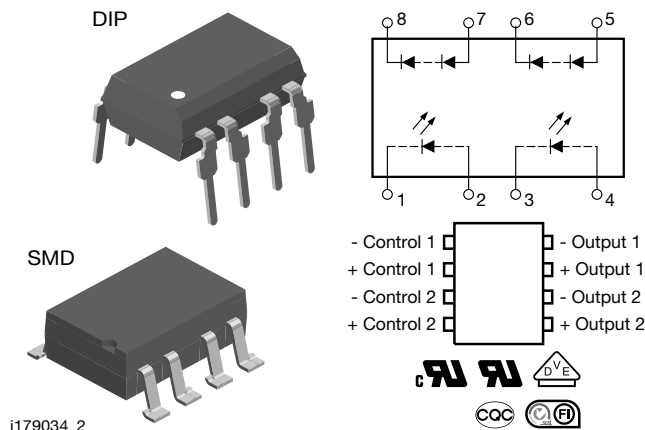


Dual Photovoltaic MOSFET Driver Solid-State Relay



i179034_2

LINKS TO ADDITIONAL RESOURCES



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.

FEATURES

- High open circuit voltage, up to 15.4 V typical
- High short circuit current, up to 50 μ A 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

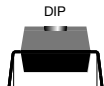
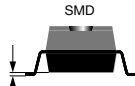

RoHS
COMPLIANT

APPLICATIONS

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

AGENCY APPROVALS

- [UL](#)
- [cUL](#)
- [DIN EN 60747-5 \(VDE 0884-5\)](#)
- [BSI](#)
- [CQC](#)
- [FIMKO](#)

ORDERING INFORMATION												
V	O	1	2	6	3	#	#	#	T	R		
PART NUMBER						ELECTR. VARIATION	PACKAGE CONFIG.		TAPE AND REEL			
PACKAGE						UL, cUL, VDE, BSI, CQC, 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 ≤ 10 μ A	V _R	5.0	V
Photodiode array reverse voltage	I _R ≤ 2.0 μ A	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	t = 7.0 s max.	T _{slid}	270	°C

Note

- 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

**ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, 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	1.7	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}	-	14.2	-	V
	$I_F = 10\text{ mA}$	V_{OC}	10.3	14.7	16.5	V
	$I_F = 15\text{ mA}$	V_{OC}	-	15	-	V
	$I_F = 20\text{ mA}$	V_{OC}	-	15.2	-	V
	$I_F = 30\text{ mA}$	V_{OC}	-	15.4	-	V
	$I_F = 5.0\text{ mA}$	I_{SC}	2.7	7	-	μA
Short circuit current (pins 5, 6 or 7, 8)	$I_F = 10\text{ mA}$	I_{SC}	7	15	-	μA
	$I_F = 15\text{ mA}$	I_{SC}	11	24	-	μA
	$I_F = 20\text{ mA}$	I_{SC}	15	33	-	μA
	$I_F = 30\text{ mA}$	I_{SC}	21	50	-	μA
	$I_F = 5.0\text{ mA}$	I_{SC}	2.7	7	-	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 ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Turn-on time	$I_F = 20\text{ mA}$ ⁽¹⁾	t_{on}	-	35	-	μs
Turn-off time	$I_F = 20\text{ mA}$ ⁽¹⁾	t_{off}	-	700	-	μs

Note

- ⁽¹⁾ $f = 100\text{ Hz}$, pulse width = 2 ms, load (R_L) = 1.0 M Ω , $C_L = 15\text{ pF}$; 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	VALUE	UNIT
Climatic classification	According to IEC 68 part 1		40 / 100 / 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, $t = 1\text{ min}$	V_{ISO}	5300	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	8000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	890	V_{peak}
Output safety power		P_{SO}	700	mW
Input safety current		I_{SI}	300	mA
Input safety temperature		T_S	175	$^{\circ}\text{C}$
Creepage distance	DIP-8, SMD-8		≥ 7	mm
Clearance distance			≥ 7	mm

Note

- This optocoupler is suitable for "safe electrical insulation" only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits



