

## 0.1-6GHz SPDT Switch for High Power Applications

### Features

- Broadband frequency range: 0.1 to 6 GHz
- High power handing capability of up to 38 dBm
- Low insertion loss : 0.7 dB typical @ 6.0 GHz
- High isolation: 22 dB typical @ 6.0 GHz
- High switching speed: 1 us typical
- Low harmonic generation
- Small FCDFN 1.1mm x 0.7mm x 0.37mm-6L package

### Applications

- Multi-Mode GSM/CDMA/WCDMA/LTE and NR including n77, n78, n79 bands
- Cellular modems, tablets and USB Devices
- Other RF front-end modules

### General Description

The AW13612TFDR is a single-pole dual-throw switch with high power handing capability of up to 38dBm and low insertion loss. It can be used to support band switching and mode switching for GSM, WCDMA, LTE, and NR applications.

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 AW13612TFDR is provided in a compact FCDFN 1.1mm x 0.7mm x 0.37mm-6L package.

### Typical Application Circuit

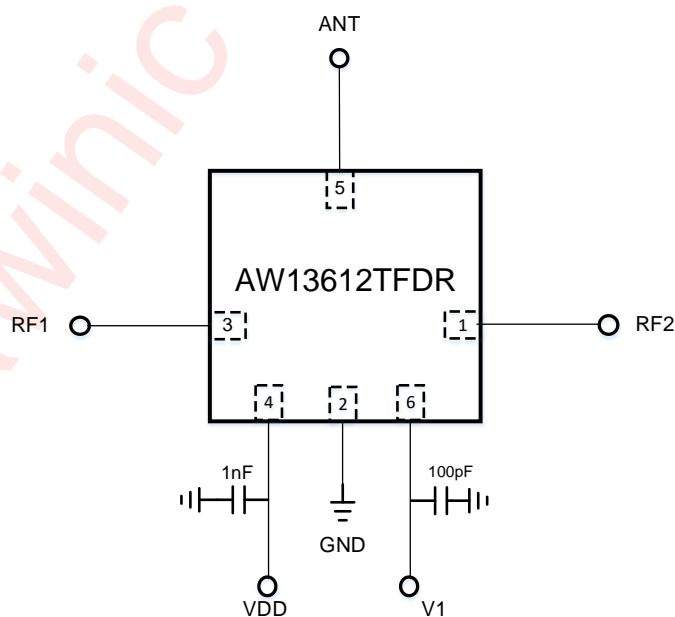


Figure 1 Typical Application Circuit of AW13612TFDR

## Pin Configuration And Top Mark

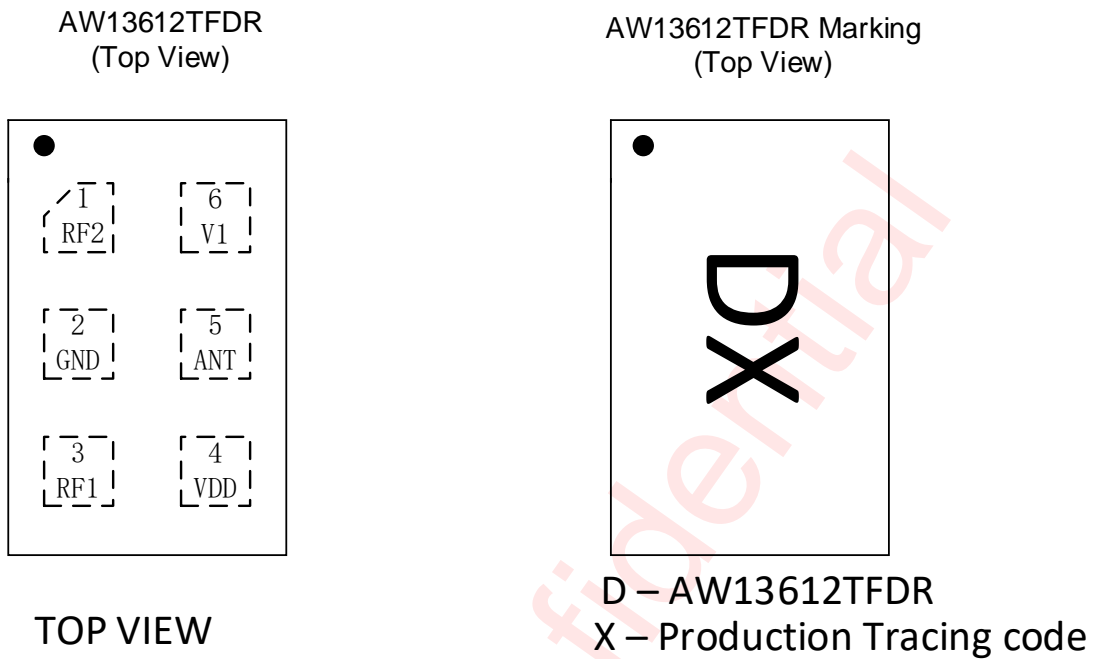


Figure 2 Pin Configuration and Top Mark

## Pin Definition

No.	NAME	DESCRIPTION
1	RF2	RF I/O path 2
2	GND	Ground
3	RF1	RF I/O path 1
4	VDD	DC power supply
5	ANT	Antenna port
6	V1	DC control voltage 1

## Functional Block Diagram

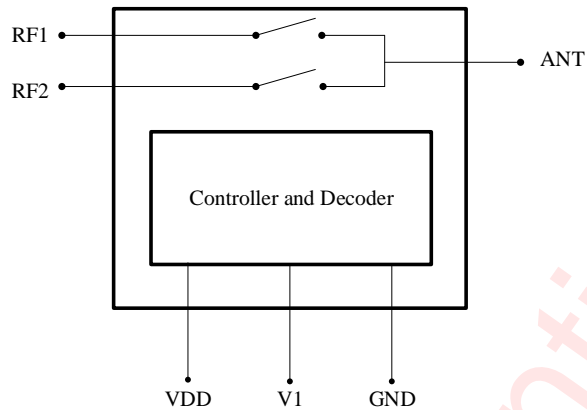


Figure 3 Functional Block Diagram

## Ordering Information

Part Number	Temperature	Package	Marking	Moisture Sensitivity Level	Environmental Information	Delivery Form
AW13612 TFDR	-40°C~85°C	FCDFN 1.1mmX0.7mm-6L	D	MSL1	RoHS+HF	9000 units/ Tape and Reel

## Absolute Maximum Ratings<sup>(NOTE1)</sup>

PARAMETERS	RANGE
