

# DATA SHEET : CKRF6163XS03

## Broadband SPDT Switch for Dual-Band Wireless LAN



### Features

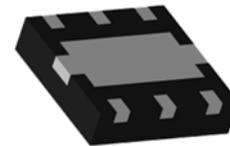
- Control voltage :  
 $VC(H) = 1.8 \text{ to } 5.0 \text{ V (3.0V TYP.)}$   
 $VC(L) = -0.2 \text{ to } 0.2 \text{ V (0V TYP.)}$
- Low insertion loss :  
 $L_{ins1} = 0.40 \text{ dB TYP. @ } f = 2.4 \text{ to } 2.5 \text{ GHz}$   
 $L_{ins2} = 0.50 \text{ dB TYP. @ } f = 4.9 \text{ to } 6.0 \text{ GHz}$
- High isolation :  
 $ISL1 = 40 \text{ dB TYP. @ } f = 2.4 \text{ to } 2.5 \text{ GHz}$   
 $ISL2 = 31 \text{ dB TYP. @ } f = 4.9 \text{ to } 6.0 \text{ GHz}$
- Handling power :  
 $P_{in(1dB)} = +33 \text{ dBm TYP. @ } f = 2.5 \text{ GHz,}$   
 $VC(H) = 3.0 \text{ V, } VC(L) = 0 \text{ V}$   
 $P_{in(1dB)} = +32 \text{ dBm TYP. @ } f = 6.0 \text{ GHz,}$   
 $VC(H) = 3.0 \text{ V, } VC(L) = 0 \text{ V}$

### Package

- 6-pin Thin SON Package(XS03)  
(1.5mm x 1.5mm x 0.37mm)

### Description

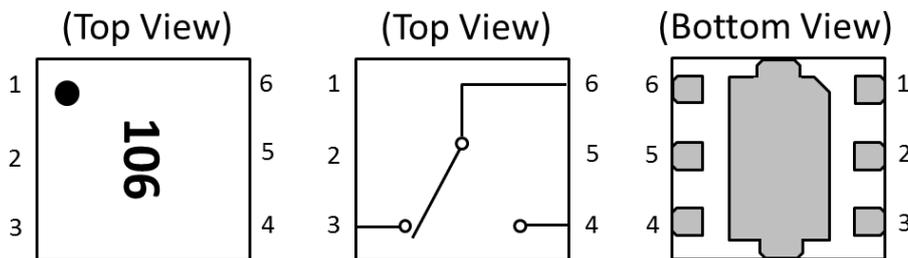
- The CKRF6163XS03 is a GaAs MMIC SPDT(Single Pole Double Throw) switch which was developed for 2.4 GHz and 6 GHz dual-band wireless LAN.



### Applications

- Dual-band wireless LAN  
(IEEE802.11a/b/g/n), etc.

### Pin Configuration and Internal Block Diagram



| Pin No. | Pin Name                 |
|---------|--------------------------|
| 1       | NC <sup>Note</sup> / GND |
| 2       | VC2                      |
| 3       | RF2                      |
| 4       | RF1                      |
| 5       | VC1                      |
| 6       | RFC                      |

**Note** Non-Connection  
**Remark** Exposed pad : GND

### Ordering Information

| Part Number     | Order Number    | Package                            | Marking | Supplying Form  |
|-----------------|-----------------|------------------------------------|---------|---|
| CKRF6163XS03-C2 | CKRF6163XS03-C2 | 6-pin plastic<br>TSOP<br>(Pb-Free) | 106     | • Embossed tape 8 mm wide<br>• Pin 1, 6 face the perforation side of the tape<br>• Qty 10 kpcs/reel |

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### Absolute Maximum Ratings

(T<sub>A</sub> = +25°C, unless otherwise specified)

| Parameter                     | Symbol           | Rating                  | Unit |
|-------------------------------|------------------|-------------------------|------|
| Control Voltage               | VC               | 6.0 <sup>Note 1</sup>   | V    |
| Input Power                   | P <sub>in</sub>  | +33.5 <sup>Note 2</sup> | dBm  |
| Operating Ambient Temperature | T <sub>A</sub>   | -45~+85                 | °C   |
| Storage Temperature           | T <sub>stg</sub> | -55~+150                | °C   |

- Note**
1.  $|VC1 - VC2| \leq 6.0V$
  2.  $3.0V \leq |VC1 - VC2| \leq 5.0V$

### Recommended Operating Range

(T<sub>A</sub> = +25°C, unless otherwise specified)

| Parameter                  | Symbol | MIN. | TYP. | MAX. | Unit |
|----------------------------|--------|------|------|------|------|
| Operating Frequency        | f1     | 2.4  | -    | 2.5  | GHz  |
|                            | f2     | 4.9  | -    | 6.0  | GHz  |
| Switch Control Voltage (H) | VC(H)  | +1.8 | +3.0 | +5.0 | V    |
| Switch Control Voltage (L) | VC(L)  | -0.2 | 0    | +0.2 | V    |

