

0.6-4GHz SP3T Switch for 3G/4G

Features

- Broadband frequency range: 0.6 to 4.0 GHz
- Low insertion loss: 0.35dB typical @ 2.7 GHz
- High isolation: >23dB @ 2.7 GHz
- Integrated logic
- QFN 1.1mm X1.1mm X0.55mm-9L package

Applications

- Cellular 3G/4G
- Cellular modems, tablets and USB Devices
- Other RF front-end modules

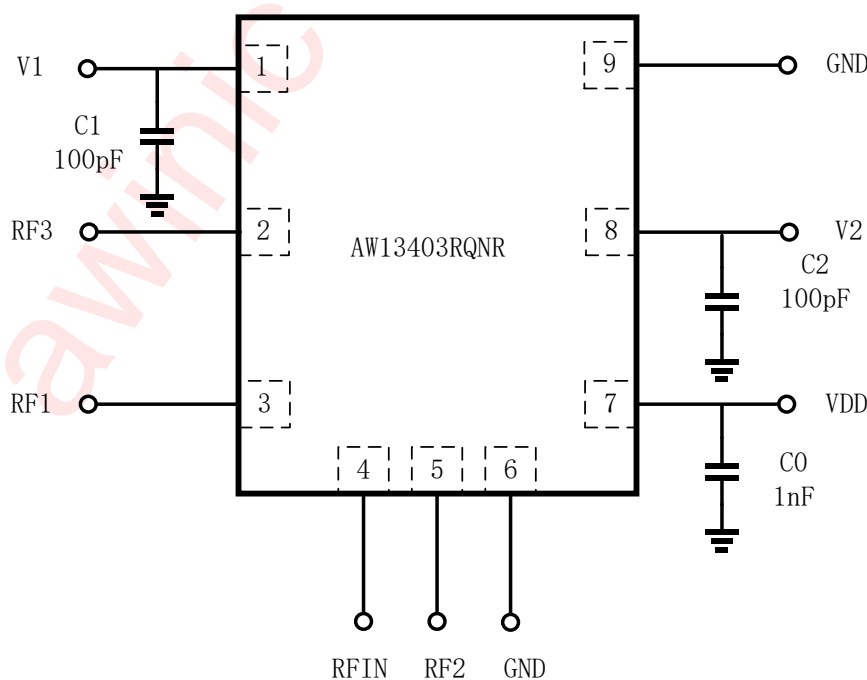
General Description

The AW13403RQNR is a SP3T switch with low insertion loss and high Isolation. It can be used to support band switching for cellular 3G/4G, data cards and tablets.

The symmetrical design of internal ports makes it convenient for PCB routing and adjustment of receiving and transmitting signals. The band/mode switching is realized by the GPIO pins as referenced in the chip block diagram and the control logic.

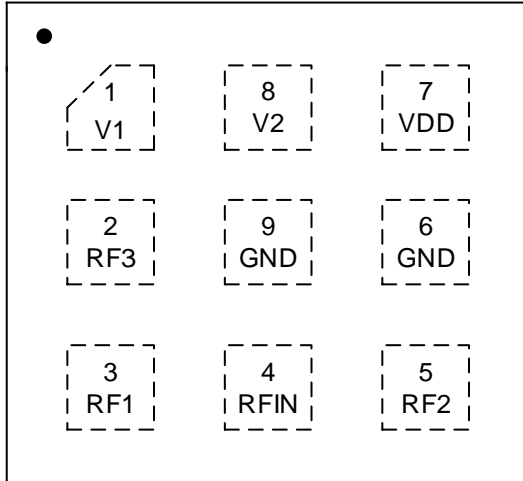
The AW13403RQNR is provided in a compact QFN 1.1mm X1.1mm X0.55mm-9L package.

