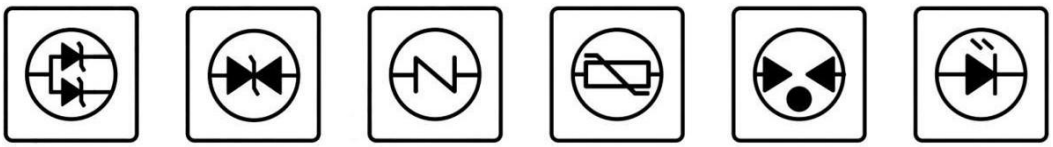
MSKSEMI 美森科
SEMICONDUCTOR




# MS6603

## Product specification

## Description

The MS6603 is a CMOS SOI single pole dual throw (SPDT) high power switch in a low cost miniature SC70-6 package. The MS6603 is ideally suited for applications where high power, low insertion loss, and small size are required. Typical applications are for handset systems that connect separate transmit and receive functions to a common antenna, as well as other related handset and general purpose applications. This part can be used in all systems operating up to 3 GHz requiring high power at low control voltage.

## Features

- $IP_{0.1dB}$: 1.6W (+32dBm) @ 3.3V, 1.4W (+31.5dBm) @1.8V
- Low insertion loss (0.28dB @ 2.5GHz)
- High isolation (24dB @ 2.5GHz)
- Low DC current: 12uA @ 3.3V, 5uA @ 1.8V
- SOT-363 Package (MSL1, 260°C per JEDEC-J-STD-020)
- ESD: 1.5 kV HBM on all pins

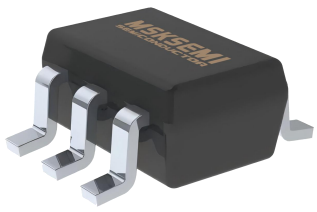
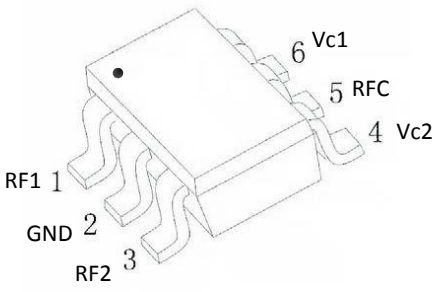
## Applications

- WLAN 802.11a/b/g/n/ac/ax networks
- ISM band radios
- Low power T/R systems

## ORDER INFORMATION

| ORDERING NUMBER | PACKAGE | PACKING OPTION |
|---|---|---|
| MS6603 | SC70-6 | 3000PCS |

## Connection Diagrams and Pin Description

| SC70-6 | PIN DESCRIPTION | MARKING |
|---|---|---|
|  |  |  |







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## Table 1.Pin Definition

| Pin # | Name | Description | Pin # | Name | Description |
|---|---|---|---|---|---|
| 1 | RF1 | RF port 1 | 4 | Vc2 | Logic control 2 |
| 2 | GND | Ground | 5 | RFC | Common Port |
| 3 | RF2 | RF port 2 | 6 | Vc1 | Logic control 1 |

## Table 2. Absolute Maximum Ratings

| Parameter | Absolute Maximum |
|---|---|
| Max Input Power (0.01 - 3 GHz, 3.3 V control) | +32.5 dBm |
| Operating Voltage | +4.2 V |
| Thermal resistance ($\Theta_{JC}$) | 25 ℃/W |
| Operating Temperature | -40℃to +85℃ |
| Storage Temperature | -65℃to +150℃ |

## Table 3. Recommended Operating Conditions

| Parameter | Symbol | Minimum | Typical | Maximum | Units |
|---|---|---|---|---|---|
| Operating frequency | $f_0$ | 0.01 | | 3.0 | GHz |
| Control voltage:<br>Low<br>High | <br>Vc_L<br>Vc_H | <br>0<br>1.6 | <br>0<br>3.3 | <br>0.4<br>3.6 | <br>V<br>V |
| Operating temperature | $T_{oper.}$ | | 25 | | ℃ |



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## Truth Table and Pin Out

**Table 4. MS6603 Truth Table**

| Vc1 | Vc2 | RFC—RF1 | RFC—RF2 |
|---|---|---|---|
| 1 | 0 | Isolation | Insertion loss |
| 0 | 1 | Insertion loss | Isolation |

