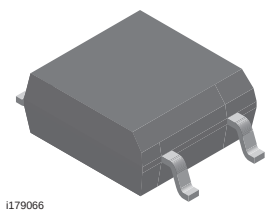
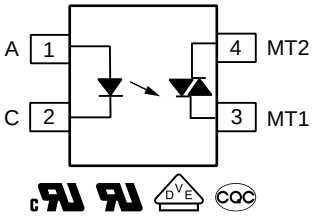
Optocoupler, Phototriac Output, Non-Zero Crossing, 1.5 kV/µs dV/dt, 600 V





FEATURES

- High static dV/dt > 1.5 kV/µs
- Input sensitivity I_{FT} = 5 mA and 10 mA
- On-state RMS current $I_{T(RMS)}$ = 70 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

Pb-free
e3
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

DESCRIPTION

The VOM3052 and VOM3053 phototriac consist a GaAs IRLED optically coupled to a photosensitive non-zero crossing TRIAC packaged in a SOP-4 package. It has a LED trigger current of 5 mA for VOM3053 and 10 mA for VOM3052.

The VOM3052 and VOM3053 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
- Industrial controls
- Office equipment
- Lighting controls

AGENCY APPROVALS

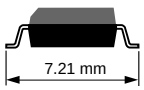
- UL1577, file no. E52744, double protection
- cUL-file no. E52744, equivalent to CSA bulletin 5A
- VDE 0884-5, DIN EN 60747-5-5
- CQC: GB8898, GB4943

ORDERING INFORMATION

V	O	M	3	0	5	X	T

PART NUMBER

SOP-4



AGENCY CERTIFIED/PACKAGE	TRIGGER CURRENT I_{FT}	
UL, cUL, CQC	**5 mA**	**10 mA**
SOP-4	VOM3053T	VOM3052T
SOP-4 180° orientation	VOM3053T3	-
VDE, UL, cUL, CQC	**5 mA**	**10 mA**
SOP-4	VOM3053-X001T	VOM3052-X001T

Notes

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

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

PARAMETER	TEST CONDITION	PART	SYMBOL	VALUE	UNIT
INPUT					
Reverse voltage			V_R	6	V
Forward current			I_F	60	mA
Peak surge current	100 µs, 200 pps		I_{FSM}	0.5	A
Power dissipation			P_{diss}	100	mW

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)					
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**VALUE**	**UNIT**
OUTPUT					
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
COUPLER					
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	°C
Ambient temperature range			T_{amb}	-40 to +100	°C
Soldering temperature			T_{sld}	260	°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.

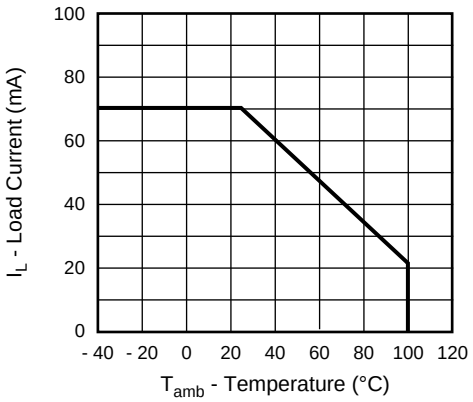

Fig. 1 - Recommended Operating Condition

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = 10 mA		V_F		1.2	1.5	V
Reverse current	V_R = 6 V		I_R			10	µA
Input capacitance	V_F = 0 V, f = 1 MHz		C_I		25		pF
OUTPUT							
Off-state current	$V_D = V_{DRM}$		I_{DRM}			100	nA
On-state voltage	I_T = 100 mA		V_{TM}			3	V
Critical rate of rise off-state voltage	V_D = 0.67 V_{DRM}, T_J = 25 °C		dV/dt_{cr}	1500			V/µs
Critical rate of rise of voltage at current commutation			dV/dt_{crq}		0.13		V/µs
COUPLER							
LED trigger current, current required to latch output	V_D = 3 V	VOM3053	I_{FT}			5	mA
		VOM3052	I_{FT}			10	mA
Capacitance (input - output)	f = 1 MHz, V_{IO} = 0 V		C_{IO}		0.8		pF
Peak off-state voltage	I_C = 100 µA		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.

