# SPDT RF Switch ZFSW2-33HDR-75+

75Ω 5 to 3000 MHz High Power 3W

## The Big Deal

- High IP3, +70 dBm typ.
- High Power P0.1dB greater than 3W
- Low Insertion Loss, 0.5 dB at 1 GHz

CASE STYLE: QY2363

## Product Overview

ZFSW2-33HDR-75+ is a connector version of a high-power reflective SPDT RF switch, with reflective short on output ports in the OFF state. Made using a Silicon-on-Insulator process, it provides very high IP3 (+70 dBm typ.). This switch also has a built-in CMOS driver and negative voltage generator. ZFSW2 uses type -F female connectors for easy integration into 75 ohm test systems.

## Key Features

| Feature | Advantages |
|---|---|
| High IIP3: +70 dBm typ. | Outstanding third order intercept perfomance makes this part ideal for use with high modulation signals such as digital CATV, QAM and other dense waveforms |
| Wideband operation, 5-3000 MHz | Enables a single component to be used in a vast array of applications DOCSYS 3.1, SATCOM system, automated test stations |
| Low Loss, 0.5 dB at 1 GHz & high input power, 3W | Low loss and high power capability enables a single switch to be used for a variety of applications, saving inventory. |
| Built-in negative voltage generator | Operates with single positive supply voltage; no need for DC blocking capacitors, unless external DC is present at the RF ports. |
| Built-in CMOS driver | No need for external driver. Simplifies use. |

# SPDT RF Switch

75Ω 5-3000 MHz

Reflective RF Switch with internal driver.
Single Supply Voltage, +2.3V to +4.8V, High Power 3W

## Product Features

- High IP3, +70 dBm typ. at 150 MHz
- High Power, P0.1dB 3W
- High Isolation, 41 dB typ. at 1 GHz
- Low insertion loss, 0.5 dB typ. at 1 GHz
- Low current consumption, 37 µA typ.


CASE STYLE: QY2363

# ZFSW2-33HDR-75+

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

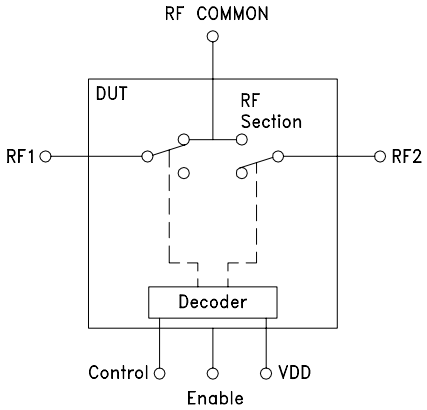
## Typical Applications

- CATV systems
- SATCOM system
- Automated Test Stations

## General Description

ZFSW2-33HDR-75+ is a high power (35 dBm) reflective SPDT switch with integral CMOS driver, operates with single positive supply voltage while consuming, 37µA typical. ZFSW2 is a reflective short on output port in OFF state. It has been designed for very wideband operation of 5-3000 MHz. ZFSW2 uses Type -F Female connectors for easy integration into 75 ohm test systems.

## Simplified Schematic




Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

### RF Electrical Specifications, 5 - 3000 MHz, $T_{AMB}$=25°C, $V_{DD}$= +2.3 to 4.8V

| Parameter | Condition (MHz) | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Frequency Range | | 5 | | 3000 | MHz |
| Insertion Loss (ON STATE) | 5 to 1000 | — | 0.5 | 0.65 | dB |
| | 1000 to 1500 | — | 0.6 | 0.85 | |
| | 1500 to 2000 | — | 0.85 | 1.15 | |
| | 2000 to 3000 | — | 0.95 | 1.30 | |
| Input IP3 ($V_{DD}$=3V) | 150 | — | +70 | — | dBm |
| | 1800 | — | +70 | — | |
| 0.1dB Input Compression(1) | 20 to 3000 | — | 35.0 | — | dBm |
| Isolation between RF Common and RF1/RF2 Ports | 5 to 1000 | 39 | 42 | — | dB |
| | 1000 to 1500 | 35 | 38 | — | |
| | 1500 to 2000 | 32 | 35 | — | |
| | 2000 to 3000 | 27 | 30 | — | |
| Isolation between RF1 and RF2 ports(2) | 5 to 1000 | 40 | 45 | — | dB |
| | 1000 to 1500 | 35 | 41 | — | |
| | 1500 to 2000 | 32 | 37 | — | |
| | 2000 to 3000 | 28 | 32 | — | |
| Return Loss (ON STATE), all ports | 5 to 1000 | — | 21 | — | dB |
| | 1000 to 1500 | — | 17 | — | |
| | 1500 to 2000 | — | 15 | — | |
| | 2000 to 3000 | — | 16 | — | |