FUNCTIONAL DESCRIPTION

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

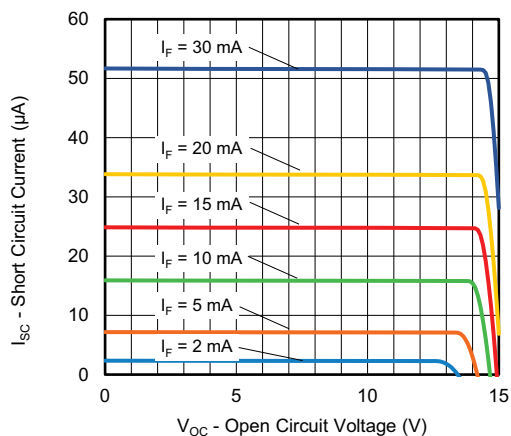


Fig. 1 - Short Circuit Current vs. Open Circuit Voltage

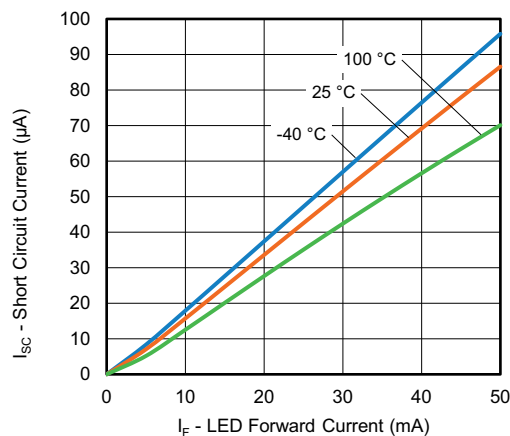


Fig. 3 - Short Circuit Current vs. LED Forward Current

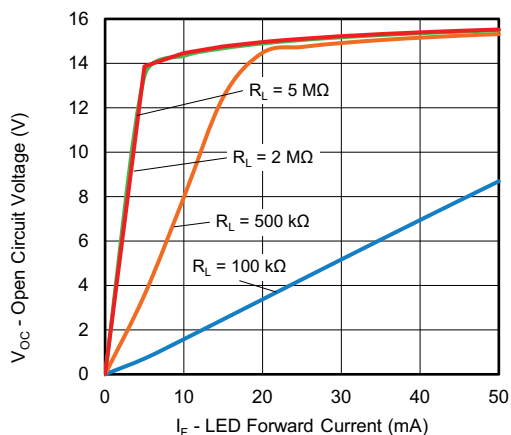


Fig. 2 - Output Voltage vs. LED Current