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SAFETY AND INSULATION RATINGS					
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 °C, V_{DC} = 500 V	R_{IO}	10^{11}			Ω
Isolation resistance at T_{amb} = 25 °C, V_{DC} = 500 V	R_{IO}	10^{12}			Ω
Safety rating - power	P_{SO}			400	mW
Safety rating - input current	I_{SI}			150	mA
Safety rating - temperature	T_{SI}			165	°C
Creepage distance		5			mm
Clearance distance		5			mm
Insulation thickness	DTI	0.4			mm

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

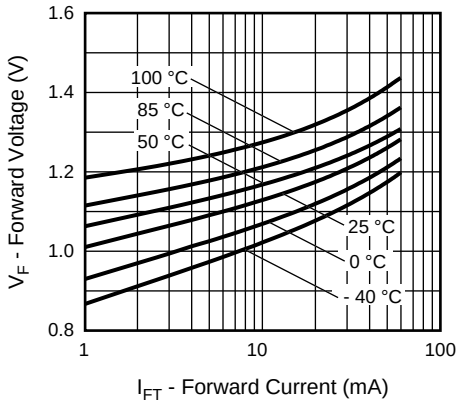

Fig. 2 - Forward Current vs. Forward Voltage

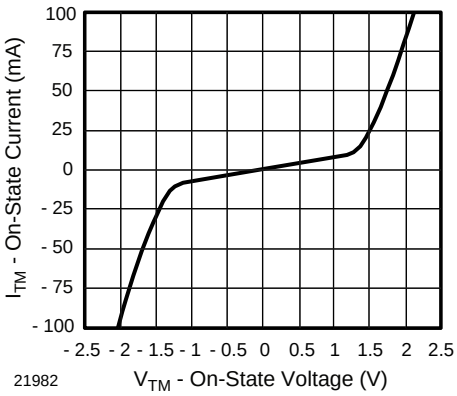

Fig. 4 - On-State Current vs. On-State Voltage

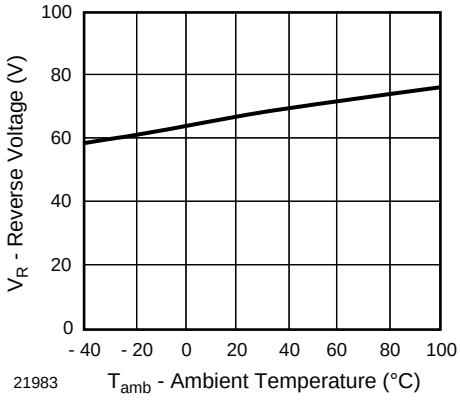

Fig. 3 - Reverse Voltage vs. Ambient Temperature

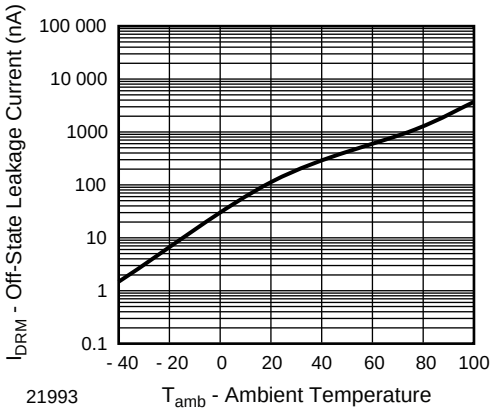

Fig. 5 - Off-State Leakage Current vs. Ambient Temperature

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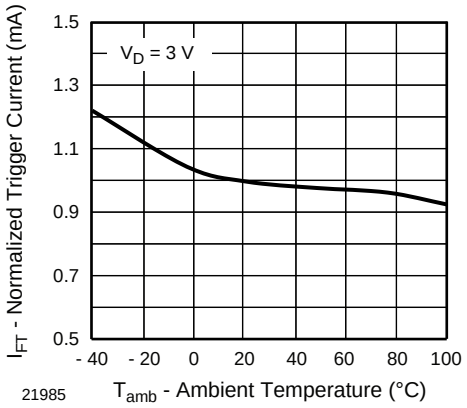

