

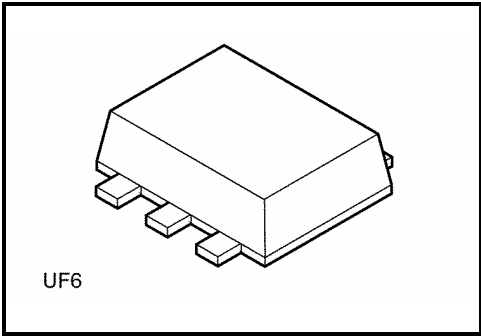
# TG2216TU

## RF SPDT Switch

Antenna switches for Bluetooth Class1, wireless LAN and PHS  
Filter switching for mobile communication

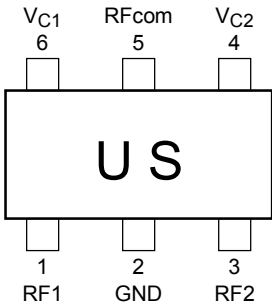
### Features

- Low insertion Loss:  $L_{OSS} = 0.5\text{dB (typ.) @1.0 GHz}$   
 $= 0.7\text{dB (typ.) @2.5 GHz}$
- High isolation:  $ISL = 25\text{dB (typ.) @1.0 GHz}$   
 $= 23\text{dB (typ.) @2.5 GHz}$
- High linearity:  $P_{1\text{dB}} = 28\text{dBmW (typ.) @2.5 GHz}$
- Low voltage operation:  $V_{CON} = 0\text{ V}/2.7\text{ V}$
- Small package: UF6 package ( $2.0 \times 2.1 \times 0.7\text{ mm}$ )

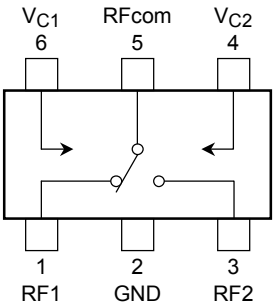


Weight: 0.007g (typ.)

### Pin Connection and Marking (top view)



### Equivalent Circuit



### Maximum Ratings (Ta = 25°C)

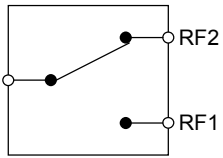
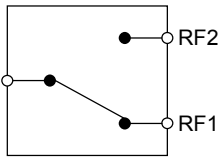
| Characteristics             | Symbol       | Rating     | Unit |
|-----------------------------|--------------|------------|------|
| Control voltage             | $V_{C1}$     | 6          | V    |
|                             | $V_{C2}$     | 6          |      |
| Input power                 | $P_i$        | 1          | W    |
| Total power dissipation     | $P_D$ (Note) | 100        | mW   |
| Operating temperature range | $T_{opr}$    | -40 to 85  | °C   |
| Storage temperature range   | $T_{stg}$    | -55 to 125 | °C   |

Note: When mounted on the glass epoxy of  $2.5\text{ cm}^2 \times 1.6\text{ t}$

## Electrical Characteristics ( $V_{CON(Hi)} = 2.7\text{ V}$ , $V_{CON(LO)} = 0\text{ V}$ , $T_a = 25^\circ\text{C}$ , $Z_g = Z_l = 50\ \Omega$ )

| Characteristics                     | Symbol    | Test Circuit | Test Condition                               | Min | Typ. | Max  | Unit |
|-------------------------------------|-----------|--------------|----------------------------------------------|-----|------|------|------|
| Insertion loss                      | LOSS (1)  | 1            | $f = 1.0\text{ GHz}$ , $P_i = 0\text{ dBmW}$ | —   | 0.5  | 0.8  | dB   |
|                                     | LOSS (2)  | 1            | $f = 2.0\text{ GHz}$ , $P_i = 0\text{ dBmW}$ | —   | 0.6  | 0.9  |      |
|                                     | LOSS (3)  | 1            | $f = 2.5\text{ GHz}$ , $P_i = 0\text{ dBmW}$ | —   | 0.7  | 1.0  |      |
| Isolation                           | ISL (1)   | 1            | $f = 1.0\text{ GHz}$ , $P_i = 0\text{ dBmW}$ | 22  | 25   | —    | dB   |
|                                     | ISL (2)   | 1            | $f = 2.0\text{ GHz}$ , $P_i = 0\text{ dBmW}$ | 22  | 24   | —    |      |
|                                     | ISL (3)   | 1            | $f = 2.5\text{ GHz}$ , $P_i = 0\text{ dBmW}$ | 20  | 23   | —    |      |
| Input power at 1dB gain compression | $P_{1dB}$ | 1            | $f = 2.5\text{ GHz}$                         | 25  | 28   | —    | dBmW |
| Control current                     | $I_{CON}$ | —            | no RF signal input                           | —   | —    | 0.01 | mA   |
| Switching time                      | $t_{sw}$  | 1            | $f = 100\text{ MHz}$ , $P_i = 0\text{ dBmW}$ | —   | 50   | 200  | ns   |

