

# APPROVAL SHEET

## **RF Switch Series – RoSH Compliance**

SPDT GPIO Switch

## **Halogens Free Product**

Any 2G/3G/4G Antenna Diversity For Receive System

**P/N: RFASWA630CTF09**

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

## Approval Sheet

### FEATURES

- Low Insertion Loss : 0.45dB typ. @ 2.7GHz
- High Isolation : 22dB min. @ 2.7GHz
- Low control voltage : 1.2V to 2.3V
- Miniature footprint : 1.1 x 0.7 x 0.45 mm<sup>3</sup>
- Moisture Sensitive Level 3 (MSL3)
- High ESD tolerance of 3kV HBM at all pins

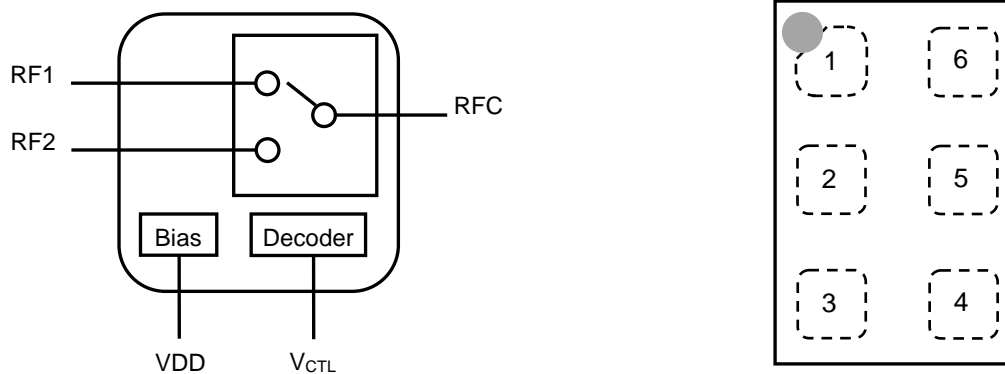
### Description

- The RFASWA630CTF09 is a SOI (Silicon On Insulator) Single-Pole, Double-Throw (SPDT) switch that operating at 0.1~2.7 GHz in a QFN Package (1.1x0.7x0.45mm<sup>3</sup>).
- The RFASWA630CTF09 features very high isolation with very low DC power consumption.
- The RFASWA630CTF09 has ESD protection devices to achieve excellent ESD performances. No DC Blocking capacitors are required for all RF ports unless DC is biased externally.

### Application

- Multi-mode 2G/3G, LTE application receive system.

### Block Diagram and Pin Out (Top View)

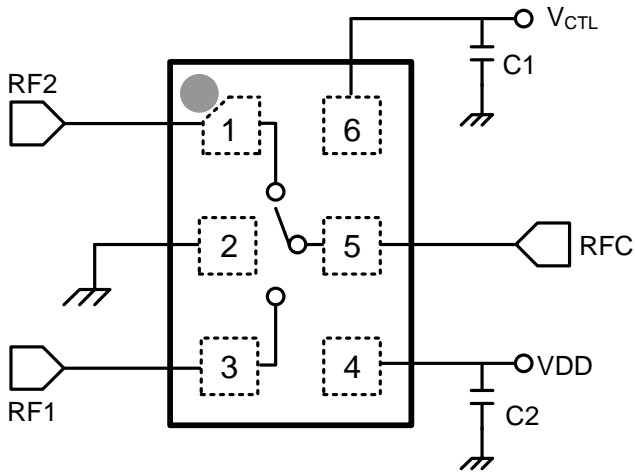


### Pin Names and Descriptions

| Pin | Name | Description | Pin | Name             | Description        |
|-----|------|-------------|-----|------------------|--------------------|
| 1   | RF2  | RF path 2   | 4   | VDD              | DC power supply    |
| 2   | GND  | Ground      | 5   | RFC              | RF common port     |
| 3   | RF1  | RF path 1   | 6   | V <sub>CTL</sub> | DC control voltage |

**Approval Sheet**

**Application Circuit**



Note: No DC Blocking capacitors are required because of the all RF ports integrated DC blocking capacitors.