Fig. 6 - Normalized Trigger Current vs. Ambient Temperature

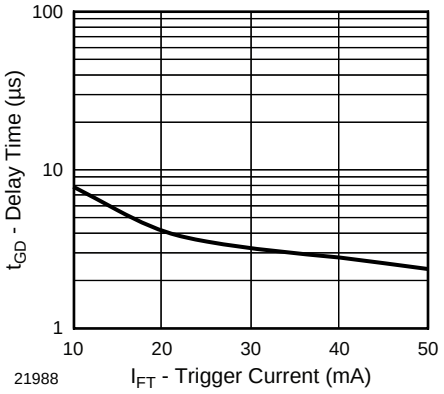

Fig. 9 - Trigger Current vs. Delay Time

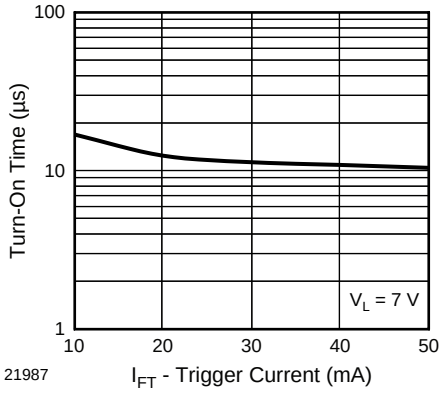

Fig. 7 - Trigger Current vs. Turn-On Time

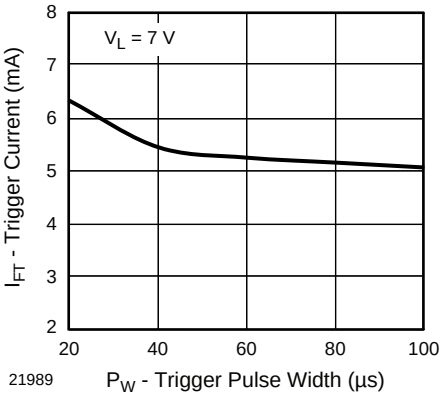

Fig. 10 - Trigger Current vs. Trigger Pulse Width

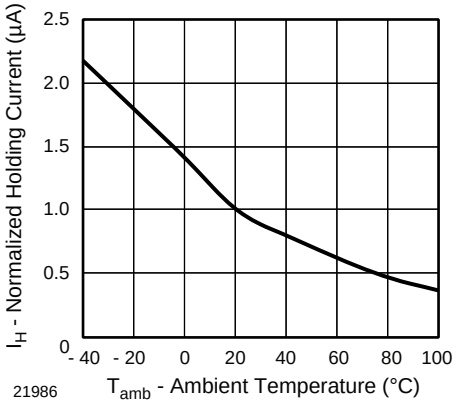

