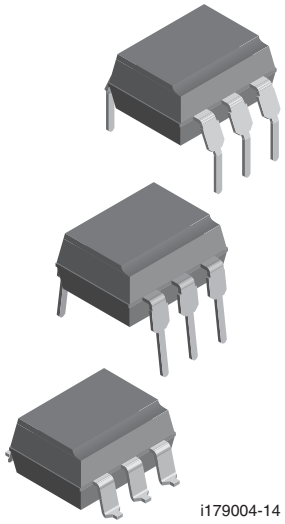
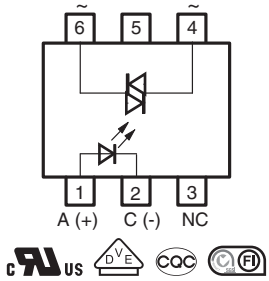
Optocoupler, Phototriac Output, 400 V_{DRM}



i179004-14



FEATURES

- 400 V blocking voltage
- Isolation test voltage, 5000 V_{RMS}, t = 1 min
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

APPLICATIONS

- High current triac driver
- Solid-state relay
- Switch small AC loads

AGENCY APPROVALS

(all parts are certified under base model VO3020)

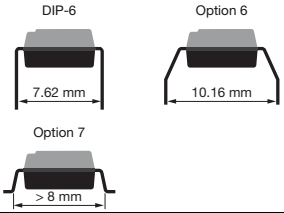
- UL1577, file no. E52744 double protection
- cUL tested to CSA 22.2 bulletin 5A
- DIN EN 60747-5-5 (VDE 0884-5), available with option 1
- FIMKO EN 60950-1
- CQC GB8898-2011, GB4943.1-2011

DESCRIPTION

The VO3020 series consists of a phototriac optically coupled to a gallium arsenide infrared-emitting diode in a 6-lead plastic dual inline package

ORDERING INFORMATION

V	O	3	0	2	#	-	X	0	0	#	T
PART NUMBER							PACKAGE OPTION				TAPE AND REEL



AGENCY CERTIFIED / PACKAGE	TRIGGER CURRENT, I_{FT}			
UL, cUL, CQC	**5 mA**	**10 mA**	**15 mA**	**30 mA**
DIP-6	VO3023	VO3022	VO3021	VO3020
DIP-6, 400 mil, option 6	VO3023-X006	VO3022-X006	VO3021-X006	VO3020-X006
SMD-6, option 7	VO3023-X007T	VO3022-X007T	VO3021-X007T	VO3020-X007T
VDE, UL, cUL, FIMKO, CQC	**5 mA**	**10 mA**	**15 mA**	**30 mA**
DIP-6	VO3023-X001	VO3022-X001	VO3021-X001	VO3020-X001
SMD-6, option 7	VO3023-X017T	-	VO3021-X017T	VO3020-X017T

Note

- Additional options may be possible, please contact sales office

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ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Reverse voltage		V_R	6	V
Forward current		I_F	50	mA
Peak surge current	100 µs, 200 pps	I_{FSM}	0.5	A
Power dissipation		P_{diss}	70	mW
OUTPUT				
Peak off-state voltage		V_{DRM}	400	V
RMS on-state current		$I_{T(RMS)}$	0.1	A
Peak non-repetitive surge current	PW = 100 ms, 120 pps	I_{TSM}	1	A
Power dissipation		P_{diss}	300	mW
COUPLER				
Isolation voltage	t = 1 min	V_{ISO}	5000	V_{RMS}
Total power dissipation		P_{tot}	330	mW
Storage temperature range		T_{stg}	-55 to +150	°C
Ambient temperature		T_{amb}	-40 to +100	°C
Lead soldering temperature (1)	2 mm from case, t < 10 s	T_{sld}	260	°C
Junction temperature		T_j	125	°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.

