Features

- **10 kV - ESD protection**
- **Two comparators with common reference**
- **Tight threshold tolerance**
- **Constant threshold**
- **NPN output**
- **Interference and damage-protection according to VDE 0839 and ISO/CD 7637**
- **EMI protection**
- **Reversal polarity protection**
- **Load-dump protection**

Overload Monitoring with Resistive Load, V_T = 44.5 mV

U4793B

Description

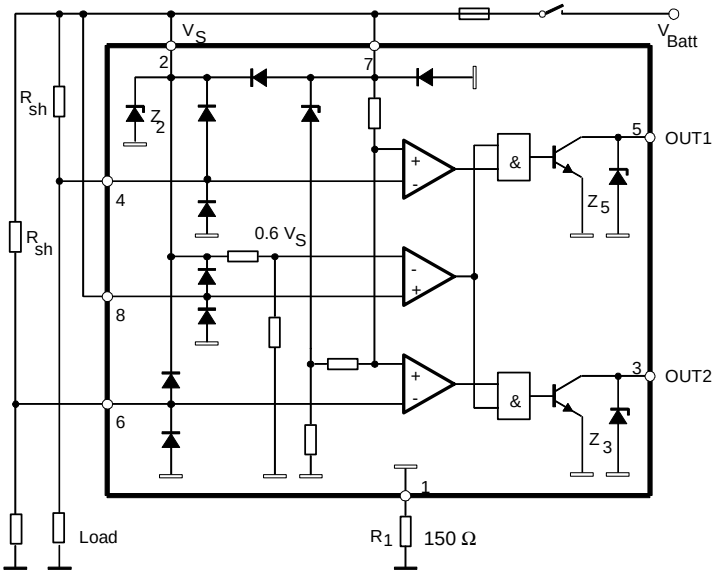
The bipolar U4793B is designed to monitor overload or a short circuit in automotive or industrial applications. The threshold is tied to $V_{4,6} = V_S - V_T$ where V_T = 44.5 mV. It is independent of the supply voltage, V_S. If the voltage drop across shunt resistor, R_{sh}, exceeds this value, the output is turned on, otherwise the output is turned off.

Without supply voltage or open input Pin 8, the output is turned off. The output breakdown voltage is determined by the Z-diodes Z_3 and Z_5 with a typical value of V_Z = 22 V.

An unused comparator input must be connected to Pin 7.

Block Diagram

Figure 1. Schematic and application circuit



Ordering Information

Extended Type Number	Package	Remarks
U4793B	DIP8	
U4793B-FP	SO8	

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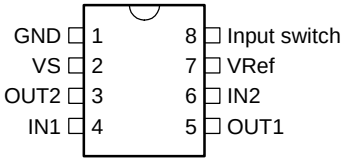
Pin Configuration

Figure 2. Pinning



Pin Description

Pin	Symbol	Function
1	GND	Reference point, ground
2	V_S	Supply voltage
3	OUT2	Output 2
4	IN1	Input 1
5	OUT1	Output 1
6	IN2	Input 2
7	V_{Ref}	Reference voltage
8	Input	Input switch

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Supply voltage	Pin 2, 7	V_S	16.5	V
Current consumption t = 2 ms, measured at Pin 1 (GND)	Pin 1	I_1	1.5	A
Output current	Pin 3, 5	$I_{3,5}$	20	mA
Input voltage reference point Pin 7	Pin 4, 6	$-V_{4,6}$	6	V
Power dissipation T_{amb} = 125 °	DIP 8 SO 8	P_{tot}	220 150	mW mW
T_{amb} = 95 °	DIP 8 SO 8	P_{tot}	420 360	mW mW
T_{amb} = 60°	DIP 8 SO 8	P_{tot}	690 560	mW mW
Ambient temperature range		T_{amb}	-40 to +125	°C
Storage temperature range		T_{stg}	-55 to +125	°C
Junction temperature		T_j	150	°C

Thermal Resistance

Parameter		Symbol	Value	Unit
Junction ambient	DIP8 SO8	R_{thJA} R_{thJA}	110 160	K/W K/W

Electrical Characteristics

V_S = 9 to 15 V, T_{amb} = -40 to +125°C, unless otherwise specified (see figure 1)

