

APPROVAL SHEET

RF Switch Series – RoHS Compliance

SP6T GPIO Switch

Halogens Free Product

Any 3G/4G Band for TRx System

P/N: RFASWH416PTF0G

*Contents in this sheet are subject to change without prior notice.

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FEATURES

- Low Insertion Loss : 0.70 dB typ. @ 2.7GHz
- Low control voltage : 0 to 3.0 V
- Miniature footprint : 2.0 x 2.0 x 0.50 mm³

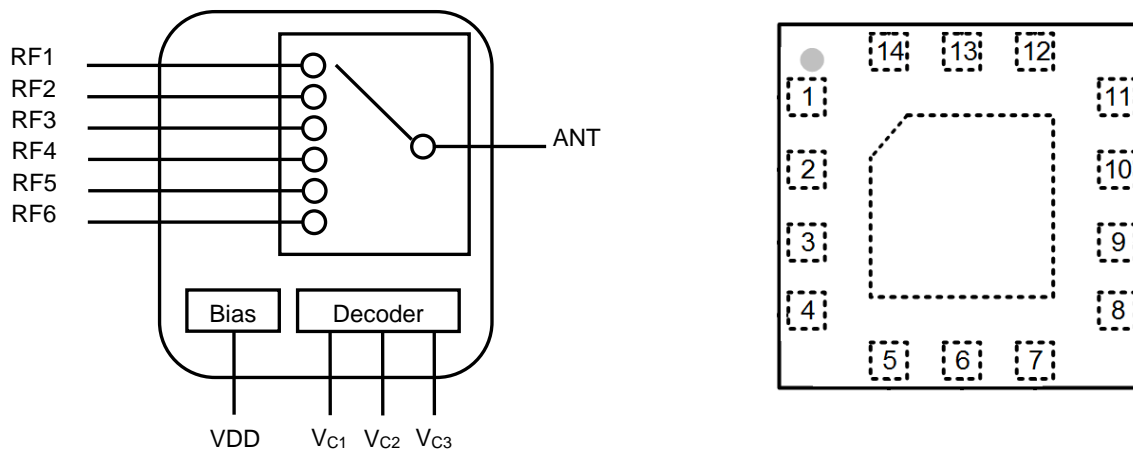
Description

- The RFASWH416PTF0G is a SOI (Silicon On Insulator) Single-Pole, Six-Throw (SP6T) switch that operating at 0.1-2.7 GHz. The RFASWH416PTF0G is manufactured in a QFN-14 (2.0 x 2.0 x 0.50mm³) package.
- The RFASWH416PTF0G features very high isolation with very low DC power consumption.

Application

- Multi-mode 3G, LTE application transmit/receive system.

Block Diagram and Pin Out (Top View)