**Note:** "1" = 1.6V to 3.6V. "0" = 0V to 0.4V.

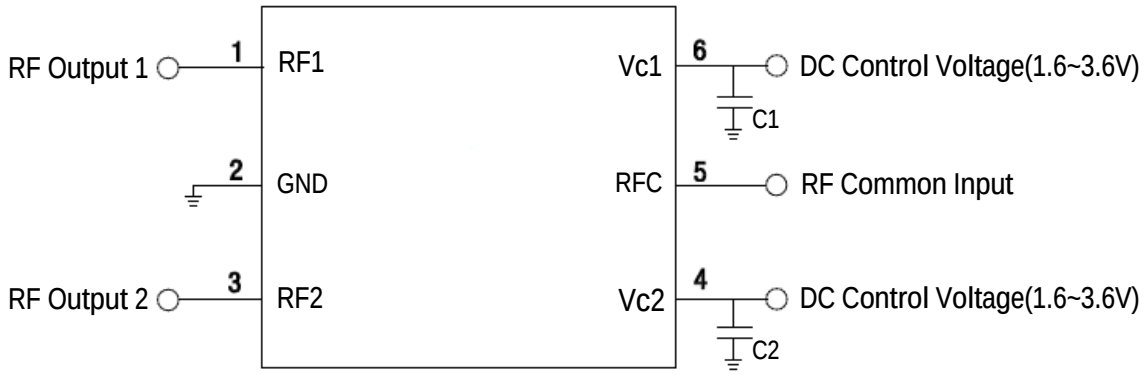



**Figure2.** MS6603 **PinOut**

C1 and C2 are optional bypass capacitors (100pF).The RF path should use DC block capacitor if it's with any dc voltage.

## ElectricalSpecification

**Table5.MS6603 Selectricalspecificationsat25℃ (0 , +3.3V)**

| Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Insertion Loss | 0.01GHz — 0.5GHz | | 0.20 | 0.30 | dB |
| | 0.5GHz — 1.5GHz | | 0.25 | 0.35 | dB |
| | 1.5GHz — 2.7GHz | | 0.28 | 0.38 | dB |
| | 2.7GHz — 3.0GHz | | 0.30 | 0.40 | dB |
| Isolation | 0.01GHz — 0.5GHz | 35 | 40 | | dB |
| | 0.5GHz — 1.5GHz | 25 | 30 | | dB |
| | 1.5GHz — 2.7GHz | 22 | 24 | | dB |
| | 2.7GHz — 3.0GHz | 20 | 22 | | dB |



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| | | | | | |
|---|---|---|---|---|---|
| Return Loss | 0.01GHz — 0.5GHz<br>0.5GHz — 1.5GHz<br>1.5GHz — 2.7GHz<br>2.7GHz — 3.0GHz | 25<br>20<br>20<br>20 | 30<br>25<br>25<br>25 | | dB<br>dB<br>dB<br>dB |
| 2nd Hamonic | 2.45GHz, Pin=+20dBm. Vc = 0V/3.3V 2.45GHz, Pin=+25dBm. Vc = 0V/3.3V | | -48<br>-40 | | dBm<br>dBm |
| 3rd Hamonic | 2.45GHz, Pin=+20dBm. Vc = 0V/3.3V 2.45GHz, Pin=+25dBm. Vc = 0V/3.3V | | -67<br>-47 | | dBm<br>dBm |
| $IP_{0.1dB}$ | 0.01 – 3 GHz, Vc = 0V/3.3V | | 1.6 | | W |
| | | | 32 | | dBm |
| | 0.01 – 3 GHz, Vc = 0V/1.8V | | 1.4 | | W |
| | | | 31.5 | | dBm |
| $IP_{1dB}$ | 0.01 – 3 GHz, Vc = 0V/3.3V | | 1.8 | | W |
| | | | 32.5 | | dBm |
| | 0.01 – 3 GHz, Vc = 0V/1.8V | | 1.6 | | W |
| | | | 32 | | dBm |
| Control Current | $V_{low}$ = 0 to 0.2 V $V_{high}$ = 3.3 V | | 12 | 20 | uA |
| | $V_{low}$ = 0 to 0.2 V $V_{high}$ = 1.8 V | | 5 | 10 | uA |
| Trise, Tfall | 10% to 90% RF, 90% to 10% RF | | 30 | | ns |
| | 50% control to 90% RF, and 50% control to 10% RF | | 125 | | ns |

