



## Features

- Six Input Comparators with Schmitt-trigger Characteristics
- Input Clamping Current Capability of  $\pm 10$  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 According to Human Body Model:  $\pm 2000$ V (C = 100 pF, R = 1.5 k $\Omega$ )
- Output Stages:
  - Short-circuit Protected
  - Load-dump Protected at 1 k $\Omega$
  - No Crosstalk on Adjacent Channels
  - Jump Start Possible



## Hex Driver IC with Thermal Monitoring

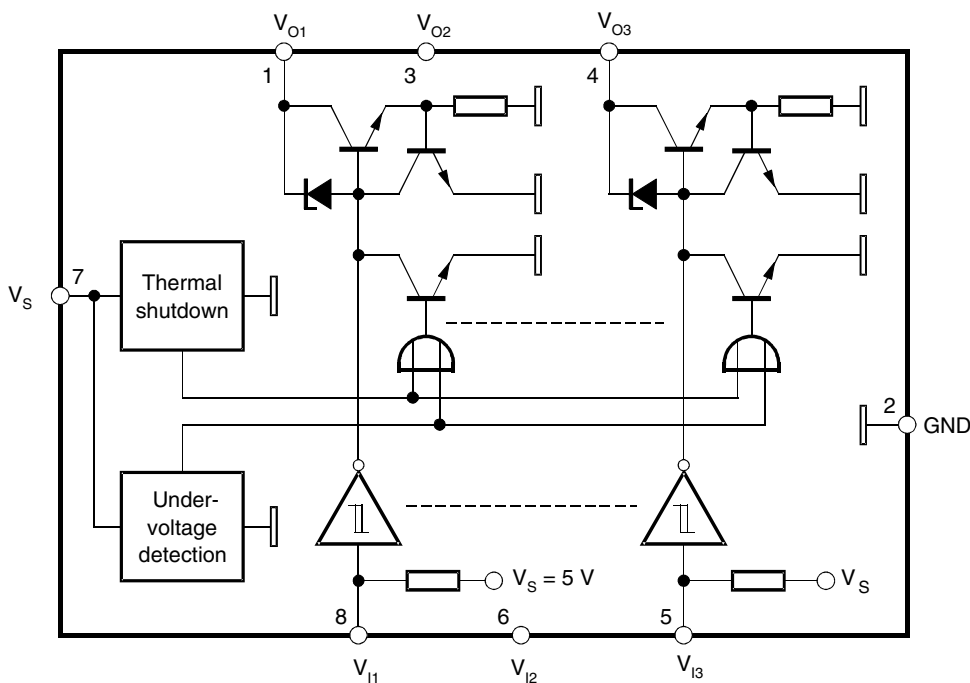
### U6805B

## 1. Description

The hex driver IC U6805B includes 6 non-inverted and current-limited output stages with an open collector. Common thermal shutdown protects outputs against critical junction temperature.

Each output can sink a current of 20 mA, and parallel output operation is possible. The digital inputs have Schmitt-trigger function with pull-up resistors of up to 5V.

Figure 1-1. Block Diagram



## 2. Pin Configuration

Figure 2-1. Pinning SO14

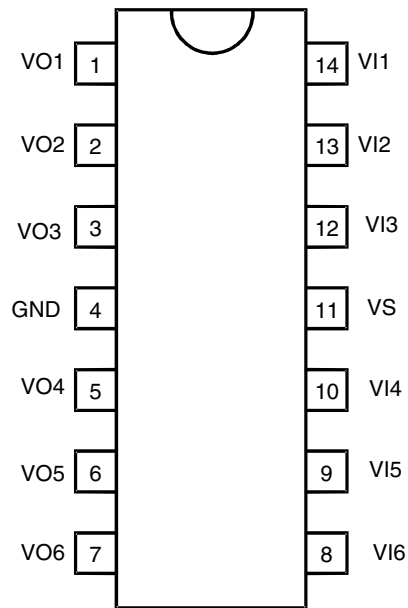


Table 2-1. Pin Description

Pin	Symbol	Function
1	VO1	Output 1
2	VO2	Output 2
3	VO3	Output 3
4	GND	Ground
5	VO4	Output 4
6	VO5	Output 5
7	VO6	Output 6
8	VI6	Input 6
9	VI5	Input 5
10	VI4	Input 4
11	VS	Supply voltage, 5V
12	VI3	Input 3
13	VI2	Input 2
14	VI1	Input 1

