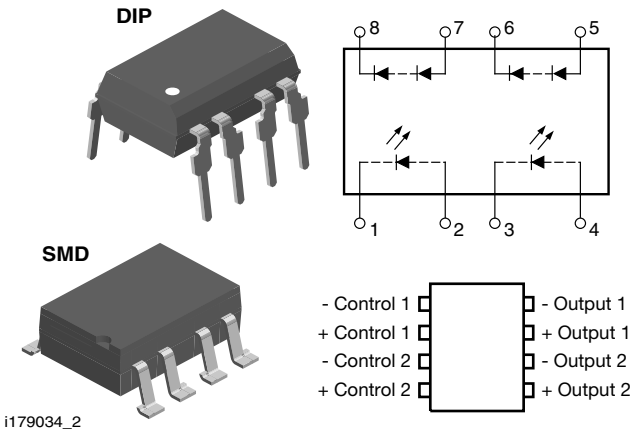
Dual Photovoltaic MOSFET Driver Solid-State Relay



FEATURES

- High open circuit voltage, up to 14.6 V typical
- High short circuit current, up to 42 µA typical
- Isolation test voltage 5300 V_{RMS}
- Logic compatible input
- High reliability
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

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

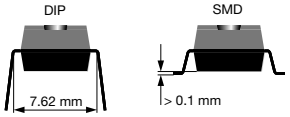
- UL1577
- DIN EN 60747-5-5 (VDE 0884-5)
- FIMKO
- BSI EN 60065, EN 60950-1
- CQC GB8898, GB4943-1

DESCRIPTION

The VO1263AB and VO1263AAC 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.

ORDERING INFORMATION

V	O	1	2	6	3	#	#	#	T	R
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.		TAPE AND REEL	



PACKAGE	UL, BSI, VDE, FIMKO
SMD-8	VO1263AAC
SMD-8, tape and reel	VO1263AACTR
DIP-8	VO1263AB

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
SSR				
LED input ratings continuous forward current		I_F	50	mA
LED input ratings reverse voltage	$I_R \leq 10$ µA	V_R	5.0	V
Photodiode array reverse voltage	$I_R \leq 2.0$ µA	V_R	100	V
Ambient operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 150	°C
Pin soldering temperature (1)	t = 7.0 s max.	T_{sld}	270	°C
Input to output isolation test voltage	t = 1 min	V_{ISO}	5300	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.

(1) 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 (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	1.3	1.6	V
Detector reverse voltage	I_R = 2.0 µA	$V_{R(PDA)}$		350		V
Open circuit voltage (pins 5, 6 or 7, 8)	I_F = 5.0 mA	V_{OC}		13.73		V
	I_F = 10 mA	V_{OC}	10.3	14.27	16.5	V
	I_F = 15 mA	V_{OC}		14.50		V
	I_F = 20 mA	V_{OC}		14.70		V
	I_F = 30 mA	V_{OC}		14.94		V
Short circuit current (pins 5, 6 or 7, 8)	I_F = 5.0 mA	I_{SC}	3.0	4.47		µA
	I_F = 10 mA	I_{SC}	7.5	9.8		µA
	I_F = 15 mA	I_{SC}	11	15.33		µA
	I_F = 20 mA	I_{SC}	15	20.97		µA
	I_F = 30 mA	I_{SC}	21	32.4		µA

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	I_F = 20 mA (1)	t_{on}		16		µs
Turn-off time	I_F = 20 mA (1)	t_{off}		472		µs

Note

(1) f = 1.0 kHz, pulse width = 100 µs, load (R_L) = 1.0 MΩ, 15 pF; measured at 90 % rated voltage (t_{on}), 10 % rated voltage (t_{off}). Actuation speed depends upon the external t_{on} and t_{off} circuitry and the capacitance of the MOSFET.

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	
Peak transient overvoltage		V_{IOTM}	8000			V
Recurring peak voltage		V_{IORM}	630			V
Package safety power		P_{SO}			500	mW
Package safety current		I_{SI}			300	mA
Package safety temperature		T_{SI}			175	°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.

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

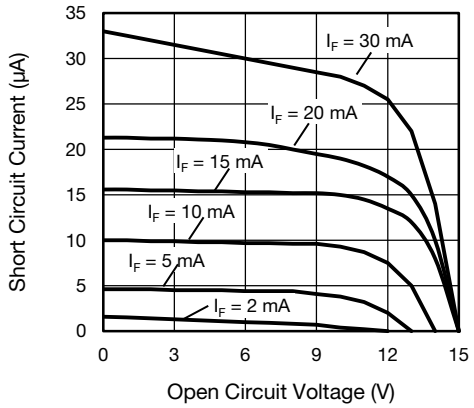


Fig. 1 - Typical PDA ON Characteristics (with different load resistors)