Fig. 8 - Normalized Holding Current vs. Ambient Temperature

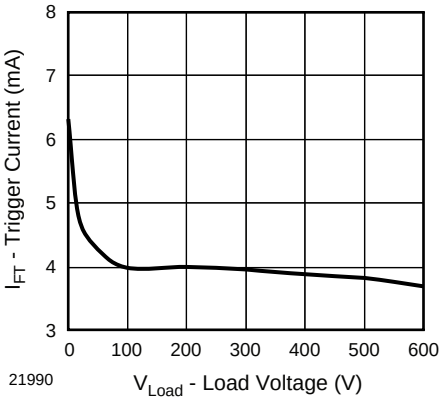

Fig. 11 - Trigger Current vs. Load Voltage

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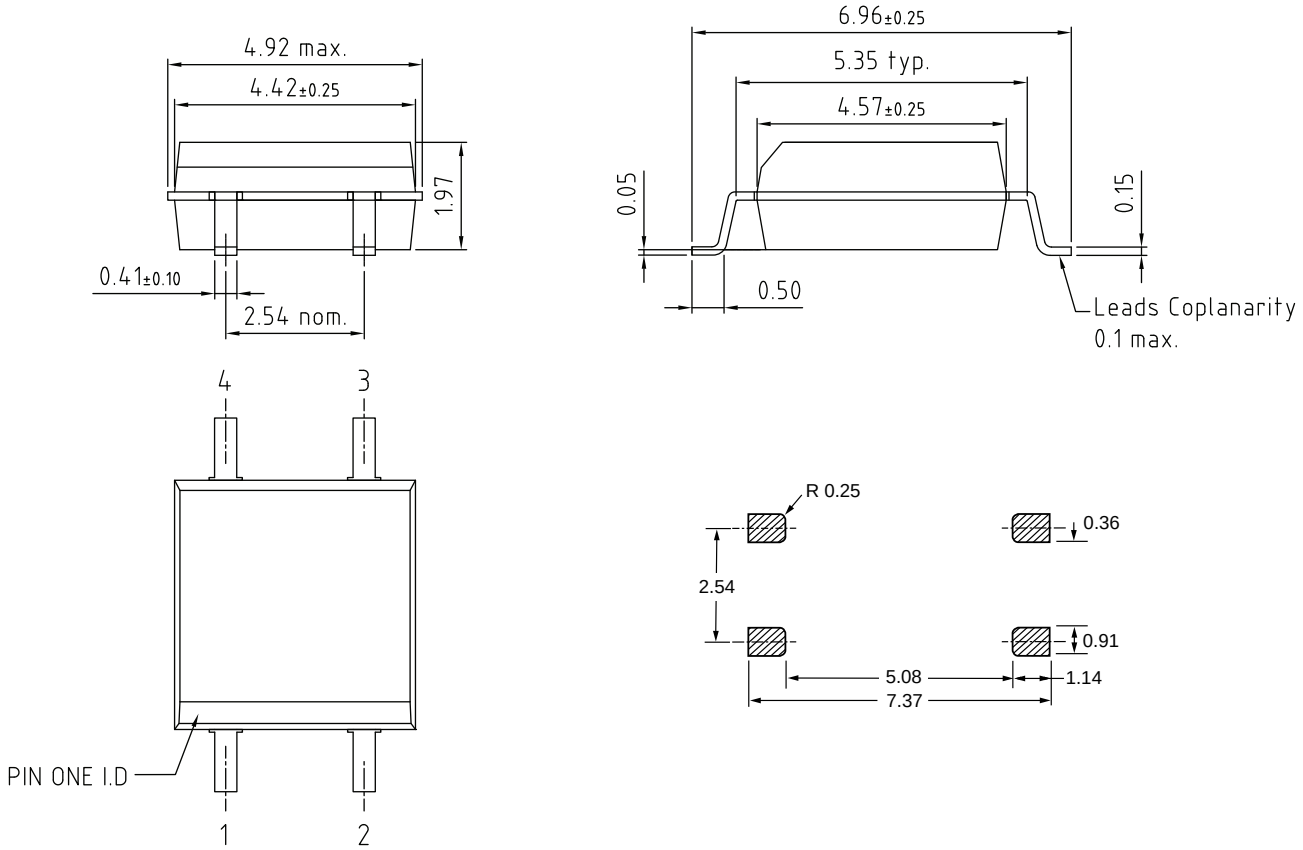
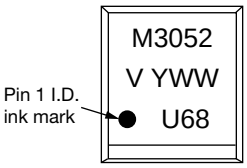
PACKAGE DIMENSIONS in millimeters



PACKAGE MARKING (example)