**Parts List**

| Parts No. | Value   |
|-----------|---------|
| C1-C2     | 1000 pF |

**Absolute Maximum Ratings**

| Parameter                 | Symbol                        | Minimum | Maximum | Units |
|---------------------------|-------------------------------|---------|---------|-------|
| RFx Input Power           | Pin                           |         | +26     | dBm   |
| DC Supply Voltage         | VDD                           | +2.5    | +4.0    | V     |
| DC Control Voltage        | V <sub>CTL</sub>              | -0.2    | +2.8    | V     |
| Storage temperature       | T <sub>STG</sub>              | -55     | +150    | °C    |
| Operating temperature     | T <sub>OP</sub>               | -35     | +90     | °C    |
| HBM ESD Voltage, All Pins | V <sub>ESD</sub> <sup>1</sup> | -       | +3000   | V     |
| MM ESD Voltage, All Pins  | V <sub>ESD</sub> <sup>2</sup> | -       | +100    | V     |

Note 1 : Human Body Model ESD Voltage, Class 2

Note 2 : Machine Model ESD Voltage, Class A

Exceeding absolute maximum ratings may cause permanent damage. Operation between operating range maximum and absolute maximum for extended periods may reduce reliability.

**Approval Sheet**

**Electrical Specifications**

(Top= 25°C, VDD=2.8V, V<sub>CTL</sub>=0/1.8V, Characteristic Impedance Z<sub>O</sub>= 50 Ω, Unless Otherwise Noted)

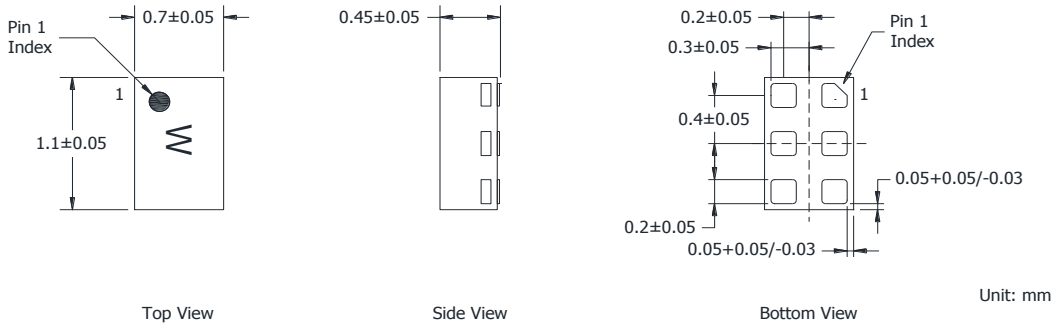
| Parameter                             | Symbol              | Test Condition                                   | Min. | Typ. | Max. | Units |
|---------------------------------------|---------------------|--|------|------|------|-------|
| <b>RF Specifications</b>              |                     |  |      |      |      |       |
| Operating Frequency                   | f                   |  | 0.1  | -    | 2.7  | GHz   |
| Insertion Loss<br>(RFC to RF1/2 port) | IL                  | 0.1 ~ 1.0 GHz                                    |      | 0.35 | 0.50 | dB    |
|                                       |                     | 1.0 ~ 2.2 GHz                                    |      | 0.40 | 0.55 | dB    |
|                                       |                     | 2.2 ~ 2.7 GHz                                    |      | 0.45 | 0.60 | dB    |
| Isolation<br>(RFC to RF1/2 port)      | Iso                 | 0.1 ~ 1.0 GHz                                    | 32   | 35   |      | dB    |
|                                       |                     | 1.0 ~ 2.2 GHz                                    | 27   | 30   |      | dB    |
|                                       |                     | 2.2 ~ 2.7 GHz                                    | 22   | 25   |      | dB    |
| On state match                        | VSWR                | 0.1 ~ 2.7 GHz                                    |      | 1.2  | 1.5  | -     |
| RFx harmonics                         | 2fo, 3fo            | PIN = +26 dBm, f = 0.1 ~ 2.7 GHz<br>VSWR = 2.5:1 |      | 81   |      | dBc   |
| <b>DC Specification (Decoder)</b>     |                     |  |      |      |      |       |
| Supply Voltage                        | VDD                 |  | 2.50 | 2.80 | 3.50 | V     |
| Supply Current                        | I <sub>DD</sub>     | VDD= 3.5V  |      | 60   | 90   | μA    |
| Control Voltage(High)                 | V <sub>CTL(H)</sub> |  | 1.20 | 1.80 | 2.30 | V     |
| Control Voltage(Low)                  | V <sub>CTL(L)</sub> |  | 0    |      | 0.45 | V     |
| Control Current                       | I <sub>CTL</sub>    | V <sub>CTL</sub> = 2.3V                          |      |      | 10   | μA    |
| <b>Switching Specification</b>        |                     |  |      |      |      |       |
| Switching speed                       | T <sub>SW</sub>     | 50% V <sub>CTL</sub> to 90/10% RF                |      | 2    | 5    | μs    |

