0.1-3GHz SP8T Diversity Switch

FEATURES

- Broadband frequency range: 0.1 to 3.0 GHz
- Low insertion loss: 0.75dB typical @ 2.7 GHz
- High isolation: >20dB @ 2.7 GHz
- Integrated logic
- Small QFN (14-pin, 2.0mm x 2.0 mm) package (MSL1, 260 °C per JEDEC J-STD-020)

APPLICATIONS

- 2G/3G/4G antenna diversity
- Cellular modems , tablets and USB Devices
- Other RF front-end modules

GENERAL DESCRIPTION

The AW13418 is a SP8T switch with low insertion loss and high Isolation. It can be used to support band switching and mode switching in antenna diversity systems for 2G/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 AW13418 is provided in a compact 2.0mm x 2.0mm, 14-pin QFN package.

TYPICAL APPLICATION CIRCUIT

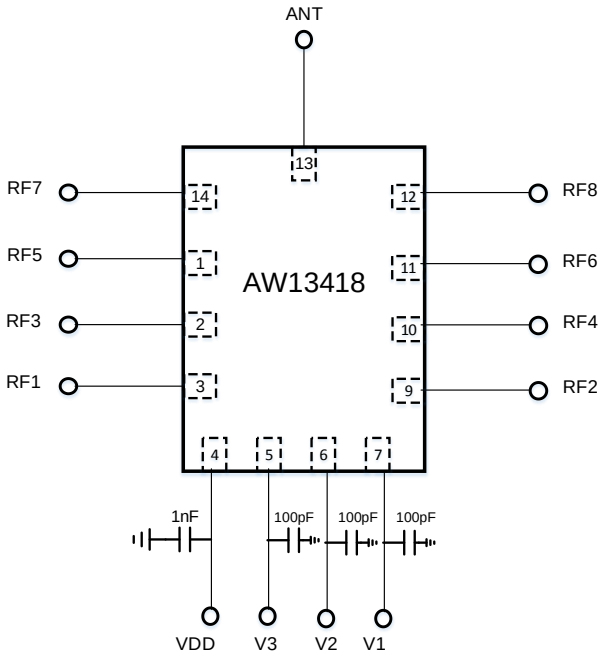

Figure 1 Typical Application Circuit of AW13418

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PIN CONFIGURATION AND TOP MARK

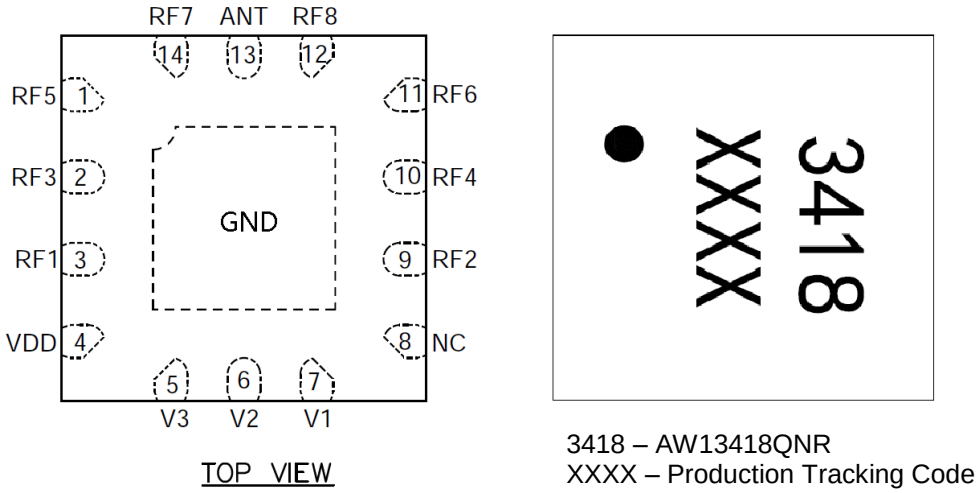


Figure 2 Pin Configuration and Top Mark

PIN DEFINITION

No.	NAME	DESCRIPTION
1	RF5	RF I/O path 5
2	RF3	RF I/O path 3
3	RF1	RF I/O path 1
4	VDD	DC power supply
5	V3	DC control voltage 3
6	V2	DC control voltage 2
7	V1	DC control voltage 1
8	NC	Not connected
9	RF2	RF I/O path 2
10	RF4	RF I/O path 4
11	RF6	RF I/O path 6
12	RF8	RF I/O path 8
13	ANT	Antenna port
14	RF7	RF I/O path 7

Note: Bottom ground paddles must be connected to ground.

