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**

Current Monitor IC

U4793B

Description

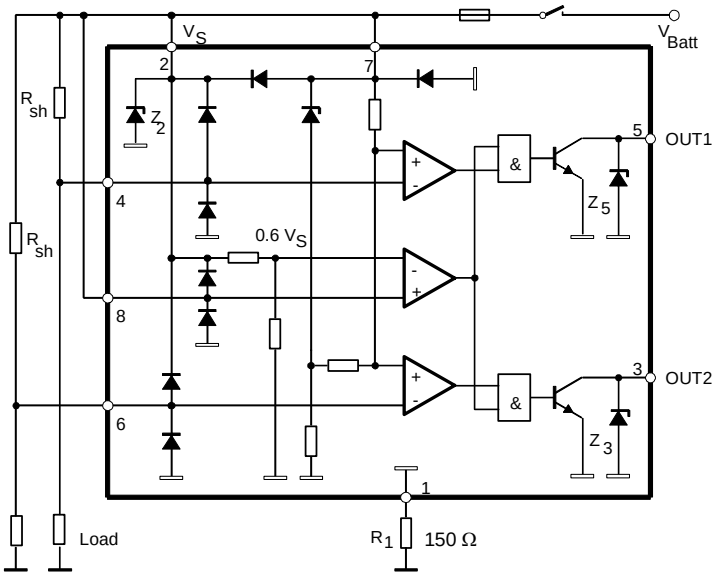
The bipolar U4793B is designed to monitor overload or a short circuit in automotive or industrial applications. The threshold is tied to $V_{4,6} = V_S - V_T$ where $V_T = 44.5$ mV. It is independent of the supply voltage, V_S. If the voltage drop across shunt resistor, R_{sh}, exceeds this value, the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

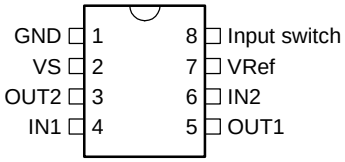
Figure 1. Schematic and Application Circuit



Rev. 4557A–AUTO–11/02

Pin Configuration

Figure 2. Pinning DIP8/SO8



Pin Description

Pin	Symbol	Function
1	GND	Reference point, ground
2	VS	Supply voltage
3	OUT2	Output 2
4	IN1	Input 1
5	OUT1	Output 1
6	IN2	Input 2
7	VRef	Reference voltage
8	Input switch	Input switch

Absolute Maximum Ratings

Parameters		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°C,	DIP8	P_{tot}	220	mW
	SO8		150	mW
T_{amb} = 95°C,	DIP8	P_{tot}	420	mW
	SO8		360	mW
T_{amb} = 60°C,	DIP8	P_{tot}	690	mW
	SO8		560	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

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

Electrical Characteristics

V_S = 9 V to 15 V, T_{amb} = -40°C 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 T_{amb} = -40°C	1	I_1	3.5	4.8	6.0	mA	C
1.4		V_S = 12 V measured T_{amb} = 25°C	1	I_1	2.8	3.4	6.0	mA	A
1.5		V_S = 12 V measured T_{amb} = 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		µV/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 (Continued)

V_S = 9 V to 15 V, T_{amb} = -40°C 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

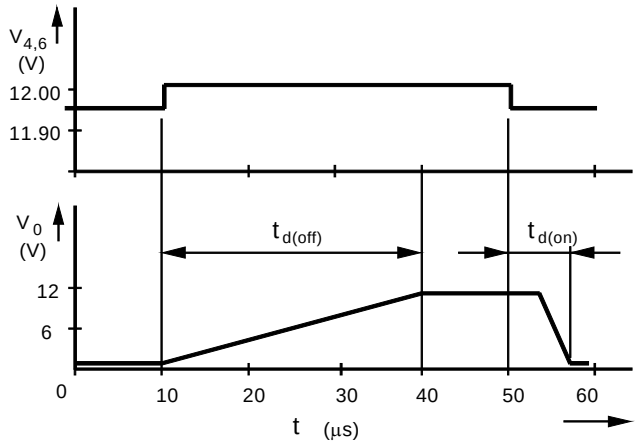
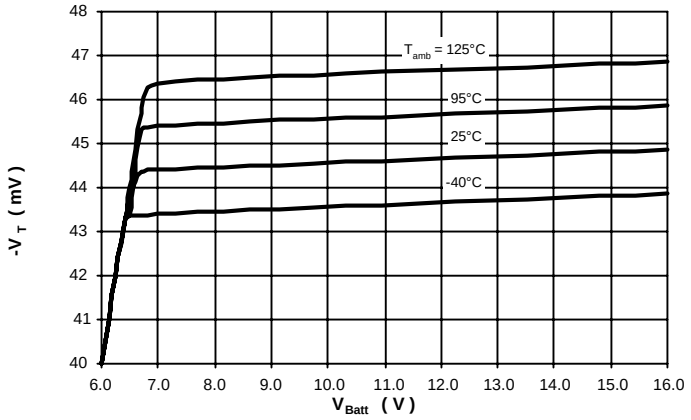