Supply voltage range $V_{BUS}$	-0.3V to 3.6V
Control Voltage Range	V1
RF input power(RF1/RF2)	39dBm
Operating Free-air Temperature Range	-40°C to 85°C
Storage temperature $T_{STG}$	-65°C to 150°C
Lead temperature (soldering 10 seconds)	260°C
ESD	
HBM(Human Body Model) <sup>(NOTE 2)</sup>	±1000V
CDM (Charged Device Model) <sup>(NOTE 3)</sup>	±500V

**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.

**NOTE3:** All pins. Test Condition: ESDA/JEDEC JS-002-2018.

## Electrical Characteristics

VDD=1.8V, V1=0/1.8V, PIN=0dBm, TOP=+25°C, Zo=50Ω. (unless otherwise noted)

PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT	
<b>DC Specifications</b>						
VDD	Supply Voltage	1.62	1.8	3.3	V	
IDD	Supply Current		40	100	μA	
VCTL_H	Control Voltage High	0.9	1.8	3.3	V	
VCTL_L	Control Voltage Low	-0.3		0.3		
ICTL	Control Current	VCTL = 1.8V		0.1	1	μA
Tsw	Turn-on Switching Time	50% of final control voltage to 90% of final RF power, switching between RF1/2		1.0	2.0	μs
<b>RF Specifications</b>						
IL	Insertion loss	617-960MHz		0.24	0.33	dB
		960-2170 MHz		0.29	0.38	dB
		2170-2700 MHz		0.34	0.45	dB
		3300-3800 MHz		0.41	0.57	dB
		3800-5000 MHz		0.53	0.69	dB
		5150-5925 MHz		0.7	0.79	dB
ISO	Isolation	617-960MHz	37	42		dB
		960-2170 MHz	30	34		dB
		2170-2700 MHz	25	30		dB
		3300-3800 MHz	22	26		dB
		3800-5000 MHz	21	25		dB
		5150-5925 MHz	18	22		dB
RL	Input return loss	617-960MHz	21	25		dB
		960-2170 MHz	16	19		dB
		2170-2700 MHz	15	18		dB
		3300-3800 MHz	14	17		dB
		3800-5000 MHz	12	15		dB
		5150-5925 MHz	10	12		dB
2fo	Second harmonics	PIN=+35dBm, 915MHz,CW		-62	-52	dBm
3fo	Third harmonics	PIN=+35dBm, 915MHz,CW		-58	-50	dBm