(1) Refer to reflow profile for soldering conditions for surface mounted devices (SMD). Refer to wave profile for soldering conditions for through hole devices (DIP)

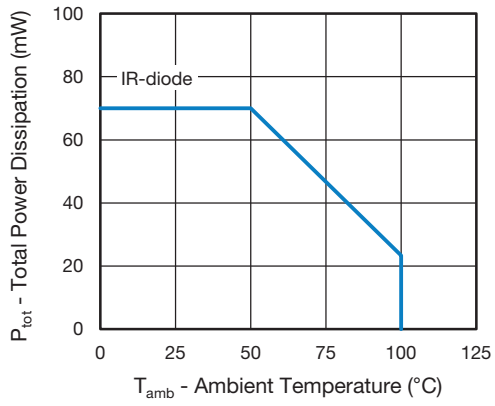


Fig. 1 - Total Power Dissipation vs. Ambient Temperature (IR-Diode)

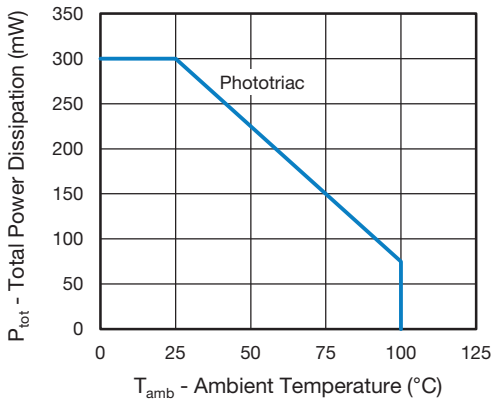


Fig. 2 - Total Power Dissipation vs. Ambient Temperature (Phototriac)

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ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = 20 mA		V_F	-	1.3	1.5	V
Reverse voltage	I_R = 10 µA		V_R	6	-	-	V
Reverse current	V_R = 6 V		I_R	-	-	10	µA
Junction capacitance	V_R = 0 V, f = 1 MHz		C_j	-	50	-	pF
OUTPUT							
Peak off-state current, either direction	V_{DRM} = 400 V (1)		I_{DRM}	-	10	100	nA
Peak off-state voltage, either direction	I_{TM} = 100 mA		V_{TM}	-	1.7	3	V
Critical rate of rise of off-state voltage	I_F = 0 A, V_D = 0.67 V_{DRM}		dV/dt_{cr}	100	-	-	V/µs
COUPLER (2)							
Emitting diode trigger current	V_S = 3 V, R_L = 150 Ω	VO3020	I_{FT}	-	15	30	mA
		VO3021	I_{FT}	-	8	15	mA
		VO3022	I_{FT}	-	5	10	mA
		VO3023	I_{FT}	-	3	5	mA
Holding current	I_F = 10 mA, $V_S \geq$ 3 V		I_H	-	200	-	µA

Notes

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements

(1) Test voltage must be applied within dV/dt ratings

(2) I_{FT} is defined as a minimum trigger current

SAFETY AND INSULATION RATINGS				
PARAMETER		**SYMBOL**	**VALUE**	**UNIT**
MAXIMUM SAFETY RATINGS				
Output safety power		P_{SO}	700	mW
Input safety current		I_{si}	400	mA
Safety temperature		T_S	175	°C
Comparative tracking index		CTI	175	
INSULATION RATED PARAMETERS				
Maximum withstanding isolation voltage		V_{ISO}	5000	V_{RMS}
Maximum transient isolation voltage		V_{IOTM}	8000	V_{peak}
Maximum repetitive peak isolation voltage		V_{IORM}	890	V_{peak}
		V_{IORM}	1140 (1)	V_{peak}
Insulation resistance	T_{amb} = 25 °C, V_{DC} = 500 V	R_{IO}	10^{12}	Ω
Isolation resistance	T_{amb} = 100 °C, V_{DC} = 500 V	R_{IO}	10^{11}	Ω
Climatic classification (according to IEC 68 part 1)			55 / 115 / 21	
Environment (pollution degree in accordance to DIN VDE 0109)			2	
Creepage distance (standard DIP-6)			≥ 7	mm
Creepage distance (400 mil DIP-6)			≥ 8	mm
Clearance distance (standard DIP-6)			≥ 7	mm
Clearance distance (400 mil DIP-6)			≥ 8	mm
Insulation thickness		DTI	≥ 0.4	mm

