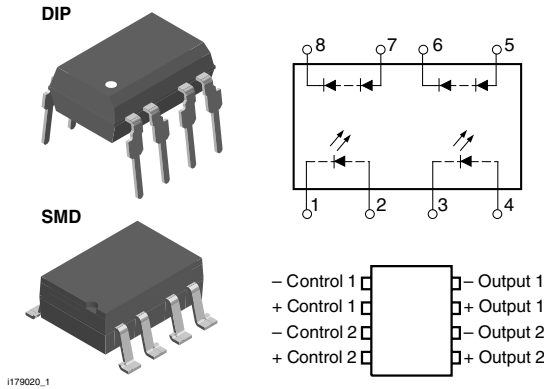


## Dual Photovoltaic MOSFET Driver Solid State Relay



### DESCRIPTION

The VO1263AB/AAC photovoltaic MOSFET driver consists of two LEDs optically coupled to two photodiode arrays. The photodiode array provides a floating source with adequate voltage and current to drive high-power MOSFET transistors. Optical coupling provides a high I/O isolation voltage. In order to turn the MOSFET off, an external resistance (gate-to-source) is required for gate discharge.

### FEATURES

- High open circuit voltage, up to 14.6 V typical
- High short circuit current, up to 42  $\mu$ A typical
- Isolation test voltage 5300 V<sub>RMS</sub>
- Logic compatible input
- High reliability
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



**RoHS**  
COMPLIANT

### APPLICATIONS

- High-side driver
- Solid state relays
- Floating power supply
- Power control
- Data acquisition
- ATE
- Isolated switching

#### Note

See "solid state relays" (application note 56)

### AGENCY APPROVALS

UL1577: file no. E52744 system code H or J, double protection

DIN EN: 60747-5-5

CUL: file no. E52744, equivalent to CSA bulletin 5A

| ORDER INFORMATION |               |         |
|-------------------|---------------|---------|
| PART              | REMARKS       | PACKAGE |
| VO1263AAC         | Tubes         | SMD-8   |
| VO1263AACTR       | Tape and reel | SMD-8   |
| VO1263AB          | Tubes         | DIP-8   |

| ABSOLUTE MAXIMUM RATINGS (1)                 |                            |           |               |                    |
|--|----------------------------|-----------|---------------|--------------------|
| PARAMETER                                    | TEST CONDITION             | SYMBOL    | VALUE         | UNIT               |
| <b>SSR</b>                                   |                            |           |               |                    |
| LED input ratings continuous forward current |                            | $I_F$     | 50            | mA                 |
| LED input ratings reverse voltage            | $I_R \leq 10 \mu\text{A}$  | $V_R$     | 5.0           | V                  |
| Photodiode array reverse voltage             | $I_R \leq 2.0 \mu\text{A}$ | $V_R$     | 100           | V                  |
| Ambient operating temperature range          |                            | $T_{amb}$ | - 40 to + 100 | $^{\circ}\text{C}$ |
| Storage temperature range                    |                            | $T_{stg}$ | - 40 to + 150 | $^{\circ}\text{C}$ |
| Pin soldering temperature (2)                | $t = 7.0 \text{ s max.}$   | $T_{sld}$ | 270           | $^{\circ}\text{C}$ |
| Input to output isolation voltage            | $t = 60 \text{ s min.}$    | $V_{ISO}$ | 5300          | $V_{RMS}$          |

#### Notes

(1)  $T_{amb} = 25 \text{ }^{\circ}\text{C}$ , unless otherwise specified.

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

(2) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP).