## Switch Connection

| $V_{C1}$ | $V_{C2}$ | Switch Condition                                                                    | RFcom – RF1 | RFcom – RF2 |
|----------|----------|-------------------------------------------------------------------------------------|-------------|-------------|
| Hi       | Low      |   | OFF         | ON          |
| Low      | Hi       |  | ON          | OFF         |

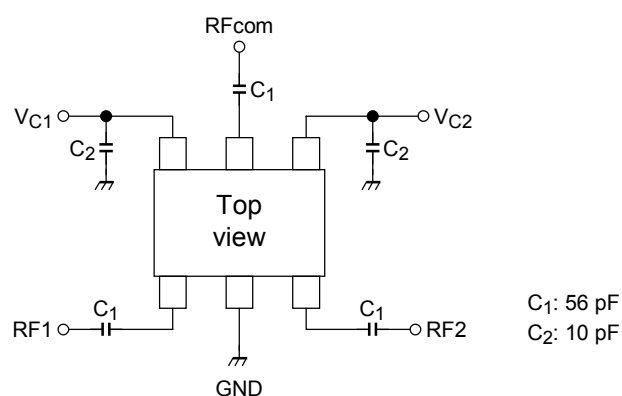
## Caution

This device is sensitive to electrostatic discharge. When using this device, please ensure that all tools and equipment are earthed.

## Pin Information

| Pin | Symbol   | Description                                                                                                                                                                                      |
|-----|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | RF1      | RF port. When $V_{C1} = \text{Hi}$ and $V_{C2} = \text{Lo}$ , this port is connected to RFcom. An external DC blocking capacitor ( $C_1$ ) is required for internal DC bias blocking.            |
| 2   | GND      | GND port. The distance between this pin and ground pattern should be as short as possible for RF performance.                                                                                    |
| 3   | RF2      | RF port. When $V_{C1} = \text{Lo}$ and $V_{C2} = \text{Hi}$ , this port is connected to RFcom. An external DC blocking capacitor ( $C_1$ ) is required for internal DC bias blocking.            |
| 4   | $V_{C2}$ | Control port. Switching operation is controlled by the voltage of this port. The bypass capacitor ( $C_2$ ) is required.                                                                         |
| 5   | RFcom    | Common RF port. Switching this port to RF1 or RF2 is controlled by " $V_{C1}$ " and " $V_{C2}$ " voltage. An external DC blocking capacitor ( $C_1$ ) is required for internal DC bias blocking. |
| 6   | $V_{C1}$ | Control port. Switching operation is controlled by the voltage of this port. The bypass capacitor ( $C_2$ ) is required.                                                                         |

## Test Circuit 1 (RF Test Circuit)

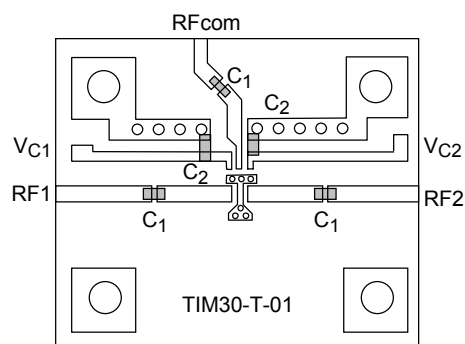


The values of capacitors depends on the application frequency range and the board pattern layout. This should be considered for Board design and external components. Please refer to the Recommend External Parts Table below.

