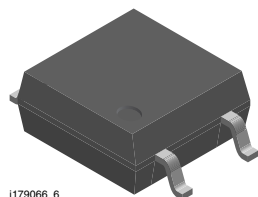
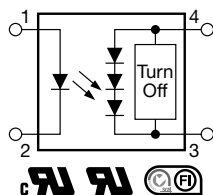




# Photovoltaic MOSFET Driver with Integrated Fast Turn-Off, Solid-State Relay



1179066\_6



**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)

## FEATURES

- Open circuit voltage at  $I_F = 10$  mA, 8.4 V typical
- Short circuit current at  $I_F = 10$  mA, 15  $\mu$ A typical
- Isolation test voltage 4500 V<sub>RMS</sub>
- Logic compatible input
- High reliability
- Integrated rapid turn-off circuitry
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

## APPLICATIONS

- High-side driver
- Solid-state relays
- Floating power supply
- Power control
- Data acquisition
- ATE
- Isolated solenoid drivers
- Isolated high current relay drivers
- Isolated high voltage relay drivers

## AGENCY APPROVALS

- UL1577
- cUL, equivalent to CSA bulletin 5A
- FIMKO EN 60950-1

## SAFETY AGENCY COMPLIANCE

Please see document: [www.vishay.com/doc?83743](http://www.vishay.com/doc?83743)

## DESCRIPTION

The VOM1271 is a stand-alone optically isolated MOSFET driver. Unlike conventional MOSFET drivers, which require an external power supply to provide  $V_{CC}$  and or  $V_{DD}$  rails to the driver itself, the VOM1271 obtains all the required current to drive its internal circuitry from the LED current on the low voltage primary side of the isolation barrier. This saves the designer the space and cost associated with providing one or more external power supplies. The VOM1271 also integrates a turn-off circuit internal to the component itself, thus doing away with the need for additional components in order to increase the overall switching speed by decreasing the turn-off time. These features, combined with a small SOP4 package, provide designers with a small footprint, highly integrated isolated gate driver solution for a large variety of MOSFET drive applications.

## ORDERING INFORMATION

|                                                                                                                                                                                                                                                                                                              |  |  |  |  |                |  |  |  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|----------------|--|--|--|--|
| <div><div><div>V</div><div>O</div><div>M</div><div>1</div><div>2</div><div>7</div><div>1</div></div><div>PART NUMBER</div></div> <div><div>T</div><div>TAPE AND REEL</div></div> <div><div>SOP-4</div><div></div></div> |  |  |  |  |                |  |  |  |  |
| PACKAGE                                                                                                                                                                                                                                                                                                      |  |  |  |  | UL, cUL, FIMKO |  |  |  |  |
| SOP-4                                                                                                                                                                                                                                                                                                        |  |  |  |  | VOM1271T       |  |  |  |  |

### Note

- For additional information on the available options refer to option information. The product is available only on tape and reel.

| <b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                  |           |               |                    |
|--------------------------------------------------------------------------------------------------------|----------------------------------|-----------|---------------|--------------------|
| PARAMETER                                                                                              | TEST CONDITION                   | SYMBOL    | VALUE         | UNIT               |
| <b>SSR</b>                                                                                             |                                  |           |               |                    |
| LED input ratings continuous forward current                                                           |                                  | $I_F$     | 50            | mA                 |
| LED input ratings reverse voltage                                                                      | $I_R \leq 10\text{ }\mu\text{A}$ | $V_R$     | 5             | V                  |
| Ambient operating temperature range                                                                    |                                  | $T_{amb}$ | - 40 to + 100 | $^{\circ}\text{C}$ |
| Storage temperature range                                                                              |                                  | $T_{stg}$ | - 40 to + 125 | $^{\circ}\text{C}$ |
| Pin soldering temperature <sup>(1)</sup>                                                               | $t \leq 10\text{ s max.}$        | $T_{sld}$ | 260           | $^{\circ}\text{C}$ |
| Isolation test voltage between emitter and detector                                                    | $t = 1\text{ s}$                 | $V_{ISO}$ | 4500          | $V_{RMS}$          |

**Notes**

- 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.