No.	Parameters	Test Conditions	Pin	Symbol	Min.	Typ.	Max.	Unit	Type*
1	**Supply**								
1.1	Supply voltage		2, 7	V_S	9		15	V	A
1.2	Internal Z-diode Z_2		2	V_Z	20			V	A
1.3	Current consumption	V_S = 12 V measured Tamb = -40°C	1	I_1	3.5	4.8	6.0	mA	C
1.4		V_S = 12 V measured Tamb = 25°C	1	I_1	2.8	3.4	6.0	mA	A
1.5		V_S = 12 V measured Tamb = 125°C	1	I_1	2.0	2.6	3.2	mA	C
2	**Output**								
2.1	Output saturation voltage	V_S = 9 V, $I_{3,5}$ = 10 mA T_{amb} = 25 °C	3, 5	V_{sat}			0.5	V	A
2.2	Output Z-diodes Z_3, Z_5		3, 5	V_Z	21			V	A
3	**Control signal**								
3.1	Control signal threshold	$I_{3,5}$ = 1 mA, figure 3 T_{amb} = -40°C	4, 6	$-V_T$	42	44	46	mV	C
3.2		$I_{3,5}$ = 1 mA, figure 3 T_{amb} = 25°C	4, 6	$-V_T$	43	44.5	46	mV	A
3.3		$I_{3,5}$ = 1 mA, figure 3 T_{amb} = 125°C	4, 6	$-V_T$	44.5	46	47.5	mV	C
3.4	Temperature coefficient of control signal threshold			TC		15		mV/K	C
3.5	Input currents Pins connected to 12 V	T_{amb} = -40°C	4, 6	I_I	100		190	nA	C
3.6		T_{amb} = 25°C		I_I	60	100	150	nA	A
3.7		T_{amb} = 125°C		I_I	30		110	nA	C
3.8	Input currents Pins connected to 12 V	T_{amb} = -40°C	8	I_I	5.5		7.0	µA	C
3.9		T_{amb} = 25°C		I_I	4.0	5.0	5.5	µA	A
3.10		T_{amb} = 125°C		I_I	3.0		4.5	µA	C
4	**Threshold**								
4.1	Threshold voltage	Switch identification T_{amb} = -40°C	8	V_8	0.47× V_S		0.69 × V_S	V	C
4.2		Switch identification T_{amb} = 25°C		V_8	0.47× V_S	0.6 V_S	0.69 × V_S	V	A
4.3		Switch identification T_{amb} = 125°C		V_8	0.47× V_S		0.69 × V_S	V	C

*) Type means: A = 100% tested, B = 100% correlation tested, C = Characterized on samples, D = Design parameter

Electrical Characteristics

V_S = 9 to 15 V, T_{amb} = -40 to +125°C, unless otherwise specified (see figure 1)

No.	Parameters	Test Conditions	Pin	Symbol	Min.	Typ.	Max.	Unit	Type*
5	**Switch delay** (R_L = 10 kΩ connected from Pin 3 or Pin 5 to V_{Batt})								
5.1	Delay time Switch-on High to low	T_{amb} = -40°C	3, 5	$t_{d(on)}$	3	4	6	µs	C
5.2		T_{amb} = 25°C		$t_{d(on)}$	4	6	8	µs	C
5.3		T_{amb} = 125°C		$t_{d(on)}$	5	7	9	µs	C
5.4	Delay time Switch-off Low to high	T_{amb} = -40°C		$t_{d(off)}$	16	24	32	µs	C
5.5		T_{amb} = 25°C		$t_{d(off)}$	18	30	50	µs	A
5.6		T_{amb} = 125°C		$t_{d(off)}$	30	50	70	µs	C
*) Type means: A = 100% tested, B = 100% correlation tested, C = Characterized on samples, D = Design parameter									

