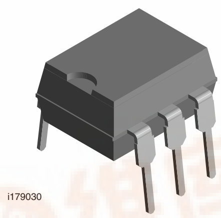
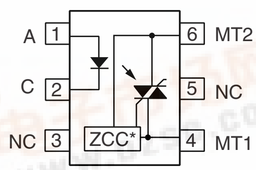
Phototriac, Zero Crossing, 1.5 kV/µs dV/dt, 600 V





*Zero crossing circuit

DESCRIPTION

The VO3062/3063 triac driver family consists of a GaAs infrared LED optically coupled to a monolithic photosensitive zero crossing triac detector chip.

The 600 V blocking voltage permits control of off-line voltages up to 240 VAC, with a safety factor of more than two, and is sufficient for as much as 380 V.

FEATURES

- 1500 V/µs dV/dt minimum
- 600 V blocking voltage
- 100 mA on-state current
- Zero crossing detector
- Low input trigger current
- 6 pin DIP package
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC

Pb-free

e3 RoHS COMPLIANT

APPLICATIONS

- Household appliances
- Triac drive/AC motor drives
- Solenoid/valve controls
- Office automation equipment/machine
- Temperature (HVAC)/lighting controls
- Switching power supply

AGENCY APPROVALS

- UL1577, file no. E52744 system code U/J
- CUL - file no. E52744, equivalent to CSA bulletin 5A
- DIN EN 60747-5-5 (VDE 0884) available with option 1
- BSI IEC 60950

ORDER INFORMATION

PART	REMARKS
VO3063	DIP-6, ZC, 600 V, I_{ft} = 5 mA
VO3062	DIP-6, ZC, 600 V, I_{ft} = 10 mA
VO3063-X006	DIP-6 400 mil, ZC, 600 V, I_{ft} = 5 mA
VO3062-X006	DIP-6 400 mil, ZC, 600 V, I_{ft} = 10 mA
VO3063-X007T	SMD-6, ZC, 600 V, I_{ft} = 5 mA
VO3062-X007T	SMD-6, ZC, 600 V, I_{ft} = 10 mA

Note

For additional information on the available options refer to option information.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT
INPUT					
Reverse voltage			V_R	6	V
Forward current - continuous			I_F	60	mA
Power dissipation			P_{diss}	100	mW
OUTPUT					
Off state output terminal voltage		VO3062/3063	V_{DRM}	600	V
Peak repetitive surge current	PW = 100 ms, 120 pps		I_{TSM}	1	A
Power dissipation			P_{diss}	200	mW
On-state RMS current			$I_{T(RMS)}$	100	mA

ABSOLUTE MAXIMUM RATINGS

PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT
COUPLER					
Isolation test voltage	t = 1 s		V_{ISO}	5300	V_{RMS}
Total power dissipation			P_{tot}	300	mW
Operating temperature range			T_{amb}	- 40 to + 100	°C
Storage temperature range			T_{stg}	- 55 to + 150	°C
Soldering temperature	maximum ≤ 10 s		T_{sld}	260	°C

Note

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.

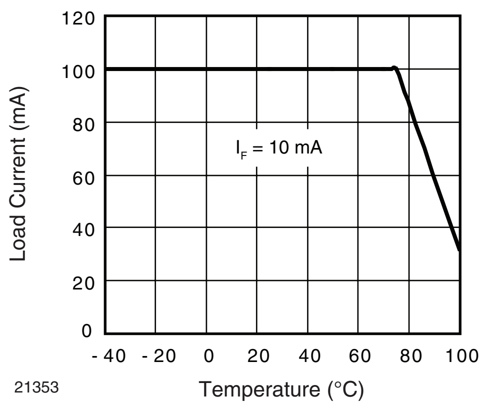


Fig. 1 - On-State Current (RMS) vs. Temperature

Note

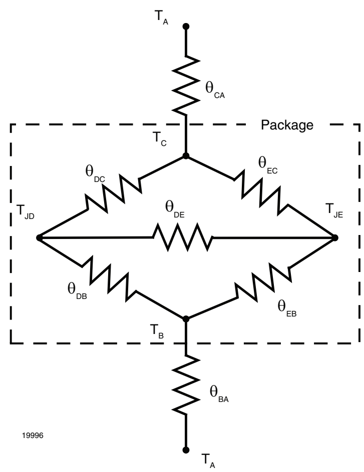
The allowable load current was calculated out under a given operating conditions and only for reference:
LED power: Q_E = 0.015 W, R_{BA} (2-layer) = 72 °C/W

