

Hex Driver for High-Temperature Application

Description

The hex driver IC includes 6 non-inverted and current limited output stages with an open collector.

Each output can sink 20 mA, parallel output operation is

possible. The digital inputs have Schmitt-trigger function with pull-up resistors to 5 V.

Features

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

Extended Type Number	Package	Remarks
U6807B-FP	SO14	

Block Diagram

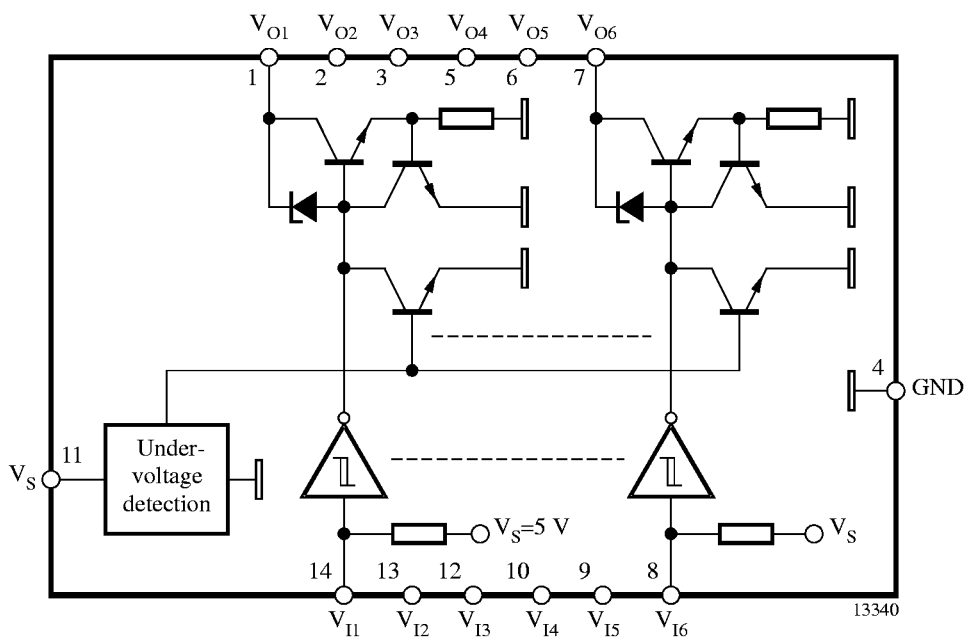


Figure 1.

Pin Description

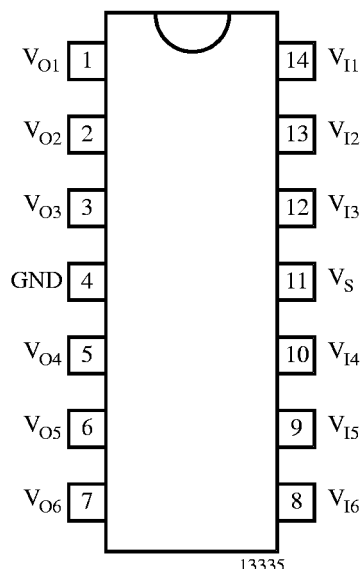


Figure 2. Pinning

Pin	Symbol	Function
1	V _{O1}	Output 1
2	V _{O2}	Output 2
3	V _{O3}	Output 3
4	GND	Ground
5	V _{O4}	Output 4
6	V _{O5}	Output 5
7	V _{O6}	Output 6
8	V _{I6}	Input 6
9	V _{I5}	Input 5
10	V _{I4}	Input 4
11	V _S	Supply voltage, 5 V
12	V _{I3}	Input 3
13	V _{I2}	Input 2
14	V _{I1}	Input 1

Basic Circuitry

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

All input stages are provided with an integrated 250-k Ω 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 KEIN MERKER

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

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

Current Limitation of the Output Stages

A temperature dependent current limitation in the range of 25 mA to 100 mA protects the stages during a short.

An appropriate heat sink assembly with $R_{thJA} < 100 \text{ K/W}$ and/or a further reduction of the maximum ambient temperature is recommended in order to avoid thermal overstress. Depending on the numbers of output stages which may be in short circuit condition these maximum ratings are (with $R_{thJA} < 120 \text{ K/W}$):

$T_{amb \text{ max}} \leq 80^\circ\text{C}$ @ 2 channels shorted simultaneously

$T_{amb \text{ max}} \leq 65^\circ\text{C}$ @ 3 channels shorted simultaneously

Refer to hexdriver U6805B if thermal shut down is required.

Transients and Load Dump

An integrated 28-V Z diode protects each output stage against transients and load dump (Schaffner pulses). With the help of external 1-k Ω resistor, the output transistor is capable to handle the corresponding current which flows during each of these conditions. Apart from that, 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 $V_{hyst} = 0.5 \text{ V}$ typically.

