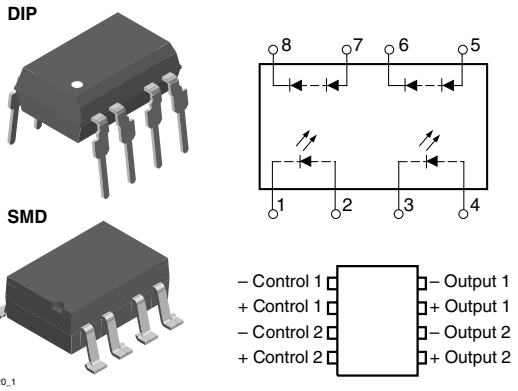
Dual Photovoltaic MOSFET Driver Solid State Relay



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
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

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)

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.

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
SSR				
LED input ratings continous 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 (2)	t = 7.0 s max.	T_{sld}	270	°C
Input to output isolation voltage	t = 60 s min.	V_{ISO}	5300	V_{RMS}

Notes

(1) T_{amb} = 25 °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 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}		13.3		V
	I_F = 10 mA	V_{OC}	10.3	13.8	16.5	V
	I_F = 15 mA	V_{OC}		14		V
	I_F = 20 mA	V_{OC}		14.3		V
	I_F = 30 mA	V_{OC}		14.6		V
Short circuit current (pins 5, 6 or 7, 8)	I_F = 5.0 mA	I_{SC}	3.0	6.0		µA
	I_F = 10 mA	I_{SC}	7.5	15		µA
	I_F = 15 mA	I_{SC}	11	22		µA
	I_F = 20 mA	I_{SC}	15	30		µA
	I_F = 30 mA	I_{SC}	21	42		µA

Note

T_{amb} = 25 °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	°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