## Reference External Parts

|       | 50 MHz to 300 MHz | 300 MHz to 500 MHz | 0.5 GHz to 2.5 GHz |
|-------|-------------------|--------------------|--------------------|
| $C_1$ | 1000 pF           | 100 pF             | 56 pF              |
| $C_2$ | 100 pF            | 10 pF              | 10 pF              |

## Test Board



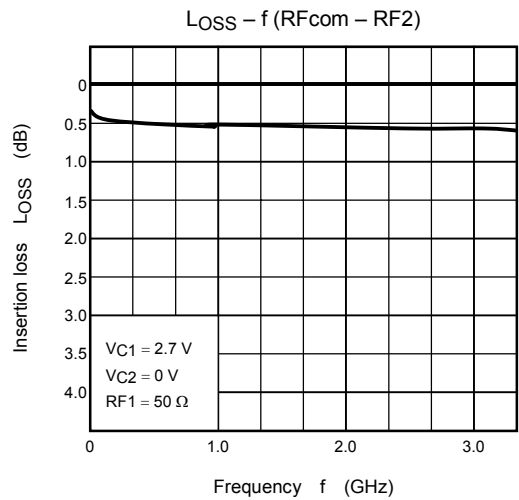
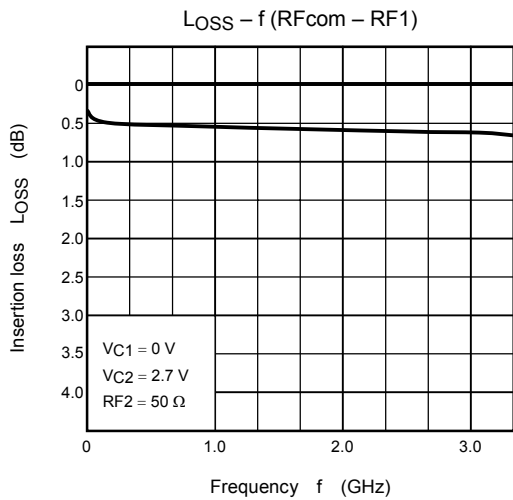
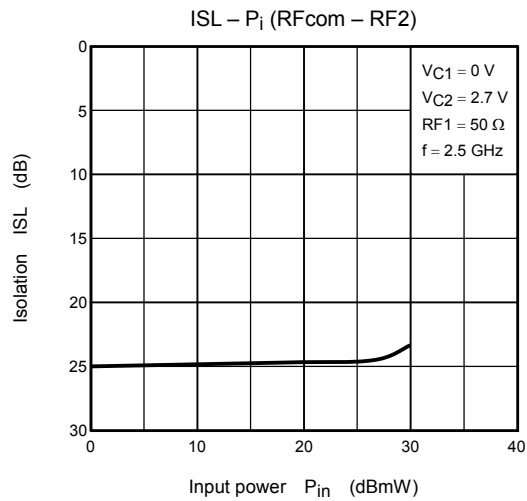
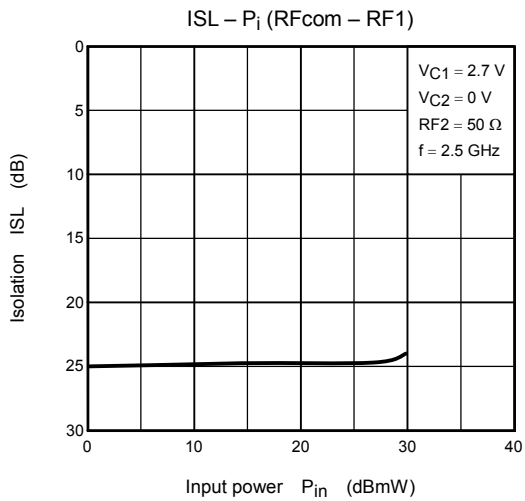
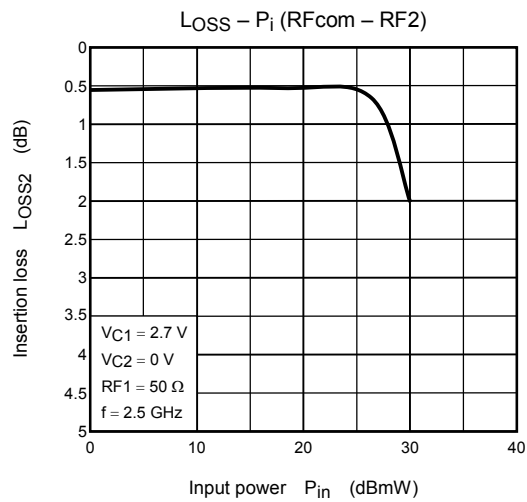
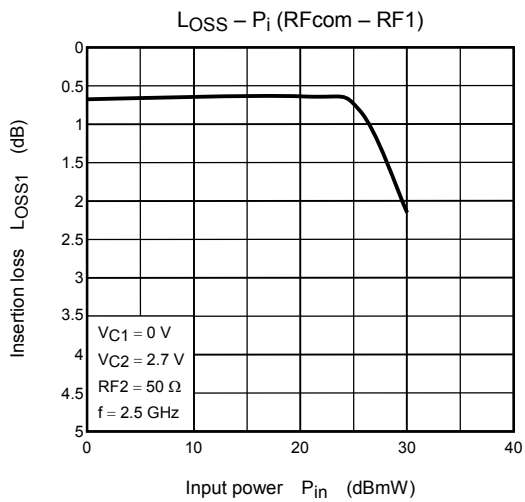
## Notice