<sup>(1)</sup> Refer to reflow profile for soldering conditions for surface mounted devices (SOP).

| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                      |          |      |      |      |               |
|----------------------------------------------------------------------------------------------------------|----------------------|----------|------|------|------|---------------|
| PARAMETER                                                                                                | TEST CONDITION       | SYMBOL   | MIN. | TYP. | MAX. | UNIT          |
| LED forward voltage                                                                                      | $I_F = 10\text{ mA}$ | $V_F$    | 1.2  | 1.4  | 1.6  | V             |
| Open circuit voltage                                                                                     | $I_F = 5\text{ mA}$  | $V_{OC}$ |      | 8.1  |      | V             |
|                                                                                                          | $I_F = 10\text{ mA}$ | $V_{OC}$ | 7.8  | 8.4  |      | V             |
|                                                                                                          | $I_F = 20\text{ mA}$ | $V_{OC}$ |      | 8.7  |      | V             |
|                                                                                                          | $I_F = 30\text{ mA}$ | $V_{OC}$ |      | 8.9  |      | V             |
|                                                                                                          | $I_F = 5\text{ mA}$  | $I_{SC}$ |      | 7.0  |      | $\mu\text{A}$ |
| Short circuit current                                                                                    | $I_F = 10\text{ mA}$ | $I_{SC}$ | 6.0  | 15.0 |      | $\mu\text{A}$ |
|                                                                                                          | $I_F = 20\text{ mA}$ | $I_{SC}$ |      | 30.0 |      | $\mu\text{A}$ |
|                                                                                                          | $I_F = 30\text{ mA}$ | $I_{SC}$ |      | 47.0 |      | $\mu\text{A}$ |

**Note**

- 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.

| <b>SWITCHING CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                                                                           |           |      |      |      |               |
|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------|------|------|------|---------------|
| PARAMETER                                                                                               | TEST CONDITION                                                                            | SYMBOL    | MIN. | TYP. | MAX. | UNIT          |
| Turn-on time                                                                                            | $C_L = 200\text{ pF}$ , $I_F = 20\text{ mA}$ ,<br>$P_W = 2\text{ ms}$ , duty cycle = 50 % | $t_{on}$  |      | 53   |      | $\mu\text{s}$ |
| Turn-off time                                                                                           |                                                                                           | $t_{off}$ |      | 24   |      | $\mu\text{s}$ |

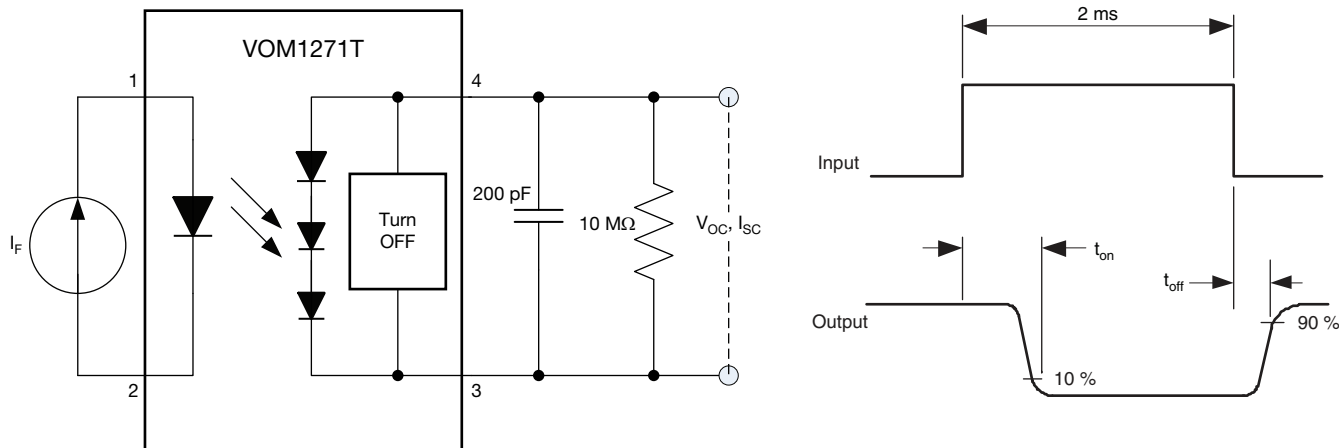


Fig. 1 -  $t_{on}$ ,  $t_{off}$  Test Circuit and Waveforms

**SAFETY AND INSULATION RATINGS**

| PARAMETER                                            | TEST CONDITION        | SYMBOL     | MIN. | TYP.      | MAX. | UNIT |
|------------------------------------------------------|-----------------------|------------|------|-----------|------|------|
| Climatic classification (according to IEC 68 part 1) | IEC 68 part 1         |            |      | 40/100/21 |      |      |
| Comparative tracking index                           | Insulation group IIIa | CTI        | 175  |           | 399  |      |
| Transient overvoltage                                |                       | $V_{IOTM}$ |      |           | 6000 | V    |
| Recurring peak voltage                               |                       | $V_{IORM}$ |      |           | 630  | V    |
| Package safety power                                 |                       | $P_{SO}$   |      |           | 350  | mW   |
| Package safety current                               |                       | $I_{SI}$   |      |           | 150  | mA   |
| Package safety temperature                           |                       | $T_{SI}$   |      |           | 175  | °C   |
| Creepage distance                                    |                       |            | 5    |           |      | mm   |
| Clearance distance                                   |                       |            | 5    |           |      | mm   |

