RICOH

# R5590N001A-EV

## Rectifier Switch for Reverse Battery Connection Evaluation Board

No. EEV-320-181225

**R5590N001A-EV is the evaluation board for R5590 which has the below features, benefits and specifications.**

### OUTLINE

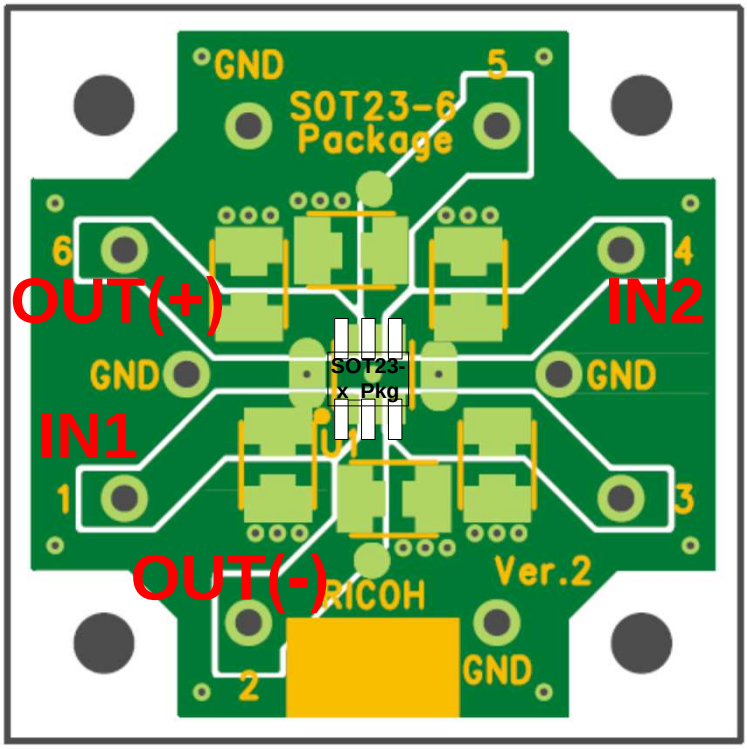
The R5590N is a rectifier switch, which allows the reverse connection of battery. This device can output the voltage rectified in either positive or negative polarity regardless of the polarity of the input voltage. Therefore, this device allows the various applications without being limited by the battery loading directions or the connector insertion directions. This device also protect the device system from the accidental reverse connection of battery. A small loss resistance of typically 0.5 Ω and a small supply current of typically 50 nA at 1.5 V input voltage make this device ideal for the applications using a battery. For the applications using multiple batteries in series or in parallel, the output pin should also be connected in series or in parallel to rectify the power source and protect the device system.

### KEY SPECIFICATIONS

- Input Voltage Range (Maximum Rating)····· 0.9 V to 5.25 V (6.0 V)
- Supply Current ····· Typ. 50 nA (Input Voltage 1.5 V)
- Loss Resistance ·····Typ. 0.5 Ω (Input Voltage 1.5 V)
- Package ····· SOT-23-5
- For more details on R5590 IC, please refer to https://www.e-devices.ricoh.co.jp/en/products/power/sw/r5590/r5590-ea.pdf.

## PCB LAYOUT

R5590N (Package: SOT-23-5) PCB Layout



# ABSOLUTE MAXIMUM RATINGS

**Absolute Maximum Ratings**

| Symbol | Parameter | | | Rating | Unit |
|---|---|---|---|---|---|
| $\Delta V_{IN}$ | Input Pin Voltage Difference (\|IN1 − IN2\|) | | | 6.0 | V |
| $\Delta V_{OUT}$ | Output Pin Voltage (OUT(+) − OUT(−)) | | | 0 to $\Delta V_{IN}$ | V |
| $I_{OUT}$ | Output Current | | | 400 | mA |
| $P_D$ | Power Dissipation(1) | SOT-23-5 | JEDEC STD.51-7 | 660 | mW |
| Tj | Junction Temperature Range | | | −40 to 125 | °C |
| Tstg | Storage Temperature Range | | | −55 to 125 | °C |

**ABSOLUTE MAXIMUM RATINGS**

Electronic and mechanical stress momentarily exceeded absolute maximum ratings may cause the permanent damages and may degrade the life time and safety for both device and system using the device in the field. The functional operation at or over these absolute maximum ratings is not assured.

# RECOMMENDED OPERATING CONDITIONS

**Recommended Operating Conditions**

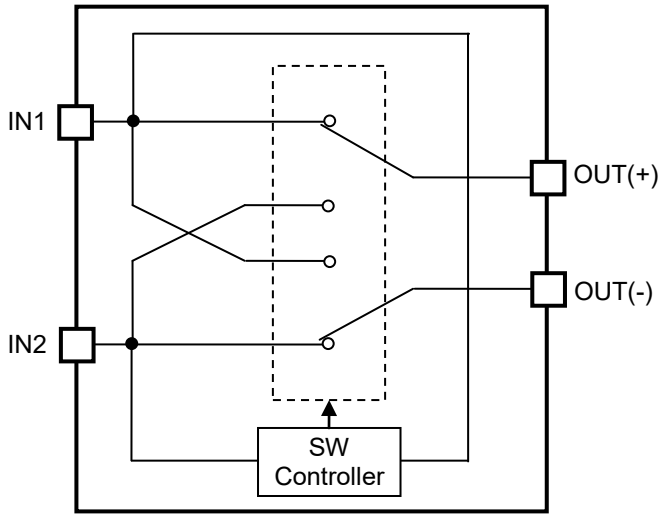
| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $V_{IN}$ | Input Voltage | 0.9 ~ 5.25 | V |
| Ta | Operating Temperature Range | −40 ~ 85 | °C |

**RECOMMENDED OPERATING CONDITONS**

All of electronic equipment should be designed that the mounted semiconductor devices operate within the recommended operating conditions. The semiconductor devices cannot operate normally over the recommended operating conditions, even if when they are used over such conditions by momentary electronic noise or surge. And the semiconductor devices may receive serious damage when they continue to operate over the recommended operating conditions.

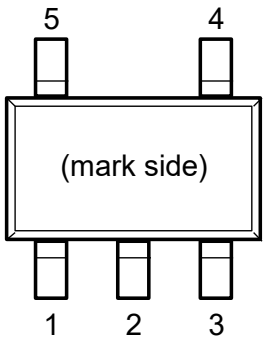
(1) Refer to *POWER DISSIPATION* for detailed information.

## TYPICAL APPLICATION




**R5590x001A Block Diagram**

## PIN DESCRIPTION




**SOT-23-5 Pin Configuration**

**SOT-23-5 Pin Description**

| Pin No. | Symbol | Description |
|---|---|---|
| 1 | IN1 | Input Pin 1 |
| 2 | OUT (−) | Negative Output Pin |
| 3 | NC | No Connection |
| 4 | IN2 | Input Pin 2 |
| 5 | OUT (+) | Positive Output Pin |

## TECHNICAL NOTES

If the input voltage difference becomes less than output voltage difference, which could happen when the AC power source is rectified or the DC power source having different voltage is used in parallel, the current flows from the output side to the input side. To prevent this, use a reverse current prevention diode.

The short circuit current flows when the output pin is shorted while bias voltage is applied to the input pin. The R5590N should be operated within the absolute maximum ratings.

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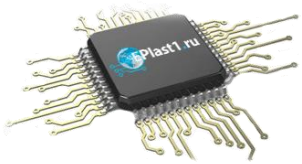


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