| ELECTRICAL CHARACTERISTICS                |                                 |              |      |      |      |               |
|---|---------------------------------|--------------|------|------|------|---------------|
| PARAMETER                                 | TEST CONDITION                  | SYMBOL       | MIN. | TYP. | MAX. | UNIT          |
| LED forward voltage                       | $I_F = 10 \text{ mA}$           | $V_F$        | 1.2  | 1.3  | 1.6  | V             |
| Detector reverse voltage                  | $I_R = 2.0 \text{ }\mu\text{A}$ | $V_{R(PDA)}$ |      | 350  |      | V             |
| Open circuit voltage (pins 5, 6 or 7, 8)  | $I_F = 5.0 \text{ mA}$          | $V_{OC}$     |      | 13.3 |      | V             |
|   | $I_F = 10 \text{ mA}$           | $V_{OC}$     | 10.3 | 13.8 | 16.5 | V             |
|   | $I_F = 15 \text{ mA}$           | $V_{OC}$     |      | 14   |      | V             |
|   | $I_F = 20 \text{ mA}$           | $V_{OC}$     |      | 14.3 |      | V             |
|   | $I_F = 30 \text{ mA}$           | $V_{OC}$     |      | 14.6 |      | V             |
| Short circuit current (pins 5, 6 or 7, 8) | $I_F = 5.0 \text{ mA}$          | $I_{SC}$     | 3.0  | 6.0  |      | $\mu\text{A}$ |
|   | $I_F = 10 \text{ mA}$           | $I_{SC}$     | 7.5  | 15   |      | $\mu\text{A}$ |
|   | $I_F = 15 \text{ mA}$           | $I_{SC}$     | 11   | 22   |      | $\mu\text{A}$ |
|   | $I_F = 20 \text{ mA}$           | $I_{SC}$     | 15   | 30   |      | $\mu\text{A}$ |
|   | $I_F = 30 \text{ mA}$           | $I_{SC}$     | 21   | 42   |      | $\mu\text{A}$ |

**Note**

$T_{amb} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified.

Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluations. Typical values are for information only and are not part of the testing requirements.

| SAFETY AND INSULATION RATINGS                        |                |        |      |           |      |                  |
|--|----------------|--------|------|-----------|------|------------------|
| PARAMETER  | TEST CONDITION | SYMBOL | MIN. | TYP.      | MAX. | UNIT             |
| Climatic classification (according to IEC 68 part 1) |                |        |      | 40/100/21 |      |                  |
| Comparative tracking index                           |                | CTI    | 175  |           | 399  |                  |
| $V_{IOTM}$   |                |        | 8000 |           |      | V                |
| $V_{IORM}$   |                |        | 630  |           |      | V                |
| $P_{SO}$   |                |        |      |           | 500  | mW               |
| $I_{SI}$   |                |        |      |           | 300  | mA               |
| $T_{SI}$   |                |        |      |           | 175  | $^\circ\text{C}$ |
| Creepage distance                                    |                |        | 7    |           |      | mm               |
| Clearance distance                                   |                |        | 7    |           |      | mm               |

**FUNCTIONAL DESCRIPTION**

Figure 1 outlines the IV characteristics of the illuminated photodiode array (PDA). For operation at voltages below  $V_{OC}$ , the PDA acts as a nearly constant current source. The actual region of operation depends upon the load.

The amount of current applied to the LED (pins 1 and 2 or 3 and 4) determines the amount of light produced for the PDA. For high temperature operation, more LED current may be required.