### Truth Table

| VC1  | VC2  | RFC-RF1 | RFC-RF2 |
|------|------|---------|---------|
| High | Low  | OFF     | ON      |
| Low  | High | ON      | OFF     |

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### Electrical Characteristics

( $T_A=+25\text{ }^\circ\text{C}$ ,  $V_C(H)=3.0\text{V}$ ,  $V_C(L)=0\text{V}$ ,  $Z_0=50\ \Omega$ , DC Block Capacitance=4pF, unless otherwise specified)

| Parameter  | Symbol            | Test Conditions  | MIN. | TYP. | MAX. | Unit          |
|--|-------------------|--|------|------|------|---------------|
| Insertion Loss                                   | Lins1             | f = 2.4 to 2.5 GHz   | -    | 0.40 | 0.60 | dB            |
|  | Lins2             | f = 4.9 to 6.0 GHz   | -    | 0.50 | 0.80 | dB            |
| Isolation  | ISL1              | f = 2.4 to 2.5 GHz   | 37   | 40   | -    | dB            |
|  | ISL2              | f = 4.9 to 6.0 GHz   | 28   | 31   | -    | dB            |
| Input Return Loss                                | RLin1             | f = 2.4 to 2.5 GHz   | -    | 15   | -    | dB            |
|  | RLin2             | f = 4.9 to 6.0 GHz   | -    | 15   | -    | dB            |
| Output Return Loss                               | RLout1            | f = 2.4 to 2.5 GHz   | -    | 15   | -    | dB            |
|  | RLout2            | f = 4.9 to 6.0 GHz   | -    | 15   | -    | dB            |
| 1 dB Loss Compression<br>Input Power <b>Note</b> | $P_{in(1dB)}$     | f = 2.4 to 2.5 GHz,<br>$V_C(H)=1.8\text{V}$ , $V_C(L)=0\text{V}$ | -    | +29  | -    | dBm           |
|  |                   | f = 2.4 to 2.5 GHz,<br>$V_C(H)=3.0\text{V}$ , $V_C(L)=0\text{V}$ | -    | +33  | -    | dBm           |
|  |                   | f = 4.9 to 6.0 GHz,<br>$V_C(H)=1.8\text{V}$ , $V_C(L)=0\text{V}$ | -    | +26  | -    | dBm           |
|  |                   | f = 4.9 to 6.0 GHz<br>$V_C(H)=3.0\text{V}$ , $V_C(L)=0\text{V}$  | -    | +32  | -    | dBm           |
| 3rd Order Input<br>Intercept Point               | IIP <sub>3</sub>  | f = 2.5GHz<br>2-tone 5MHz Spacing                                | -    | +55  | -    | dBm           |
| Error Vector Magnitude                           | EVM               | 802.11a, 64QAM, 54Mbps,<br>$P_{in}\leq+22\text{dBm}$             | -    | 2.5  | -    | %             |
|  |                   | 802.11g, 64QAM, 54Mbps,<br>$P_{in}\leq+25\text{dBm}$             | -    | 2.5  | -    | %             |
| Switch Control Speed                             | t <sub>sw</sub>   | 50% CTL to 90/10%  | -    | 80   | -    | ns            |
| Switch Control Current                           | I <sub>cont</sub> | RF None  | -    | 2    | -    | $\mu\text{A}$ |

**Note**  $P_{in(1dB)}$  is the measured input power level when the insertion loss increases 1dB more than that of the linear range.



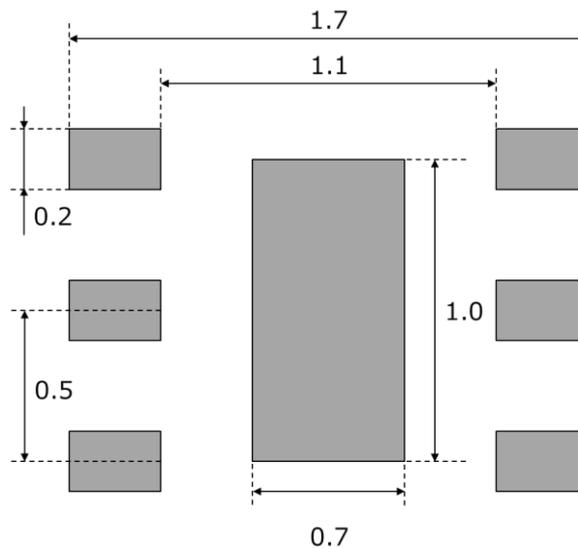
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### PCB Layout Footprint

6-pin TSON (Unit : mm)



The PCB Layout Footprint in this document is for reference only.

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Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

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