

Absorptive

# SPDT RF Switch

## ZASWA-2-50DRA+

50Ω DC<sup>2</sup> - 5000 MHz

### The Big Deal

- Wide bandwidth DC<sup>2</sup> to 5000 MHz
- High Isolation, 70 dB typ.
- Very fast switching, 20ns typ.
- Low video break thru 45 mV<sub>p-p</sub> typ.



CASE STYLE: CY353

### Product Overview

The ZASWA-2-50DRA+ is an excellent high isolation, solid state SPDT, absorptive RF switch. With its broad frequency range, fast switching time and excellent RF performance, the ZASWA-2-50DRA+ is an excellent replacement for the Mini-Circuits' legacy switch model ZASWA-2-50DR+. Refer app note [AN-80-021](#) for more details. The wide bandwidth, high isolation and fast switching characteristics makes this switch a versatile choice for several RF applications & systems.

### Key Features

| Feature                                                                  | Advantages                                                                                                                                |
|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Integrated TTL Driver                                                    | -Operates at +5V to -5V<br>-Low control current allows compatibility with a variety of driver circuits<br>-Fast 20 ns typ. Switching time |
| Excellent for a Variety of Applications From Bench to Integrated Systems | -High speed testers<br>-Automated switching networks<br>-Wireless Infrastructure<br>-Military                                             |
| Excellent RF Performance                                                 | -Wide bandwidth: DC <sup>2</sup> to 5000 MHz<br>-Good Insertion Loss: 2.5 dB Typ<br>-Low video leakage, 45 mVp-p typ.                     |

2. All RF connections must be blocked or held at 0V DC. Low frequency is determined by value of Coupling capacitors at RF ports.

#### Notes

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Coaxial

# SPDT RF Switch

50Ω DC<sup>2</sup>-5000 MHz

Absorptive RF Switch with Internal Driver  
Dual Supply Voltage, +5V to -5V

## Product Features

- Wide bandwidth, DC<sup>2</sup> to 5000 MHz
- Good Insertion loss, 2.5 dB typ.
- Internal TTL driver
- Fast switching, Rise/fall time, 4 ns typ.
- Wide operating temperature, -20°C to +85°C



## ZASWA-2-50DRA+

CASE STYLE: CY353

| Connectors | Model          |
|------------|----------------|
| SMA        | ZASWA-2-50DRA+ |

### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

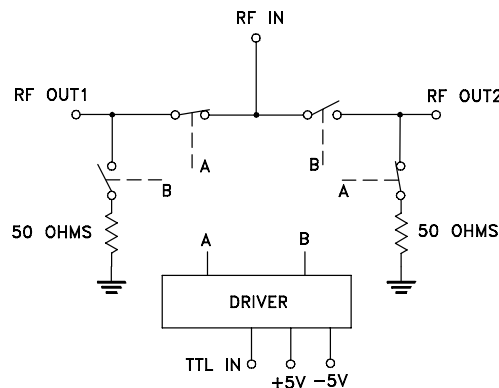
## Typical Applications

- Cellular
- ISM, WCDMA, WIMAX
- PCN
- Automated switching networks
- Military

## General Description

The ZASWA-2-50DRA+ is a 50Ω absorptive, high isolation SPDT RF switch. It is designed for RF/wireless applications covering a broad frequency range from DC<sup>2</sup> to 5000 MHz with good insertion loss and Isolation. The ZASWA-2-50DRA+ operates with a dual supply voltage ±5V. This unit includes an internal driver circuitry which makes it easier to control switching with standard voltage levels.

## Schematic and Application Circuit



2. All RF connections must be blocked or held at 0V DC. Low frequency is determined by value of Coupling capacitors at RF ports.

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**RF Electrical Specifications, DC<sup>2</sup> - 5000 MHz, T<sub>AMB</sub>=25°C, Supply Voltage (+V, -V) =+5V, -5V**

| Parameter                                          | Condition (MHz)       | Min.            | Typ. | Max. | Units             |
|----------------------------------------------------|-----------------------|-----------------|------|------|-------------------|
| Frequency Range                                    |                       | DC <sup>2</sup> |      | 5000 | MHz               |
| Insertion Loss                                     | DC <sup>2</sup> -100  | —               | 1.3  | 2.0  | dB                |
|                                                    | 100-1000              | —               | 1.7  | 2.5  |                   |
|                                                    | 1000-2000             | —               | 1.8  | 3.0  |                   |
|                                                    | 2000-5000             | —               | 3.0  | 4.5  |                   |
| Isolation between Common port and RF1/RF2 Ports    | DC <sup>2</sup> -100  | 68              | 90   | —    | dB                |
|                                                    | 100-1000              | 75              | 90   | —    |                   |
|                                                    | 1000-2000             | 65              | 82   | —    |                   |
|                                                    | 2000-5000             | 40              | 65   | —    |                   |
| Return Loss (IN PORT)                              | DC <sup>2</sup> -5000 | —               | 14   | —    | dB                |
| Return Loss @ RF1/RF2 ports (ON STATE)             | DC <sup>2</sup> -5000 | —               | 14.5 | —    | dB                |
| Return Loss @ RF1/RF2 ports (OFF STATE)            | DC <sup>2</sup> -5000 | —               | 16.5 | —    | dB                |
| Input 1dB Compression <sup>(1)</sup>               | DC <sup>2</sup> -100  | —               | —    | —    | dBm               |
|                                                    | 100-1000              | —               | >20  | —    |                   |
|                                                    | 1000-2000             | —               | >24  | —    |                   |
|                                                    | 2000-5000             | —               | >23  | —    |                   |
| <b>DC Electrical Specifications</b>                |                       |                 |      |      |                   |
| Supply Voltage (+V)                                |                       | —               | 5    | —    | V                 |
| Supply Voltage (-V)                                |                       | —               | -5   | —    | V                 |
| Positive Supply Current                            | +V=5V                 | —               | 4.6  | —    | mA                |
| Negative Supply Current                            | -V=-5V                | —               | -8.2 | —    | mA                |
| Control Voltage Low                                |                       | 0               | —    | 0.7  | V                 |
| Control Voltage High                               |                       | 2.1             | —    | 5    | V                 |
| Control Current                                    |                       | —               | —    | 2    | mA                |
| <b>Switching Specifications</b>                    |                       |                 |      |      |                   |
| Rise/Fall Time (10 to 90% or 90 to 10% RF)         | +V=5V, -V=-5V         | —               | 5    | —    | nSec              |
| Switching Time (50% CTRL to 90/10% RF)             | +V=5V, -V=-5V         | —               | 20   | —    | nSec              |
| Video Feed through (Control 0-5V, Frequency 1 MHz) | +V=5V, -V=-5V         | —               | 45   | —    | mV <sub>P-P</sub> |