### 3. Basic Circuitry

The integrated circuit U6805B requires a stabilized supply voltage ( $V_S = 5V \pm 5\%$ ) to comply with its electrical characteristics. An external buffer capacitor of  $C = 100 \text{ nF}$  is recommended. An integrated 14V Z diode between  $V_S$  and ground protects the supply pin.

All input stages are provided with an integrated 250 k $\Omega$  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,  $R = 1 \text{ k}\Omega$

Capacitor to GND,  $C = 470 \text{ pF}$ , see [Figure 4-1 on page 4](#)

### 4. Functional Description

#### 4.1 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.

7V Zener diodes between each input pin and GND are capable of  $\pm 10 \text{ mA}$  clamping current without crosstalk on adjacent input stages.

A total clamping current of  $\pm 30 \text{ mA}$  should be observed with respect to the power dissipation.

#### 4.2 Current Limitation of the Output Stages and Overtemperature Shutdown

A temperature-dependent current limitation in the range of 25 to 100 mA protects the stages in case of a short-circuit. Additionally, the chip temperature is monitored. If  $T_{\text{chip}} > 148^\circ\text{C}$ , all outputs are disabled and automatically enabled with a hysteresis of  $\Delta T_{\text{Chip}} > 5\text{K}$ . Refer to the hex driver U6807B if the temperature shutdown feature is not required.

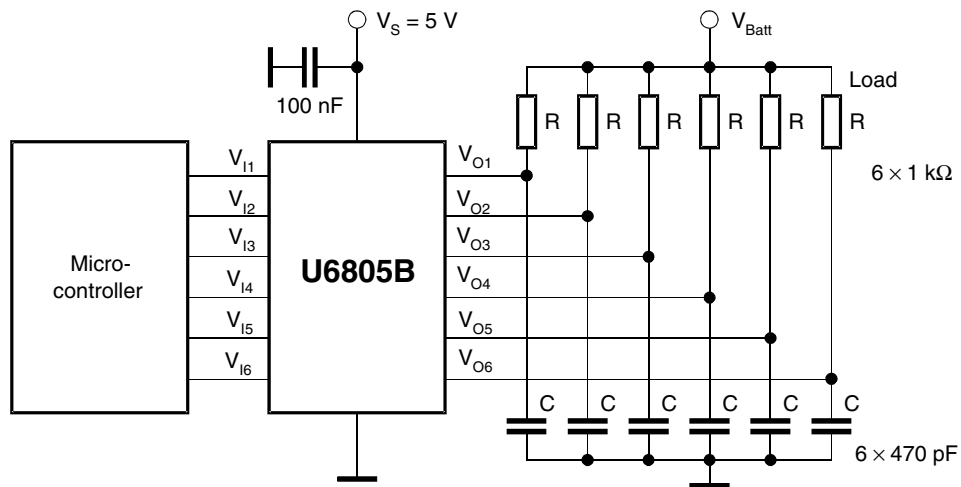
#### 4.3 Transients and Load Dump

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

#### 4.4 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  $V_{\text{hyst}} = 0.5\text{V}$  typically.

Figure 4-1. Application Schematic



## 5. Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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

## 6. Thermal Resistance

Parameters	Symbol	Value	Unit
Junction ambient	$R_{thJA}$	120	K/W

## 7. Electrical Characteristics

$V_S = 5V \pm 5\%$ ,  $T_{amb} = 27^\circ C$ , reference point pin 4 (GND), unless otherwise specified, see [Figure 1-1 on page 1](#)