TAPE AND REEL PACKAGING

Dimensions in millimeters

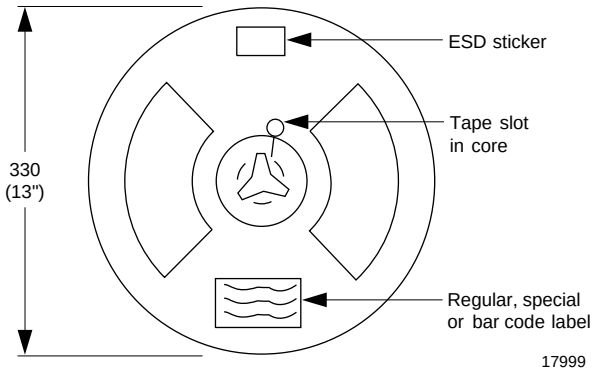


Fig. 12 - Tape and Reel Shipping Medium, 2000 units per reel

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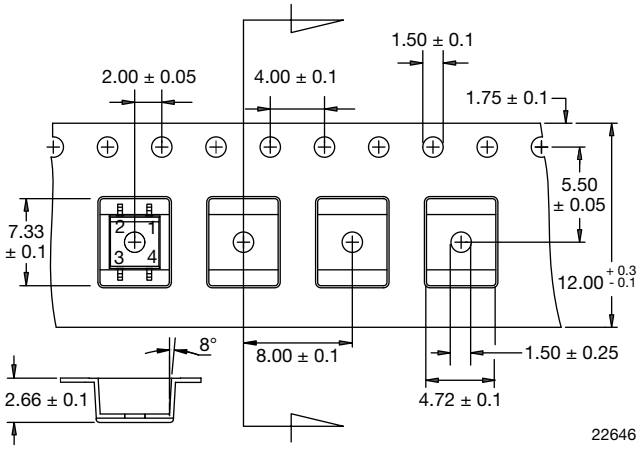

Fig. 13 - Tape Dimensions

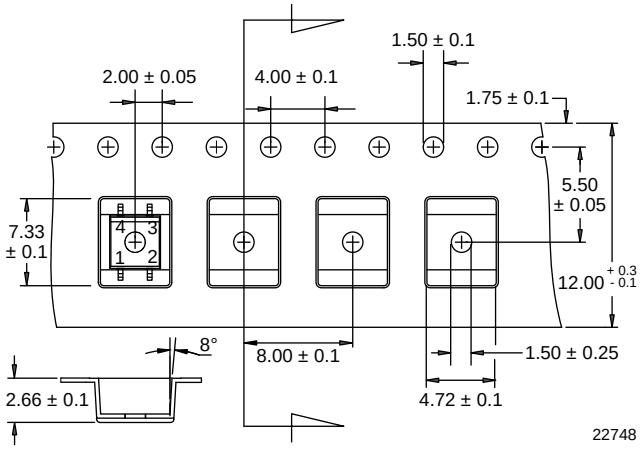

Fig. 14 - Tape Dimensions (order code T3)

SOLDER PROFILE

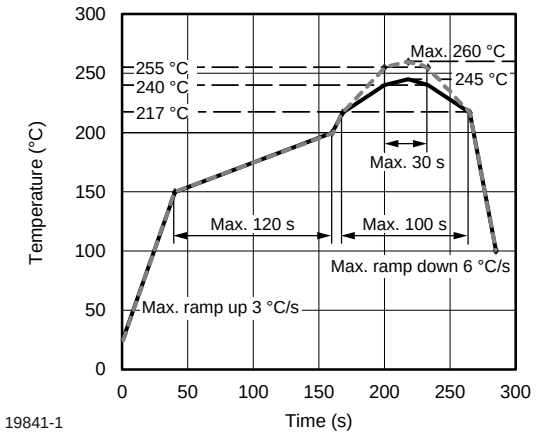

Fig. 15 - Lead (Pb)-free Reflow Solder Profile according to J-STD-020

HANDLING AND STORAGE CONDITIONS

ESD level: HBM class 2

Floor life: unlimited

Conditions: $T_{amb} < 30$ °C, RH < 85 %

Moisture sensitivity level 1, according to J-STD-020

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