Figure 4. Threshold Voltage = f (V_{Batt} and Temperature)



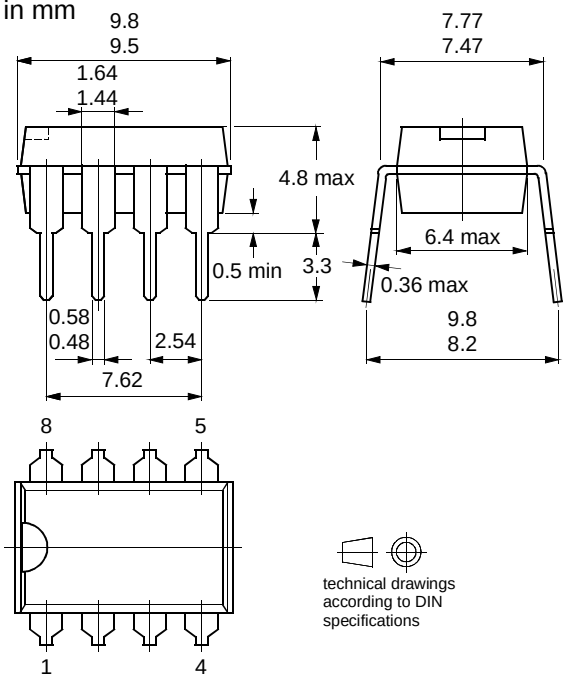
Ordering Information

Extended Type Number	Package	Remarks
U4793B	DIP8	–
U4793B-FP	SO8	–

Package Information

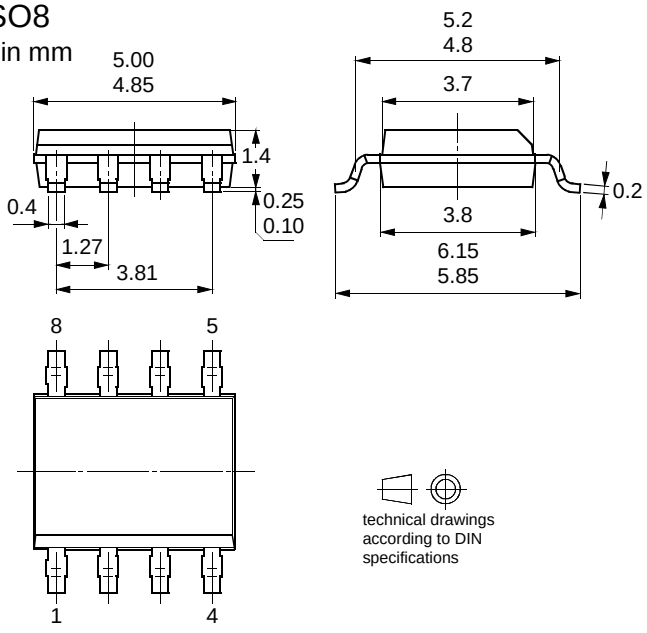
Package DIP8

Dimensions in mm



Package SO8

Dimensions in mm



Atmel Headquarters

Corporate Headquarters
2325 Orchard Parkway
San Jose, CA 95131
TEL 1(408) 441-0311
FAX 1(408) 487-2600

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 Tsimhatsui
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
TEL 1(408) 441-0311
FAX 1(408) 436-4314

Microcontrollers
2325 Orchard Parkway
San Jose, CA 95131
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
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
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

---

e-mail
literature@atmel.com

Web Site
http://www.atmel.com

© Atmel Corporation 2002.
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® is the registered trademark of Atmel.

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

Printed on recycled paper.

4557A–AUTO–11/02 xM