



### **Automotive Lamp-outage Monitor IC**

#### **DATASHEET**

#### **Features**

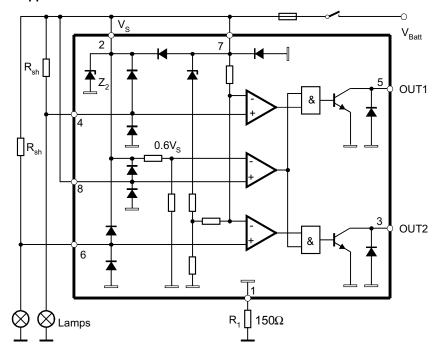
- 2-kV ESD protection
- Two comparators with common reference
- Tight threshold tolerance
- Threshold matched to PTC characteristic of incandescent lamps
- Temperature compensated
- NPN output
- Interference and damage-protection according to VDE 0839
- EMI protection
- Reversal polarity protection
- Load-dump protection

#### **Description**

The Atmel® monolithic integrated bipolar circuit, U479B, is designed as a monitor for lamp failure in automobiles. The comparator threshold is matched to the PTC characteristic of incandescent lamps. The threshold is tied to  $V_{4.6} = V_S - V_T$  where  $V_T = 8mV$ .

If the voltage drop across the shunt resistor,  $R_{sh}$ , exceeds 8mV, the output is turned off, otherwise, the output is turned on. Without supply voltage or open input pin 8, the output is turned off. A comparator input, which is not used, must be connected to pin 7.

Figure 1. Schematic and Application Circuit





# 1. Pin Configuration

Figure 1-1. Pinning SO8

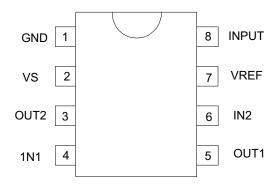


Table 1-1. Pin Description

| 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  | Input switch            |



### 2. 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  | Pin  | Symbol                               | Value       | Unit     |
|---|------|--------------------------------------|-------------|----------|
| Supply voltage  | 2, 7 | V <sub>S</sub>                       | 16.5        | V        |
| Current consumption, t = 2 ms   | 1    | I <sub>1</sub>                       | 1.5         | Α        |
| Output current  | 3, 5 | I <sub>3,5</sub>                     | 20          | mA       |
| Input voltage<br>Reference point pin 7                                      | 4, 6 | -V <sub>4,6</sub>                    | 6           | V        |
| Power dissipation SO8<br>$T_{amb} = 95^{\circ}C$<br>$T_{amb} = 60^{\circ}C$ |      | P <sub>tot</sub><br>P <sub>tot</sub> | 360<br>560  | mW<br>mW |
| Ambient temperature range   |      | $T_{amb}$                            | -40 to +95  | °C       |
| Storage temperature range   |      | $T_{stg}$                            | -55 to +125 | °C       |
| Junction temperature  |      | T <sub>j</sub>                       | 150         | °C       |

### 3. Thermal Resistance

| Parameters           | Symbol             | Value | Unit |
|----------------------|--------------------|-------|------|
| Junction ambient SO8 | R <sub>th,JA</sub> | 160   | K/W  |

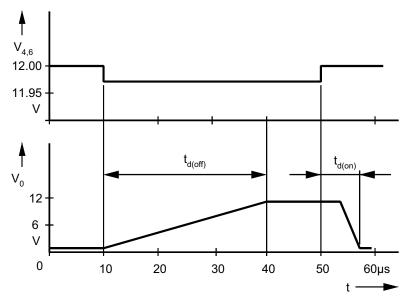


### 4. Electrical Characteristics

 $V_S$  = 9V to 15V,  $T_{amb}$  = -40 to +95°C, Figure 1 on page 2, unless otherwise specified.

| Parameters                      | Test Conditions  | Pin  | Symbol                             | Min.       | Тур.               | Max.        | Unit     |
|---------------------------------|--|------|------------------------------------|------------|--------------------|-------------|----------|
| Supply voltage                  |  | 2, 7 | V <sub>S</sub>                     | 9          |                    | 15          | V        |
| Internal Z-diode Z <sub>2</sub> |  | 2    | $V_Z$                              | 20         |                    |             | V        |
| Current consumption             | V <sub>S</sub> = 12V   | 1    | I <sub>1</sub>                     |            | 4.5                | 6           | mA       |
| Output saturation voltage       | $V_S = 9V$ , $I_{3,5} = 10mA$<br>$T_{amb} = 25^{\circ}C$                                   | 3, 5 | $V_{sat}$                          |            |                    | 0.5         | V        |
| Control signal threshold        | Reference point $V_{Pin 7}$<br>$I_{3,5} = 3mA$<br>$V_{S} = 12V$<br>$V_{S} = 15V$           | 4, 6 | -V <sub>T</sub><br>-V <sub>T</sub> | 6.5<br>7.8 | 8<br>9.3           | 9.5<br>10.8 | mV<br>mV |
| Voltage drift                   | $\Delta V = \frac{V_{T(15 \text{ V})} - V_{T(12 \text{ V})}}{15 \text{ V} - 12 \text{ V}}$ |      | ΔV                                 |            | 0.45               |             | mV/V     |
| Threshold voltage               | Switch identification  | 8    | $V_8$                              |            | 0.6 V <sub>S</sub> |             | V        |
| Input currente                  | Input 1/input 2  | 4, 6 | I <sub>I</sub>                     |            | 100                |             | nA       |
| Input currents                  | Input switch   | 8    | I <sub>I</sub>                     |            | 5                  |             | μA       |
| Delay time                      | Switch-on, high to low   | 3, 5 | $t_{d(on)}$                        |            | 6                  |             | μs       |
| Delay liftle                    | Switch-off, low to high  |      | $t_{d(off)}$                       |            | 30                 |             | μs       |

Figure 4-1. Delay Times





## 5. Ordering Information

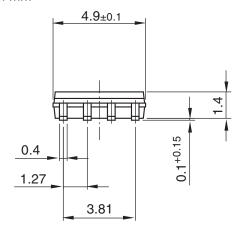
| Extended Type Number | Package | Remarks                   |
|----------------------|---------|---------------------------|
| U479B-MFPY           | SO8     | Tubed, Pb-free            |
| U479B-MFPG3Y         | SO8     | Taped and reeled, Pb-free |

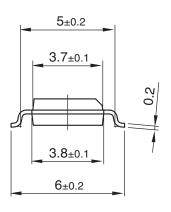
## 6. Package Information

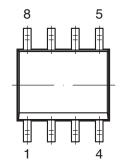
Figure 6-1. SO8

Package: SO 8

Dimensions in mm









technical drawings according to DIN specifications

Drawing-No.: 6.541-5031.01-4

Issue: 1; 15.08.06



# 7. Revision History

Please note that the following page numbers referred to in this section refer to the specific revision mentioned, not to this document.

| Revision No.     | History  |
|------------------|--|
|                  | Section 2 "Absolute Maximum Ratings" on page 4 changed               |
| 4775C-AUTO-06/12 | <ul> <li>Section 3 "Thermal Resistance" on page 4 changed</li> </ul> |
|                  | Section 5 "Ordering Information" on page 6 changed                   |
|                  | Section 6 "Package Information" on page 6 changed                    |
|                  | Put datasheet in a new template                                      |
| 4775B-AUTO-09/05 | Pb-free logo on page 1 added   |
|                  | Ordering Information on page 5 changed                               |





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