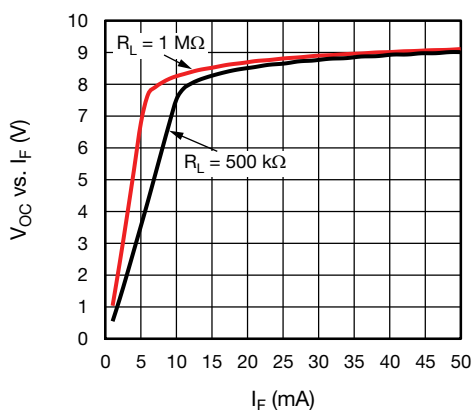
**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)


Fig. 2 - Output Open Circuit Voltage vs. LED Current

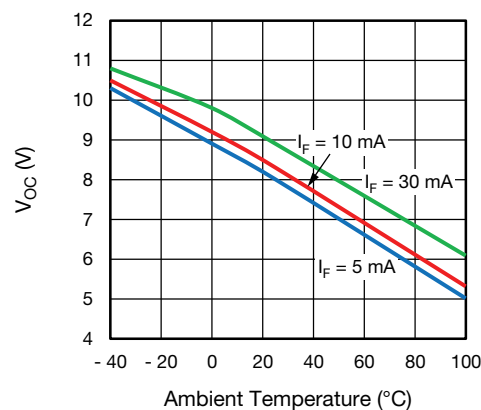


Fig. 4 - Output Open Circuit Voltage vs. Ambient Temperature

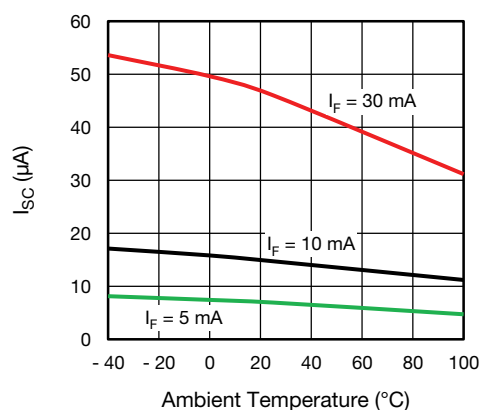
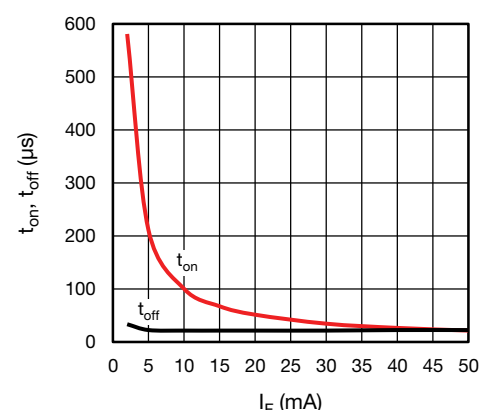