FUNCTIONAL BLOCK DIAGRAM

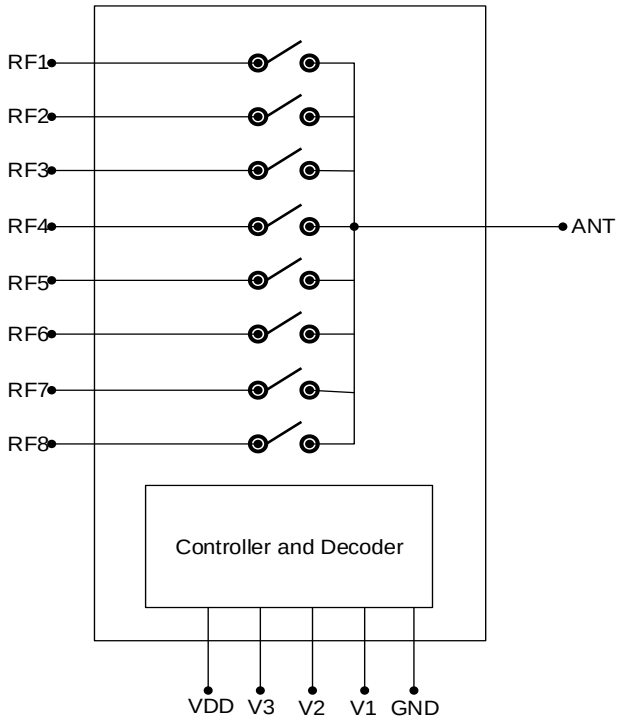
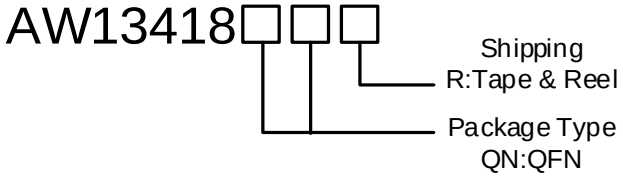


Figure 3 FUNCTIONAL BLOCK DIAGRAM

ORDERING INFORMATION

Part Number	Temperature	Package	Marking	Moisture Sensitivity Level	Environmental Information	Delivery Form
AW13418QNR	-40°C～85°C	QFN2mm*2mm-14L	3418	MSL1	ROHS+HF	3000 units/ Tape and Reel



ABSOLUTE MAXIMUM RATINGS(NOTE1)

PARAMETERS		RANGE
Supply Voltage Range VDD		2.4V to 3.3V
Control Voltage Range	V1,V2,V3	0V to 3V
RF input power(RF1 to RF8)		31dBm
Operating Free-air Temperature Range		-40°C to 85°C
Storage Temperature T_{STG}		-55°C to 150°C
Lead Temperature (Soldering 10 Seconds)		260°C
ESD (NOTE 2)		
HBM		±2kV
CDM		±1kV

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: MIL-STD-883J Method 3015.9*

ELECTRICAL CHARACTERISTICS

VDD=2.8V, V1=V2=V3=0/1.8V, PIN=0dBm, TOP=+25℃, Z_0=50Ω. (unless otherwise noted)

PARAMETER		TEST CONDITION	MIN	TYP	MAX	UNIT
DC Specifications						
VDD	Supply Voltage		2.4	2.8	3	V
IDD	Supply Current			45		μA
VCTL_H VCTL_L	Control Voltage High Low		 1.35 0	 1.8	 3 0.45	V
ICTL	Control Current	VCTL = 1.8V		0.1	1	μA
tON	Turn-on Switching Time	50% of final control voltage to 90% of final RF power, switching between RF1/2/3/4/5/6/7/8		0.5	1	μS
RF Specifications						
IL	Insertion loss(ANT pin to RF1-RF8)	0.1-1.0G 1.0-2.0G 2.0-2.7G		0.50 0.70 0.75	0.60 0.80 0.90	dB dB dB
ISO	Isolation (ANT pin to RF1-RF8)	0.1-1.0G 1.0-2.0G 2.0-2.7G	28 22 18	35 27 22		dB dB dB

