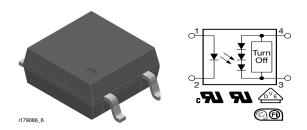


Photovoltaic MOSFET Driver With Integrated Fast Turn-Off, Solid-State Relay



FEATURES

- Open circuit voltage at I_F = 10 mA, 8.4 V typical
- Short circuit current at I_F = 10 mA, 15 μA typical
- Isolation test voltage 3750 V_{RMS}
- · Logic compatible input
- · High reliability
- Integrated rapid turn-off circuitry
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>





COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

LINKS TO ADDITIONAL RESOURCES









DESCRIPTION

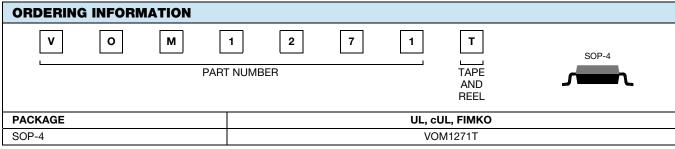
The VOM1271 is a stand-alone optically isolated MOSFET driver. Unlike conventional MOSFET drivers, which require an external power supply to provide V_{CC} and or V_{DD} rails to the driver itself, the VOM1271 obtains all the required current to drive its internal circuitry from the LED current on the 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 driver applications.

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

- UL
- cUL
- VDE
- FIMKO



Note

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



ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT		
SSR						
LED continous forward current		l _F	50	mA		
LED reverse voltage	I _R ≤ 10 μA	V _R	5	V		
Ambient operating temperature range		T _{amb}	-40 to +100	°C		
Storage temperature range		T _{stg}	-40 to +125	°C		
Pin soldering temperature (1)	t = 10 s	T _{sld}	260	°C		

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.
- (1) Refer to reflow profile for soldering conditions for surface mounted devices (SOP)

ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED forward voltage	I _F = 10 mA	V_{F}	1.2	1.4	1.6	V
Open circuit voltage	I _F = 5 mA	V _{OC}	-	8.1	-	V
	I _F = 10 mA	V _{OC}	7.8	8.4	-	V
	I _F = 20 mA	V _{OC}	-	8.7	-	V
	I _F = 30 mA	V _{OC}	-	8.9	-	V
Short circuit current	I _F = 5 mA	I _{SC}	-	7.0	-	μΑ
	I _F = 10 mA	I _{SC}	6.0	15.0	-	μA
	I _F = 20 mA	I _{SC}	-	30.0	-	μΑ
	I _F = 30 mA	I _{SC}	-	47.0	-	μΑ

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.

SWITCHING CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$C_L = 200 \text{ pF}, I_F = 20 \text{ mA},$	t _{on}	-	53	-	μs
Turn-off time	$P_W = 2 \text{ ms, duty cycle} = 50 \%$	t _{off}	-	65	-	μs

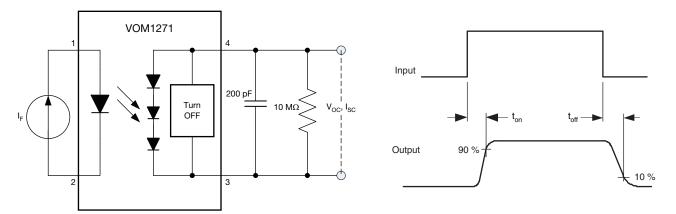


Fig. 1 - t_{on}, t_{off} Test Circuit and Waveforms

SAFETY AND INSULATION RATINGS					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Climatic classification	According to IEC 68 part 1		55 / 110 / 21		
Pollution degree	According to DIN VDE 0109		2		
Comparative tracking index	Insulation group IIIa	CTI	175		
Maximum rated withstanding isolation voltage	According to UL1577, t = 1 min	V _{ISO}	3750	V _{RMS}	
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	6000	V _{peak}	
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V _{IORM}	707	V _{peak}	
Leafalter metalance	T _{amb} = 25 °C, V _{IO} = 500 V	R _{IO}	≥ 10 ¹²	Ω	
Isolation resistance	T _{amb} = 100 °C, V _{IO} = 500 V	R _{IO}	≥ 10 ¹¹	Ω	
Output safety power		P _{SO}	350	mW	
Input safety current		I _{SI}	150	mA	
Input safety temperature		T _S	175	°C	
Creepage distance	SOP-4		≥ 5	mm	
Clearance distance	SOP-4		≥ 5	mm	
Insulation thickness		DTI	≥ 0.4	mm	