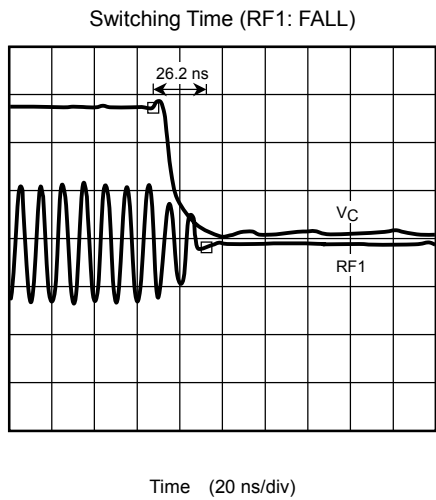
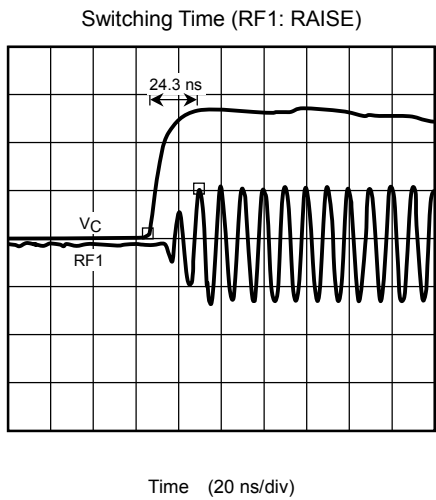
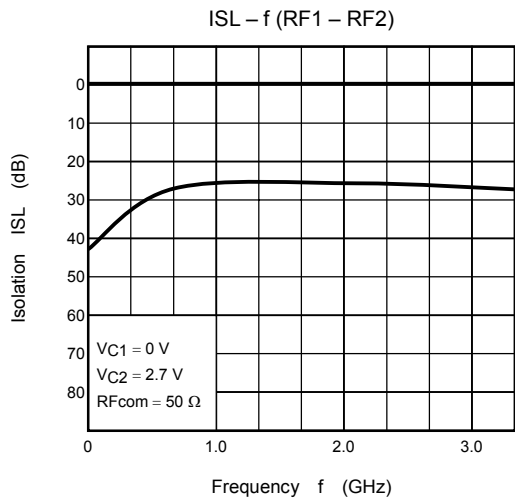
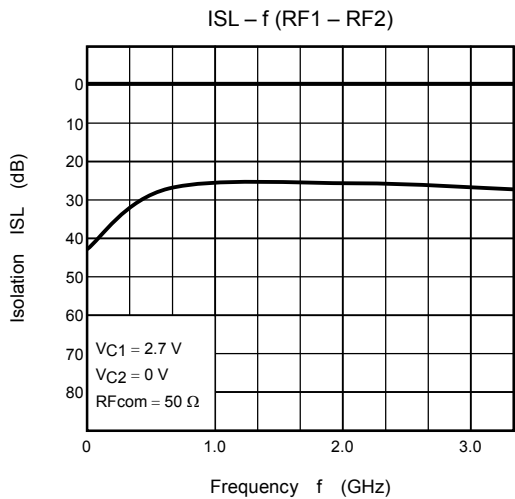
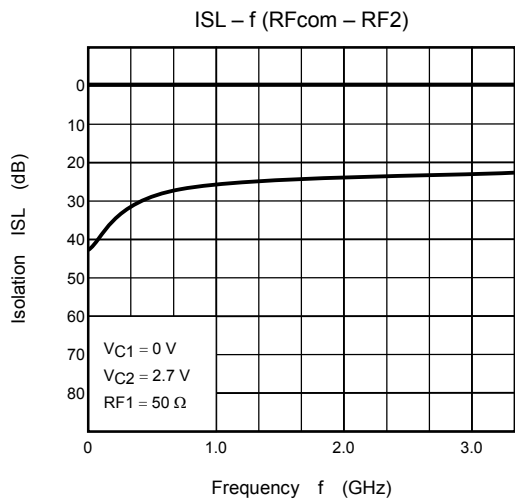
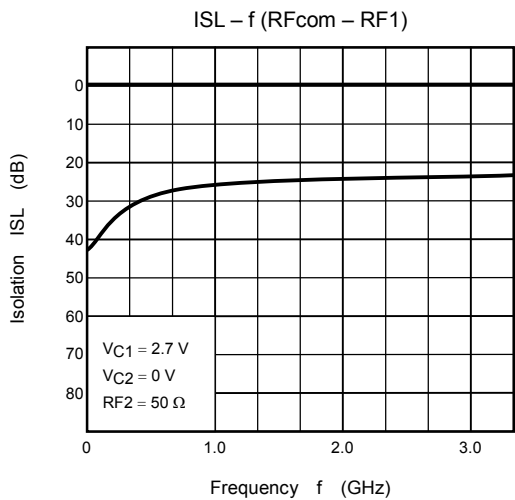
The circuits and measurements contained in this document are given only in the context of as examples of applications for these products.