Typical Application Circuit

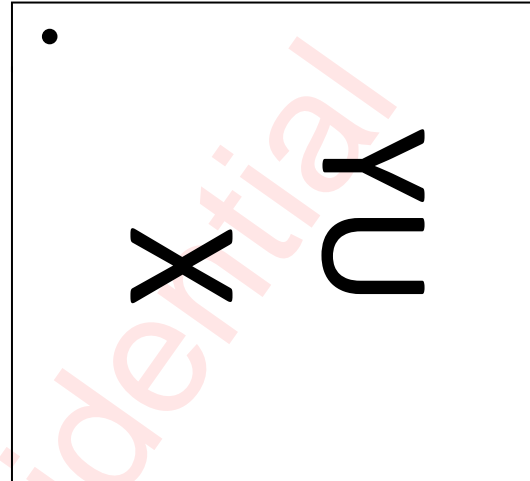


Pin Configuration And Top Mark

AW13403RQNR
(Top View)



AW13403RQNR Marking
(Top View)



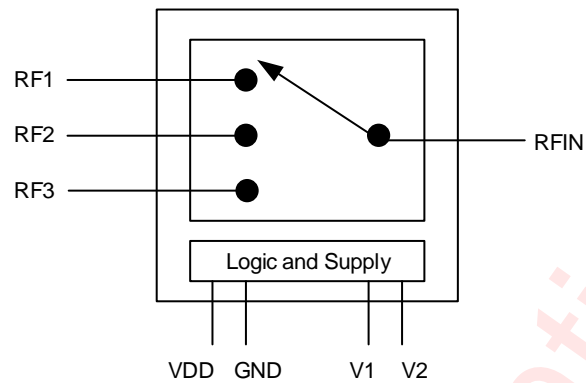
YU - AW13403RQNR

X - Production Tracing Code

Pin Definition

No.	NAME	DESCRIPTION
1	V1	DC Control Voltage 1
2	RF3	RF Port3
3	RF1	RF Port1
4	RFIN	Antenna
5	RF2	RF Port2
6	GND	Ground
7	VDD	Power Supply
8	V2	DC Control Voltage 2
9	GND	Ground

Functional Block Diagram



Ordering Information

Part Number	Temperature	Package	Marking	Moisture Sensitivity Level	Environmental Information	Delivery Form
AW13403RQNR	-40℃~90℃	QFN 1.1mm x 1.1mm x 0.55mm-9L	YU	MSL1	ROHS+HF	3000 units/ Tape and Reel

Absolute Maximum Ratings^(NOTE1)

PARAMETERS		RANGE
Supply Voltage Range VDD		-0.3V to 3.6V
Control Voltage Range	V1,V2	-0.3V to 3.6V
RF input power(RFIN to RF1/RF2/RF3) 900MHz,CW,VSWR=1:1		34dBm
Operating Free-air Temperature Range		-40°C to 90°C
Storage Temperature TSTG		-65°C to 150°C
Lead Temperature (Soldering 10 Seconds)		260°C
ESD (NOTE 2)		
HBM		±1500V
CDM		±1000V

NOTE1: Conditions out of those ranges listed in "absolute maximum ratings" may cause permanent damages to the device. In spite of the limits above, functional operation conditions of the device should within the ranges listed in "recommended operating conditions". Exposure to absolute-maximum-rated conditions for prolonged periods may affect device reliability.

NOTE2: The human body model is a 100pF capacitor discharged through a 1.5kΩ resistor into each pin. Test method: ESDA/JEDEC JS-001-2017. CDM test method ESDA/JEDEC JS -002-2018.

Electrical Characteristics

VDD=2.8V, V1/V2=0/1.8V, PIN=0dBm, TEMP=+25°C, Z0=50Ω. (unless otherwise noted)

PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT	
DC Specifications						
VDD	Supply Voltage	2.4	2.8	3.3	V	
IDD	Supply Current		26	50	μA	
VCTL_H	Control Voltage High	1		VDD	V	
VCTL_L	Control Voltage Low	0		0.3	V	
T _{sw}	Switching On/Off Time	50% of final control voltage to 10%/90% of final RF power, switching between RF1/2/3		0.3	1	μs
RF Specifications						
IL	Insertion loss(RFIN pin to RF1/RF2/RF3)	0.6-1.0G		0.25	0.39	dB
		1.0-2.0G		0.28	0.45	dB
		2.0-2.7G		0.33	0.52	dB
		2.7-3.8G		0.45	0.59	dB
ISO	Isolation (RFIN pin to RF1/RF2/RF3)	0.6-1.0G	33	38		dB
		1.0-2.0G	27	31		dB
		2.0-2.7G	22	27		dB
		2.7-3.8G	17	21		dB
RL	Input return loss (RFIN pin to RF1/RF2/RF3)	0.6-1.0G	23	31		dB
		1.0-2.0G	20	28		dB
		2.0-2.7G	18	20		dB
		2.7-3.8G	14	17		dB
2fo	Second harmonics (RFIN pin to RF1/RF2/RF3)	PIN=+26dBm, 900MHz		95		dBc
3fo	Third harmonics (RFIN pin to RF1/RF2/RF3)	PIN=+26dBm, 900MHz		88		dBc
P0.1dB	0.1dB Compression Point (RFIN pin to RF1/RF2/RF3)	900MHz, 25% DC, VSWR=1:1		33.5		dBm

