



## Features

- Input Comparator with Schmitt-trigger Characteristic
- Input Clamping Current Capability of  $\pm 10$  mA
- Integrated Protection Cells (EMC, ESD, RF) Dedicated to All Input Stages
- 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 Stage:
  - Short-circuit Protected
  - Load-dump Protected at 1 k $\Omega$
  - Jump Start Possible

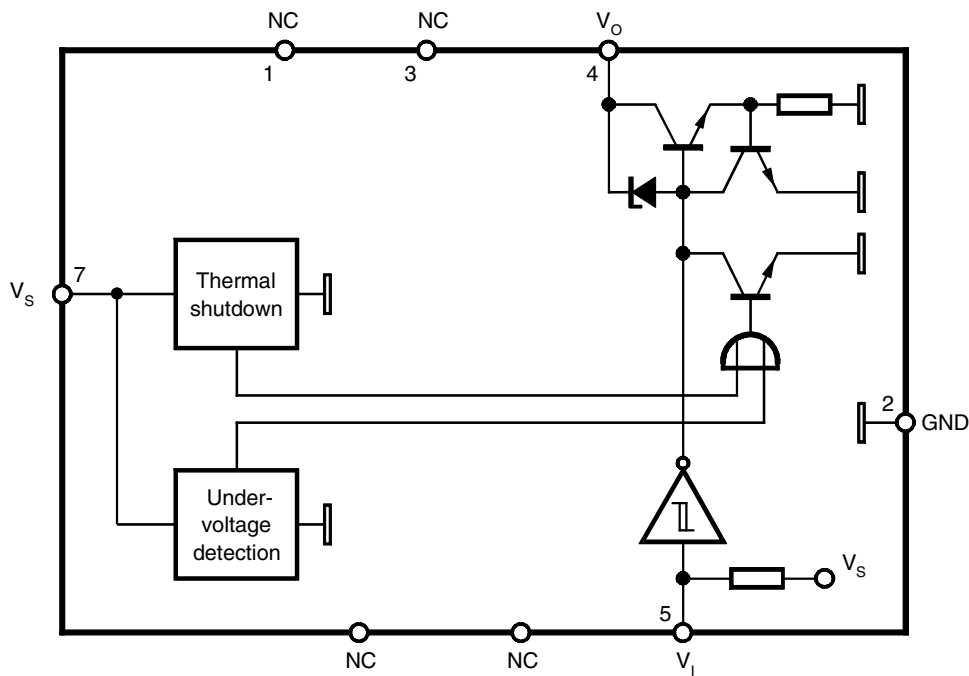
## Description

The single-channel driver IC includes one non-inverted and current-limited output stage with an open collector. Thermal shutdown protects the output against critical junction temperatures. The output can sink a current of 20 mA. The digital input has Schmitt-trigger function with pull-up resistors to 5 V.

## Single-channel Driver IC with Thermal Monitoring

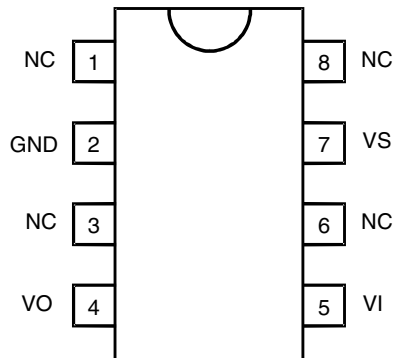
### T6801

Figure 1. Block Diagram



## Pin Configuration

Figure 2. Pinning SO8



## Pin Description

Pin	Symbol	Function
1	NC	Not connected
2	GND	Ground
3	NC	Not connected
4	VO	Output
5	VI	Input
6	NC	Not connected
7	VS	Supply voltage 5 V
8	NC	Not connected

## Basic Circuitry

The integrated circuit T6801 requires a stabilized supply voltage ( $V_S = 5\text{ V} \pm 5\%$ ) to comply with its electrical characteristics. An external buffer capacitor of  $C = 100\text{ nF}$  is recommended. An integrated  $14\text{ V}$  Zener diode between  $V_S$  and ground protects the supply pin.

The input stage is provided with an integrated  $250\text{ k}\Omega$  pull-up resistor and can be directly connected to a microcontroller.