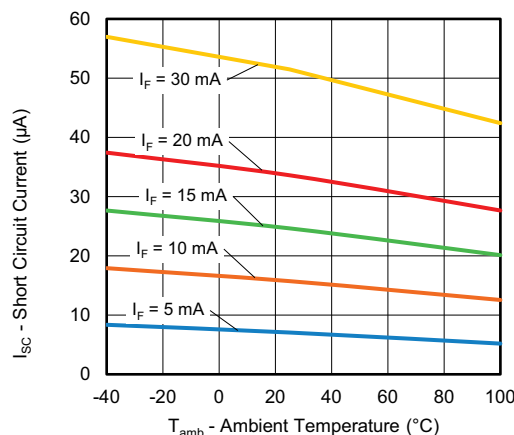


Fig. 4 - Short Circuit Current vs. Ambient Temperature

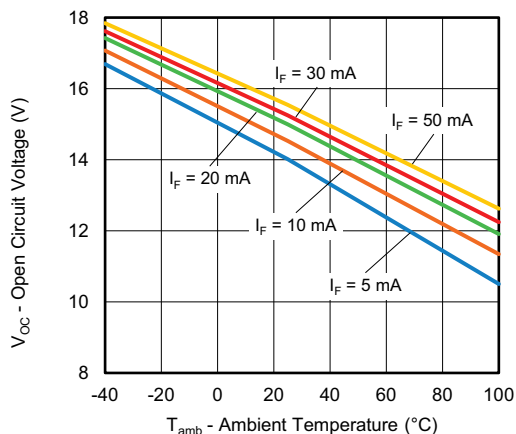


Fig. 5 - Open Circuit Voltage vs. Ambient Temperature

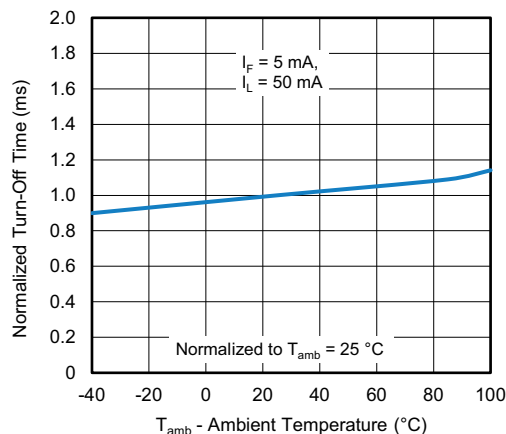


Fig. 8 - Normalized Turn-Off Time vs. Ambient Temperature

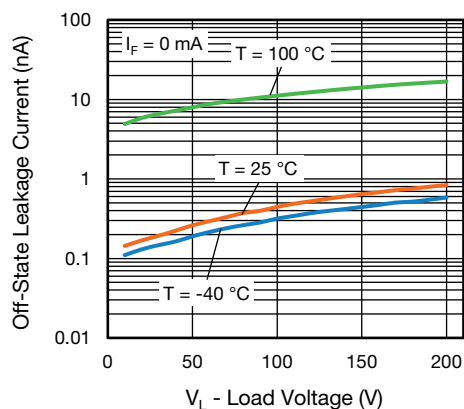


Fig. 6 - Leakage Current vs. Load Voltage

