

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

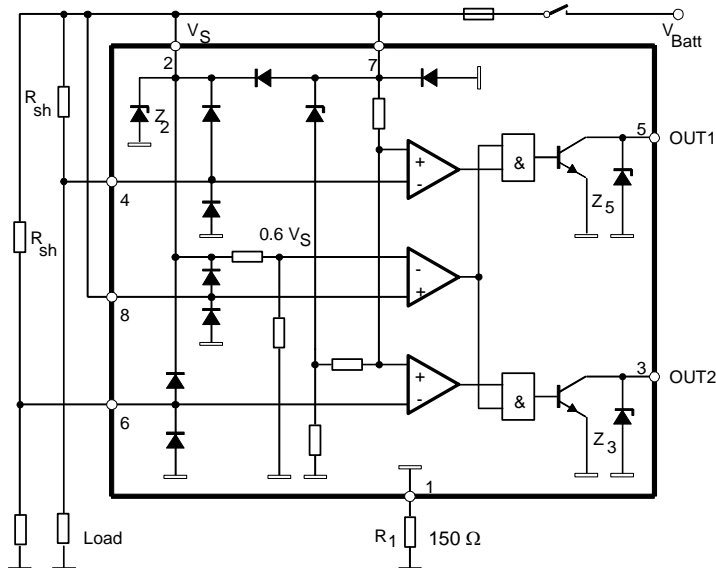
Description

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 break-down 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

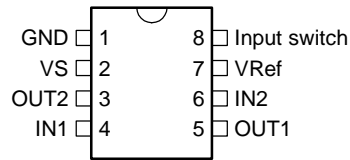


Current Monitor IC

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

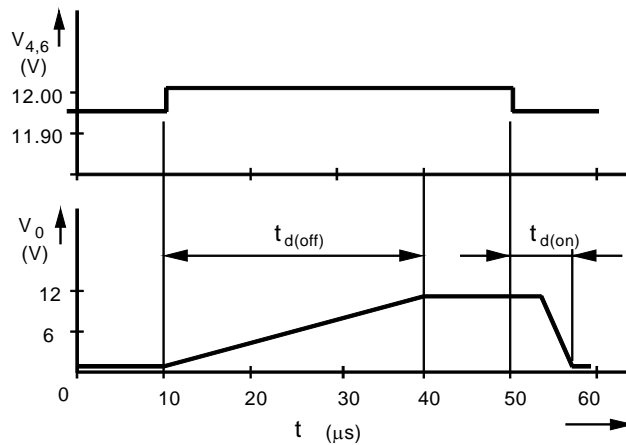
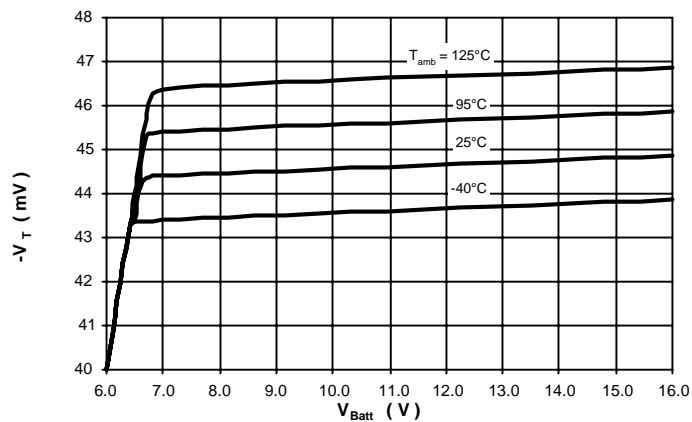


Figure 4. Threshold Voltage = $f(V_{\text{Batt}}$ and Temperature)



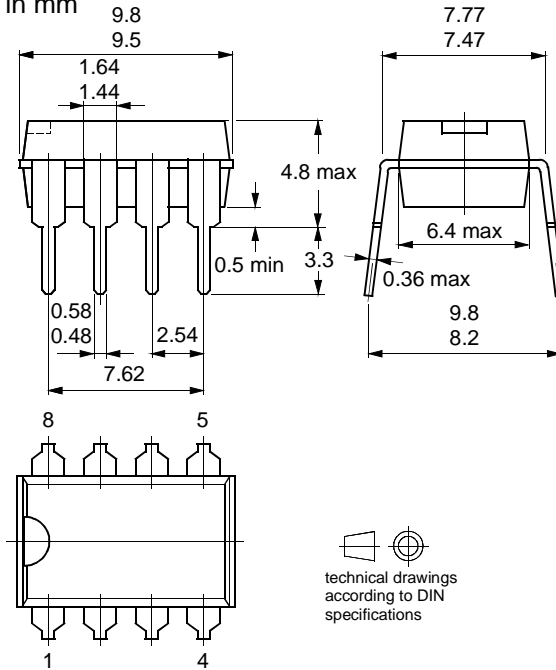
Ordering Information

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

Package Information

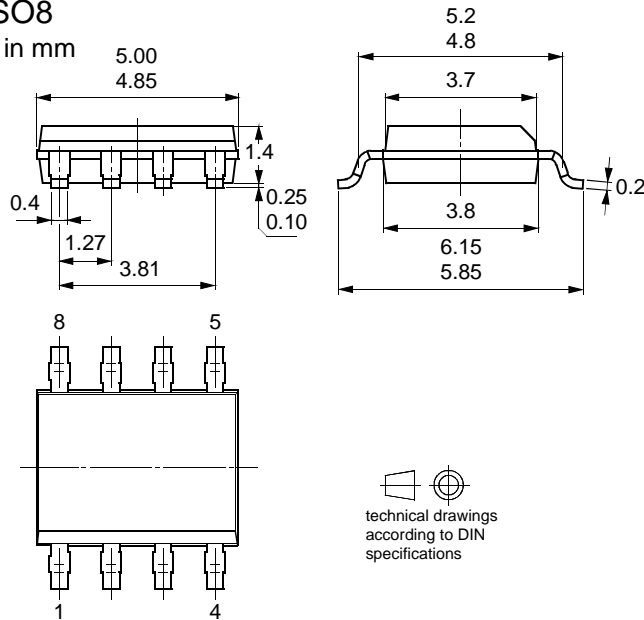
Package DIP8

Dimensions in mm



Package SO8

Dimensions in mm





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