Notes

- As per DIN EN 60747-5-5, § 7.4.3.8.2, this optocoupler is suitable for “safe electrical insulation” only within the safety ratings. Compliance with the safety ratings shall be ensured by means of protective circuits

(1) 400 mil, option 6 only

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

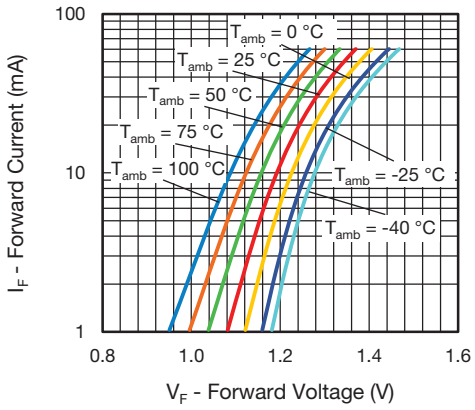


Fig. 3 - Forward Current vs. Forward Voltage

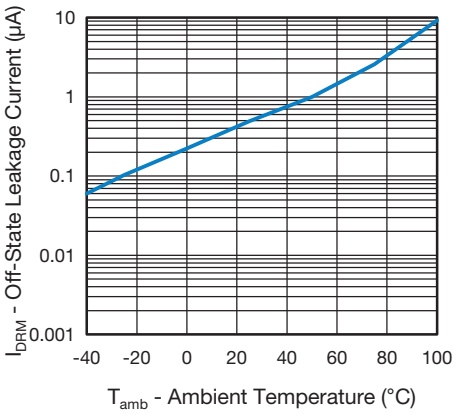


Fig. 6 - Off-State Leakage Current vs. Ambient Temperature

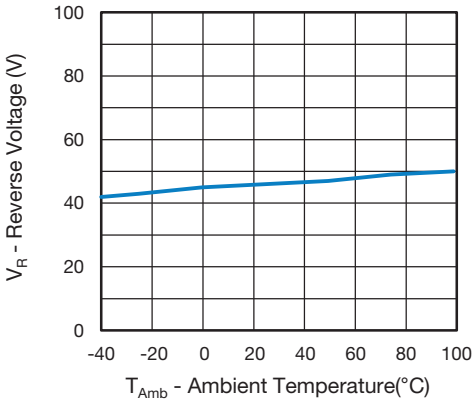


Fig. 4 - Reverse Voltage vs. Ambient Temperature

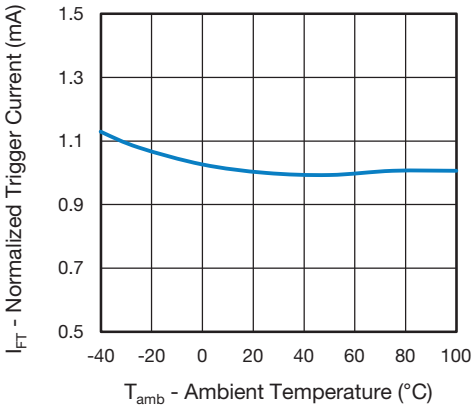


Fig. 7 - Normalized Trigger Current vs. Ambient Temperature

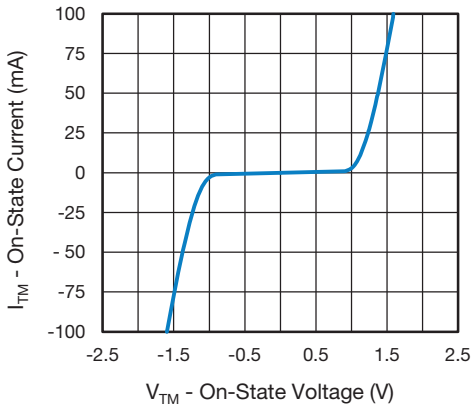


Fig. 5 - On-State Current vs. On-State Voltage

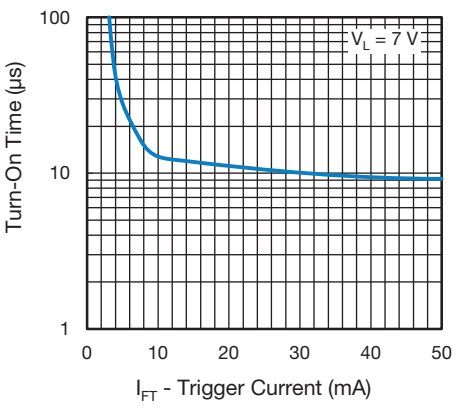


Fig. 8 - Turn-On Time vs. Trigger Current

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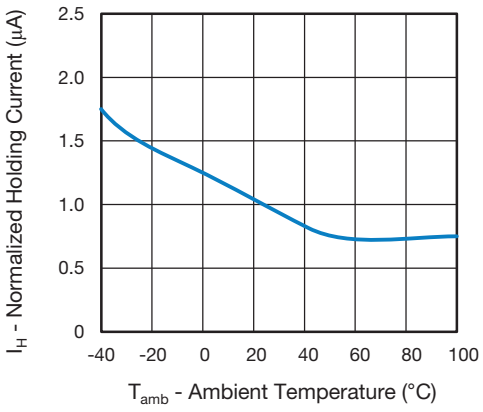