The output stage is an open collector, capable of sinking  $20\text{ mA}$ . Recommended external components:

- Pull-up resistor,  $R = 1\text{ k}\Omega$
- Capacitor to GND,  $C = 470\text{ pF}$ , see Figure 3

## Functional Description

### General

ON state: Low level at the input stage activates the output stage.

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

A  $7\text{ V}$  Zener diode between input pin and GND is capable of  $\pm 10\text{ mA}$  clamping current.

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

A temperature-dependent current limitation in the range of  $25$  to  $100\text{ mA}$  protects the stage in case of a short circuit. Additionally, the chip temperature is monitored. For  $T_{\text{Chip}} > 148^\circ\text{C}$ , the output is disabled and automatically enabled with a hysteresis of  $T_{\text{Chip}} > 5^\circ\text{C}$ .

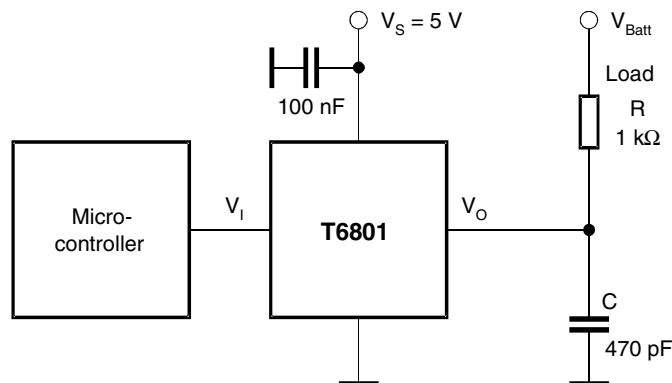
### Transients and Load Dump

An integrated  $28\text{ V}$  Zener diode protects the output stage against transients and load-dump (Schaffner pulses). With the help of an external  $1\text{ k}\Omega$  resistor, the output transistor is capable of handling the corresponding current which flows during each of these conditions. Apart from that, the output is 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 the output stage 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 3.** Application Schematic



## 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

## Thermal Resistance

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

## Electrical Characteristics

$V_S = 5\text{ V} \pm 5\%$ ,  $T_{amb} = 27^\circ\text{C}$ , reference point pin 2 (GND), unless otherwise specified, see Figure 1 on page 1 and Figure 3 on page 3.

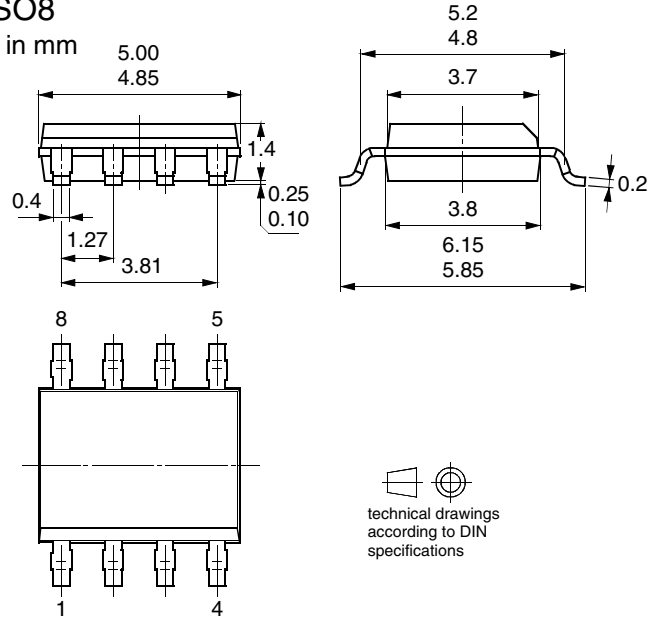
Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
<b>Supply, Pin 7</b>						
Supply voltage		$V_S$	4.75		5.25	V
Supply current	Input open	$I_S$	0.8		3.2	mA
	Input closed to GND	$I_S$	7		13	mA
Low-voltage detection threshold	ON	$V_{TH(ON)}$	3.7		4.6	V
	OFF	$V_{TH(OFF)}$	3.0		3.8	V
Low-voltage hysteresis		$V_{hyst}$	0.55		1.05	V
Temperature shutdown		$T_{Chip}$	140		149	°C
Temperature shutdown hysteresis		$T_{hyst}$	5			°C
<b>Input, Pin 5</b>						
Zener-diode protection voltage	$I_I = 10\text{ mA}$	$V_I$	6.7		8.5	V
Zener-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>Output, Pin 4</b>						
Zener-diode protection voltage	$I_O = 10\text{ mA}$	$V_O$	26.5			V
Integrated capacitor				5		pF
Leakage current		$I_{Leak}$			2.5	$\mu\text{A}$
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 $\Omega$ , 20 V)	$t_d$			5	$\mu\text{s}$

