

# Optocoupler, Phototriac Output, Non-Zero Crossing, 0.5 kV/ $\mu$ s dV/dt, 600 V



I179066



### FEATURES

- High static dV/dt > 0.5 kV/ $\mu$ s
- Input sensitivity  $I_{FT} = 5\text{ mA}, 7\text{ mA}, \text{ and } 10\text{ mA}$
- On-state RMS current  $I_{T(RMS)} = 70\text{ mA}$
- 600 V peak off-state blocking voltage
- Isolation test voltage 3750  $V_{RMS}$
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### DESCRIPTION

The VOM160 series phototriac consist a AlGaAs infrared emitting diode (IRED) optically coupled to a photosensitive non-zero crossing TRIAC packaged in a SOP-4 package. It has a IRED trigger current of 5 mA, 7 mA, and 10 mA.

The VOM160 series phototriac isolate low-voltage logic from 120  $V_{AC}$ , 240  $V_{AC}$ , and 380  $V_{AC}$  lines to control resistive, inductive, or capacitive loads including motors, solenoids, high current thyristors or TRIAC and relays.

### APPLICATIONS

- Consumer appliances
- Triac drives
- Solid-state relays
- Motor controls
- Office equipment

### AGENCY APPROVALS

- UL1577, file no. E52744, double protection
- cUL-file no. E52744, equivalent to CSA bulletin 5A
- VDE 0884-5, DIN EN 60747-5-5
- CQC: GB8898, GB4943

ORDERING INFORMATION			
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">V</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">O</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">M</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">1</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">6</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">0</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">X</div> <div style="border: 1px solid black; padding: 2px 5px; margin: 2px;">T</div> </div> <p style="text-align: center; margin-top: 5px;">PART NUMBER</p>			
AGENCY CERTIFIED/PACKAGE	TRIGGER CURRENT $I_{FT}$		
UL, cUL, CQC	5 mA	7 mA	10 mA
SOP-4	VOM160NT	VOM160PT	VOM160RT
VDE, UL, cUL, CQC	5 mA	7 mA	10 mA
SOP-4	VOM160N-X001T	VOM160P-X001T	VOM160R-X001T

### Notes

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

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)					
PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT
<b>INPUT</b>					
Reverse voltage			$V_R$	6	V
Forward current			$I_F$	60	mA
Peak surge current	100 $\mu\text{s}$ , 200 pps		$I_{FSM}$	0.5	A
Power dissipation			$P_{diss}$	100	mW
<b>OUTPUT</b>					
Peak off-state voltage			$V_{DRM}$	600	V
RMS on-state current			$I_{T(RMS)}$	70	mA
Peak non-repetitive surge current	PW = 100 ms, 120 pps		$I_{TSM}$	1	A
Power dissipation			$P_{diss}$	200	mW
<b>COUPLER</b>					
Isolation test voltage	t = 1 min		$V_{ISO}$	3750	$V_{RMS}$
Power dissipation			$P_{tot}$	300	mW
Storage temperature range			$T_{stg}$	- 55 to + 150	$^{\circ}\text{C}$
Ambient temperature range			$T_{amb}$	- 40 to + 100	$^{\circ}\text{C}$
Soldering temperature <sup>(1)</sup>			$T_{sld}$	260	$^{\circ}\text{C}$

**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.

<sup>(1)</sup> Wave soldering three cycles are allowed. Also refer to "Assembly Instructions" for surface mounted devices ([www.vishay.com/doc?80054](http://www.vishay.com/doc?80054)).

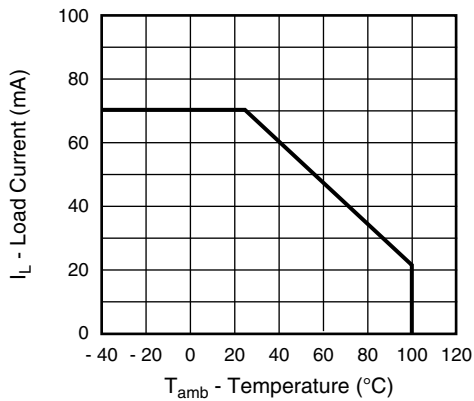


Fig. 1 - Recommended Operating Condition



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
<b>INPUT</b>							
Forward voltage	$I_F = 10\text{ mA}$		$V_F$		1.2	1.5	V
Reverse current	$V_R = 6\text{ V}$		$I_R$			10	$\mu\text{A}$
Input capacitance	$V_F = 0\text{ V}$ , $f = 1\text{ MHz}$		$C_I$		25		pF
<b>OUTPUT</b>							
Off-state current	$V_D = V_{DRM}$		$I_{DRM}$			100	nA
On-state voltage	$I_T = 100\text{ mA}$		$V_{TM}$			2.8	V
Critical rate of rise off-state voltage	$V_D = 0.67 V_{DRM}$ , $T_J = 25\text{ }^{\circ}\text{C}$		$dV/dt_{cr}$	500			V/ $\mu\text{s}$
Critical rate of rise of voltage at current commutation			$dV/dt_{crq}$		0.13		V/ $\mu\text{s}$
<b>COUPLER</b>							
LED trigger current, current required to latch output	$V_D = 3\text{ V}$	VOM160N	$I_{FT}$			5	mA
		VOM160P	$I_{FT}$			7	mA
		VOM160R	$I_{FT}$			10	mA
Capacitance (input - output)	$f = 1\text{ MHz}$ , $V_{IO} = 0\text{ V}$		$C_{IO}$		0.8		pF
Peak off-state voltage	$I_C = 100\text{ }\mu\text{A}$		$V_{DRM}$	600			V
Holding current			$I_{hold}$		0.3		mA

**Note**

- Minimum and maximum values were tested 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.