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

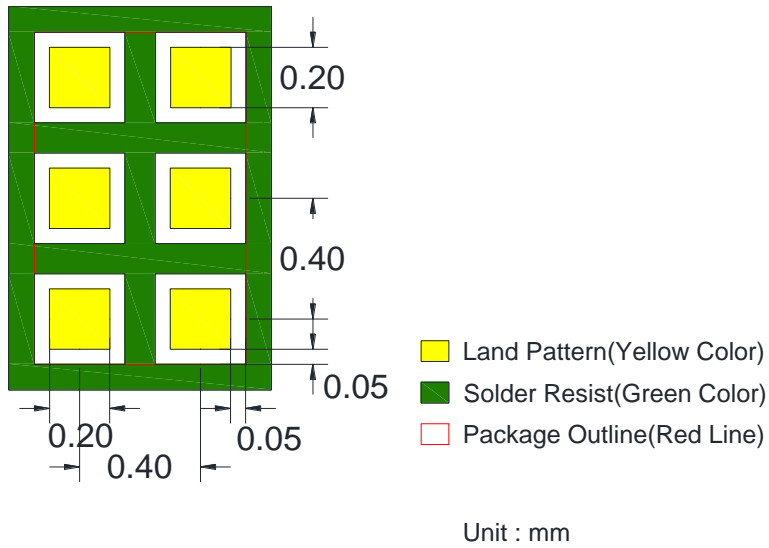
**Logic Table for Switch On-Path (High=1.8V ,Low= 0V)**

| V <sub>CTL</sub> | RF1 | RF2 |
|------------------|-----|-----|
| 0                | on  | off |
| 1                | off | on  |