Figure 3. Timing diagram

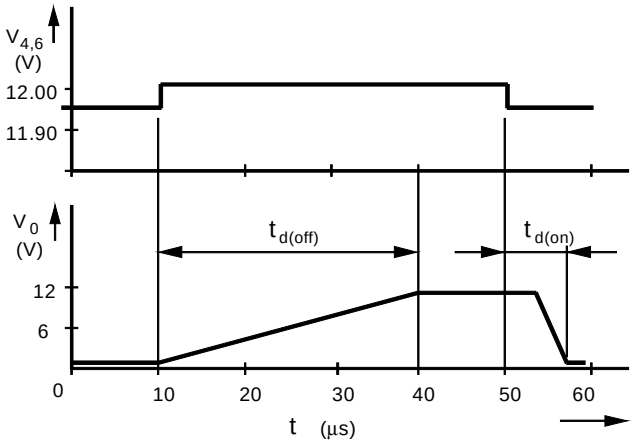
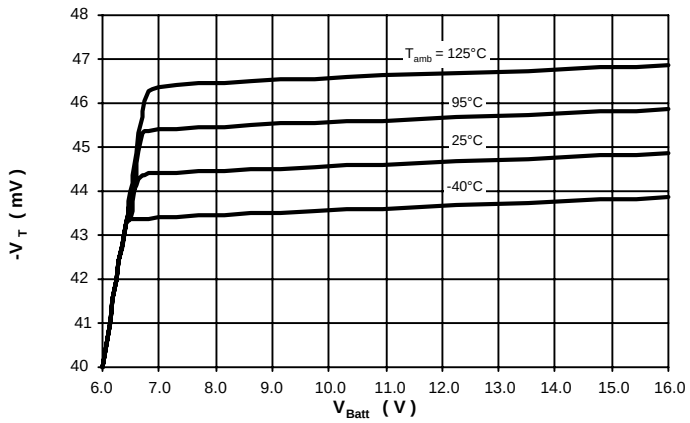


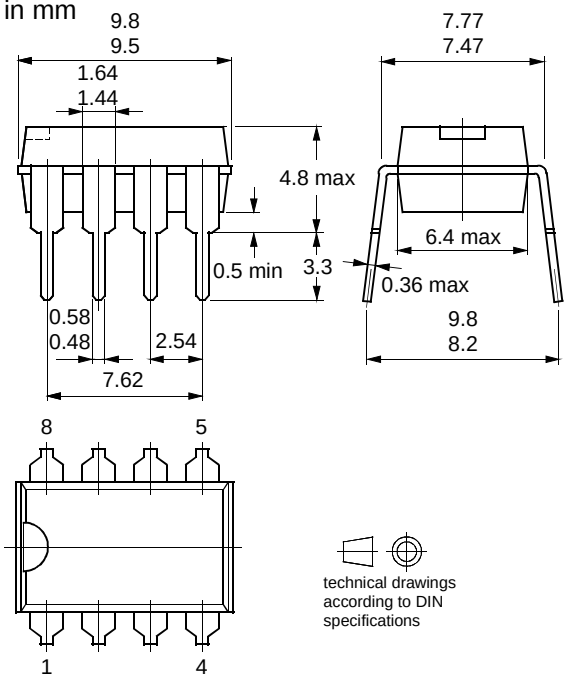
Figure 4. Threshold voltage = f (V_{Batt} and temperature)



Package Information

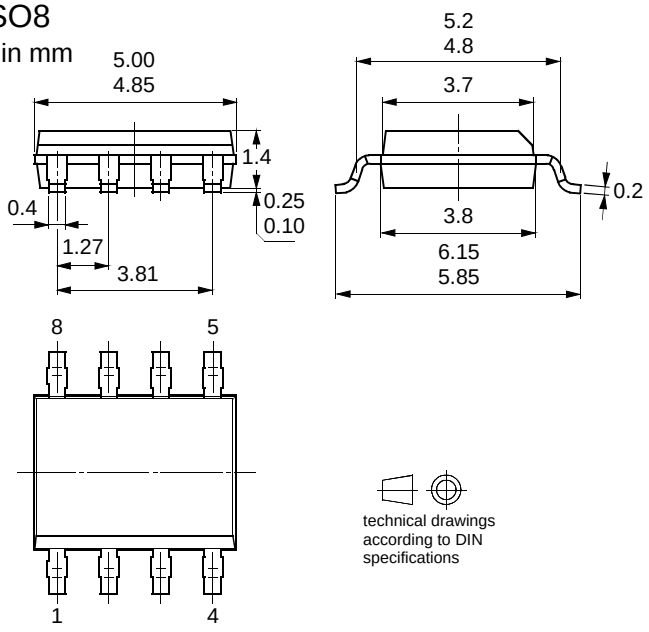
Package DIP8

Dimensions in mm



Package SO8

Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **Atmel Germany GmbH** to

1. Meet all present and future national and international statutory requirements.

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.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Atmel Germany GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

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.

Atmel Germany GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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Data sheets can also be retrieved fron the Internet: http://www.atmel-wm.com

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