# VO1263AAC/VO1263AACTR/VO1263AB

Dual Photovoltaic MOSFET Driver Solid State Relay Vishay Semiconductors

## TYPICAL CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

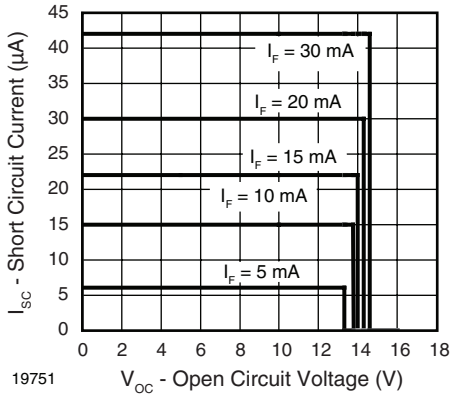


Fig. 1 - Short Circuit Current vs. Open Circuit Voltage

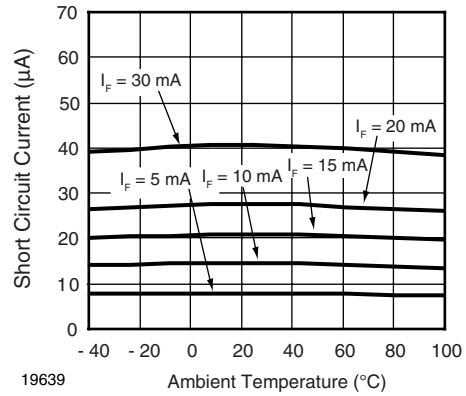


Fig. 4 - Short Circuit Current vs. Temperature

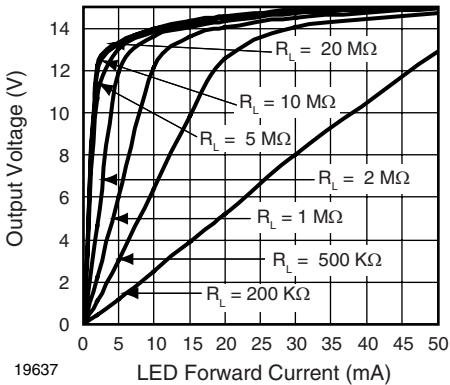


Fig. 2 - Output Voltage vs. LED Current

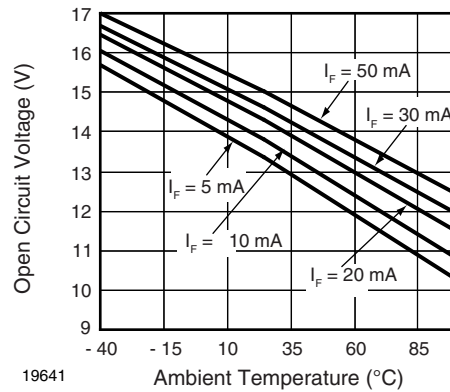


Fig. 5 - Open Circuit Voltage vs. Temperature

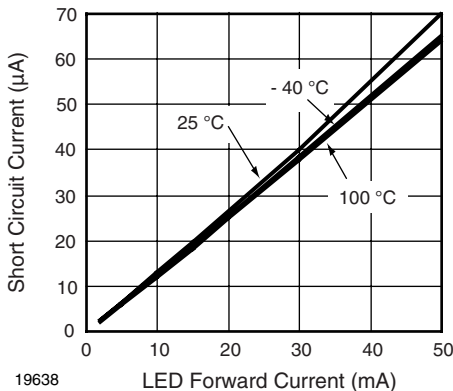


Fig. 3 -  $I_{sc}$  vs. LED Forward Current

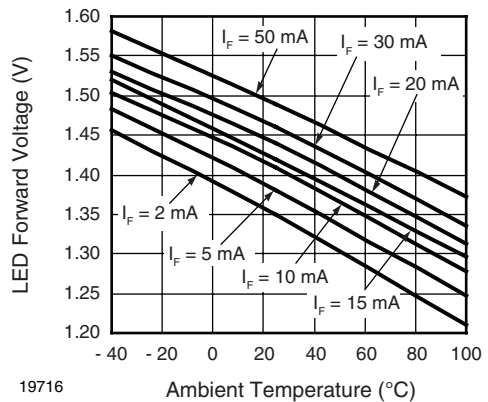
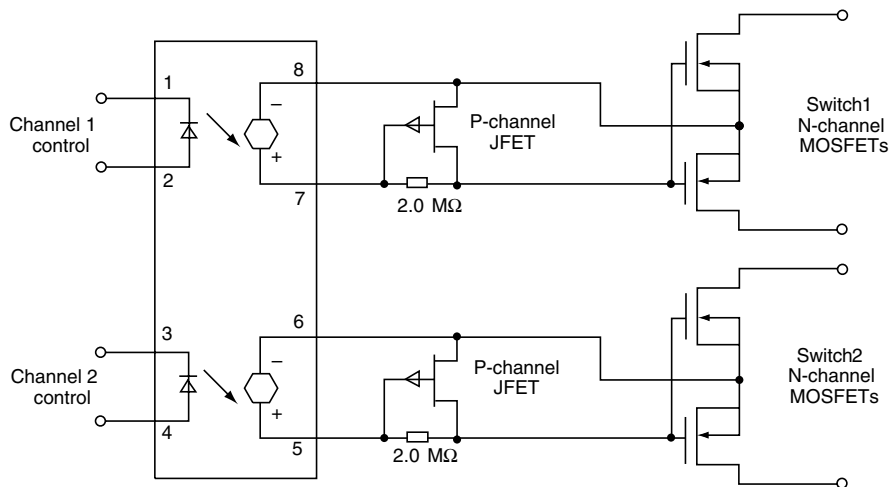