Detailed Functional Description

It is very important that the user adheres to the correct power-on/off sequence in order to avoid damaging the device. The control signal V1/V2 should be set to 0V unless VDD is set in the operating voltage range.

Power ON:

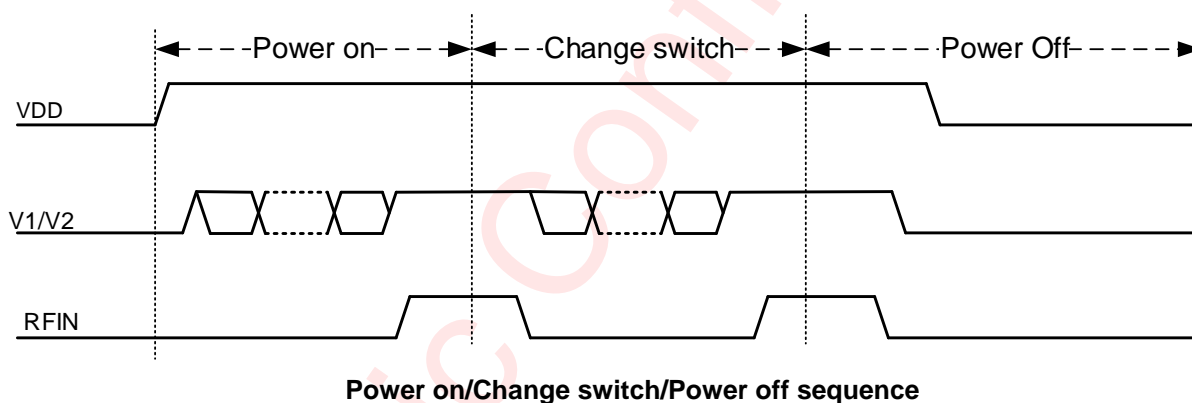
- 1) Apply voltage supply --- VDD
- 2) Set Controls---V1/V2
- 3) Apply RF input

Change switch position from one RF port to another:

- 1) Remove RF input
- 2) Change control voltages V1/V2 to set the switch to desired RF port
- 3) Apply RF input

Power OFF:

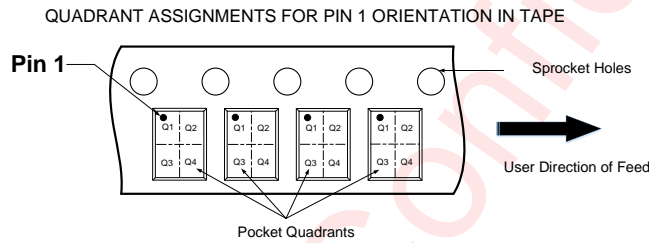
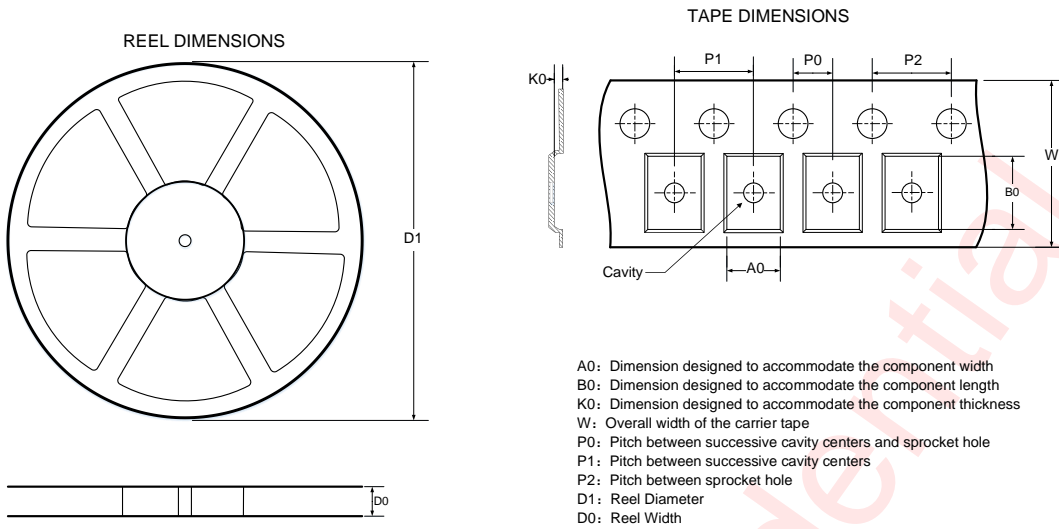
- 1) Remove RF input
- 2) Remove control voltages-V1/V2
- 3) Remove VDD input



