# Triple Driver with Thermal Monitoring

## Description

The triple-driver IC includes three non-inverted and current-limited output stages with an open collector. Common thermal shutdown protects the outputs against critical junction temperatures. Each output can sink a current of 20 mA, parallel output operation is possible. The digital inputs have Schmitt-trigger function with pull-up resistors to 5 V.

## Features

- Three input comparators with Schmitt-trigger characteristic
- Input clamping current capability of ± 10 mA
- Integrated protection cells (EMC, ESD, RF) dedicated to all input stages
- Common shutdown by junction-temperature monitor
- Reset with hysteresis at low voltage
- ESD protection acording to human body model: ± 2000 V (C = 100 pF, R = 1.5 kΩ)
- Output stages:
  - Short-circuit protected
  - Load-dump protected @ 1 kΩ
  - No crosstalk on adjacent channels
  - Jump start possible

## Block Diagram / Applications

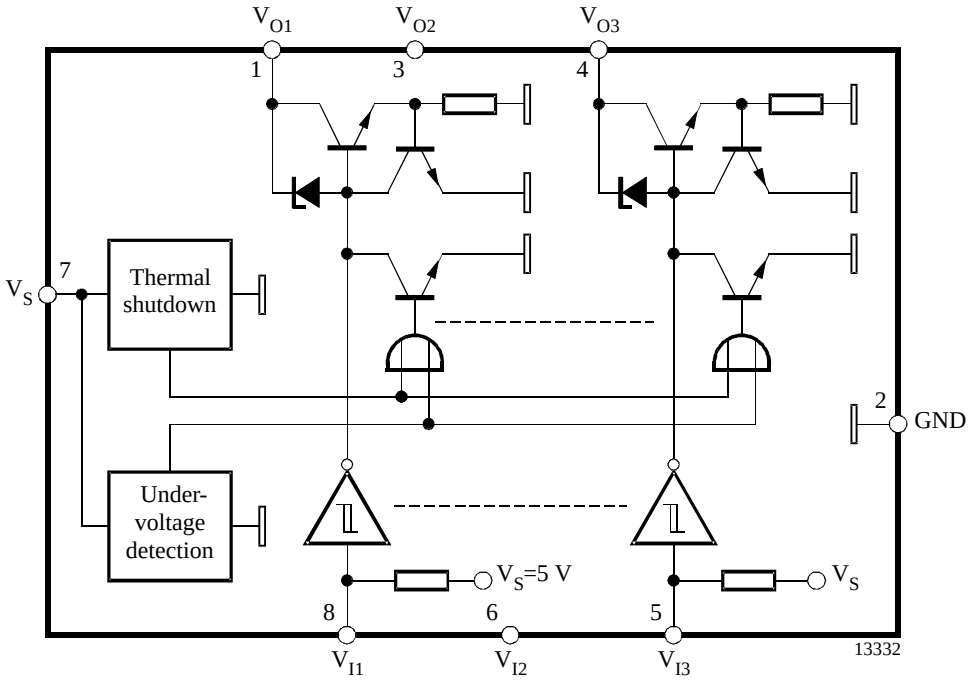



Figure 1. Block diagram

## Ordering Information

| Extended Type Number | Package | Remarks |
|---|---|---|
| U6803B–FP | SO8 | |

## Pin Description

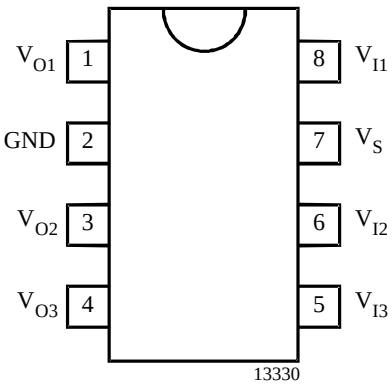



Figure 2. Pinning

| Pin | Symbol | Function |
|---|---|---|
| 1 | $V_{O1}$ | Output 1 |
| 2 | GND | Ground |
| 3 | $V_{O2}$ | Output 2 |
| 4 | $V_{O3}$ | Output 3 |
| 5 | $V_{I3}$ | Input 3 |
| 6 | $V_{I2}$ | Input 2 |
| 7 | $V_S$ | Supply voltage 5 V |
| 8 | $V_{I1}$ | Input 1 |

## Basic Circuitry

The integrated circuit U6803B requires a stabilized supply voltage ($V_S$ = 5 V ± 5%) to comply with its electrical characteristics. An external buffer capacitor of C = 100 nF value is recommended. An integrated 14-V Zener diode between $V_S$ and ground protects the supply pin.

All input stages are provided with an integrated 250-kΩ pull-up resistor and can be directly connected to a microcontroller.

All output stages are open collectors – each capable of sinking 20 mA. Recommended external components:

Pull-up resistor, R = 1 kΩ
Capacitor to GND, C = 470 pF, see figure 3

## Functional Description

### General

ON state: Low level at the input stage activates the corresponding output stage.
OFF state: The internal pull-up resistor provides high level to the input comparator and deactivates the output stage.

7-V Zener diodes between each input pin and GND are capable of ± 10 mA clamping currents without crosstalk on adjacent input stages.

A total clamping current of ± 30 mA should be observed with respect to the power dissipation.

### Current Limitation of the Output Stages and Overtemperature Shut-down

A temperature-dependent current limitation in the range of 25 to 100 mA protects the stages in case of a short. Additionally, the chip temperature is monitored. For $T_{chip}$ > 148°C, all outputs are disabled and automatically enabled with a hysteresis of $T_{Chip}$ > 5°C.

