

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

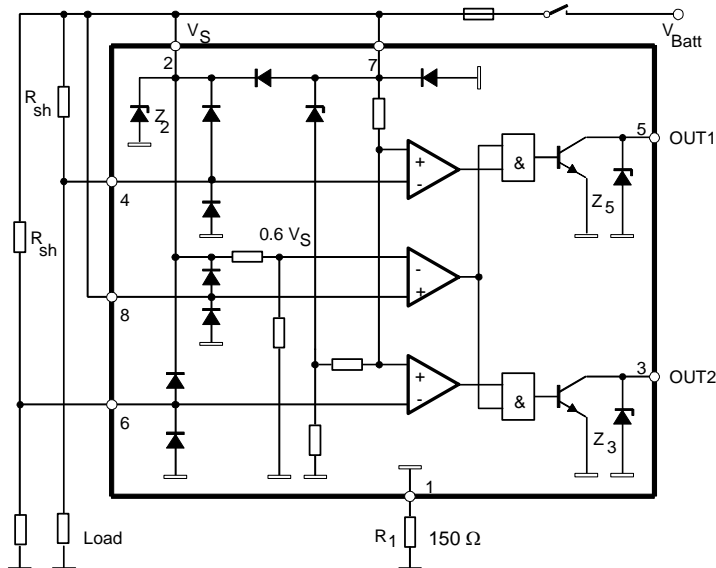
Description

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

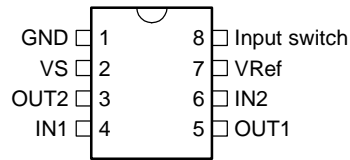


Current Monitor IC

U4793B

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 $T_{amb} = 125^\circ\text{C}$, DIP8 SO8	P_{tot}	220	mW
		150	mW
$T_{amb} = 95^\circ\text{C}$, DIP8 SO8	P_{tot}	420	mW
		360	mW
$T_{amb} = 60^\circ\text{C}$, DIP8 SO8	P_{tot}	690	mW
		560	mW
Ambient temperature range	T_{amb}	-40 to +125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to +125	$^\circ\text{C}$
Junction temperature	T_j	150	$^\circ\text{C}$

Thermal Resistance

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

Electrical Characteristics

$V_S = 9\text{ V to }15\text{ V}$, $T_{amb} = -40^\circ\text{C to }+125^\circ\text{C}$, 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	$V_S = 12\text{ V measured}$ $T_{amb} = -40^\circ\text{C}$	1	I_1	3.5	4.8	6.0	mA	C
1.4		$V_S = 12\text{ V measured}$ $T_{amb} = 25^\circ\text{C}$	1	I_1	2.8	3.4	6.0	mA	A
1.5		$V_S = 12\text{ V measured}$ $T_{amb} = 125^\circ\text{C}$	1	I_1	2.0	2.6	3.2	mA	C
2	Output								
2.1	Output saturation voltage	$V_S = 9\text{ V}$, $I_{3,5} = 10\text{ mA}$ $T_{amb} = 25^\circ\text{C}$	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	$I_{3,5} = 1\text{ mA, figure 3}$ $T_{amb} = -40^\circ\text{C}$	4, 6	$-V_T$	42	44	46	mV	C
3.2		$I_{3,5} = 1\text{ mA, figure 3}$ $T_{amb} = 25^\circ\text{C}$	4, 6	$-V_T$	43	44.5	46	mV	A
3.3		$I_{3,5} = 1\text{ mA, figure 3}$ $T_{amb} = 125^\circ\text{C}$	4, 6	$-V_T$	44.5	46	47.5	mV	C
3.4	Temperature coefficient of control signal threshold			TC		15		$\mu\text{V/K}$	C
3.5	Input currents	$T_{amb} = -40^\circ\text{C}$	4, 6	I_I	100		190	nA	C
3.6	Pins connected to 12 V	$T_{amb} = 25^\circ\text{C}$		I_I	60	100	150	nA	A
3.7		$T_{amb} = 125^\circ\text{C}$		I_I	30		110	nA	C
3.8	Input currents	$T_{amb} = -40^\circ\text{C}$	8	I_I	5.5		7.0	μA	C
3.9	Pins connected to 12 V	$T_{amb} = 25^\circ\text{C}$		I_I	4.0	5.0	5.5	μA	A
3.10		$T_{amb} = 125^\circ\text{C}$		I_I	3.0		4.5	μA	C
4	Threshold								
4.1	Threshold voltage	Switch identification $T_{amb} = -40^\circ\text{C}$	8	V_8	$0.47 \times V_S$		$0.69 \times V_S$	V	C
4.2		Switch identification $T_{amb} = 25^\circ\text{C}$		V_8	$0.47 \times V_S$	$0.6 V_S$	$0.69 \times V_S$	V	A
4.3		Switch identification $T_{amb} = 125^\circ\text{C}$		V_8	$0.47 \times V_S$		$0.69 \times V_S$	V	C

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

Electrical Characteristics (Continued)

$V_S = 9\text{ V to }15\text{ V}$, $T_{\text{amb}} = -40^\circ\text{C to }+125^\circ\text{C}$, unless otherwise specified (see Figure 1)