Fig. 3 - Output Short-Circuit Current vs. Ambient Temperature


Fig. 5 -  $t_{on}$ ,  $t_{off}$  vs. LED Current

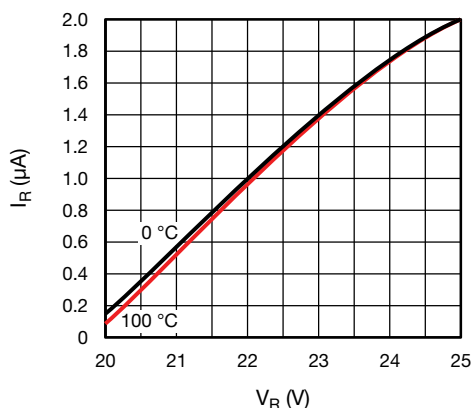


Fig. 6 - LED Reverse Current vs. Reverse Voltage

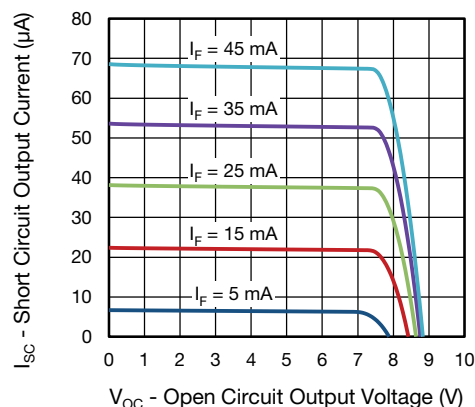


Fig. 8 - Short Circuit Output Current vs. Open Circuit Output Voltage

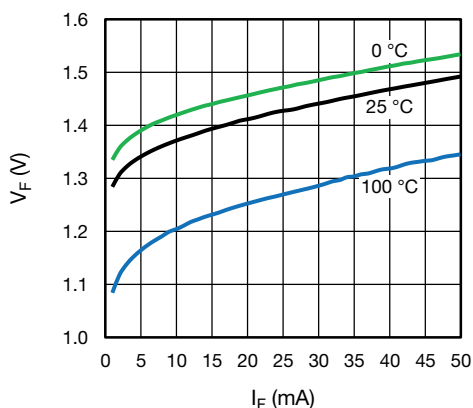


Fig. 7 - LED Forward Voltage vs. LED Forward Current

## APPLICATION DESCRIPTION

Figure 8 illustrates a standard isolated MOSFET driver such as Vishay's VO1263. Though these parts are generally capable of supplying higher output current, they lack integrated fast turn-off circuitry. Thus, if high turn-off speed is required, external circuitry needs to be provided, as illustrated in figure one.

Figure 9 illustrates the ability to do away with external turn-off circuitry with the VOM1271, by taking advantage of the VOM1271's integrated turn-off circuitry.