Fig. 9 - Normalized Holding Current vs. Ambient Temperature

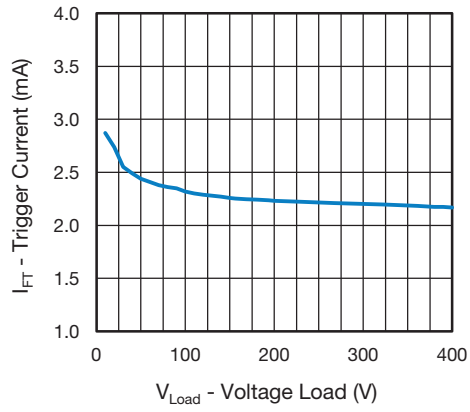


Fig. 12 - Trigger Current vs. Voltage Load

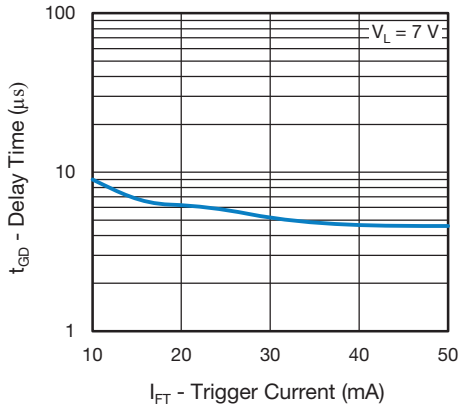


Fig. 10 - Delay Time vs. Trigger Current

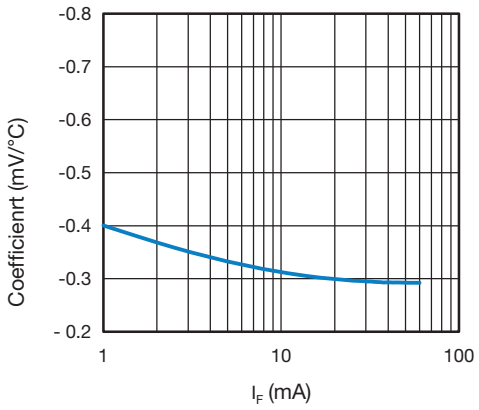


Fig. 13 - Coefficient vs. Forward Current

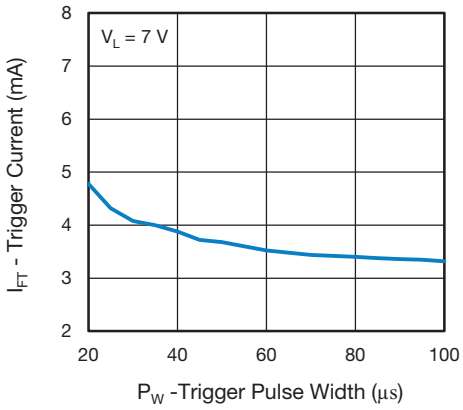