Fig. 6 - LED Forward Voltage vs. Temperature

# VO1263AAC/VO1263AACTR/VO1263AB

Vishay Semiconductors Dual Photovoltaic MOSFET Driver Solid State Relay



ih1262cb\_09

Fig. 7 - Typical Dual Form A Solid State Relay Application

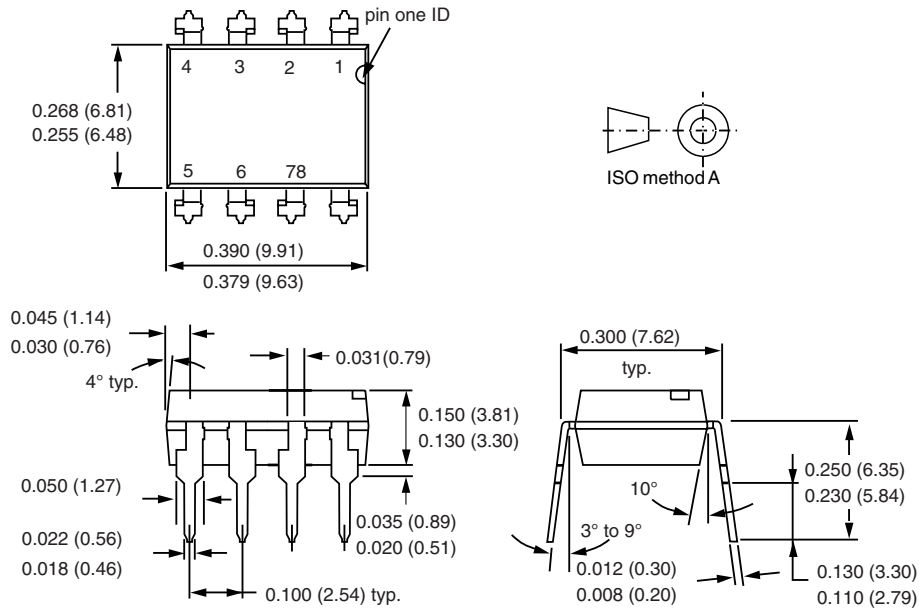


# VO1263AAC/VO1263AACTR/VO1263AB

Dual Photovoltaic MOSFET Driver Solid State Relay Vishay Semiconductors

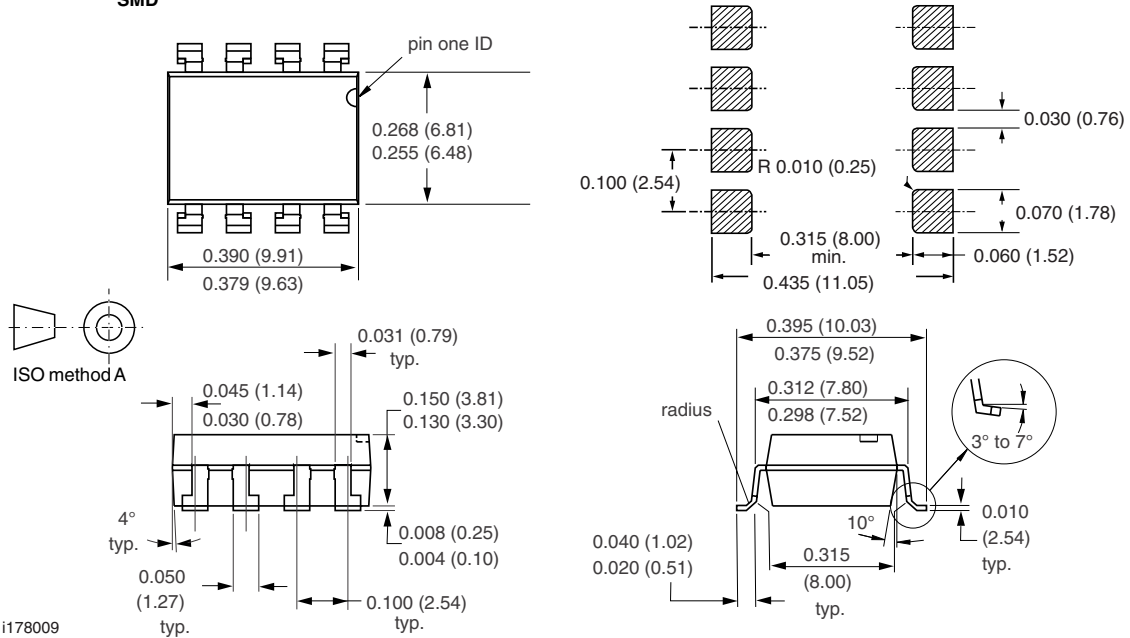
## PACKAGE DIMENSIONS in inches (millimeters)

### DIP



i178008

### SMD



i178009



## **OZONE DEPLETING SUBSTANCES POLICY STATEMENT**

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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.

Vishay Semiconductor 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.

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

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