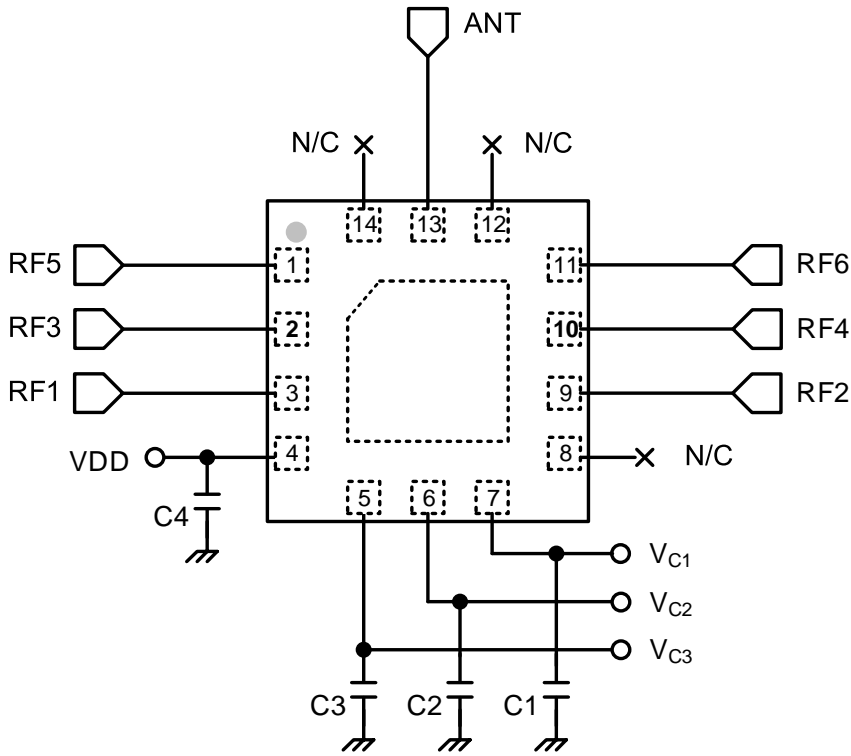


Pin Names and Descriptions

Pin	Name	Description	Pin	Name	Description
1	RF5	RF path 5	8	NC	Not connected
2	RF3	RF path 3	9	RF2	RF path 2
3	RF1	RF path 1	10	RF4	RF path 4
4	VDD	DC power supply	11	RF6	RF path 6
5	V _{c3}	DC control voltage 3	12	NC	Not connected
6	V _{c2}	DC control voltage 2	13	ANT	Antenna port
7	V _{c1}	DC control voltage 1	14	NC	Not connected

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Application Circuit



Parts List

Parts No.	Value
C1-C4	100 pF

Absolute Maximum Ratings

Parameter	Symbol	Minimum	Maximum	Units
RFx Input Power	PIN		+33	dBm
Storage temperature	T _{STG}	-55	+150	°C
Operating temperature	T _{OP}	-40	+90	°C

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Electrical Specifications

(Top= 25°C, VDD=2.8V, VCTL=0/1.8V, Characteristic Impedance Z₀= 50 Ω, Unless Otherwise Noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Units
RF Specifications						
Operating frequency	f		0.1		2.7	GHz
Insertion Loss (ANT port to RF1/2/3/4/5/6 port)	IL	0.1 ~ 1.0GHz 1.0 ~ 2.0GHz 2.0 ~ 2.7GHz		0.45 0.60 0.70	0.60 0.75 0.85	dB dB dB
Isolation (ANT port to RF1/2/3/4/5/6 port)	Iso	0.1 ~ 1.0GHz 1.0 ~ 2.0GHz 2.0 ~ 2.7GHz	30 24 21	34 28 25		dB dB dB
On state match	VSWR	0.1 ~ 2.7GHz		1.22	1.67	
RFx Harmonics	2f ₀	PIN = +25dBm, f = 0.1 to 2.7GHz RF1 port		-38		dBm
	2f ₀	PIN = +25dBm, f = 0.1 to 2.7GHz RF2 to RF6 port		-55		dBm
	3f ₀	PIN = +25dBm, f = 0.1 to 2.7GHz		-60		dBm
DC Specification (Decoder)						
Supply Voltage	VDD		1.6	2.8	3.3	V
Supply Current	I _{DD}	VDD=2.8V		100		μA
Control Voltage(High)	V _{CTL}		1.6	1.8	3.0	V
Control Voltage(Low)	V _{CTL}		0		0.4	V
Switching Specification						
Switching speed	T _{SW}	50% V _{CTL} to 90/10% RF		0.5		μs