Fig. 11 - Trigger Current vs. Trigger Pulse Width

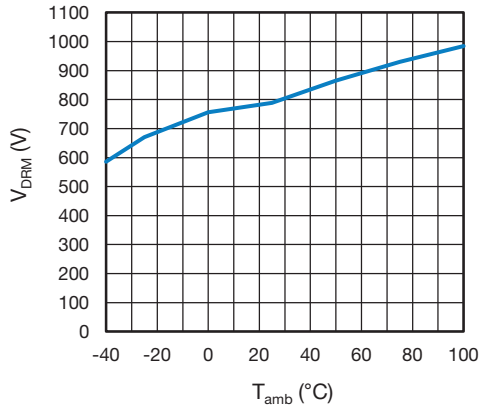


Fig. 14 - Peak Off-State Voltage vs. Ambient Temperature

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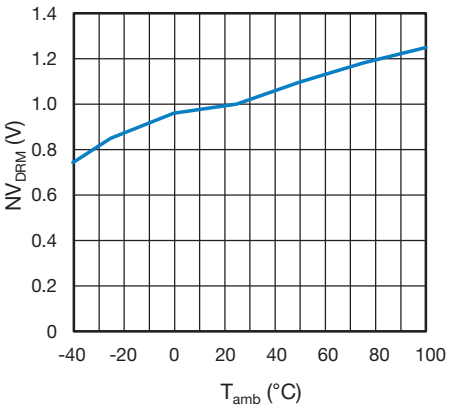
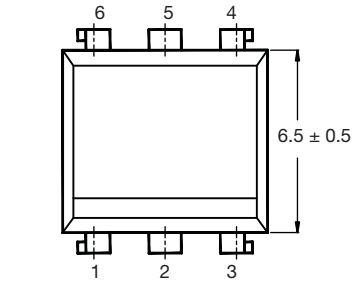
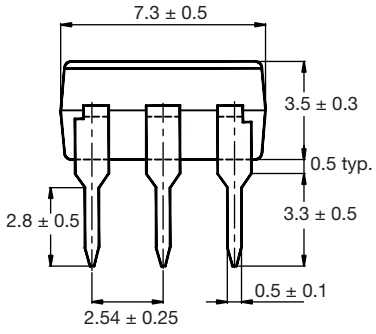
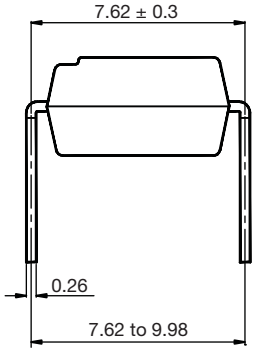