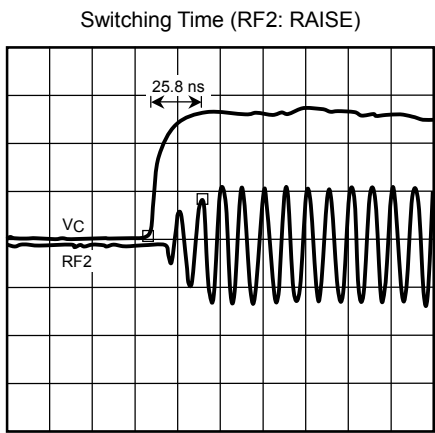
Moreover, these example application circuits are not intended for mass production, since the high-frequency characteristics (the AC characteristics) of these devices will be affected by the external components which the customer uses, by the design of the circuit and by various other conditions.

It is the responsibility of the customer to design external circuits which correctly implement the intended application, and to check the characteristics of the design.

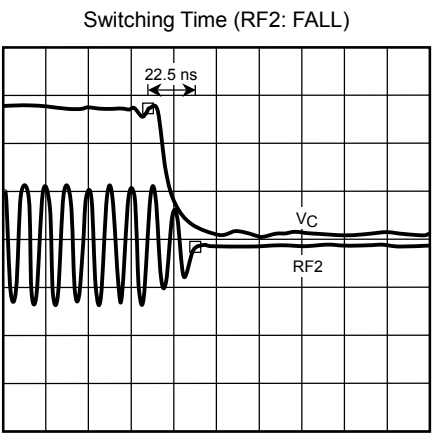
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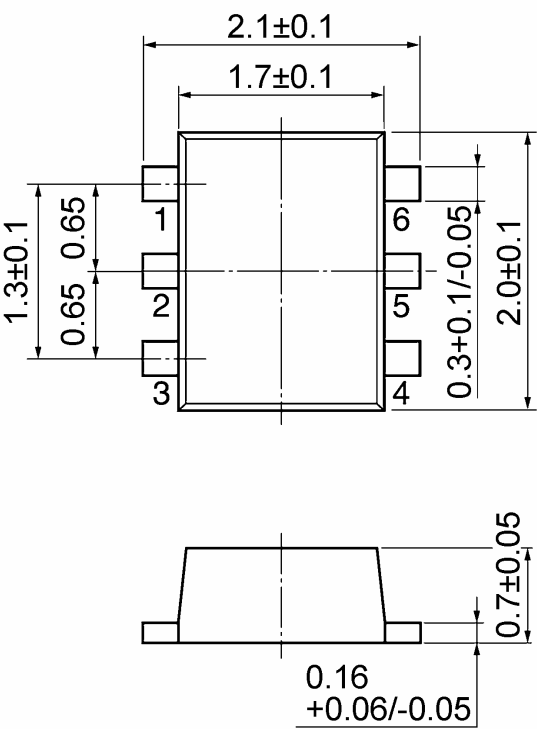
Time (20 ns/div)



Time (20 ns/div)

Package Dimensions

UF6



Weight: 0.007 g (typ.)

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020704EAC

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