**Note**

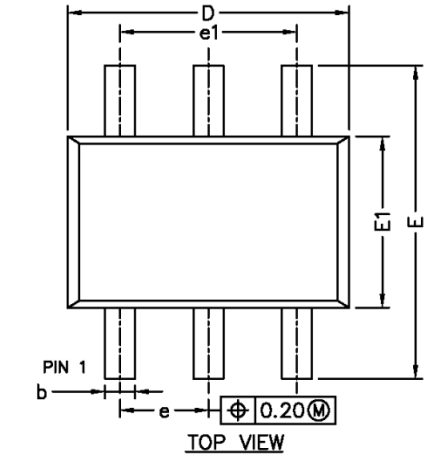
**1:** Performance is guaranteed only under the conditions listed in this Table.

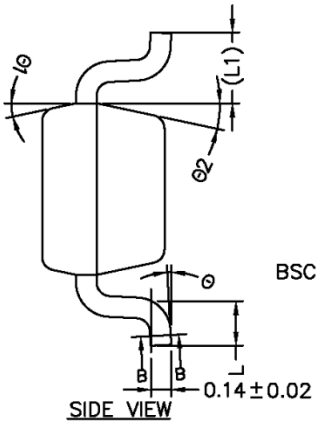
**2:** Board loss de-embedded.



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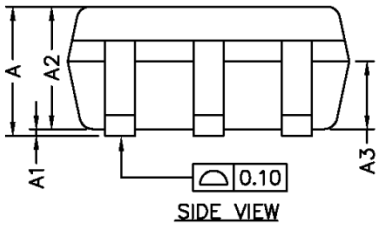
## PackageDimensions

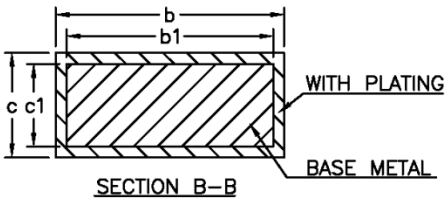



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | 0.80 | – | 1.10 |
| A1 | 0 | – | 0.15 |
| A2 | 0.80 | 0.90 | 1.00 |
| A3 | 0.40 | 0.50 | 0.60 |
| b | 0.17 | – | 0.30 |
| b1 | 0.17 | 0.22 | 0.25 |
| c | 0.14 | – | 0.20 |
| c1 | 0.14 | 0.15 | 0.16 |
| D | 2.02 | 2.07 | 2.12 |
| E | 2.20 | 2.30 | 2.40 |
| E1 | 1.21 | 1.26 | 1.31 |
| e | 0.60 | 0.65 | 0.70 |
| e1 | 1.20 | 1.30 | 1.40 |
| L | 0.26 | 0.33 | 0.46 |
| L1 | 0.52REF | | |
| θ | 0° | – | 8° |
| θ1 | 10° | 12° | 14° |
| θ2 | 10° | 12° | 14° |