THERMAL CHARACTERISTICS

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Maximum LED junction temperature		T_{jmax}	125	°C
Maximum output die junction temperature		T_{jmax}	125	°C
Thermal resistance, junction emitter to board		θ_{JEB}	150	°C/W
Thermal resistance, junction emitter to case		θ_{JEC}	139	°C/W
Thermal resistance, junction detector to board		θ_{JDB}	78	°C/W
Thermal resistance, junction detector to case		θ_{JDC}	103	°C/W
Thermal resistance, junction emitter to junction detector		θ_{JED}	496	°C/W
Thermal resistance, case to ambient		θ_{CA}	3563	°C/W

Note

The thermal model is represented in the thermal network below. Each resistance value given in this model can be used to calculate the temperatures at each node for a given operating condition. The thermal resistance from board to ambient will be dependent on the type of PCB, layout and thickness of copper traces. For a detailed explanation of the thermal model, please reference Vishay's Thermal Characteristics of Optocouplers Application note.



ELECTRICAL CHARACTERISTCS

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT							
Reverse current	V_R = 6 V		I_R			10	µA
Forward voltage	I_F = 30 mA		V_F		1.2	1.5	V
OUTPUT							
Leakage with LED off, either direction	V_{DRM} = 600 V		I_{DRM}		10	500	nA
Critical rate of rise off-state voltage	V_D = 400 V		dV/dt	1500	2000		V/µs
COUPLER							
LED trigger current, current required to latch output		VO3063	I_{FT}			5	mA
		VO3062	I_{FT}			10	mA
Peak on-state voltage, either direction	I_{TM} = 100 mA Peak, I_F = Rated I_{FT}		V_{TM}		1.7	3	V
Holding current, either direction			I_H		200		µA
Inhibit voltage (MT1-MT2 voltage above which device will not trigger)			V_{INH}		12	22	V
Leakage in inhibited state	IF = 10 mA maximum, at rated V_{DRM}, off state		V_{DRM2}		250	1000	µA

Note

T_{amb} = 25 °C, unless otherwise specified.
Minimum and maximum values were tested requierements. 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	IEC 68 part 1			40/85/21		
Pollution degree	DIN VDE 0109			2		
Comparative tracking index per DIN IEC 112/VDE 0303 part 1, group IIIa per DIN VDE 6110 175 399		CTI	175			
Highest allowable overvoltage	Transient overvoltage	V_{IOTM}	8000			V_{peak}
Maximum working insulation voltage	Recurring peak voltage	V_{IORM}	890			V_{peak}
Insulation resistance at 25 °C	V_{IO} = 500 V	R_{IS}			$\geq 10^{12}$	Ω
Insulation resistance at T_S	V_{IO} = 500 V	R_{IS}			$\geq 10^{9}$	Ω
Insulation resistance at 100 °C	V_{IO} = 500 V	R_{IS}			$\geq 10^{11}$	Ω

SAFETY AND INSULATION RATINGS

PARAMETER		TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Partial discharge test voltage		Method a, $V_{pd} = V_{IORM}$ x 1.875	V_{pd}			1325	V_{peak}
Safety limiting values - maximum values allowed in the event of a failure	Safety power rating		P_{SO}			400	mW
	Safety current rating		I_{SI}			150	mA
	Safety temperature rating		T_{SI}			165	°C
Minimum external air gap (clearance)		Measured from input terminals to output terminals, shortest distance through air		≥ 7			mm
Minimum external tracking (creepage)		Measured from input terminals to output terminals, shortest distance path along body		≥ 7			mm

Note

As per IEC 60747-5-2, 7.4.3.8.1, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of prodective circuits.