Approval Sheet  
Package Dimensions



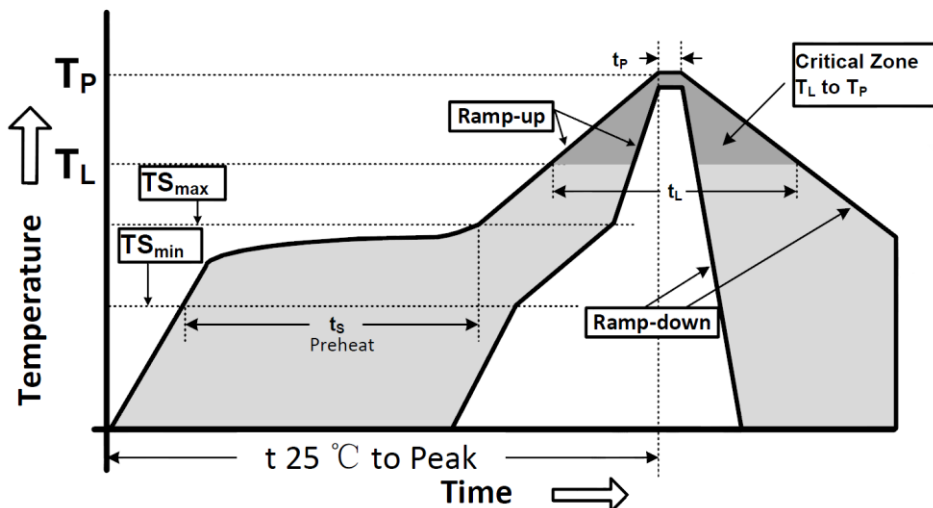
Solder Land Pattern



Reliability test

| TEST  | PROCEDURE / TEST METHOD  | REQUIREMENT   |
|---|--|---|
| Solderability<br>JIS C 0050-4.6<br>JESD22-B102D | *Solder bath temperature : $255 \pm 5^{\circ}\text{C}$<br>*Immersion time : $5 \pm 0.5$ sec<br>Solder : Sn3Ag0.5Cu for lead-free   | At least 95% of a surface of each terminal electrode must be covered by fresh solder.   |
| High temperature<br>JIS C 0021                  | *Temperature : $90^{\circ}\text{C} \pm 2^{\circ}\text{C}$<br>*Test duration : $1000+24/-0$ hours<br>Measurement to be made after keeping at room temperature for $24 \pm 2$ hrs  | No mechanical damage.<br>Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-30 \sim 90^{\circ}\text{C}$ . |
| Low temperature<br>JIS C 0020                   | *Temperature : $-30^{\circ}\text{C} \pm 2^{\circ}\text{C}$<br>*Test duration : $1000+24/-0$ hours<br>Measurement to be made after keeping at room temperature for $24 \pm 2$ hrs   | No mechanical damage.<br>Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-30 \sim 90^{\circ}\text{C}$ . |
| Temperature cycle<br>JIS C 0025                 | 1. $30 \pm 3$ minutes at $-30 \pm 3^{\circ}\text{C}$ ,<br>2. 10~15 minutes at room temperature,<br>3. $30 \pm 3$ minutes at $+90 \pm 3^{\circ}\text{C}$ ,<br>4. 10~15 minutes at room temperature,<br>Total 100 continuous cycles<br>Measurement to be made after keeping at room temperature for $24 \pm 2$ hrs | No mechanical damage.<br>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 : $90^{\circ}\text{C}$<br>*VDD = 4.8V<br>*Time : $1000+24/-0$ hrs.<br>Measurement to be made after keeping at room temperature for $24 \pm 2$ hrs   | No mechanical damage.<br>Electrical specification shall satisfy the descriptions in electrical characteristics under the operational temperature range within $-30 \sim 90^{\circ}\text{C}$ . |