1. At low frequency(<100 MHz), the dynamic range of switch decreases.

**Absolute Maximum Ratings**

| Parameter                   | Ratings                                 |
|-----------------------------|-----------------------------------------|
| Operating Temperature       | -20°C to 85°C                           |
| Storage Temperature         | -55°C to 100°C                          |
| Supply Voltage (+V & -V)    | +5.5V, -5.5V                            |
| Voltage Control             | -0.2V min, +5.5V max                    |
| RF input power <sup>3</sup> | 31 dBm                                  |
| ESD, HBM                    | Class 1A (250 to <500V) per JESD22-A114 |

2. All RF connections must be blocked or held at 0V DC. Low frequency is determined by value of Coupling capacitors at RF ports.

3. Frequency range of 500-5000 MHz.

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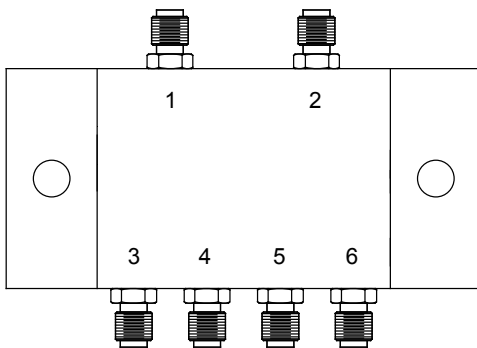
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**Truth Table** (State of control voltage selects the desired switch state)

| State of Control Voltage                             | Switch State - RF IN to |     |
|------------------------------------------------------|-------------------------|-----|
|                                                      | RF1                     | RF2 |
| Low                                                  | ON                      | OFF |
| High                                                 | OFF                     | ON  |
| ON- low insertion loss state<br>OFF- Isolation State |                         |     |

**Coaxial Configuration**



**Coaxial Connections**

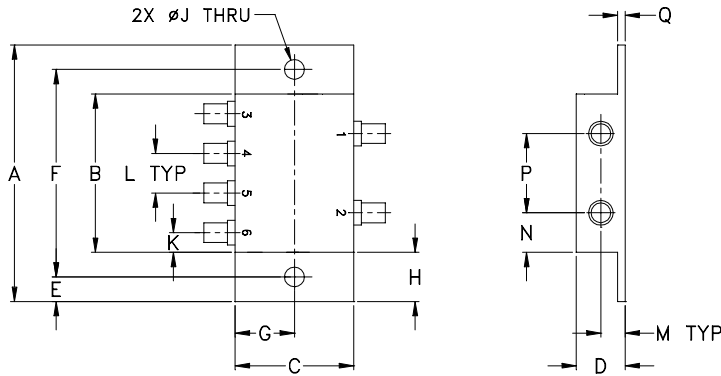
| Function | Port Number | Description             |
|----------|-------------|-------------------------|
| RF IN    | 1           | RF Common/ SUM Port     |
| RF1      | 3           | RF Out #1/In Port #1    |
| RF2      | 6           | RF Out #2/In Port #2    |
| Control  | 4           | TTL Control IN          |
| +5V      | 2           | Positive Supply Voltage |
| -5V      | 5           | Negative Supply Voltage |

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Outline Drawing (CY353)



Outline Dimensions (inch mm)

| A     | B     | C     | D     | E     | F     | G     | H     |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 3.24  | 2.00  | 1.50  | .62   | .31   | 2.620 | .75   | .62   |
| 82.30 | 50.80 | 38.10 | 15.75 | 7.87  | 66.55 | 19.05 | 15.75 |
| J     | K     | L     | M     | N     | P     | Q     | wt    |
| .250  | .25   | .50   | .31   | .50   | 1.00  | .13   | grams |
| 6.35  | 6.35  | 12.70 | 7.87  | 12.70 | 25.40 | 3.30  | 65.0  |

Additional Detailed Technical Information

|                                                                                                                                   |                                              |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Additional information is available on our web site. To access this information enter the model number on our web site home page. |                                              |
| <b>Performance Data</b>                                                                                                           | Data Table                                   |
|                                                                                                                                   | Swept Graphs                                 |
|                                                                                                                                   | S-Parameter (S2P Files) Data Set (.zip file) |
| <b>Case Style</b>                                                                                                                 | <b>CY353</b>                                 |
| <b>Environmental Ratings</b>                                                                                                      | <b>ENV28T16</b>                              |

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