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

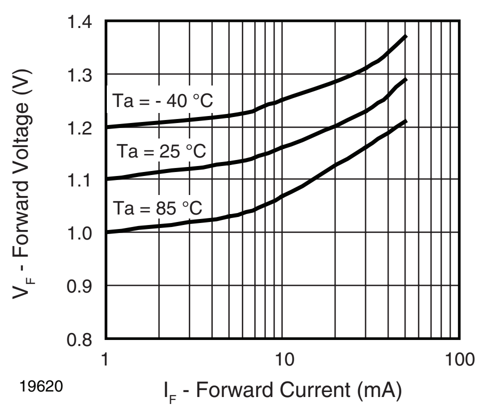


Fig. 2 - Forward Voltage vs. Forward Current

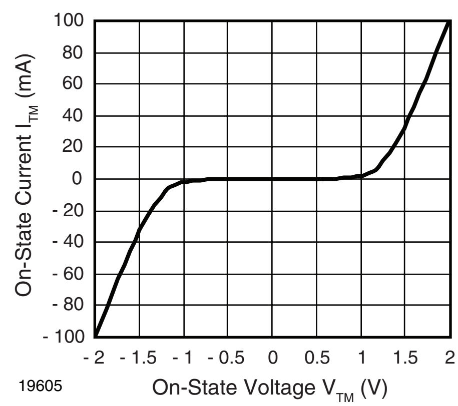


Fig. 4 - On-State Current vs. V_{TM}

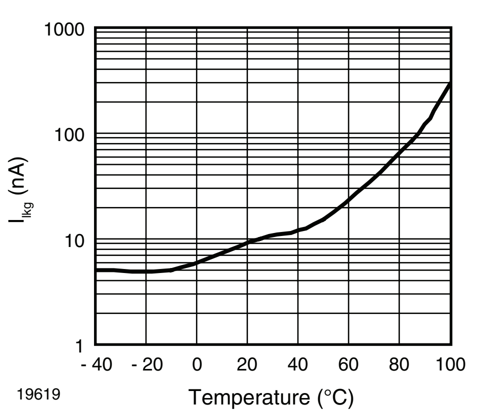


Fig. 3 - Off-State Leakage Current vs. Temperature

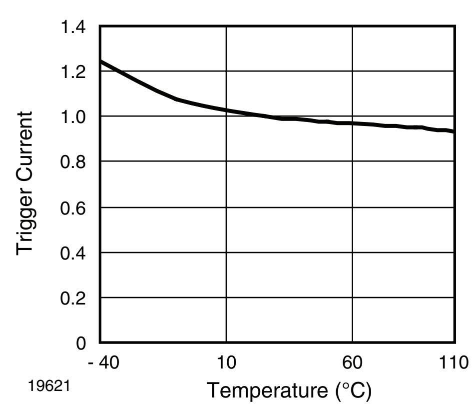


Fig. 5 - Normalized Trigger Current vs. Temperature

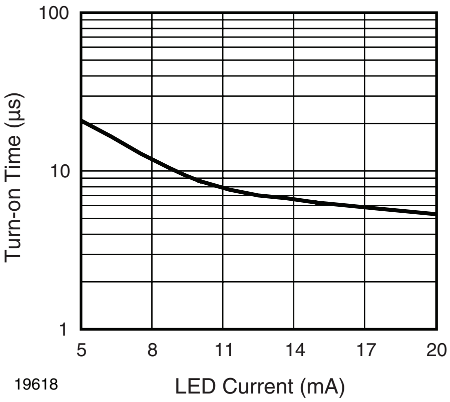


Fig. 6 - Turn-on Time vs. LED Current

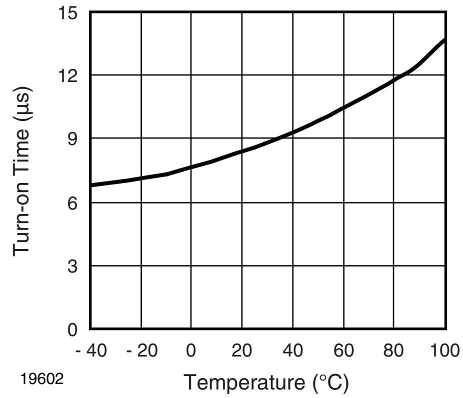


Fig. 8 - Turn-on Time vs. Temperature