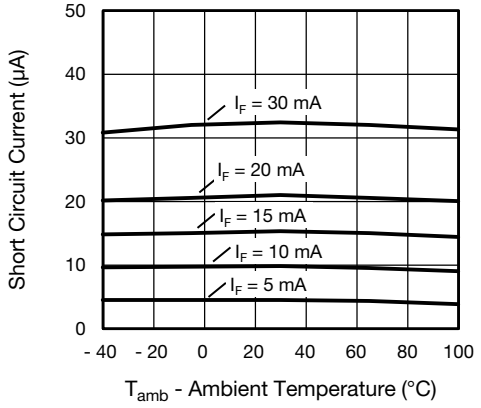


Fig. 4 - Short Circuit Current vs. Ambient Temperature

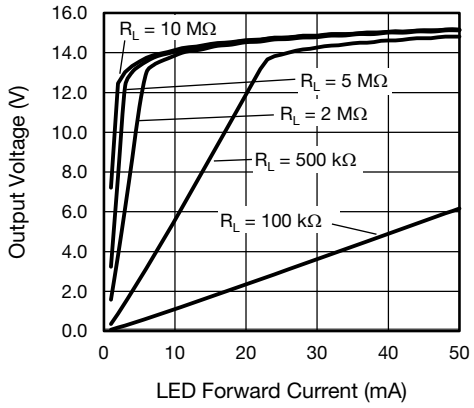


Fig. 2 - Output Voltage vs-LED Current

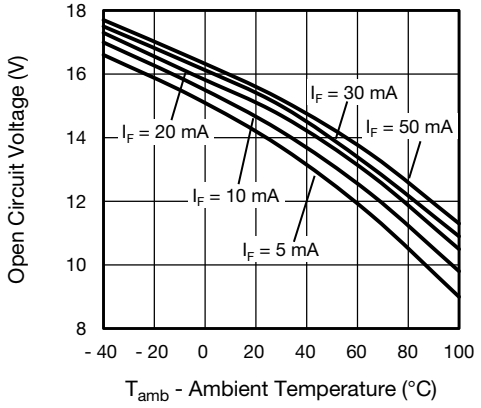


Fig. 5 - Open Circuit Voltage vs. Ambient Temperature

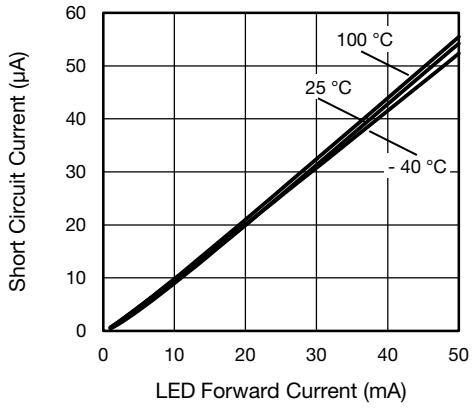


Fig. 3 - Short Circuit Current vs. LED Forward Current

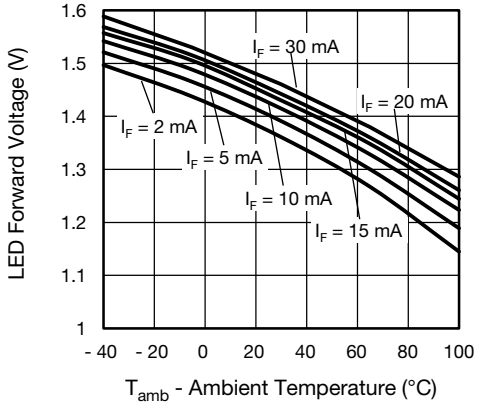