Soldering Condition



**Approval Sheet**

**Soldering Condition as Below**

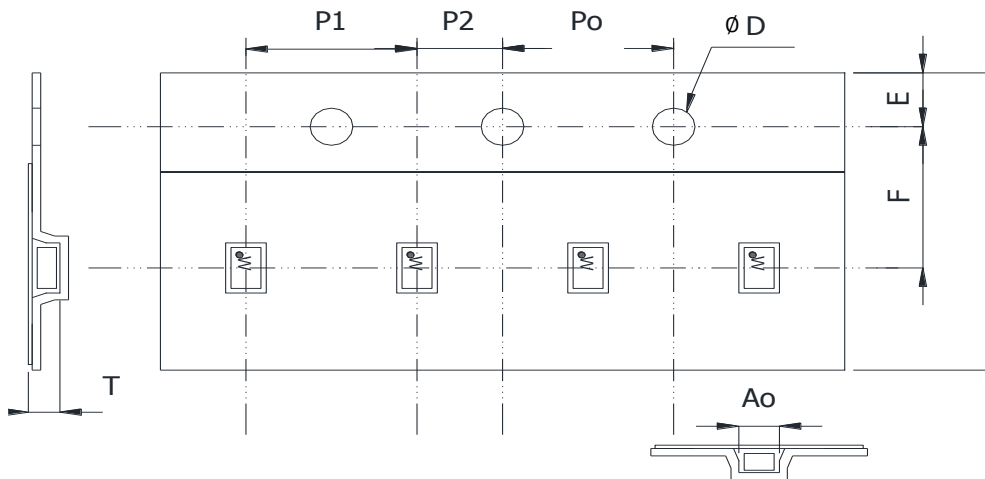
| Profile Parameter  | Lead-Free Assembly, Convection, IR/Convection |
|--|---|
| Ramp-up rate (TS <sub>max</sub> to T <sub>p</sub> )            | 3°C/second max.                               |
| Preheat temperature ( TS <sub>min</sub> to TS <sub>max</sub> ) | 150°C to 200°C                                |
| Preheat time (t <sub>s</sub> )                                 | 60 - 180 seconds                              |
| Time above TL, 217°C (t <sub>L</sub> )                         | 60 - 150 seconds                              |
| Peak temperature (T <sub>p</sub> )                             | 260°C   |
| Time within 5°C of peak temperature (t <sub>p</sub> )          | 20 - 40 seconds                               |
| Ramp-down rate   | 6°C/second max.                               |
| Time 25°C to peak temperature                                  | 8 minutes max.                                |

**Ordering code**

| RF  | ASW                                       | A                             | 630C               | T                           |
|---|---|-------------------------------|--------------------|-----------------------------|
| <b>RF module</b><br>RF:<br>Walsin RF Switch<br>Device | <b>Module type</b><br>ASW: Antenna Switch | <b>Application</b><br>A: SPDT | <b>Design Code</b> | <b>Packing</b><br>T: Taping |

**Minimum Ordering Quantity: 3000 pieces per reel.**

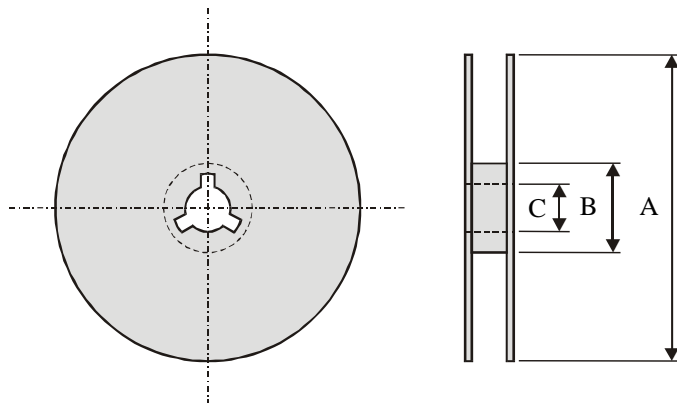
**Packaging**



**Plastic Tape specifications (unit :mm)**

|                |             |             |             |             |             |
|----------------|-------------|-------------|-------------|-------------|-------------|
| Index          | Ao          | Bo          | ΦD          | T           | W           |
| Dimension (mm) | 0.85 ± 0.03 | 1.25 ± 0.03 | 1.50 ± 0.10 | 0.60 ± 0.03 | 8.00 ± 0.20 |
| Index          | E           | F           | Po          | P1          | P2          |
| Dimension (mm) | 1.75 ± 0.10 | 3.50 ± 0.05 | 4.00 ± 0.10 | 4.00 ± 0.10 | 2.00 ± 0.05 |

Reel dimensions



| Index          | A      | B     | C     |
|----------------|--------|-------|-------|
| Dimension (mm) | Φ178.0 | Φ60.0 | Φ13.2 |

Taping Quantity : 3000 pieces per 7" reel

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 WAL SIN 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.



单击下面可查看定价，库存，交付和生命周期等信息

[>>Walsin Technology\(华新科技\(华科\)\)](#)