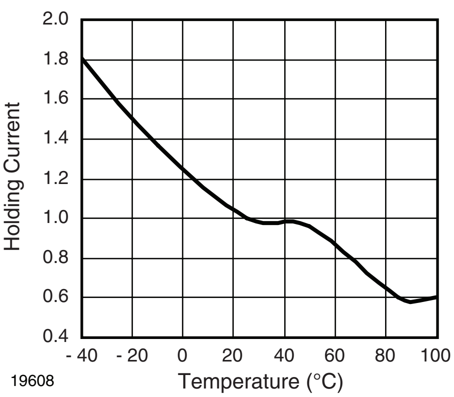


Fig. 7 - Normalized Holding Current vs. Temperature

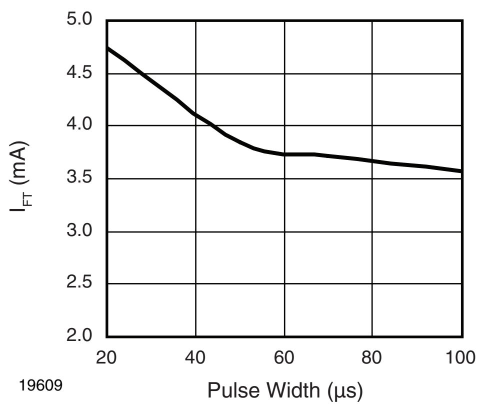
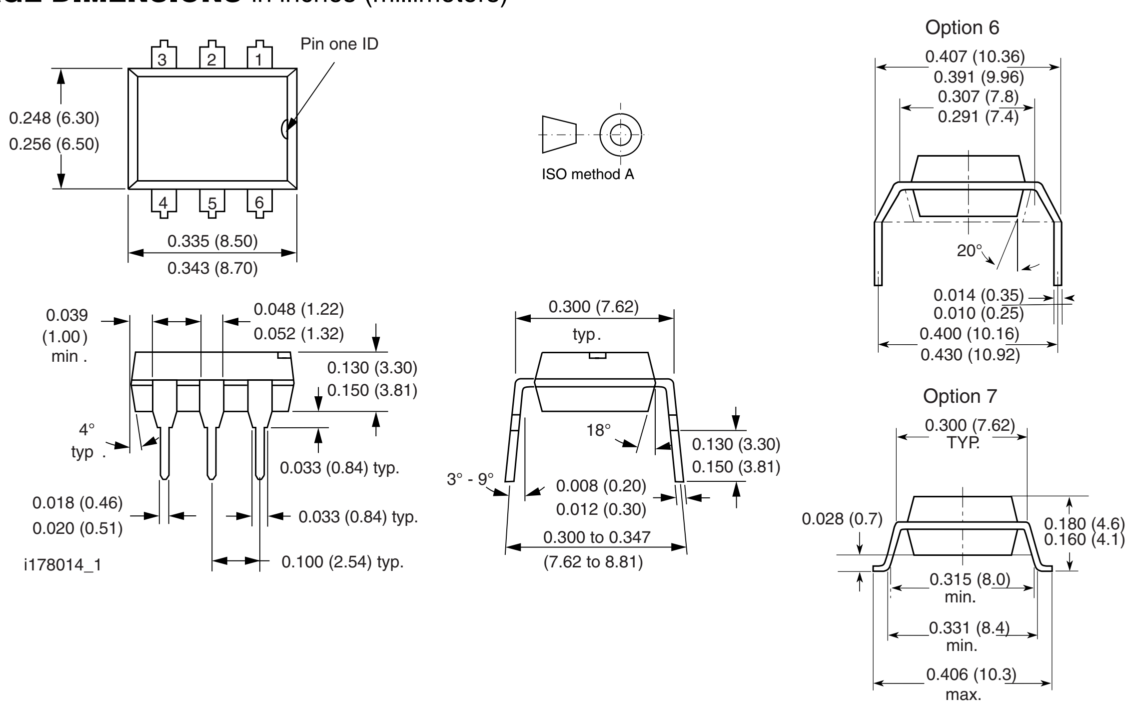


Fig. 9 - Trigger Current vs. Pulse Width

PACKAGE DIMENSIONS in inches (millimeters)



OZONE DEPLETING SUBSTANCES POLICY STATEMENT

It is the policy of Vishay Semiconductor GmbH to

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.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

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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