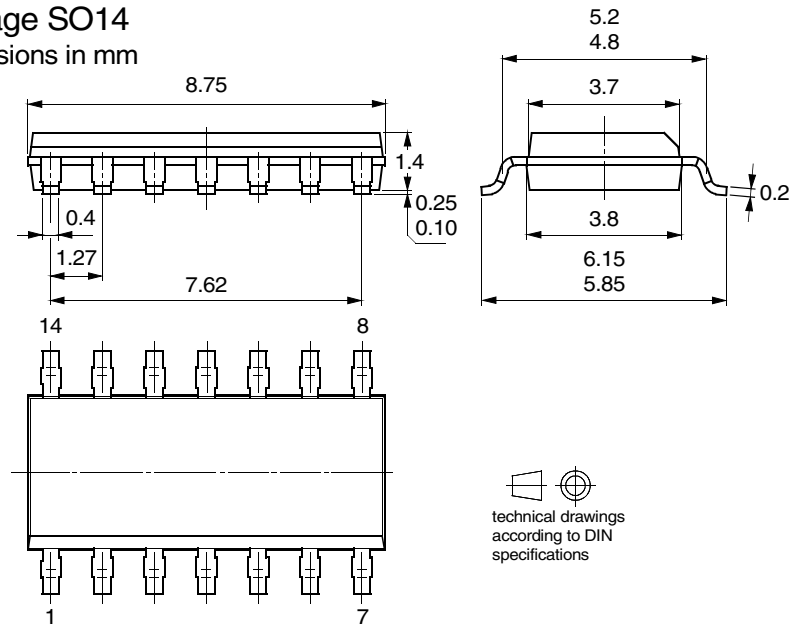
Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
<b>Supply, Pin 11</b>						
Supply voltage		$V_S$	4.75		5.25	V
Supply current	Inputs open	$I_S$	0.8		3.2	mA
	Inputs switched to GND	$I_S$	7		13	mA
Low-voltage detection threshold	ON	$V_{TH(ON)}$	3.7		4.6	V
	OFF	$V_{TH(OFF)}$	3.0		3.8	V
Low-voltage hysteresis		$V_{hyst}$	0.55		1.05	V
Temperature shutdown		$T_{Chip}$	140		149	°C
Temperature shutdown hysteresis		$T_{hyst}$	5			°C
<b>Inputs; Pins 8, 9, 10, 12, 13 and 14</b>						
Z-diode protection voltage	$I_I = 10 \text{ mA}$	$V_I$	6.7		8.5	V
Z-diode clamping current		$I_I$			$\pm 10$	mA
Pull-up resistor		$R_I$	170	250	305	k $\Omega$
Switching threshold	OFF	$V_I$		3.3		V
	ON	$V_I$		1.8		V
Hysteresis		$V_{hyst}$		1.5		V
<b>Outputs; Pins 1, 2, 3, 5, 6 and 7</b>						
Z-diode protection voltage	$I_O = 10 \text{ mA}$	$V_O$	26.5			V
Integrated capacitor				5		pF
Leakage current		$I_{Leak}$			2.5	$\mu A$
Saturation voltage	$I_O = 20 \text{ mA}$	$V_{Sat}$			0.7	V
Current limitation		$I_{limit}$	25		100	mA
Propagation delay	470 pF, 1 k $\Omega$ , 20V	$t_d$			5	$\mu s$

## 8. Ordering Information

Extended Type Number	Package	Remarks
U6805B-MFPG3Y	SO14	Taped and reeled, Pb-free

## 9. Package Information

Package SO14  
Dimensions in mm



## 10. Revision History

Please note that the following page numbers referred to in this section refer to the specific revision mentioned, not to this document.

Revision No.	History
4763B-AUTO-09/05	<ul style="list-style-type: none"> <li>Put datasheet in a new template</li> <li>Pb-free logo on page 1 added</li> <li>Table "Ordering Information" on page 6 changed</li> </ul>



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