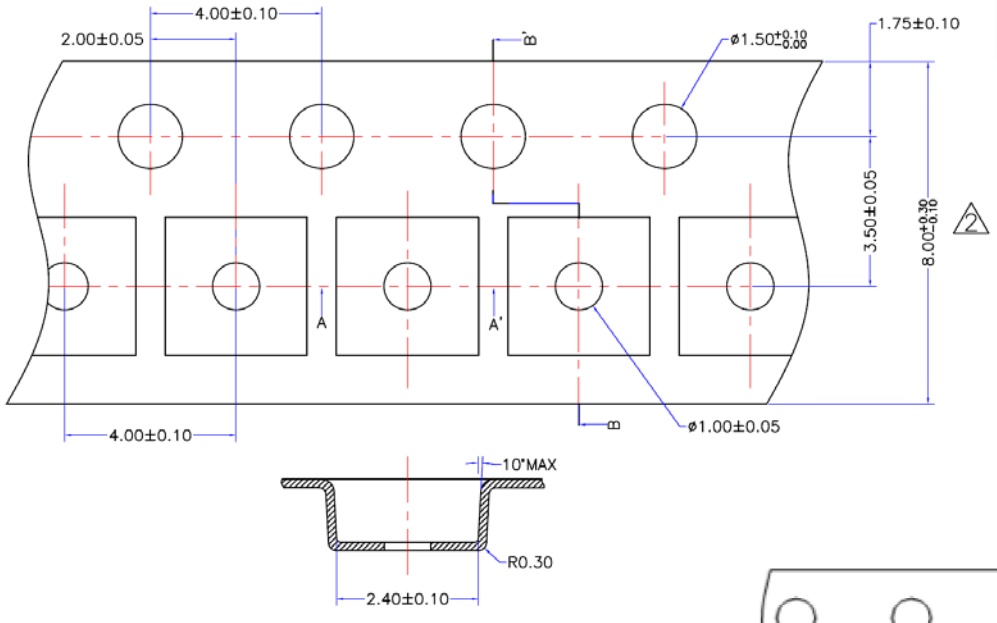


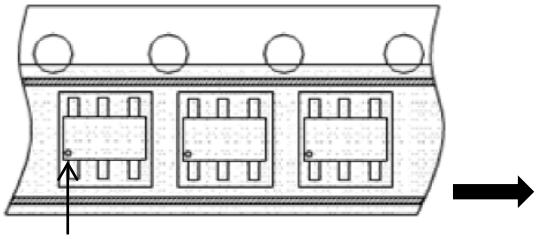

NOTES:
1.ALL DIMENSIONS REFER TO JEDEC STANDARD MO–203 AB DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.
2.DAMBAR PROTRUSION SHALL BE 0.08mm TOTAL IN EXCESS OF THE "b" DIMENSION AT MAXIMUM MATERIAL CONDITION.

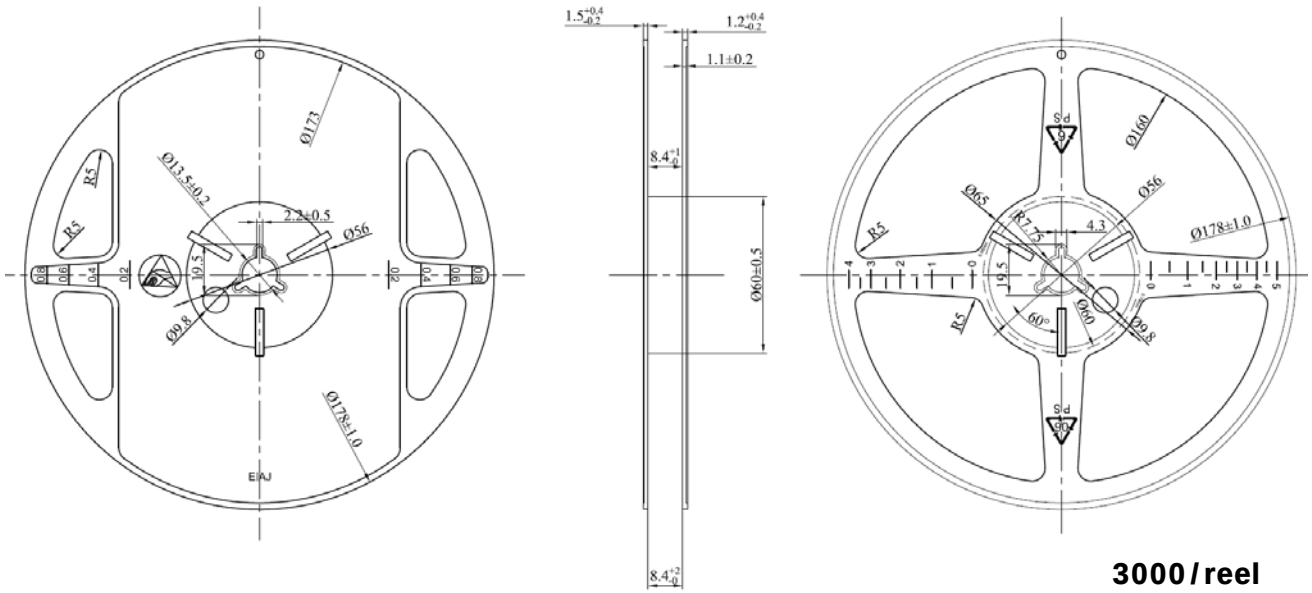


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NOTES:
1. ALL DIMS IN MM
2. MATERIAL: BLACK CONDUCTIVE POLYSTYRENE
3. 10 sprocket hole pitch cumulative tolerance ±0.20mm
4. Carrier camber is within 1mm in 250mm
5. There must not be foreign body adhesion and the state of the surface must be excellent
6. Surface resistance 1X10E5≤Rs≤1X10E9 OHMS
7. 17" PLASTIC–Reel, 255000 pockets (1020m)
SC70