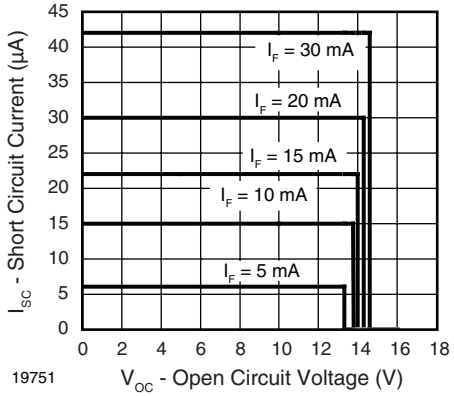


Fig. 1 - Short Circuit Current vs. Open Circuit Voltage

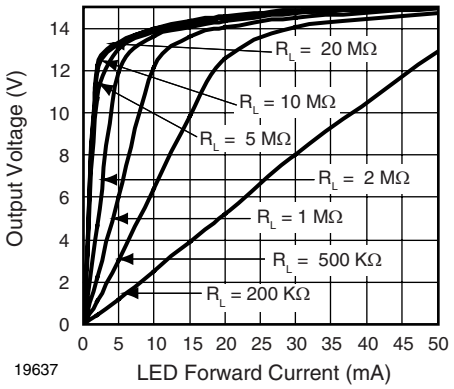


Fig. 2 - Output Voltage vs. LED Current

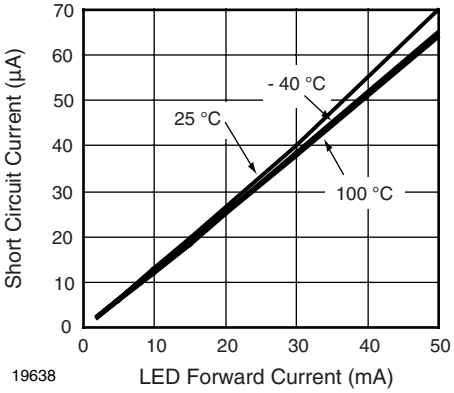


Fig. 3 - I_{SC} vs. LED Forward Current

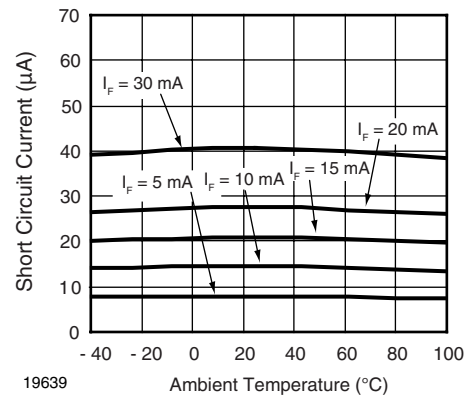


Fig. 4 - Short Circuit Current vs. Temperature

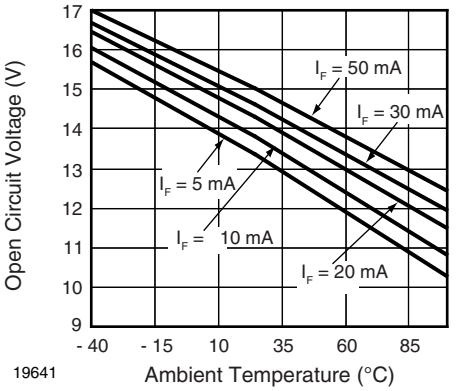


Fig. 5 - Open Circuit Voltage vs. Temperature

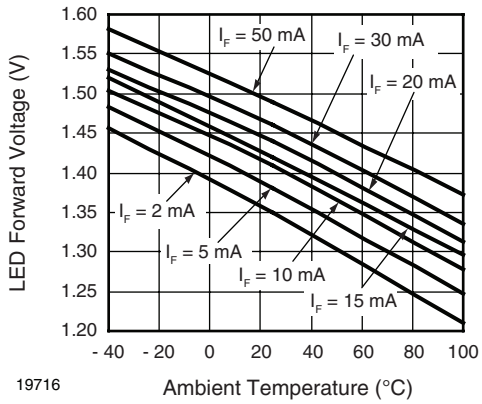


Fig. 6 - LED Forward Voltage vs. Temperature

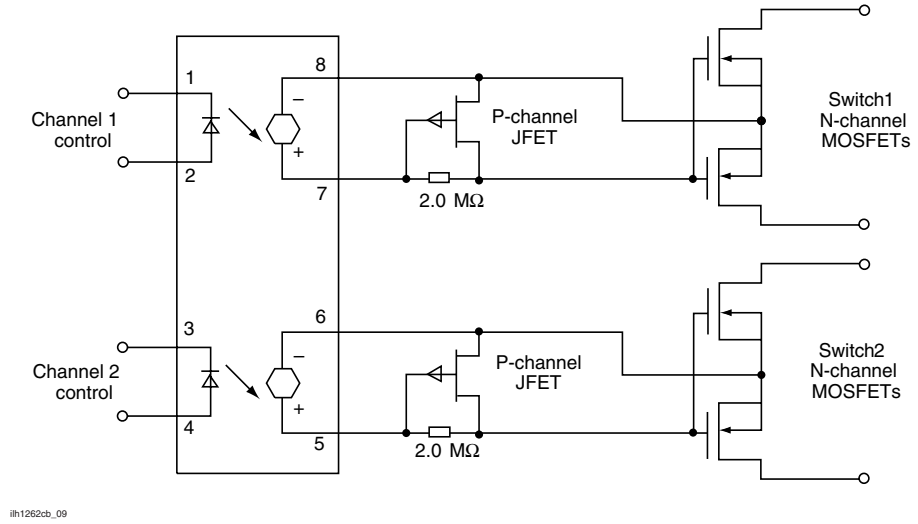
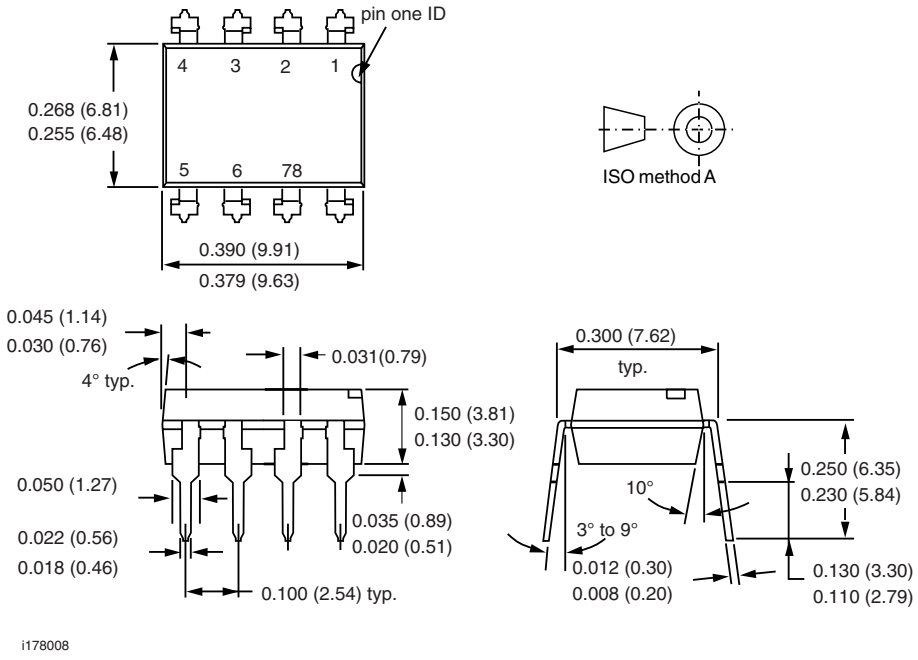