### Ordering Information

Extended Type Number	Package	Remarks
T6801-TAQ	SO8	Taped and reeled

### Package Information

Package SO8  
Dimensions in mm





## Atmel Corporation

2325 Orchard Parkway  
San Jose, CA 95131, USA  
Tel: 1(408) 441-0311  
Fax: 1(408) 487-2600

## Regional Headquarters

### Europe

Atmel Sarl  
Route des Arsenaux 41  
Case Postale 80  
CH-1705 Fribourg  
Switzerland  
Tel: (41) 26-426-5555  
Fax: (41) 26-426-5500

### Asia

Room 1219  
Chinachem Golden Plaza  
77 Mody Road Tsimshatsui  
East Kowloon  
Hong Kong  
Tel: (852) 2721-9778  
Fax: (852) 2722-1369

### Japan

9F, Tonetsu Shinkawa Bldg.  
1-24-8 Shinkawa  
Chuo-ku, Tokyo 104-0033  
Japan  
Tel: (81) 3-3523-3551  
Fax: (81) 3-3523-7581

## Atmel Operations

### Memory

2325 Orchard Parkway  
San Jose, CA 95131, USA  
Tel: 1(408) 441-0311  
Fax: 1(408) 436-4314

### Microcontrollers

2325 Orchard Parkway  
San Jose, CA 95131, USA  
Tel: 1(408) 441-0311  
Fax: 1(408) 436-4314

La Chantrerie  
BP 70602  
44306 Nantes Cedex 3, France  
Tel: (33) 2-40-18-18-18  
Fax: (33) 2-40-18-19-60

### ASIC/ASSP/Smart Cards

Zone Industrielle  
13106 Rousset Cedex, France  
Tel: (33) 4-42-53-60-00  
Fax: (33) 4-42-53-60-01

1150 East Cheyenne Mtn. Blvd.  
Colorado Springs, CO 80906, USA  
Tel: 1(719) 576-3300  
Fax: 1(719) 540-1759

Scottish Enterprise Technology Park  
Maxwell Building  
East Kilbride G75 0QR, Scotland  
Tel: (44) 1355-803-000  
Fax: (44) 1355-242-743

### RF/Automotive

Theresienstrasse 2  
Postfach 3535  
74025 Heilbronn, Germany  
Tel: (49) 71-31-67-0  
Fax: (49) 71-31-67-2340

1150 East Cheyenne Mtn. Blvd.  
Colorado Springs, CO 80906, USA  
Tel: 1(719) 576-3300  
Fax: 1(719) 540-1759

### Biometrics/Imaging/Hi-Rel MPU/ High Speed Converters/RF Datacom

Avenue de Rochepleine  
BP 123  
38521 Saint-Egreve Cedex, France  
Tel: (33) 4-76-58-30-00  
Fax: (33) 4-76-58-34-80

---

### Literature Requests

[www.atmel.com/literature](http://www.atmel.com/literature)

**Disclaimer:** Atmel Corporation makes no warranty for the use of its products, other than those expressly contained in the Company's standard warranty which is detailed in Atmel's Terms and Conditions located on the Company's web site. The Company assumes no responsibility for any errors which may appear in this document, reserves the right to change devices or specifications detailed herein at any time without notice, and does not make any commitment to update the information contained herein. No licenses to patents or other intellectual property of Atmel are granted by the Company in connection with the sale of Atmel products, expressly or by implication. Atmel's products are not authorized for use as critical components in life support devices or systems.

© Atmel Corporation 2003. All rights reserved.

Atmel® and combinations thereof are the registered trademarks of Atmel Corporation or its subsidiaries.

Other terms and product names may be the trademarks of others.



Printed on recycled paper.