PARAMETER		TEST CONDITION	MIN	TYP	MAX	UNIT
P0.1dB	0.1dB Compression Point	0.1-6 GHz		38		dBm

## Power ON and OFF Sequence

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 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
- 3) Apply RF input

Change switch position from one RF port to another:

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

Power OFF:

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

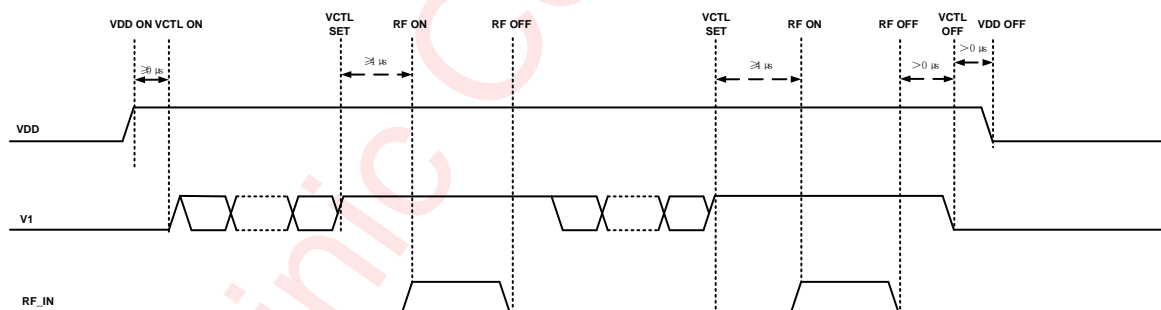
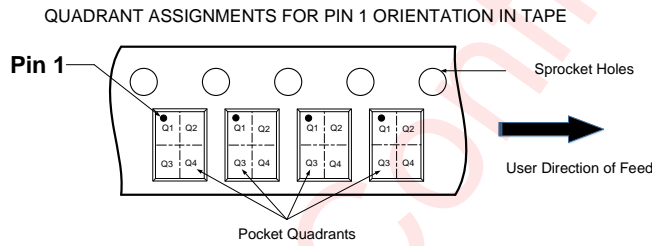
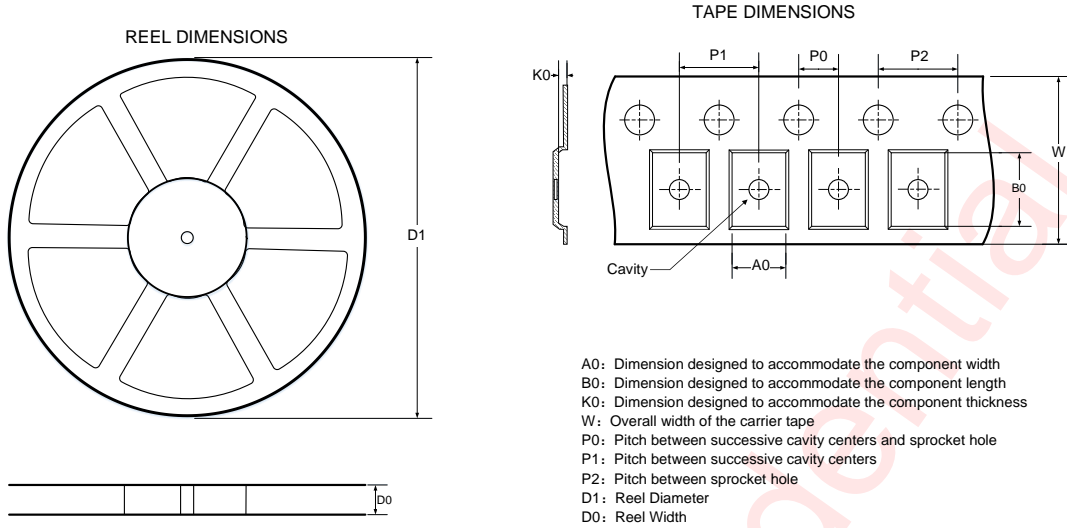