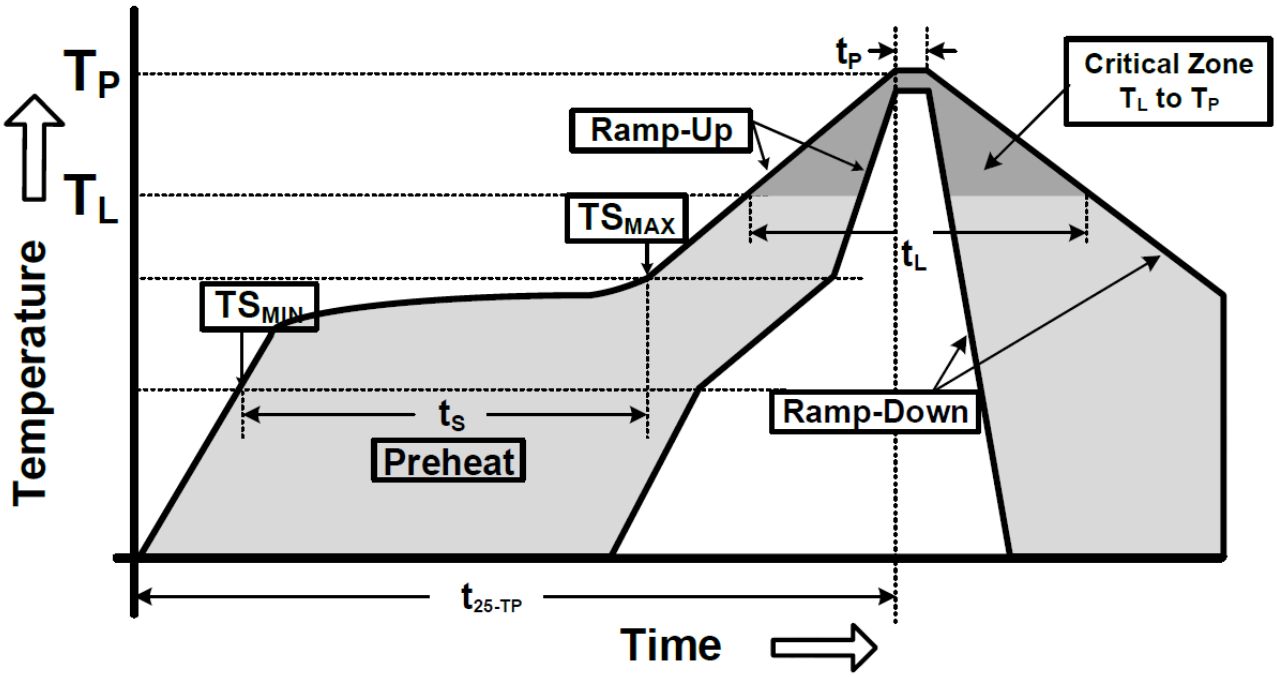




MS6603 TapeandReelDimensions



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## ReflowChart




| Reflow Profile | Parameter |
|---|---|
| Preheat Temperature ($TS_{MIN}$ to $TS_{MAX}$) | 150℃to 200℃ |
| Preheat Time ($t_s$) | 60 to 180 Seconds |
| Ramp-Up Rate ($TS_{MAX}$ to $T_P$) | 3℃/s MAX |
| Time Above $T_L$ 217℃ ($t_L$) | 60 to 150 Seconds |
| Peak Temperature ($T_P$) | 260℃ |
| Time within 5℃of Peak Temperature ($t_P$) | 20 to 40 Seconds |
| Ramp-Down Rate ($TS_{MAX}$ to $T_P$) | 6℃/s MAX |
| Time for 25℃to Peak Temperature ($t_{25\text{-}TP}$) | 8 Minutes MAX |



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## ESDPrecautions

The MS6603 is a static-sensitive electronic device. Do not operate or store near strong electrostatic fields. ESD protection circuitry is contended in this device, but special handling precautions are required.

| | | |
|---|---|---|
| Human Body Model (HBM), Class-1C | HBM | 1500 V |
| Charged Device Model (CDM), Class_C3 | CDM | 2000V |

## RoHSCompliant

The product does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE), and are therefore considered RoHS compliant.



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