PARAMETER		TEST CONDITION	MIN	TYP	MAX	UNIT
RL	Input return loss (ANT pin to RF1-RF8)	0.1-1.0G 1.0-2.0G 2.0-2.7G	23 20 18	27 22 20		dB dB dB
2fo	Second harmonics (ANT pin to RF1-RF8)	PIN=+26dBm, 0.1-3GHz		90		dBc
3fo	Third harmonics (ANT pin to RF1-RF8)	PIN=+26dBm, 0.1-3GHz		80		dBc
$P_{0.1dB}$	0.1dB Compression Point (ANT pin to RF1-RF8)	0.1GHz–3GHz		31		dBm
IIP3	3rd Order Input Intercept Point	@ 2.0GHz, PIN=+26dBm, Δf=1MHz		57		dBm

TIMING DIAGRAM (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, V2, V3 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, V3
3) Apply RF input

Change switch position from one RF port to another:

1) Remove RF input
2) Change control voltages V1, V2, V3 to set the switch to desired RF port
3) Apply RF input

Power OFF:

1) Remove RF input
2) Remove control voltages-V1, V2, V3
3) Remove VDD input

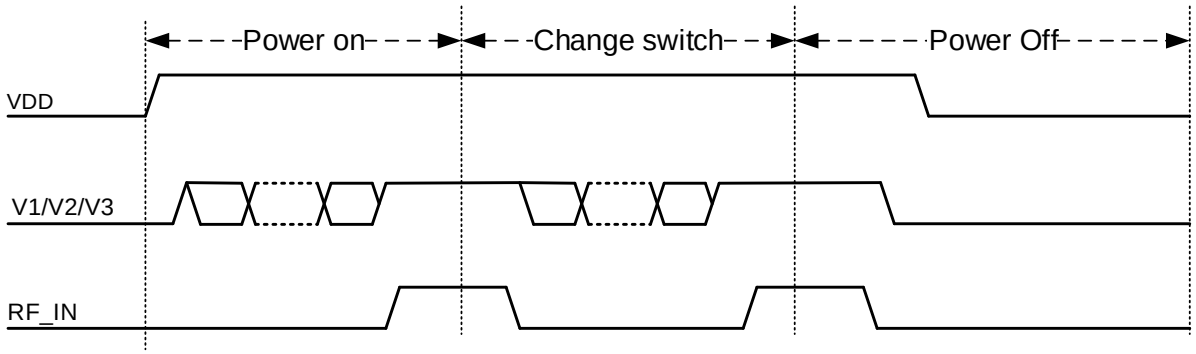


Figure 4 Power on/Change switch/Power off sequence

AW13418 CONTROL LOGIC

Control Pins			Switch RF I/O							
V1	**V2**	**V3**	**RF1**	**RF2**	**RF3**	**RF4**	**RF5**	**RF6**	**RF7**	**RF8**
0	0	0	**ON**	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation
0	0	1	Isolation	**ON**	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation
0	1	0	Isolation	Isolation	**ON**	Isolation	Isolation	Isolation	Isolation	Isolation
0	1	1	Isolation	Isolation	Isolation	**ON**	Isolation	Isolation	Isolation	Isolation
1	0	0	Isolation	Isolation	Isolation	Isolation	**ON**	Isolation	Isolation	Isolation
1	0	1	Isolation	Isolation	Isolation	Isolation	Isolation	**ON**	Isolation	Isolation
1	1	0	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	**ON**	Isolation
1	1	1	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	Isolation	**ON**