### Transients and Load Dump

An integrated 28-V Zener diode protects each output stage against transients and load-dump (Schaffner pulses). With the help of external 1-kΩ resistor, the output transistor is capable to handle the corresponding current which flows during each of these conditions. Apart from that, the outputs are short circuit and overload protected.

### Low-Voltage Detection

When the supply voltage is switched on, a power-on reset pulse is generated internally which disables all output stages until a defined supply-voltage level is reached. The low-voltage detection is provided with a hysteresis of $V_{hyst}$ = 0.5 V typically.

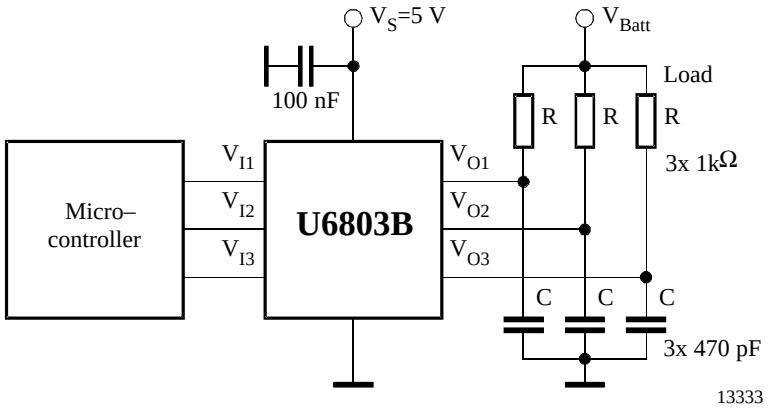



Figure 3. Application schematic

## Absolute Maximum Ratings

| Parameters | Symbol | Value | Unit |
|---|---|---|---|
| Supply voltage | $V_S$ | 7.0 | V |
| Ambient temperature range | $T_{amb}$ | –40 to +125 | °C |
| Storage temperature range | $T_{stg}$ | –50 to +150 | °C |
| Maximum junction temperature | $T_j$ | +150 | °C |

## Thermal Resistance

| Parameters | Symbol | Value | Unit |
|---|---|---|---|
| Junction ambient | $R_{thJA}$ | 160 | K/W |

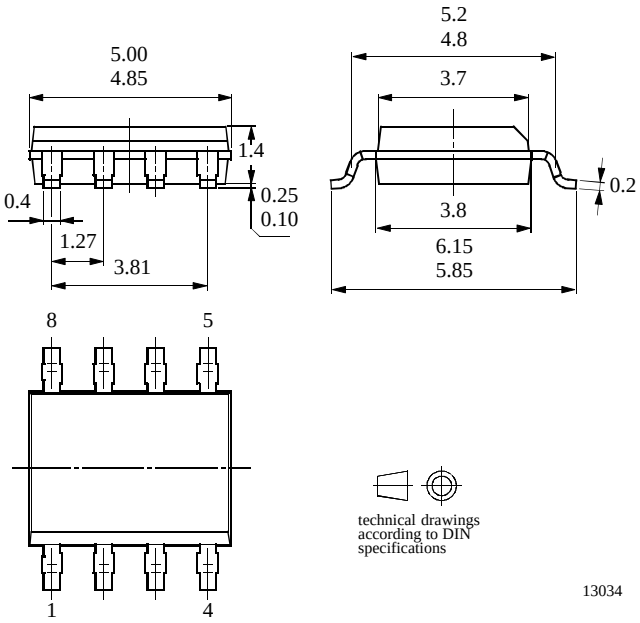
## Electrical Characteristics

$V_S$ = 5 V ± 5%, $T_{amb}$ = 27°C, reference point pin 2 (GND), unless otherwise specified, see figures 1 and 3.

| Parameters | Test Conditions / Pins | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Supply Pin 7** | | | | | | |
| Supply voltage | | $V_S$ | 4.75 | | 5.25 | V |
| Supply current | Inputs open<br>Inputs closed to GND | $I_S$<br>$I_S$ | 0.8<br>7 | | 3.2<br>13 | mA<br>mA |
| Low-voltage detection threshold: | ON<br>OFF | $V_{TH(ON)}$<br>$V_{TH(OFF)}$ | 3.7<br>3.0 | | 4.6<br>3.8 | V<br>V |
| Low-voltage hysteresis | | $V_{hyst}$ | 0.55 | | 1.05 | V |
| Temperature shutdown | | $T_{Chip}$ | 140 | | 149 | °C |
| Temperature shutdown hysteresis | | $T_{hyst}$ | 5 | | | °C |
| **Input Pins 5, 6, 8** | | | | | | |
| Zener-diode protection voltage | $I_I$ = 10 mA | $V_I$ | 6.7 | | 8.5 | V |
| Zener-diode clamping current | | $I_I$ | | | ± 10 | mA |
| Pull-up resistor | | $R_I$ | 170 | 250 | 305 | kΩ |
| Switching threshold | OFF<br>ON | $V_I$<br>$V_I$ | | 3.3<br>1.8 | | V<br>V |
| Hysteresis | | $V_{hyst}$ | | 1.5 | | V |
| **Output Pins 1, 3, 4** | | | | | | |
| Zener-diode protection voltage | $I_O$ = 10 mA | $V_O$ | 26.5 | | | V |
| Integrated capacitor | | | | 5 | | pF |
| Leakage current | | $I_{Leak}$ | | | 2.5 | µA |
| Saturation voltage | ($I_O$ = 20 mA) | $V_{Sat}$ | | | 0.7 | V |
| Current limitation | | $I_{limit}$ | 25 | | 100 | mA |
| Propagation delay | (470 pF, 1 kΩ, 20 V) | $t_d$ | | | 5 | µs |

## Package Information

Package SO8
Dimensions in mm



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2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

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2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

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