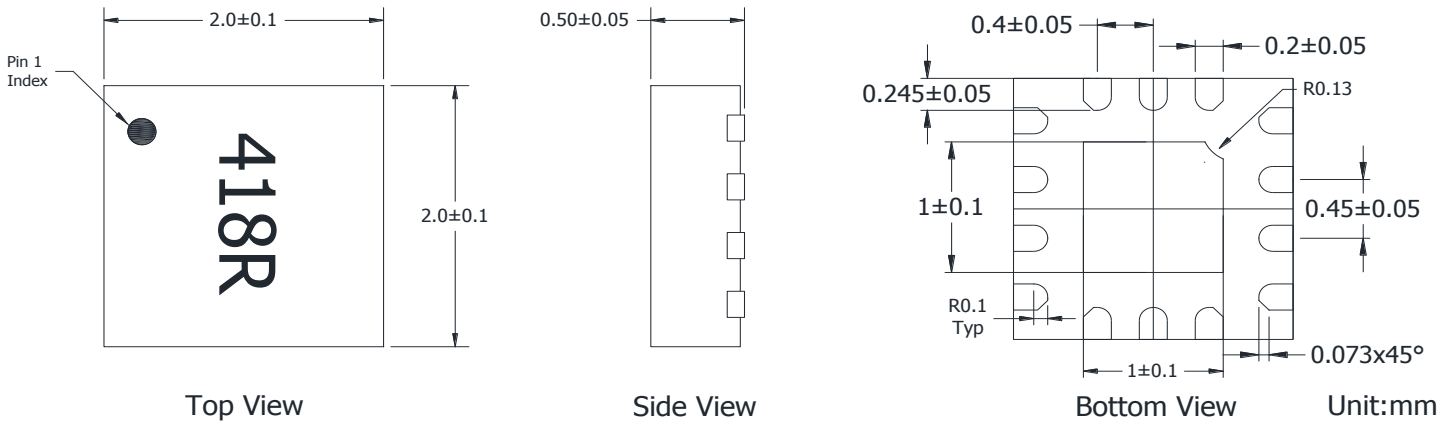
Note : All measurements made in a 50Ω system with 0/+1.8V control voltages, unless otherwise specified.

Logic Table for Switch On-Path (High=1.8V ,Low= 0V)

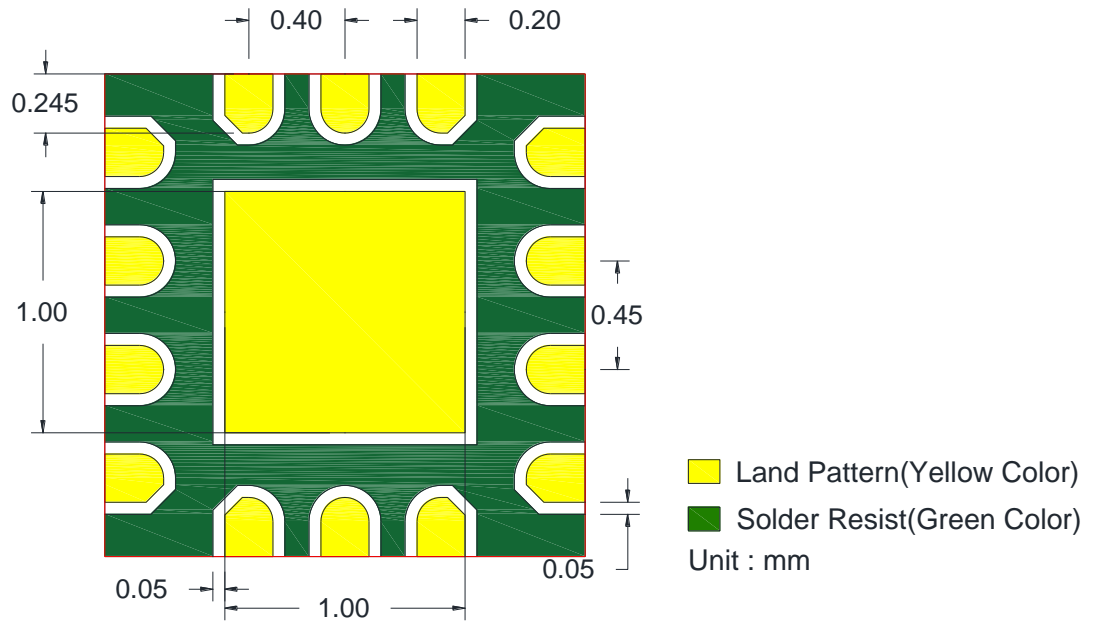
V _{c1}	V _{c2}	V _{c3}	RF1	RF2	RF3	RF4	RF5	RF6
0	0	0	On	Off	Off	Off	Off	Off
0	0	1	Off	On	Off	Off	Off	Off
0	1	0	Off	Off	On	Off	Off	Off
0	1	1	Off	Off	Off	On	Off	Off
1	0	0	Off	Off	Off	Off	On	Off
1	0	1	Off	Off	Off	Off	Off	On

