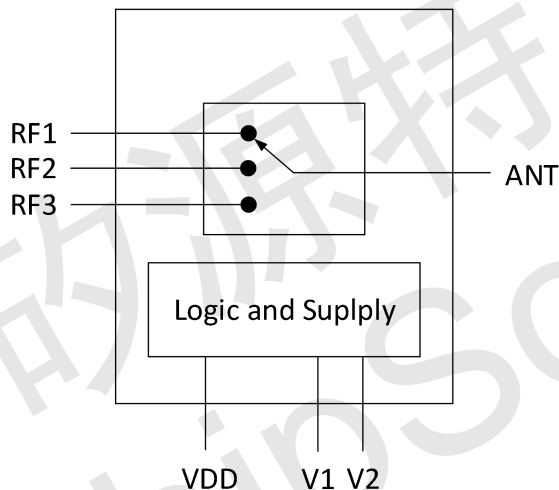


Figure 1. FM8638 Block Diagram

FEATURES

- Broadband frequency range: 0.1 to 3.0 GHz
- Low insertion: 0.50 dB @ 2.7 GHz
- High isolation: 25 dB up to 2.7 GHz
- P0.1dB of 36dBm
- No external DC blocking capacitors required
- Positive low voltage control: VC = 1.6 to 3.00 V, VDD = 2.5 to 3.0 V
- Small, QFN (9-pin, 1.1mm x 1.1mm x 0.5mm) package

APPLICATIONS

- GSM/WCDMA/LTE receive and transmit
- 802.11b/g/n WLANs

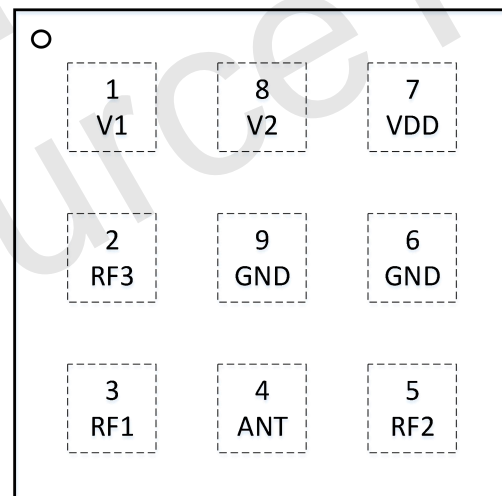


Figure 2. FM8638 Pinout (Top View)



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APPLICATION CIRCUIT

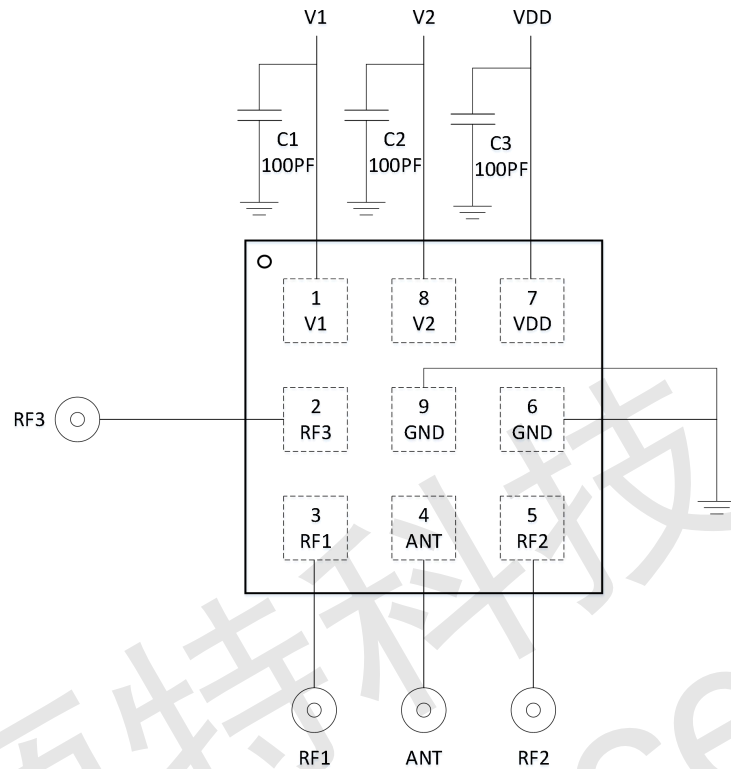


Figure 3. FM838 Application Circuit

Table 1. Pin Descriptions

Pin No.	Name	Description	Pin No.	Name	Description
1	V1	Control Pin 1	6	GND	Ground
2	RF3	RF-Port 3	7	VDD	Power Supply
3	RF1	RF-Port 1	8	V2	Control Pin 2
4	ANT	Antenna	9	GND	Ground
5	RF2	RF-Port 2			

TRUTH TABLE

Table 2.

V1	V2	Active Path
0	0	OFF
1	0	ANT to RF1
0	1	ANT to RF2
1	1	ANT to RF3

RECOMMENDED OPERATION RANGE

Table 3.

Parameters	Symbol	Min	Typ	Max	Units
Operation Frequency	f1	0.1	-	3.0	GHz
Power supply	V _{DD}	2.5	2.8	3.0	V
Switch Control Voltage High	V _{CTL_H}	1.6	1.8	3.0	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						
Control voltage:						
Low	V_{CTL_L}	0	+1.8	0.3	V	
High	V_{CTL_H}	1.60		3.00	V	
Supply voltage	V_{DD}	2.5	2.8	3.0	V	
Supply current	I_{DD}		40	60	μA	$V_{DD} = 2.8 V$
Control current	I_{ctl}		1		μA	$V_C = 1.8 V$
RF Specifications						
Insertion loss	IL		0.30 0.40 0.50	0.40 0.50 0.60	dB dB dB	0.1 to 1.0 GHz 1.0 to 2.2 GHz 2.2 to 3.0 GHz
Isolation	ISO	30 25 20	35 30 25		dB dB dB	0.1 to 1.0 GHz 1.0 to 2.2 GHz 2.2 to 3.0 GHz
Return loss	$ S_{11} $		15		dB	0.1 to 3.0 GHz
3rd Order Input Intercept Point	IIP3	+60	+70		dBm	0.1 to 3.0 GHz, $\Delta F = 1 MHz,$ PIN = +20 dBm/tone
Input 0.1 dB compression point	P0.1dB		+36		dBm	0.1 to 3.0 GHz, ANT to RF1, RF2 and RF3
2nd harmonic	2fo		+83		dBc	0.1~3GHz, PIN = +26 dBm
3rd harmonic	3fo		+70		dBc	0.1~3GHz, PIN = +26 dBm
Switching on time			2		μs	50% VCTL to 10/90% RF
Switching off time			2		μs	50% VCTL to 90/10% RF
Startup time			5		μs	Shutdown state to any RF switch state



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ABSOLUTE MAXIMUM RATINGS

Table 5. Maximum ratings

Parameters	Symbol	Minimum	Maximum	Units
Supply voltage	V _{DD}	+2.5	+3.0	V
Digital control voltage	V _{CTL}	0	+3.0	V
RF input power	P _{IN}		+36	dBm
Operating temperature	T _{OP}	-30	+85	°C
Storage temperature	T _{STG}	-55	+150	°C
Electrostatic discharge:				
Human Body Model (HBM), Class 1C	ESD		1000	V
Machine Model (MM), Class A			100	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.

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.