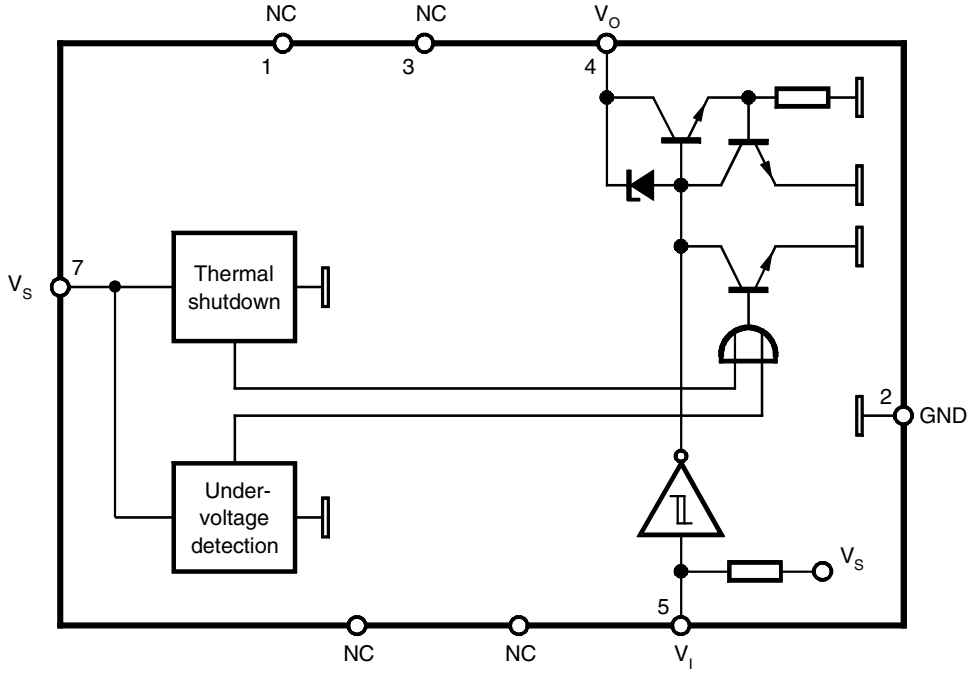
Features

- **Input Comparator with Schmitt-trigger Characteristic**
- **Input Clamping Current Capability of ±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 Acording to Human Body Model: ±2000 V (C = 100 pF, R = 1.5 kΩ)**
- **Output Stage:**
  - **Short-circuit Protected**
  - **Load-dump Protected at 1 kΩ**
  - **Jump Start Possible**

Description

The singel-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.

Figure 1. Block Diagram



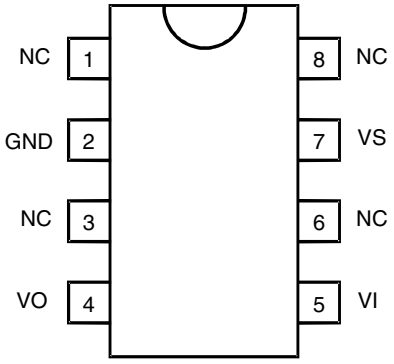
Single-channel Driver IC with Thermal Monitoring

T6801

Rev. 4761A–AUTO–11/03

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 V ±5%) to comply with its electrical characteristics. An external buffer capacitor of C = 100 nF is recommended. An integrated 14 V Zener diode between V_S and ground protects the supply pin.

The input stage is provided with an integrated 250 kΩ pull-up resistor and can be directly connected to a microcontroller.

The output stage is an open collector, 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 output stage.

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

A 7 V Zener diode between input pin and GND is capable of ±10 mA clamping current.

Current Limitation of the Output Stages and Overtemperature Shutdown

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

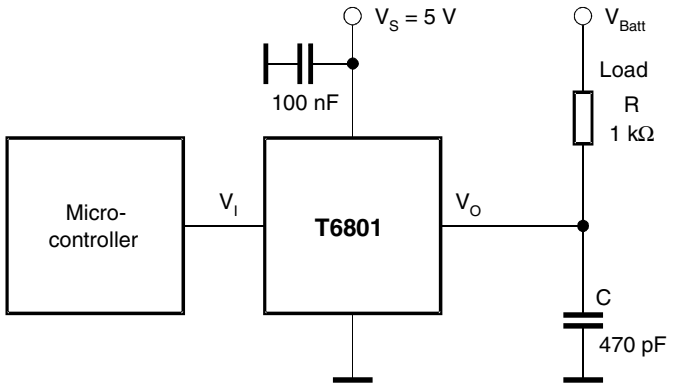
Transients and Load Dump

An integrated 28 V Zener diode protects the output stage against transients and load-dump (Schaffner pulses). With the help of an external 1 kΩ 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_{hyst} = 0.5 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 V ±5%, T_{amb} = 27°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
Supply, Pin 7						
Supply voltage		V_S	4.75		5.25	V
Supply current	Input open Input closed to GND	I_S I_S	0.8 7		3.2 13	mA mA
Low-voltage detection threshold	ON OFF	$V_{TH(ON)}$ $V_{TH(OFF)}$	3.7 3.0		4.6 3.8	V 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, Pin 5						
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 ON	V_I V_I		3.3 1.8		V V
Hysteresis		V_{hyst}		1.5		V
Output, Pin 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

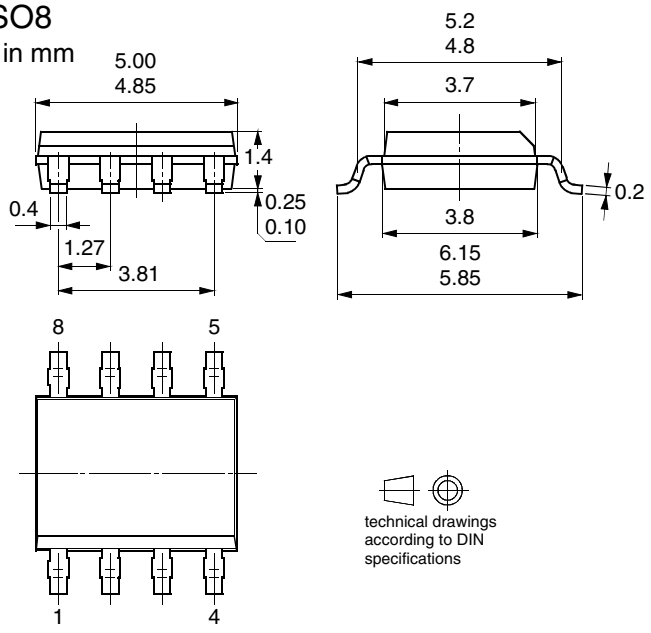
Ordering Information

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

4761A–AUTO–11/03