Fig. 6 - LED Forward Voltage vs. Ambient Temperature

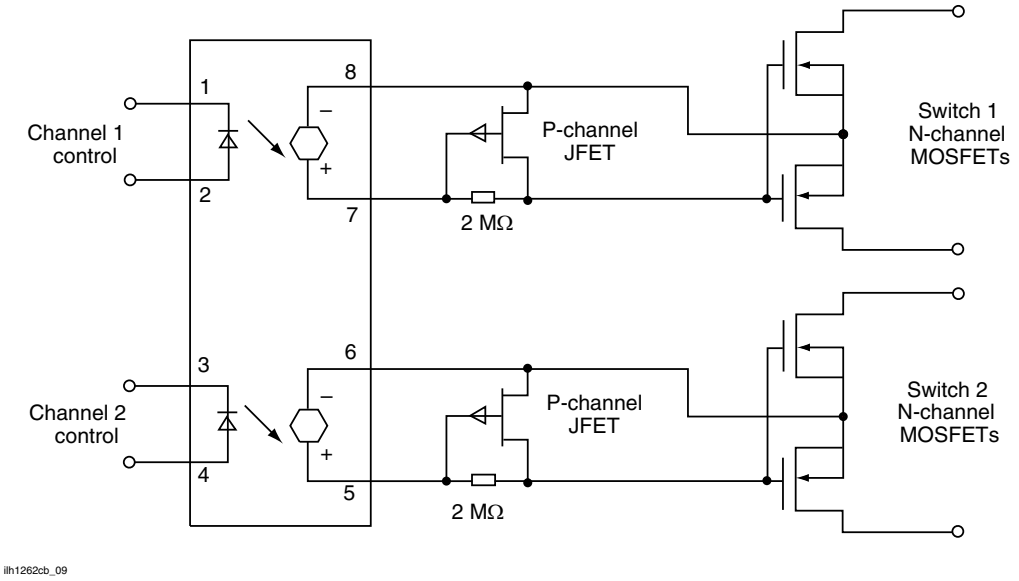
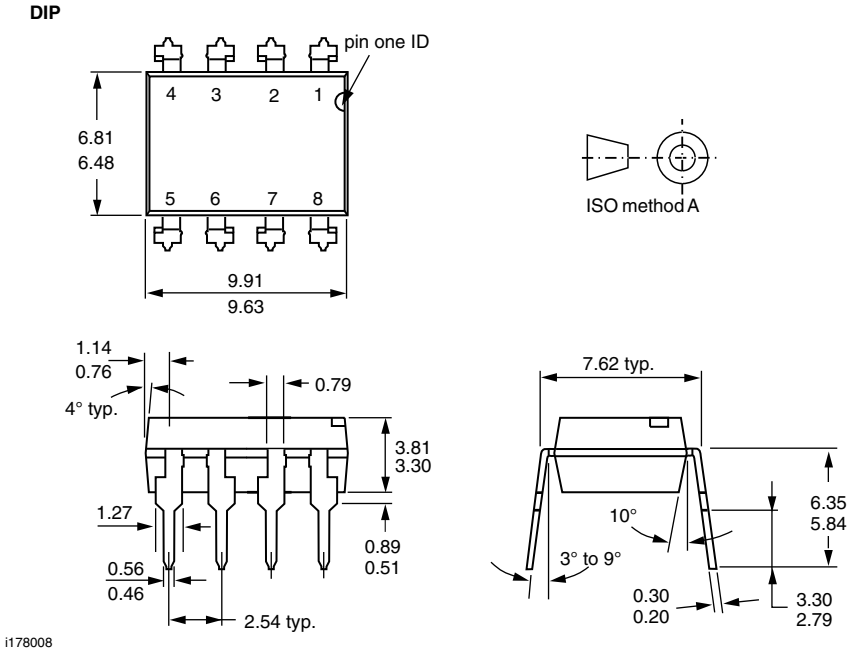
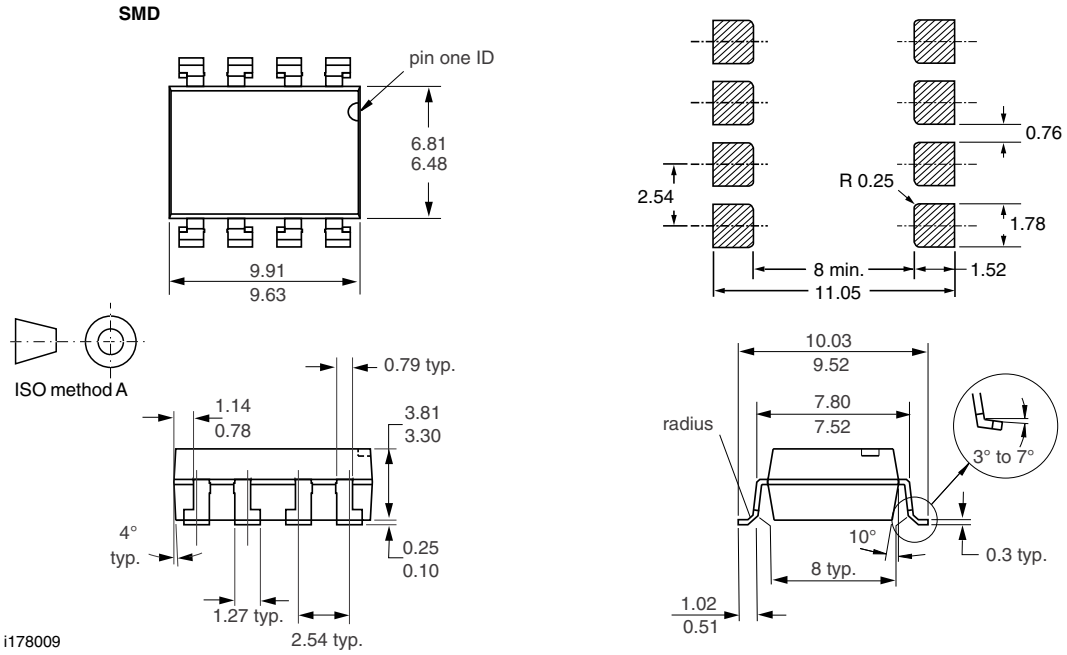


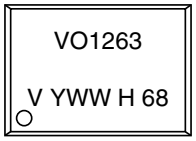
Fig. 7 - Typical Dual Form A Solid-State Relay Application

PACKAGE DIMENSIONS in millimeters





PACKAGE MARKING (example)



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