APPLICATION CIRCUITS

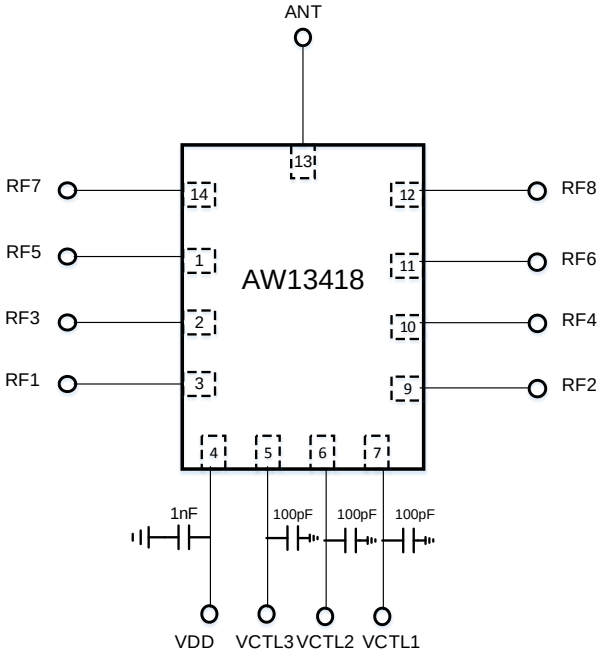


Figure 5 AW13418 EVB Schematic

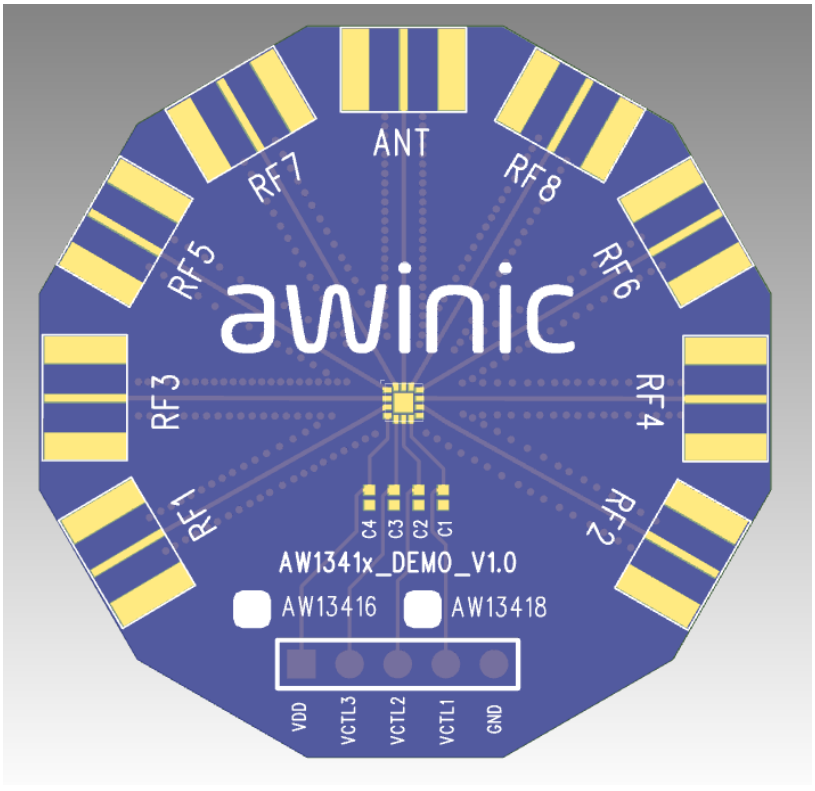


Figure 6 AW13418 EVB

PACKAGE OUTLINE DIMENSIONS

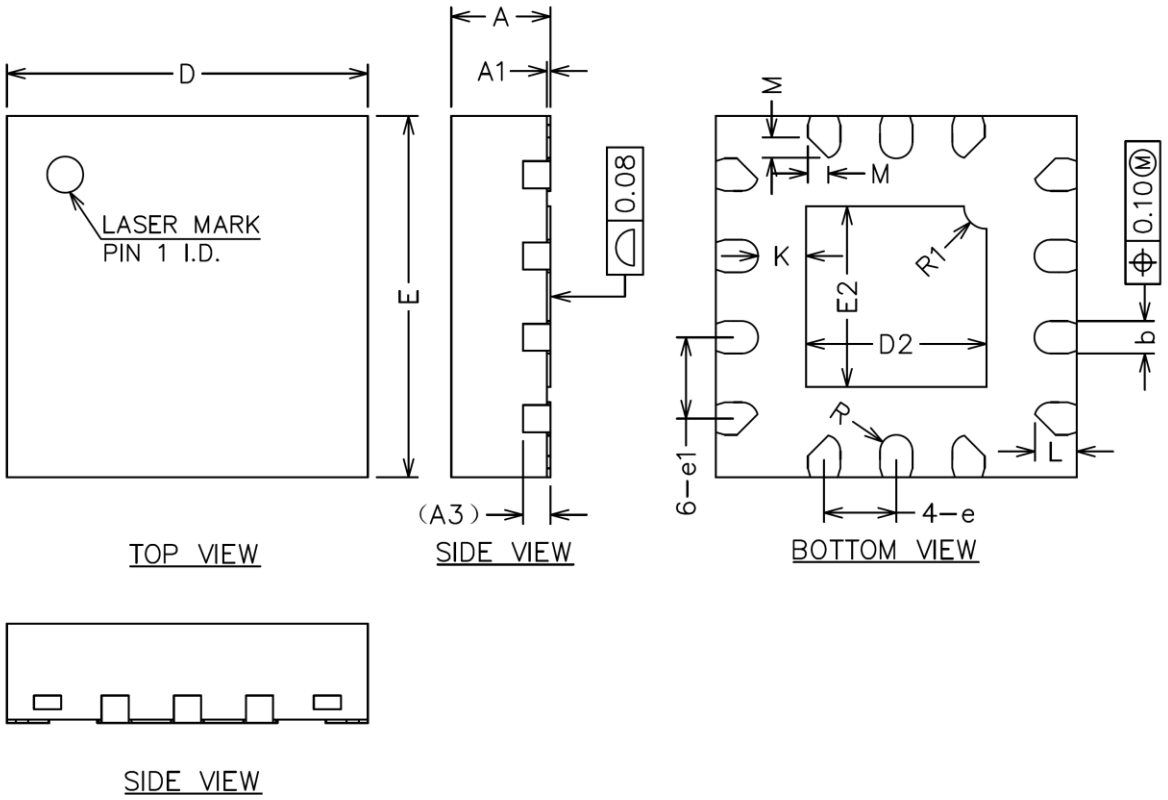


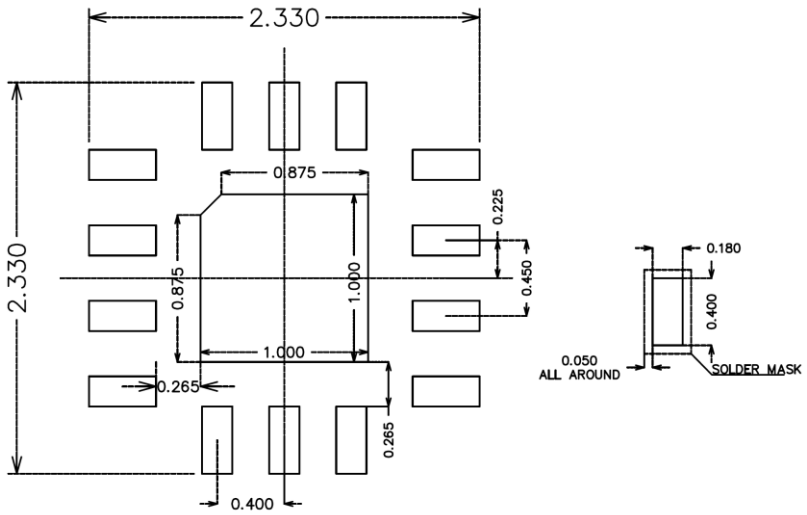
Figure 7 Package Outline

AW13418 OUTLINE DIMENSIONS

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
A3		0.152REF	
b	0.13	0.18	0.23
D	1.90	2.00	2.10
E	1.90	2.00	2.10
D2	0.90	1.00	1.10
E2	0.90	1.00	1.10
e	0.35	0.40	0.45
e1	0.40	0.45	0.50
K	0.165	0.265	0.365
L	0.185	0.235	0.285
M		0.11REF	
R		0.09REF	
R1		0.125REF	