Fig. 15 - Normalized Off-State Voltage M2/M1 vs. Ambient Temperature

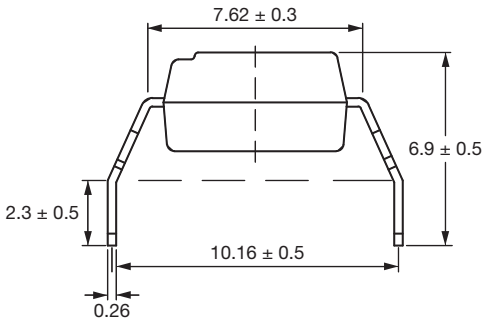
PACKAGE DIMENSIONS in millimeters



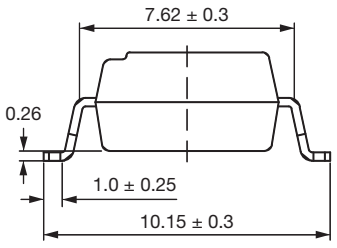


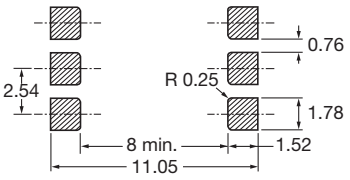


Option 6



Option 7





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PACKAGE MARKING



Fig. 16 - Example VO3020-X017T

Notes

- VDE logo is only marked on option 1 parts. Option information is not marked on the part
- Tape and reel suffix (T) is not part of the package marking

PACKING INFORMATION

DEVICES PER TUBE			
TYPE	**UNITS/TUBE**	**TUBES/BOX**	**UNITS/BOX**
DIP-6	50	40	2000

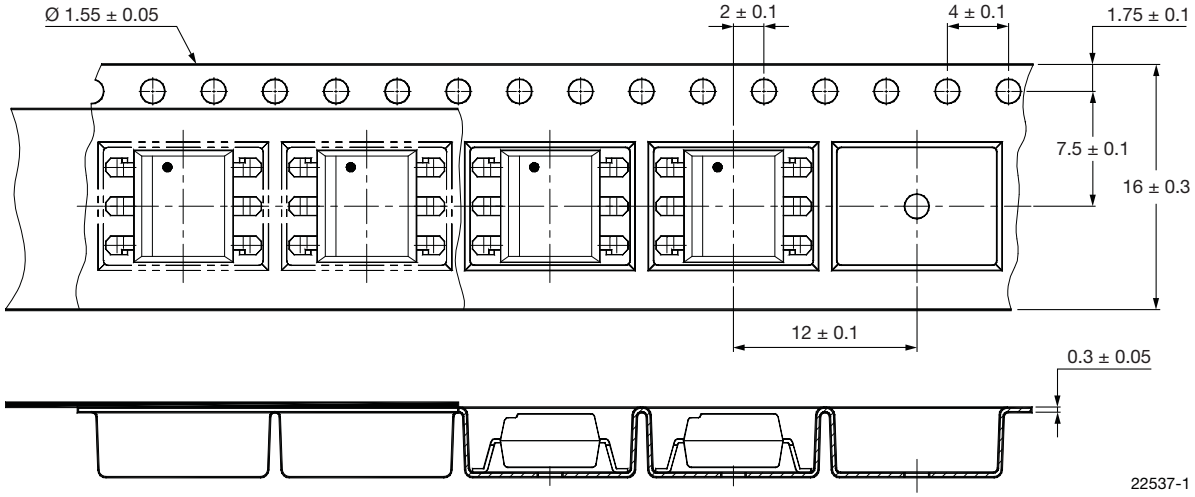


Fig. 17 - Tape and Reel Drawing, 1000 Units per Reel

REEL DIMENSIONS in millimeters

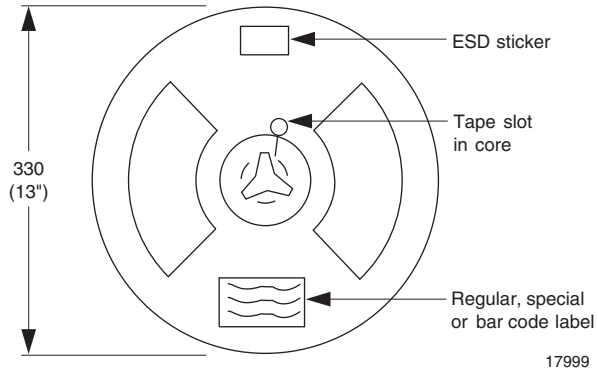


Fig. 18 - Reel Dimensions

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