No.	Parameters	Test Conditions	Pin	Symbol	Min.	Typ.	Max.	Unit	Type*
5	Switch Delay ($R_L = 10\text{ k}\Omega$ connected from Pin 3 or Pin 5 to V_{Batt})								
5.1	Delay time Switch-on High to low	$T_{\text{amb}} = -40^\circ\text{C}$	3, 5	$t_{\text{d(on)}}$	3	4	6	μs	C
5.2		$T_{\text{amb}} = 25^\circ\text{C}$		$t_{\text{d(on)}}$	4	6	8	μs	C
5.3		$T_{\text{amb}} = 125^\circ\text{C}$		$t_{\text{d(on)}}$	5	7	9	μs	C
5.4	Delay time Switch-off Low to high	$T_{\text{amb}} = -40^\circ\text{C}$		$t_{\text{d(off)}}$	16	24	32	μs	C
5.5		$T_{\text{amb}} = 25^\circ\text{C}$		$t_{\text{d(off)}}$	18	30	50	μs	A
5.6		$T_{\text{amb}} = 125^\circ\text{C}$		$t_{\text{d(off)}}$	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

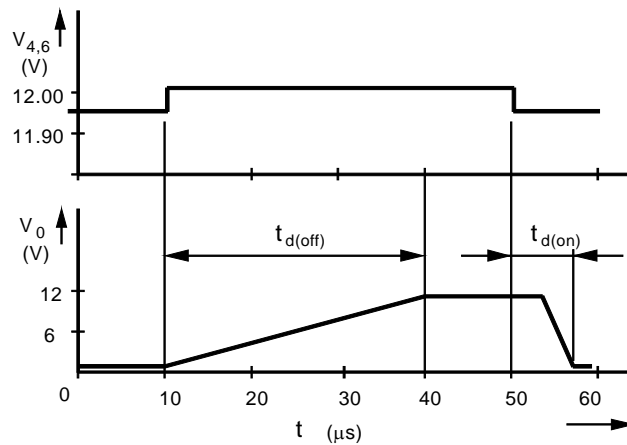
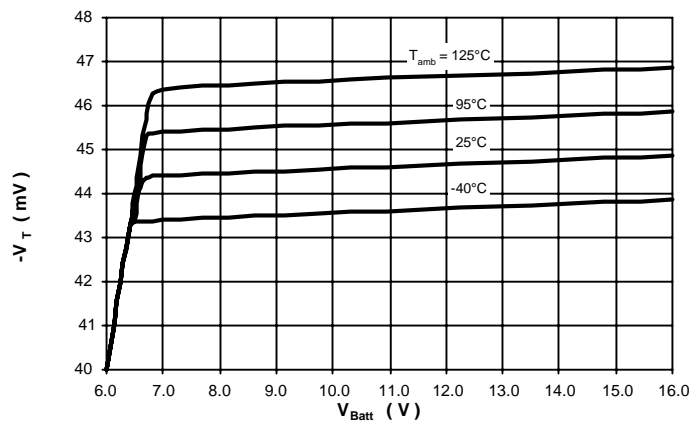


Figure 4. Threshold Voltage = $f(V_{\text{Batt}}$ and Temperature)



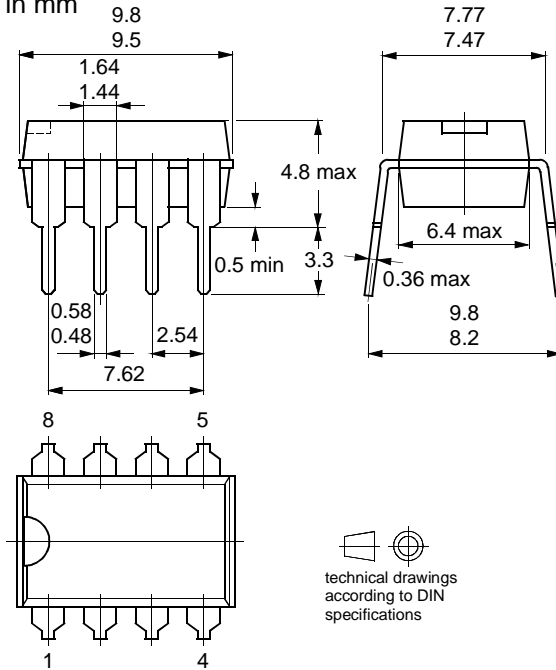
Ordering Information

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

Package Information

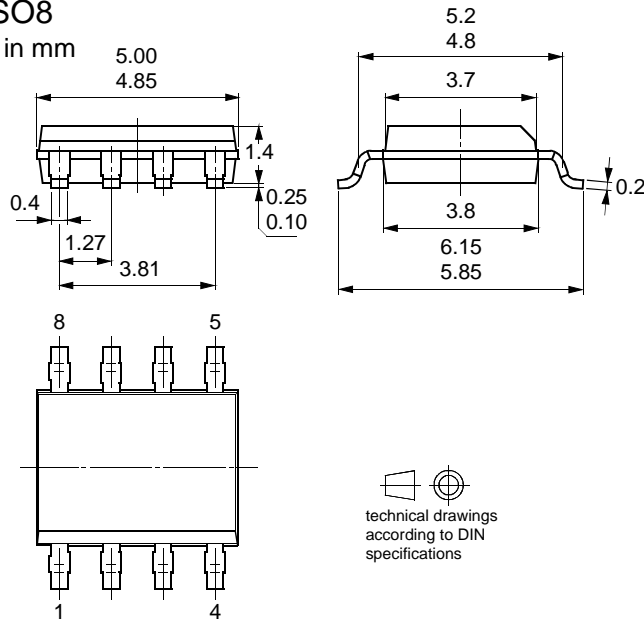
Package DIP8

Dimensions in mm



Package SO8

Dimensions in mm





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