LAND PATTERN DATA



TAPE AND REEL INFORMATION

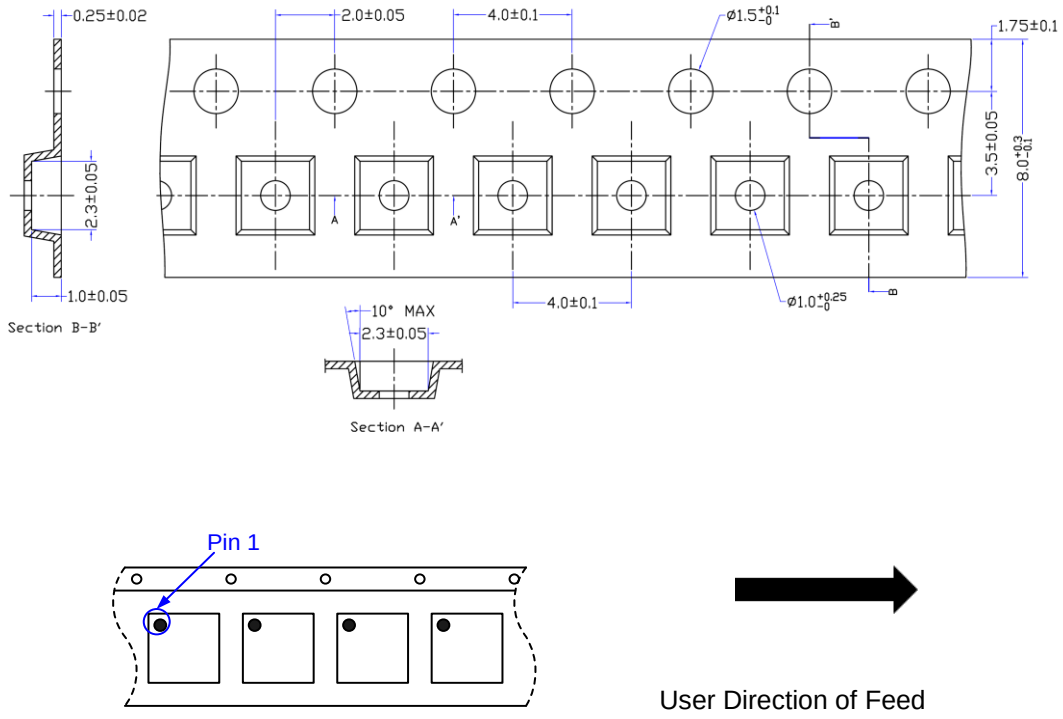


Figure 8-1 Tape and Reel

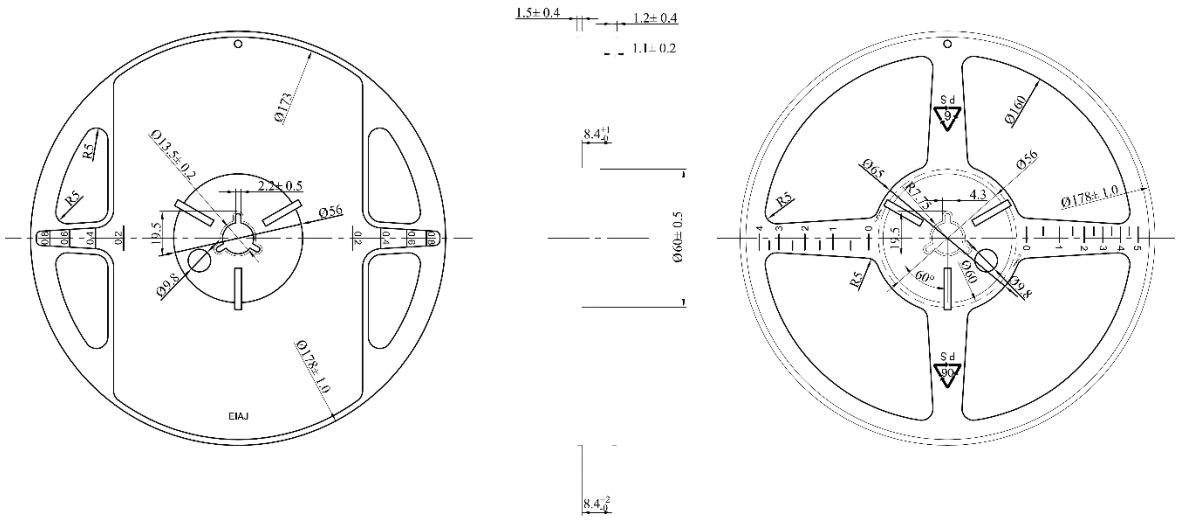
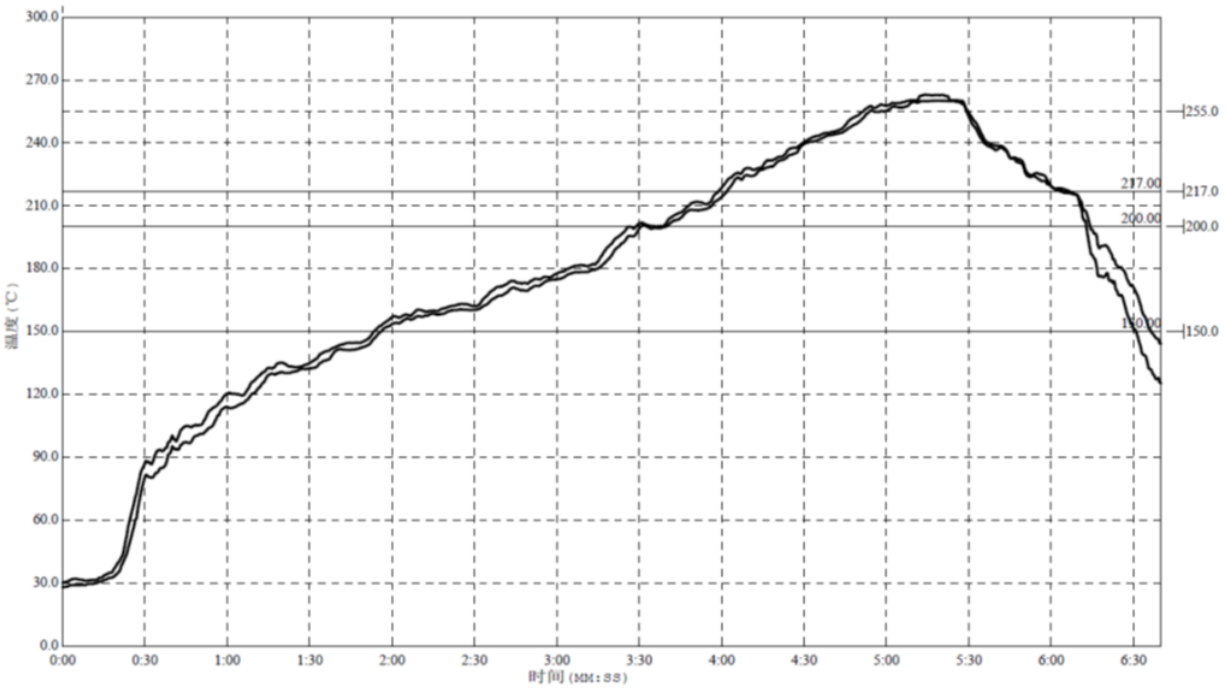


Figure 8-2 Tape and Reel

REFLOW



Reflow Note	Spec
Average ramp-up rate (217°C to peak)	Max. 3°C /sec
Time of Preheat temp. (from 150°C to 200°C)	60-120sec
Time to be maintained above 217°C	60-150sec
Peak Temperature	>260°C
Time within 5°C of actual peak temp	20-40sec
Ramp-down rate	Max. 6°C /sec
Time from 25°C to peak temp	Max. 8min

Figure 9 Package Reflow Standard Profile

NOTE 1: All data are compared with the package-top temperature, measured on the package surface;

NOTE 2: AW13418 adopted the Pb-Free assembly.

REVISION HISTORY

Vision	Date	Change Record
V1.0	Aug 2017	Officially Released
V1.1	Nov 2017	Change datasheet template

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