Fig. 7 - Typical Dual Form A Solid State Relay Application

PACKAGE DIMENSIONS in inches (millimeters)

DIP



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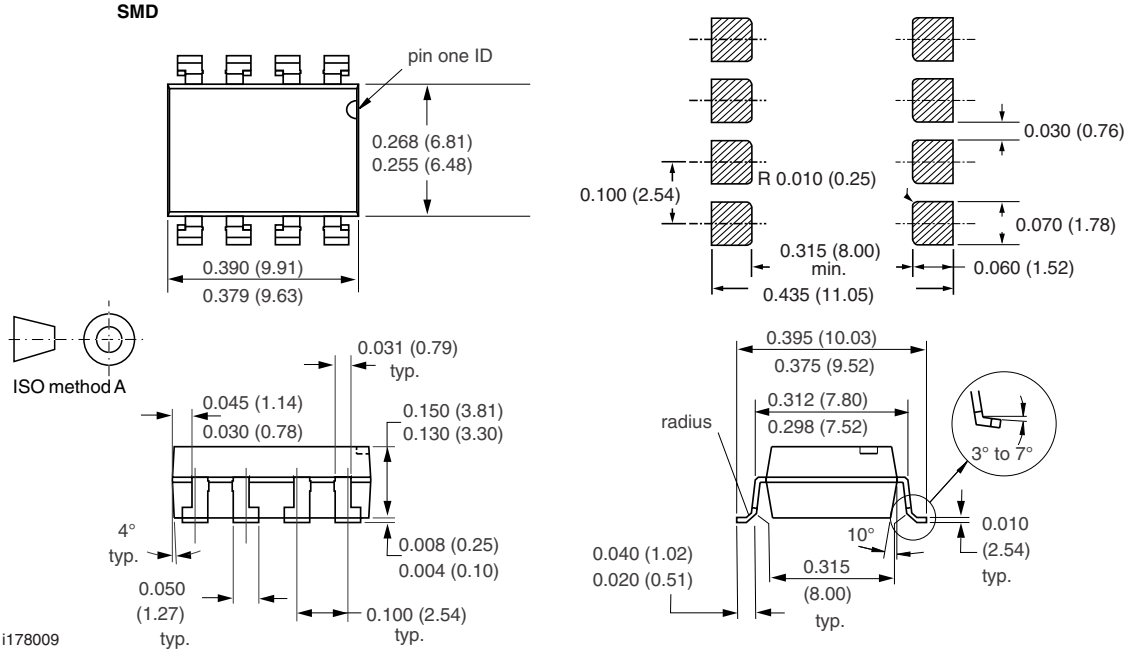
SMD



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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.

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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.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

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