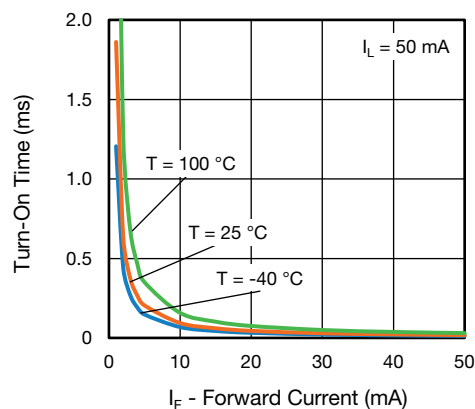


Fig. 9 - Turn-On Time vs. Forward Current

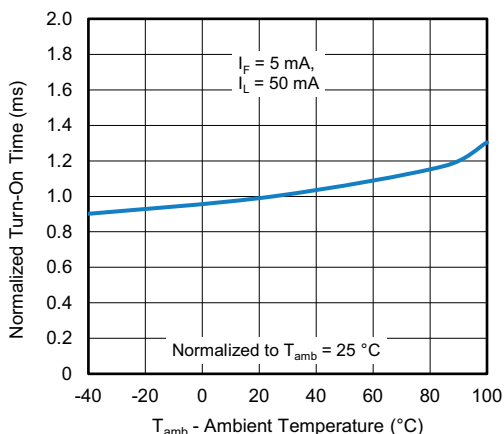


Fig. 7 - Normalized Turn-On Time vs. Ambient Temperature

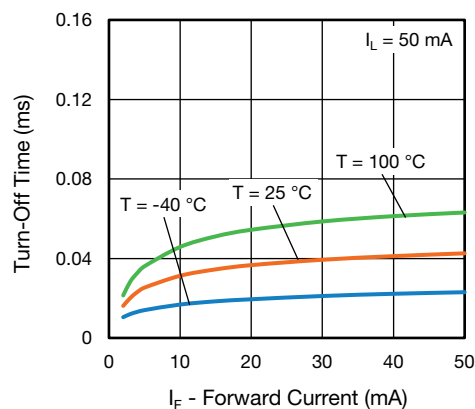
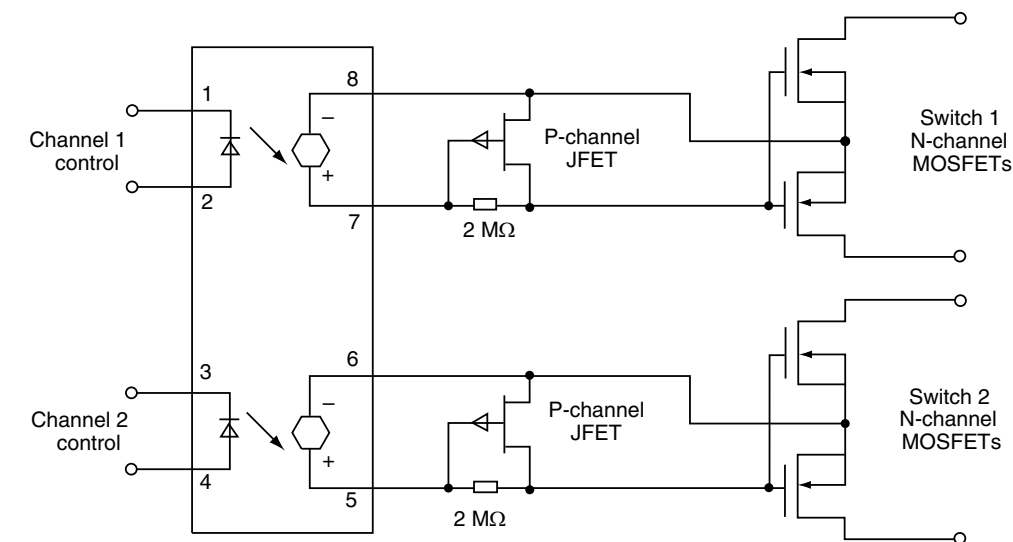


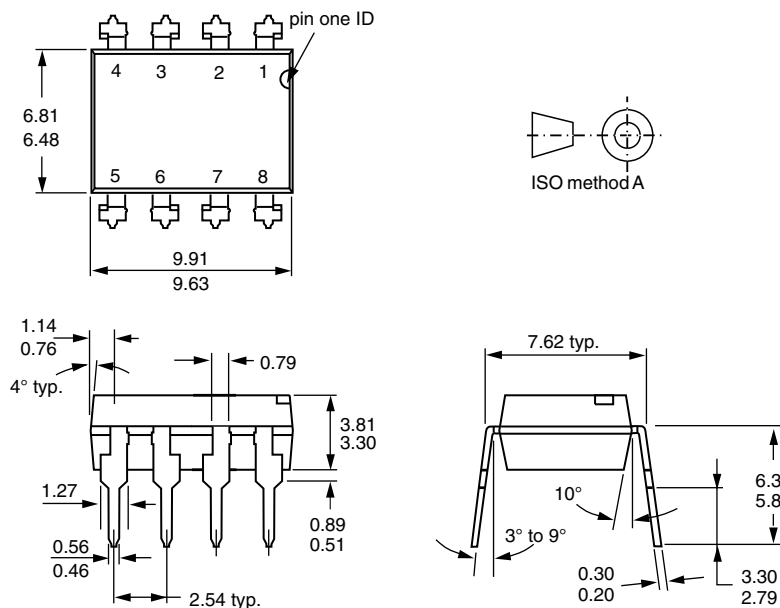
Fig. 10 - Turn-Off Time vs. Forward Current