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Package Dimensions



Land Pattern



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Reliability test

TEST	PROCEDURE / TEST METHOD	REQUIREMENT
Solderability JIS C 0050-4.6 JESD22-B102D	*Solder bath temperature : $255 \pm 5^{\circ}\text{C}$ *Immersion time : 5 ± 0.5 sec Solder : Sn3Ag0.5Cu for lead-free	At least 95% of a surface of each terminal electrode must be covered by fresh solder.
High temperature JIS C 0021	*Temperature : $90^{\circ}\text{C} \pm 2^{\circ}\text{C}$ *Test duration : $1000+24/-0$ hours Measurement to be made after keeping at room temperature for 24 ± 2 hrs	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-30 \sim 90^{\circ}\text{C}$.
Low temperature JIS C 0020	*Temperature : $-30^{\circ}\text{C} \pm 2^{\circ}\text{C}$ *Test duration : $1000+24/-0$ hours Measurement to be made after keeping at room temperature for 24 ± 2 hrs	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-30 \sim 90^{\circ}\text{C}$.
Temperature cycle JIS C 0025	1. 30 ± 3 minutes at $-30 \pm 3^{\circ}\text{C}$, 2. 10~15 minutes at room temperature, 3. 30 ± 3 minutes at $+90 \pm 3^{\circ}\text{C}$, 4. 10~15 minutes at room temperature, Total 100 continuous cycles Measurement to be made after keeping at room temperature for 24 ± 2 hrs	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-30 \sim 90^{\circ}\text{C}$.
High temperature operation life (HTOL)	*Temperature : 90°C *V = Vmax *Time : $1000+24/-0$ hrs. Measurement to be made after keeping at room temperature for 24 ± 2 hrs	No mechanical damage. Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-30 \sim 90^{\circ}\text{C}$.

Soldering condition

Typical examples of soldering processes that provide reliable joints without any damage are given in Figure 11.