### DC Operating Electrical Specifications

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| VDD, Supply Voltage | 2.3 | | 4.8 | V |
| Supply Current | — | 37 | — | µA |
| Control Enable Voltage Low | 0 | — | 0.4 | V |
| Control Enable Voltage High(3) | 1.65 | — | 2.7 | V |
| Control Current | — | 1 | — | µA |
| Shutdown mode - Supply Current | — | 7 | — | µA |

Notes:
1. Do not exceed RF input power as shown in Absolute Maximum Rating table.
2. Enable voltage “HI”, either RF1 or RF2 are ON.
3. If $V_{DD}$ < 2.7, then Max Control Voltage High=$V_{DD}$

### Switching Specifications

| Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|
| Rise/Fall Time (10 to 90% or 90 to 10% RF) | — | 0.5 (Rise Time)<br>0.7 (Fall Time) | — | µSec |
| Switching Time, 50% CTRL to 90/10% RF | — | 1.9 (ON Time)<br>1.1 (OFF Time) | — | µSec |
| Video Feedthrough, (control 0 to 1.65V, freq.=10 KHz) | — | 3.0 | — | $mV_{P-P}$ |

## Truth Table (State of control and enable voltage selects the desired switch state)

| State of: | | RF Common to | |
|---|---|---|---|
| Control Voltage | Enable Voltage | RF1 | RF2 |
| High | High | ON | OFF |
| Low | High | OFF | ON |
| Low/High | Low | Shutdown | |

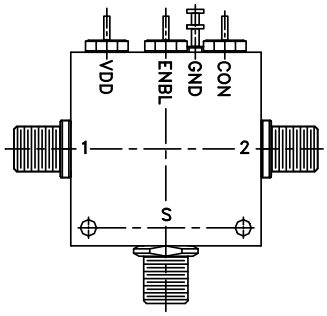
ON- low insertion loss state OFF- Isolation State

## Absolute Maximum Ratings(6)

| Parameter | Ratings |
|---|---|
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -55°C to 125°C |
| $V_{DD}$, Supply Voltage | 5.0V |
| Voltage Control | -0.2V Min. $V_{DD}$ Max. |
| RF input power | 5 Watt[7] |

6. Operation of this device above any of these conditions may cause permanent damage.
7. Derate linearly to 2.5W at 85°C.

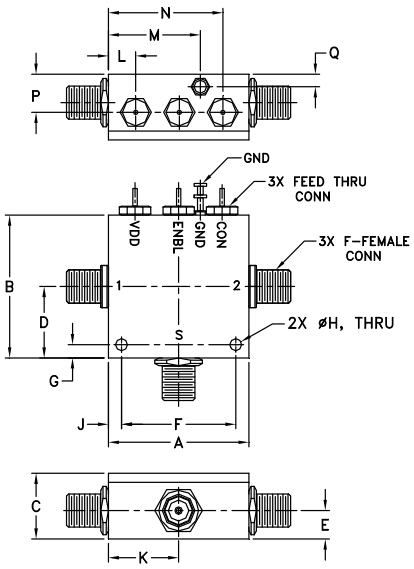
## Coaxial Configuration




## Coaxial Connections

| Function | Port Number | Description |
|---|---|---|
| RF COM | S | RF Common/ SUM Port |
| RF1 | 1 | RF Out #1/In Port #1 |
| RF2 | 2 | RF Out #2/In Port #2 |
| Control | CON | CMOS Control IN |
| VDD | $V_{DD}$ | Supply Voltage |
| Enable | ENBL | Shutdown mode enabled by connecting to logic low |
| Ground | Case Ground and GND Pin | Ground Externally |

## Outline Drawing (QY2363)




## Outline Dimensions (inch / mm)

| A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|
| 1.61 | 1.61 | .74 | .81 | .32 | 1.312 | .15 | .136 |
| 40.89 | 40.89 | 18.80 | 20.57 | 8.13 | 33.32 | 3.81 | 3.45 |

| J | K | L | M | N | P | Q | wt |
|---|---|---|---|---|---|---|---|
| .15 | .81 | .31 | 1.06 | 1.31 | .43 | .14 | grams |
| 3.81 | 20.57 | 7.87 | 26.92 | 33.27 | 10.92 | 3.56 | 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.

### Performance data, graphs

### Case Style: QY2363

### Environmental Ratings: ENV75