**eFuse IC for robust power supply protection**

Toshiba eFuse IC incorporates high-performance, high-accuracy protective functions in a single package, which contributes to shorter designing times and robust protection of power supply lines.

**Outline of TOSHIBA eFuse IC**

An eFuse IC is a semiconductor device with a fuse function designed to protect an electronic circuit from overcurrent conditions. The Toshiba eFuse IC has a lot of built-in protective functions and provide many advantages over physical fuses.

**Main Protective Functions**

- **Short circuit protection operation**
  - $V_{IN} \ 5V/div$
  - $V_{OUT} \ 5V/div$
  - $I_{OUT}$
  - Simulation waveform of TCXE8 series.  
  - Fast Trip function
  - 150ns

- **Overvoltage protection (OVC, OVP)**
  - $V_{OUT}$
  - $V_{IN}$
  - UVLO
  - Two types (varies by product)

**eFuse IC Applications diagram**

It can be used for all applications requiring functions such as short circuit protection, overcurrent protection, overvoltage protection, slew rate control, reverse current blocking, and thermal shutdown.

**Power supply**
- Power supply
- eFuse IC
  - Short Circuit Protection

**USB device**
- Power supply
- eFuse IC
  - Protection of the subsequent IC

**eFuse IC**
- Power supply IC
- CPU
- Motor
- Battery
- Mobile
- Consumer
- IT equipment
- Industrial equipment

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Example of power supply line combining eFuse IC with Zener diode and SBD

The eFuse IC has built-in overvoltage, overcurrent, and short circuit protection functions, but more robust power supply lines can be built by adding external components. If a Zener diode is connected between the input terminal and the GND terminal of eFuse IC, it provides a more robust protection against surges. In addition, the output may become a negative voltage due to the protective operation of eFuse IC, but the negative voltage can be reduced by connecting SBD.

**NOTE**: Select Zener diodes and SBDs considering the maximum rating of eFuse IC.

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**Hot swap protection with Zener diode**

Overvoltage occurs when Hot swap. The Zener diodes can easily protect internal circuits.

**Negative voltage protection with SBD**

A large negative voltage occurs the output side when the current path is cut off. The SBD can reduce negative voltage.

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## eFuse IC selection table

<table>
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<tr>
<th>Product name</th>
<th>Package</th>
<th>Size (mm)</th>
<th>$V_{IN}$/V (Min)</th>
<th>$V_{IN}$/V (Max)</th>
<th>$I_{OUT}$/A (DC)</th>
<th>$I_{ON}$/mΩ (typ)</th>
<th>$I_{Q}$/mA (typ)</th>
<th>Control Active</th>
<th>SRC</th>
<th>OAD</th>
<th>RCB</th>
<th>OVC/OVP</th>
<th>OCL</th>
<th>TSD</th>
<th>Recovery</th>
<th>FLAG</th>
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**Related LINK**

- Introduction to eFuse IC Products
- Application note
- Frequently Asked Questions for eFuse IC (FAQ)
- Online distributor purchase, inventory search page
- Cross-reference search
- eFuse IC feature articles
- Introduction to Zener diode products
- Introduction to SBD products

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2021-12-15