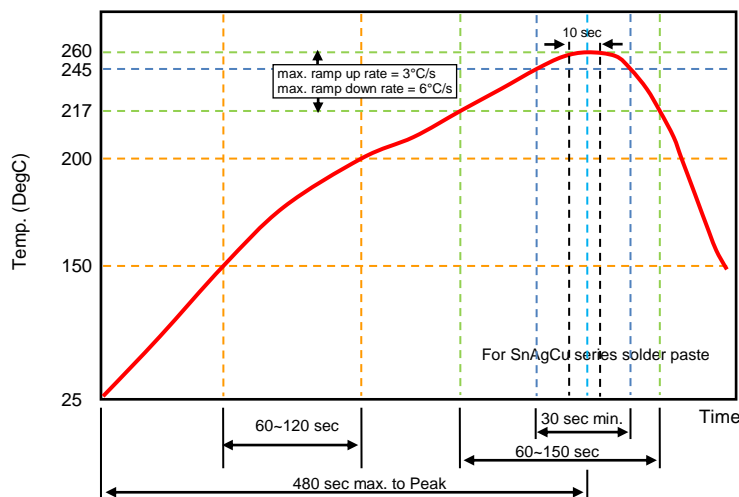


Figure 11. Infrared soldering profile

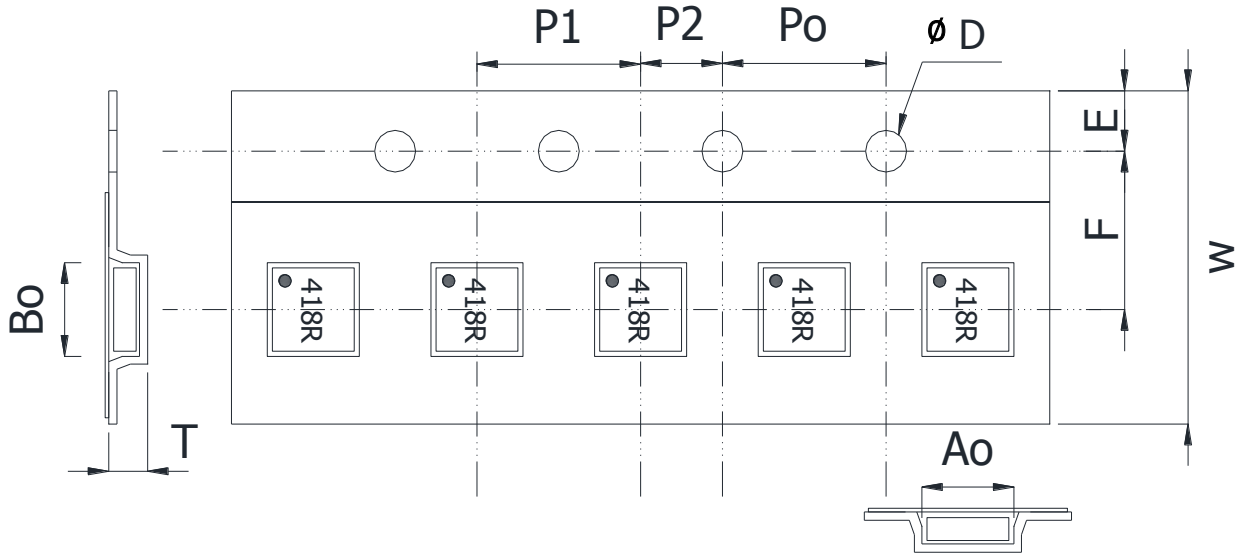
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Ordering code

RF	ASW	H	416P	T
RF module RF: Walsin RF Switch Device	Module type ASW: Antenna Switch	Application H: SP6T	Design Code	Packing T: Taping

Minimum Ordering Quantity: 5000 pcs per reel.

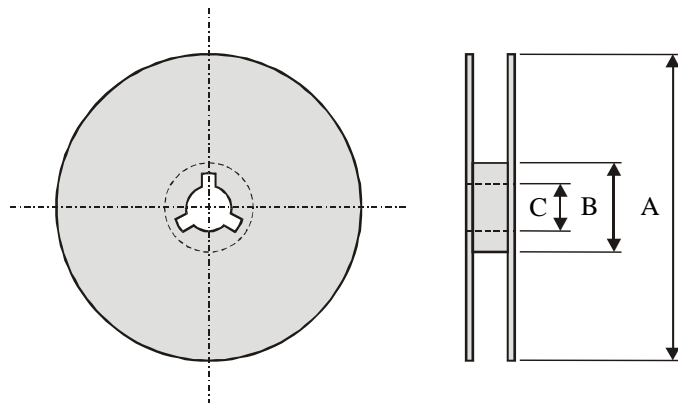
Packaging



Plastic Tape specifications (unit :mm)

Index	Ao	Bo	φD	T	W
Dimension (mm)	2.25 ± 0.10	2.25 ± 0.10	1.55 ± 0.05	0.75 ± 0.10	8.0 ± 0.30
Index	E	F	Po	P1	P2
Dimension (mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.05

Reel dimensions



Index	A	B	C
Dimension (mm)	Φ180±2	Φ60.0±1	Φ13.1±0.2

Taping Quantity : 5000 pieces per 7" reel

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Caution of handling

Limitation of Applications

Please contact us before using our products for the applications listed below which require especially high reliability for the prevention of defects, which might directly cause damage to the third party's life, body or property.

- (1) Aircraft equipment
- (2) Aerospace equipment
- (3) Undersea equipment
- (4) Medical equipment
- (5) Disaster prevention / crime prevention equipment
- (6) Traffic signal equipment
- (7) Transportation equipment (vehicles, trains, ships, etc.)
- (8) Applications of similar complexity and /or reliability requirements to the applications listed in the above.

Storage condition

- (1) Products should be used in 6 months from the day of WALSIN outgoing inspection, which can be confirmed.
- (2) Storage environment condition.
 - Products should be storage in the warehouse on the following conditions.
 - Temperature : -10 to +40°C
 - Humidity : 30 to 70% relative humidity
 - Don't keep products in corrosive gases such as sulfur. Chlorine gas or acid or it may cause oxidization of electrode, resulting in poor solderability.
 - Products should be storage on the palette for the prevention of the influence from humidity, dust and son on.
 - Products should be storage in the warehouse without heat shock, vibration, direct sunlight and so on.
 - Products should be storage under the airtight packaged condition.