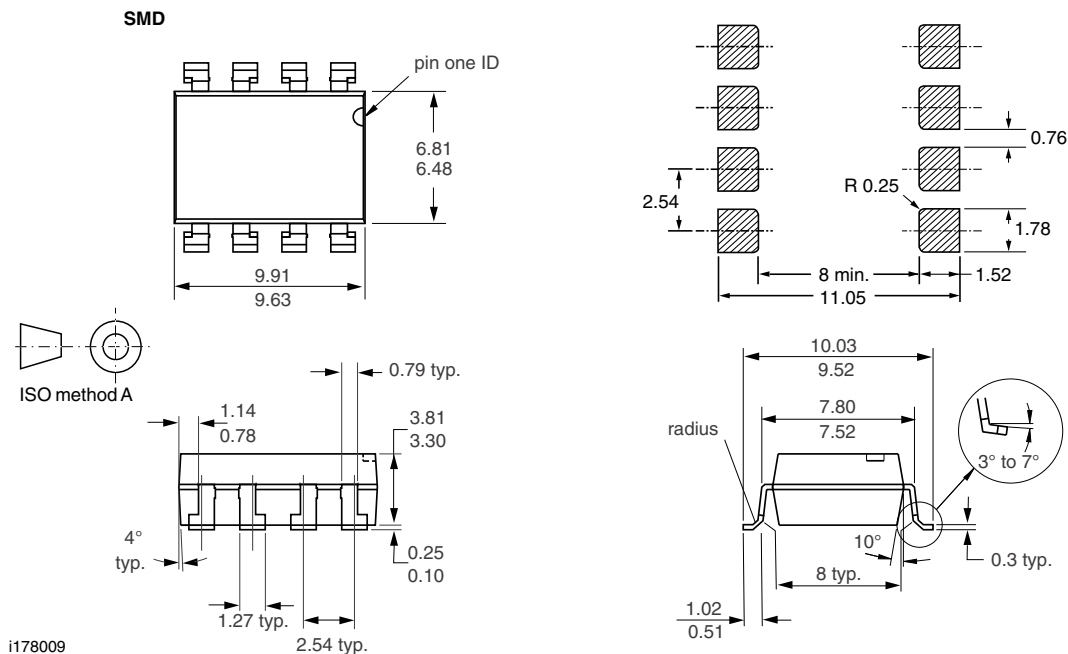
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Fig. 11 - Typical Dual Form A Solid-State Relay Application

PACKAGE DIMENSIONS in millimeters

DIP


i178008



PACKAGE MARKING (example)

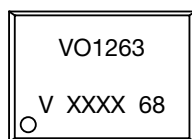


Fig. 12 - Example of VO1263AAC

Note

- XXXX = LMC (lot marking code)

SOLDER PROFILES

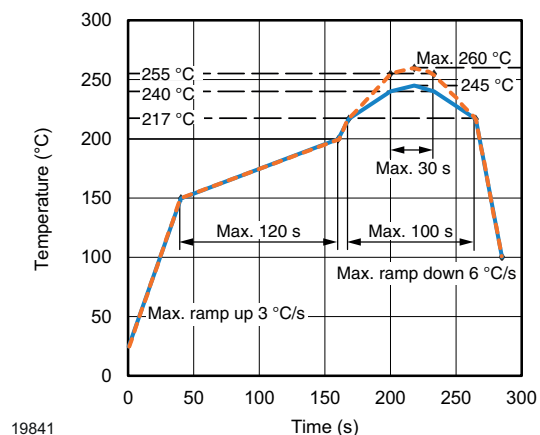


Fig. 13 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020 for SMD Devices

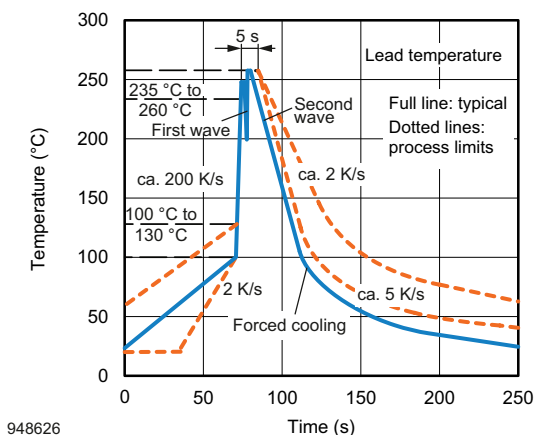


Fig. 14 - Wave Soldering Double Wave Profile
According to J-STD-020 for DIP Devices



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