<b>SAFETY AND INSULATION RATINGS</b>						
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Climatic classification (according to IEC 68 part 1)			40/100/21			
Pollution degree (DIN VDE 0109)			2			
Comparative tracking index	CTI	175		399		
Peak transient overvoltage	$V_{IOTM}$			6000	$V_{peak}$	
Peak insulation voltage	$V_{IORM}$			707	$V_{peak}$	
Isolation resistance at $T_{amb} = 100\text{ }^{\circ}\text{C}$ , $V_{DC} = 500\text{ V}$	$R_{IO}$	$10^{11}$			$\Omega$	
Isolation resistance at $T_{amb} = 25\text{ }^{\circ}\text{C}$ , $V_{DC} = 500\text{ V}$	$R_{IO}$	$10^{12}$			$\Omega$	
Safety rating - power rating	$P_{SO}$			400	mW	
Safety rating - input current	$I_{SI}$			150	mA	
Safety rating - temperature	$T_{SI}$			165	$^{\circ}\text{C}$	
Creepage distance		5			mm	
Clearance distance		5			mm	
Insulation thickness		0.4			mm	

**TYPICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)



Fig. 2 - Forward Current vs. Forward Voltage

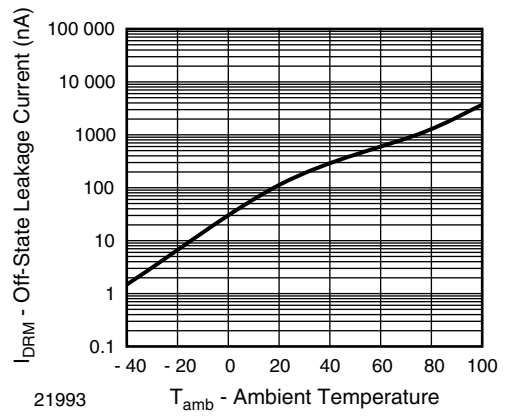


Fig. 5 - Off-State Leakage Current vs. Ambient Temperature

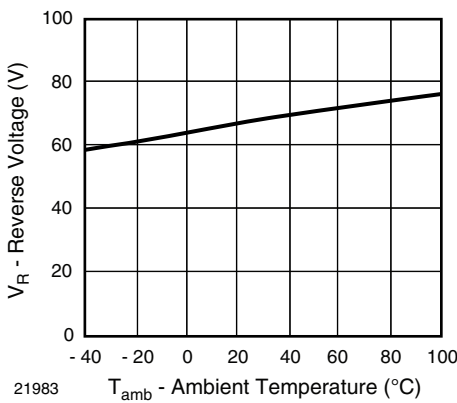


Fig. 3 - Reverse Voltage vs. Ambient Temperature

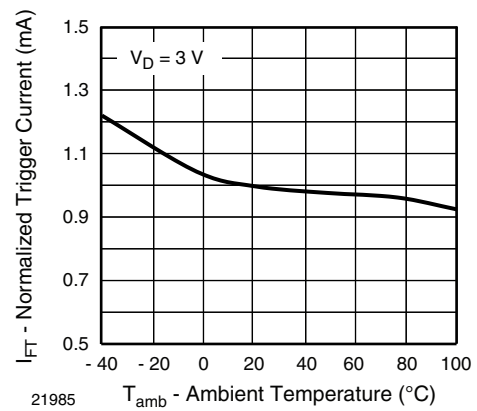


Fig. 6 - Normalized Trigger Current vs. Ambient Temperature



Fig. 4 - On-State Current vs. On-State Voltage

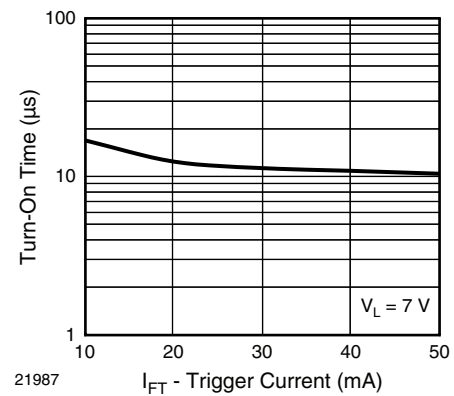


Fig. 7 - Trigger Current vs. Turn-On Time



Fig. 8 - Normalized Holding Current vs. Ambient Temperature

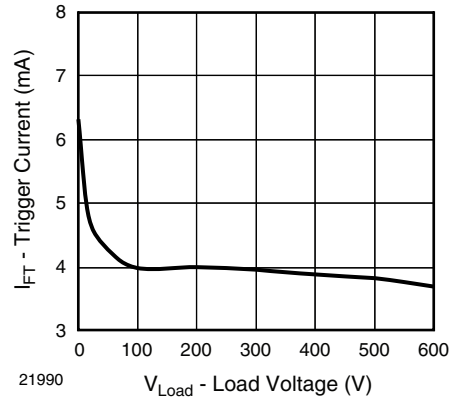


Fig. 11 - Trigger Current vs. Load Voltage



Fig. 9 - Trigger Current vs. Delay Time



Fig. 10 - Trigger Current vs. Trigger Pulse Width

**PACKAGE DIMENSIONS** in millimeters



**PACKAGE MARKING** (example)



**TAPE AND REEL PACKAGING**

Dimensions in millimeters



Fig. 12 - Tape and Reel Shipping Medium, 2000 units per reel



Fig. 13 - Tape Dimensions



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