Control Logic

Control Pins		Switch RF I/O		
V1	V2	RF1	RF2	RF3
0	0	Isolation	Isolation	Isolation
1	0	ON	Isolation	Isolation
0	1	Isolation	ON	Isolation
1	1	Isolation	Isolation	ON

Tape And Reel Information

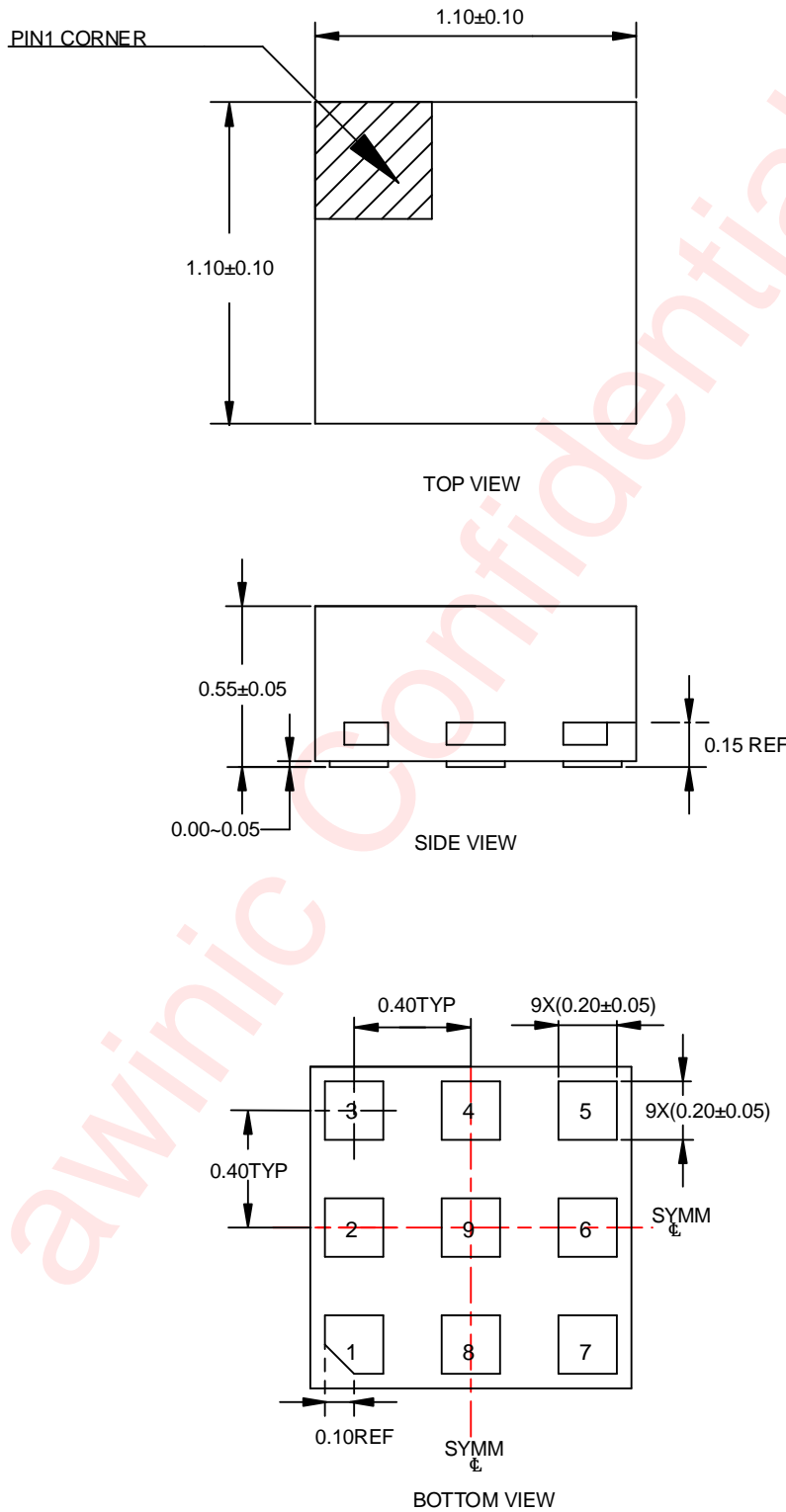


Note: The above picture is for reference only. Please refer to the value in the table below for the actual size

DIMENSIONS AND PIN1 ORIENTATION									
D1 (mm)	D0 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
178	8.4	1.3	1.3	0.69	2	4	4	8	Q1

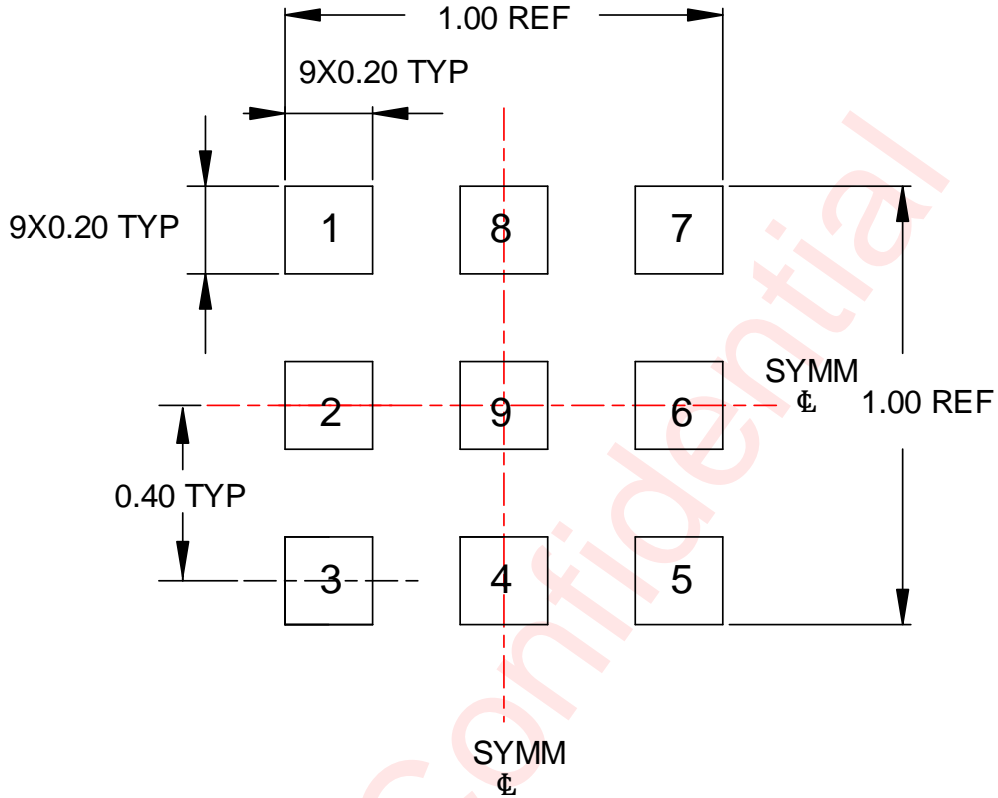
All dimensions are nominal

Package Description

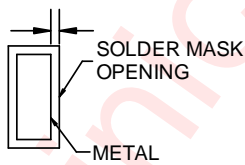


Unit: mm

Land Pattern Data

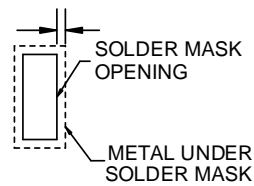


0.05 MAX
All AROUND



NON SOLDER MASK DEFINED

0.05 MIN
All AROUND



SOLDER MASK DEFINED

Unit: mm

Revision History

Version	Date	Change Record
V1.0	Oct. 2021	Officially Released
V1.1	Aug. 2022	Update ordering information and AMR and Electrical characteristics
V1.2	May. 2023	Update P0.1dB and application scenario

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