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

* To be reduced if 2 or 3 output stages are shorted simultaneously (see “Current Limitation of the Output Stages” on page 2).

Thermal Resistance

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

Electrical Characteristics

$V_S = 5\text{ V} \pm 5\%$, $T_{amb} = 27^\circ\text{C}$, reference point pin 4 (GND), unless otherwise specified, see figures KEIN MERKER and 3.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply Pin 11						
Supply voltage		V_S	4.75		5.25	V
Supply current	Inputs open	I_S	0.8		4.2	mA
	Inputs closed to GND	I_S	7		14.5	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
Inputs Pins 8, 9, 10, 12, 13 and 14						
Z diode protection voltage	$I_I = 10\text{ mA}$	V_I	6.7		8.5	V
Z diode clamping current		I_I			± 10	mA
Pull-up resistor		R_I	170	250	305	k Ω
Switching threshold	OFF	V_I		3.3		V
	ON	V_I		1.8		V
Hysteresis		V_{hyst}		1.5		V
Outputs Pins 1, 2, 3, 5, 6 and 7						
Z diode protection voltage	$I_O = 10\text{ mA}$	V_O	26.5			V
Integrated capacitor				5		pF
Leakage current		I_{Leak}			2.5	μA
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 Ω , 20 V	t_d			5	μs

Application Circuit

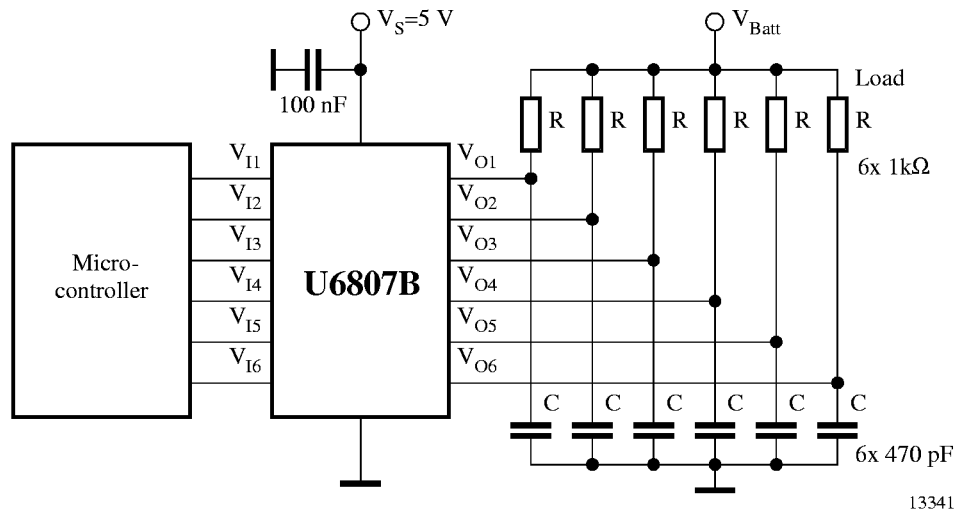
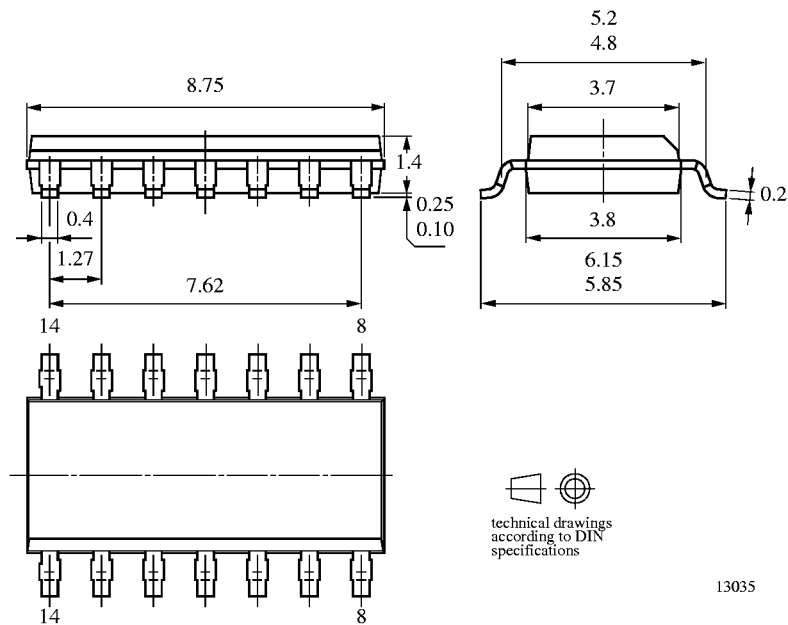


Figure 3. Application schematic

Package Information

Package SO14
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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1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
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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TEMIC Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2594, Fax number: 49 (0)7131 67 2423