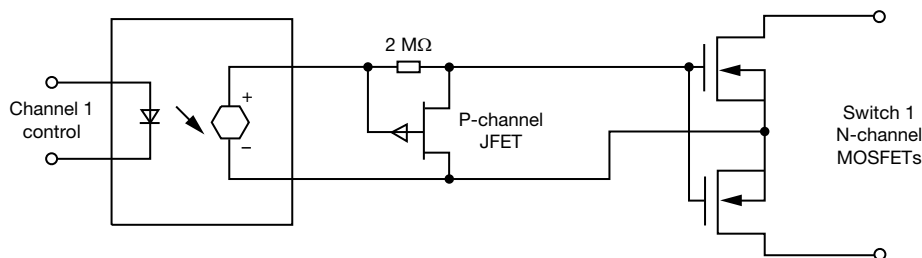


Fig. 9 - Typical MOSFET Driver Application without Integrated Fast Turn-Off

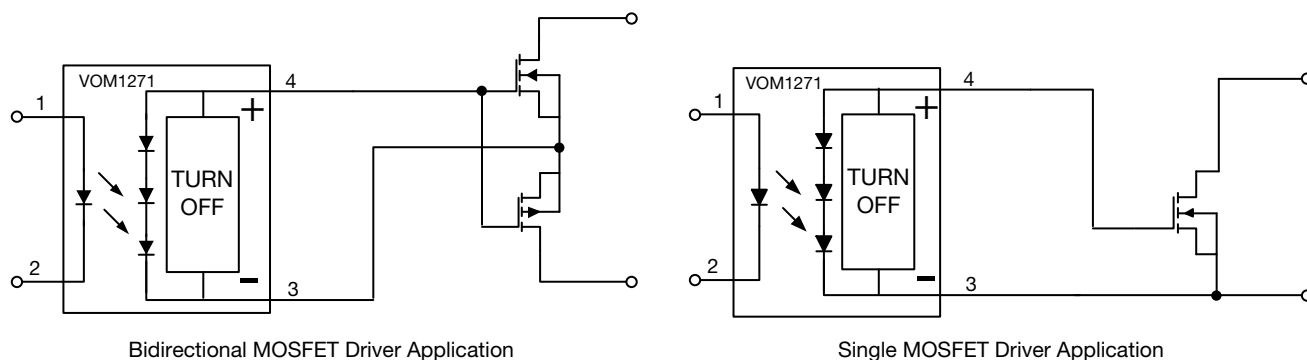
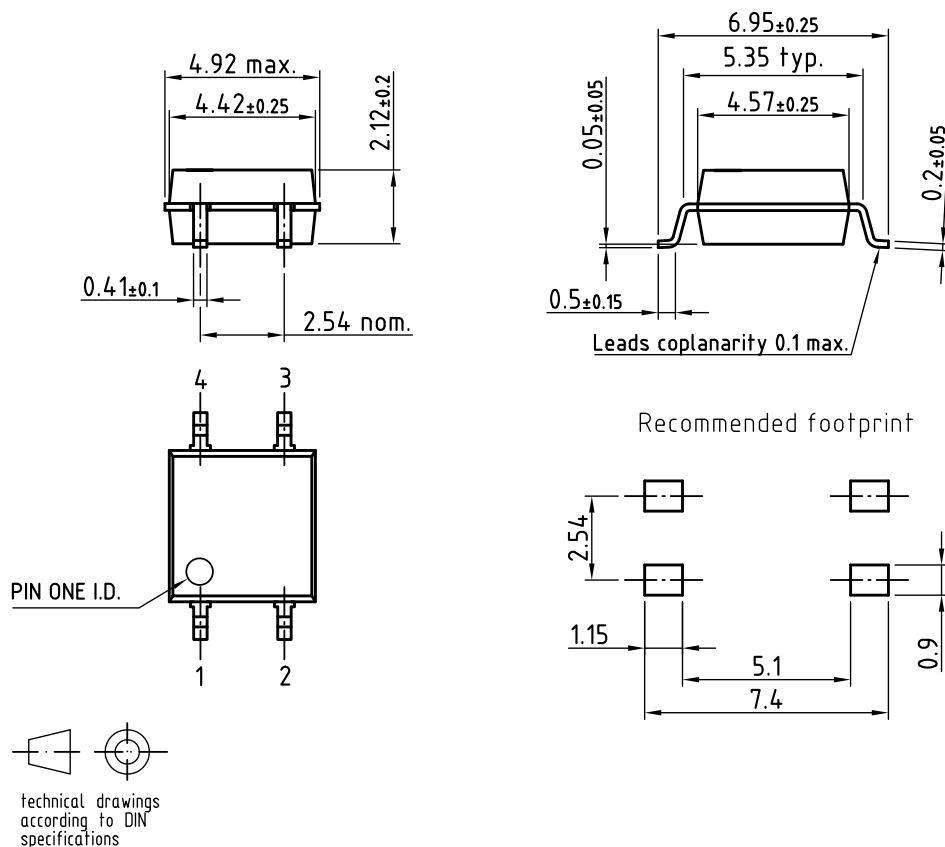
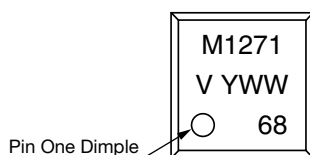


Fig. 10 - Typical Bidirectional MOSFET Driver Application with Integrated Fast Turn-Off

### PACKAGE DIMENSIONS in millimeters



### PACKAGE MARKING (example)



## TAPE AND REEL PACKAGING

Dimensions in millimeters

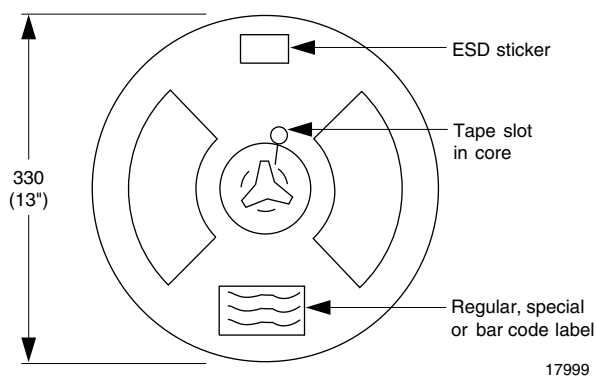


Fig. 11 - Tape and Reel Shipping Medium  
(EIA-481, revision A, and IEC 60286), 2000 units per reel

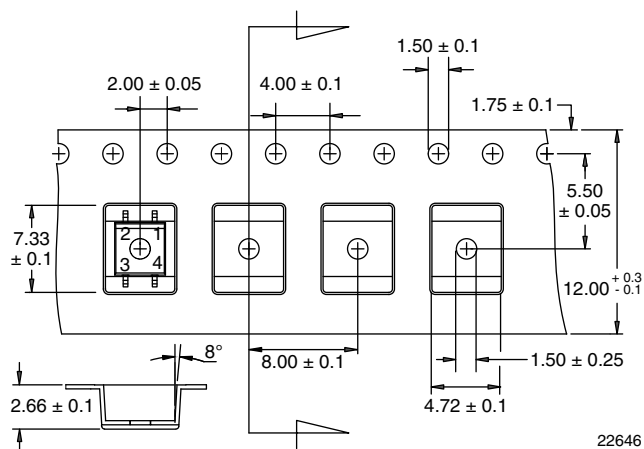


Fig. 12 - Tape Dimensions



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