



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.

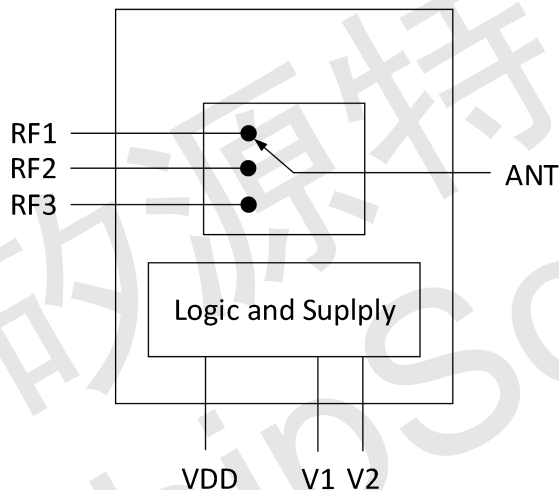


Figure 1. FM8638 Block Diagram

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

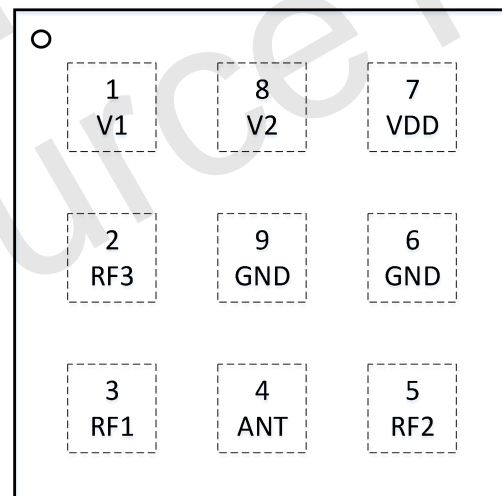


Figure 2. FM8638 Pinout (Top View)



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APPLICATION CIRCUIT

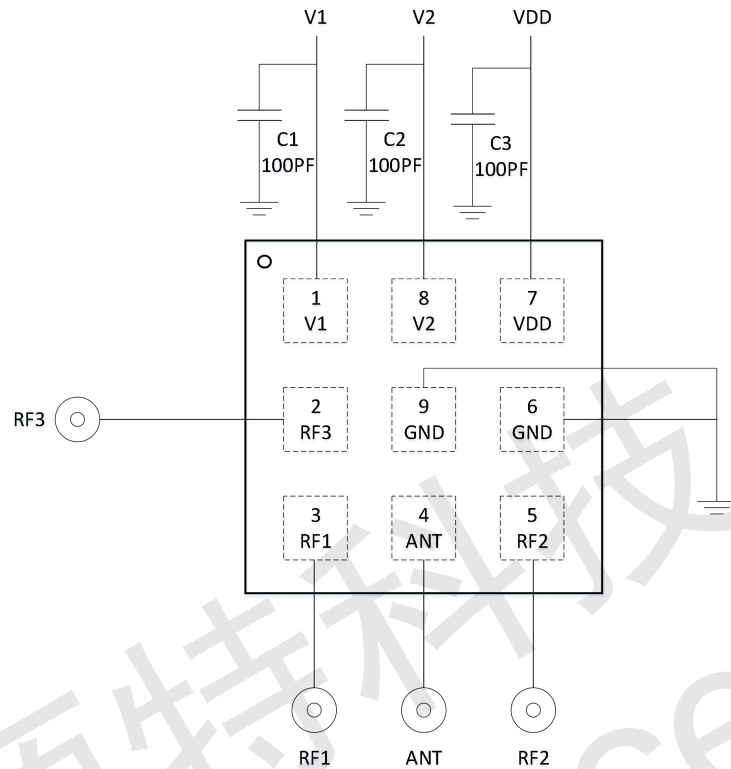


Figure 3. FM838 Application Circuit

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.