Note

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

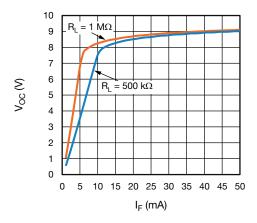


Fig. 2 - Output Open Circuit Voltage vs. LED Current

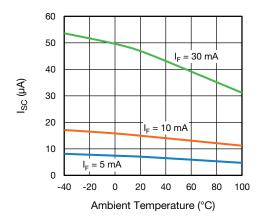


Fig. 3 - Output Short-Circuit Current vs. Ambient Temperature

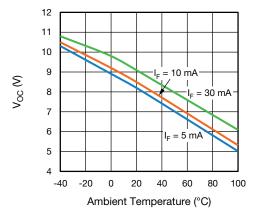


Fig. 4 - Output Open Circuit Voltage vs. Ambient Temperature

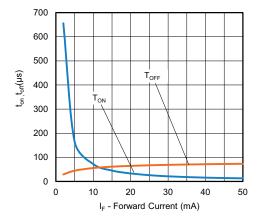


Fig. 5 - ton, toff vs. LED Current

As per DIN EN 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance
with the safety ratings shall be ensured by means of protective circuits.

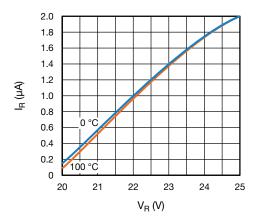


Fig. 6 - LED Reverse Current vs. Reverse Voltage

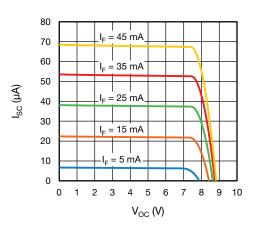


Fig. 8 - Short Circuit Output Current vs.
Open Circuit Output Voltage

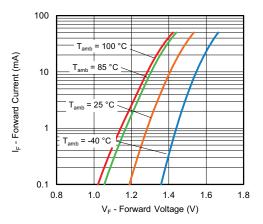


Fig. 7 - LED Forward Voltage vs. LED Forward Current

APPLICATION EXAMPLE

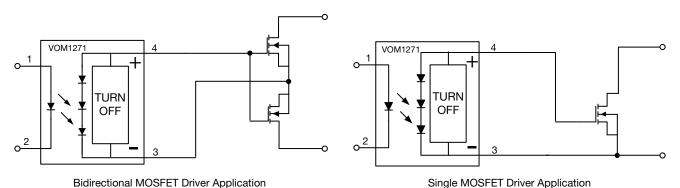
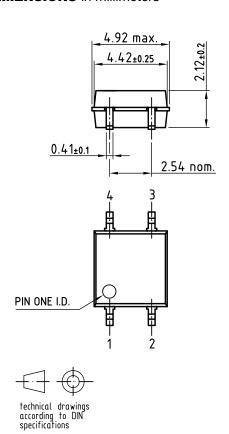
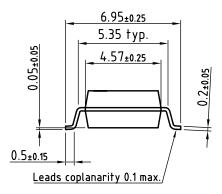


Fig. 9 - Typical MOSFET Driver Applications with Integrated Fast Turn-Off

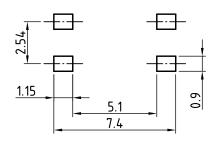


PACKAGE DIMENSIONS in millimeters

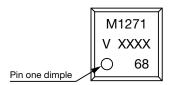




Recommended footprint



PACKAGE MARKING (example)



Note

• XXXX = LMC (lot marking code)

TAPE AND REEL PACKAGING

Dimensions in millimeters

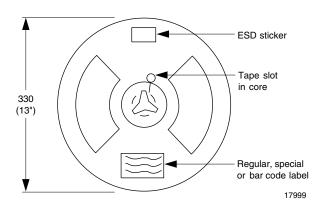


Fig. 10 - Tape and Reel Shipping Medium (EIA-481, revision A, and IEC 60286), 2000 units per reel

SOLDER PROFILES

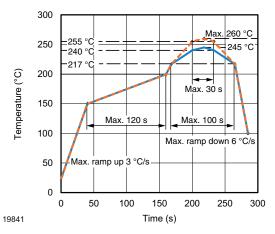


Fig. 12 - Lead (Pb)-free Reflow Solder Profile According to J-STD-020 for SMD Devices

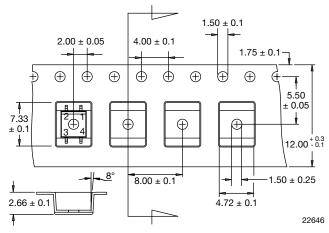


Fig. 11 - Tape Dimensions

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2 Floor life: unlimited

Conditions: T_{amb} < 30 °C, RH < 60 %

Moisture sensitivity level 1, according to J-STD-020



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