Figure 4 Power on/Change switch/Power off sequence

## Control Logic

State	Active Path	V1
0	ANT to RF1	0
1	ANT to RF2	1

## Tape And Reel Information



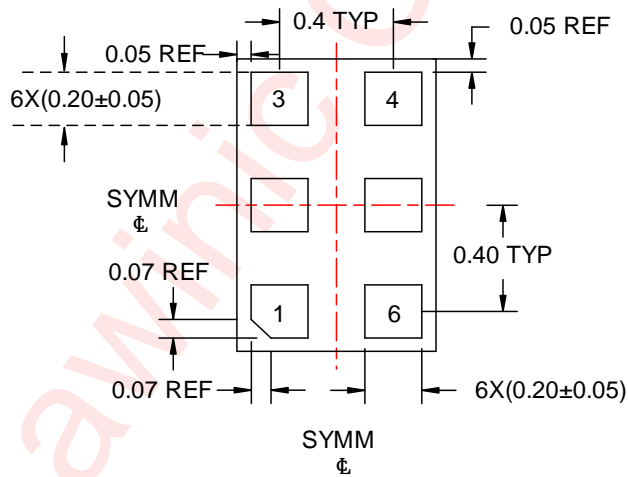
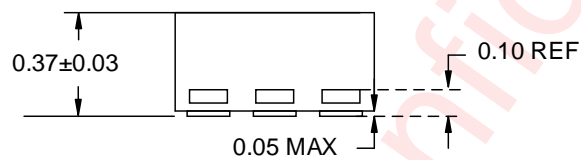
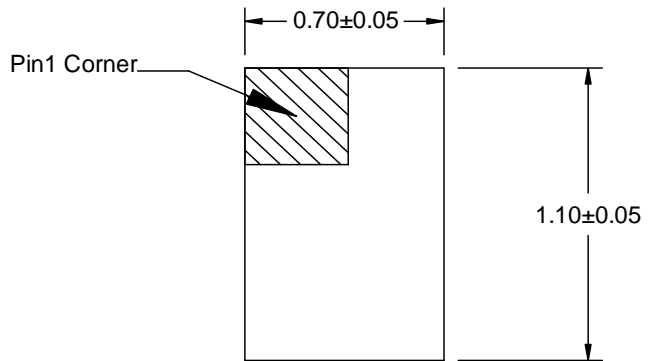
DIMENSIONS AND PIN1 ORIENTATION

D1 (mm)	D0 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
178.0	8.40	0.82	1.22	0.46	2.00	2.00	4.00	8.00	Q1

All dimensions are nominal

Figure 5 Tape and Reel

## Package Description



Unit:mm

Figure 6 Package Outline

Land Pattern Data

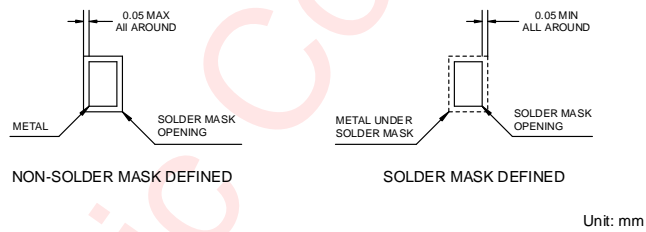
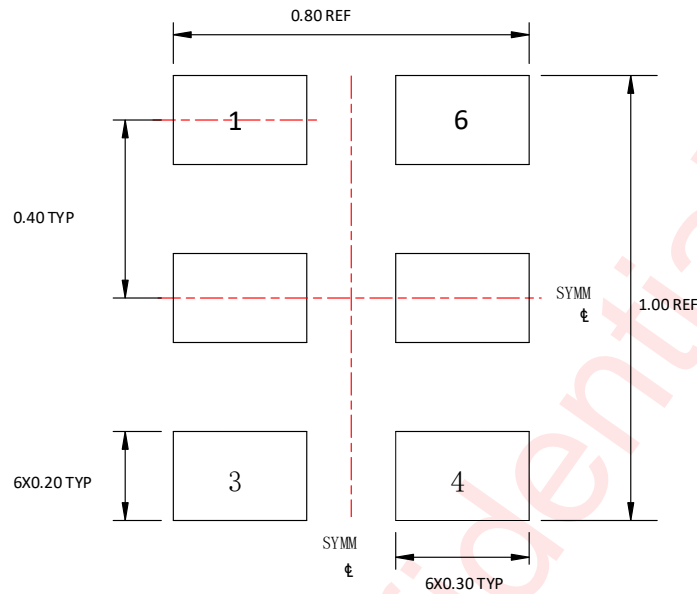


Figure 7 Land Pattern Data

## Revision History

Version	Date	Change Record
V1.0	Nov. 2021	Officially Released

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