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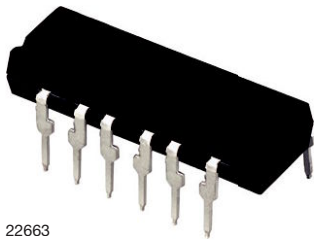
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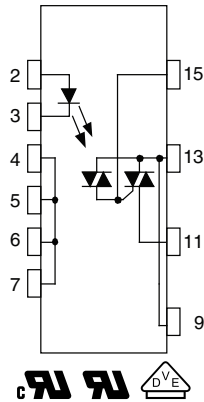
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Optocoupler, Power Phototriac



22663



FEATURES

- Maximum trigger current (I_{FT}): 10 mA
- Isolation test voltage 5300 V_{RMS}
- Peak off-state voltage 600 V
- Load current 1 A
- dV/dt of 500 V/μs
- Pure tin leads

APPLICATIONS

- Triac driver
- Programmable controllers
- AC-output module

AGENCY APPROVALS

- UL - E52744 system code H
- CUL - E52744 system code H
- VDE - DIN EN 60747-5-5 (VDE 0884-5)

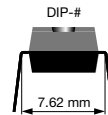
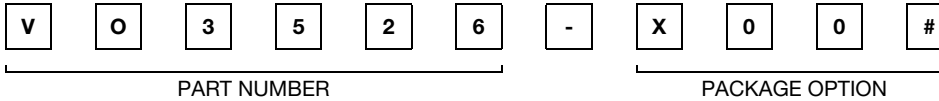
DESCRIPTION

The VO3526 is an optically couple phototriac driving a power triac in a DIP-10 (16) package.



PIN	FUNCTION
2	LED anode
3	LED cathode
4	No connection
5	No connection
6	No connection
7	No connection
9, 13	Triac T2
11	Triac T1
15	Triac gate

ORDERING INFORMATION



AGENCY CERTIFIED/PACKAGE	TRIGGER, CURRENT I_{FT} (mA)
VDE, UL, cUL	10
DIP-10, tubes	VO3526

Note

- For additional information on the possible lead bend and VDE options refer to option information.

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
INPUT				
LED continuous forward current		I_F	50	mA
LED reverse voltage		V_R	5.0	V
OUTPUT				
Repetitive peak off-state voltage	Sine wave, 50 to 60 Hz, gate open	V_{DRM}	600	V
On-state RMS current		$I_{T(RMS)}$	1.0	A
Peak nonrepetitive surge current (50 Hz, peak)		I_{TSM}	10	A

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
COUPLER				
Total power dissipation		P_{diss}	1.2	W
Ambient temperature range		T_{amb}	- 40 to + 85	$^{\circ}\text{C}$
Storage temperature range		T_{stg}	- 40 to + 125	$^{\circ}\text{C}$
Soldering temperature ⁽¹⁾	$t \leq 10\text{ s max.}$	T_{sld}	260	$^{\circ}\text{C}$
Isolation test voltage	for 1.0 s	V_{ISO}	5300	V_{RMS}

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 wave profile for soldering conditions for through hole devices.

⁽²⁾ Total power dissipation value is based on 2S2P PCB. Refer to power phototriac application note for PCB design tips.

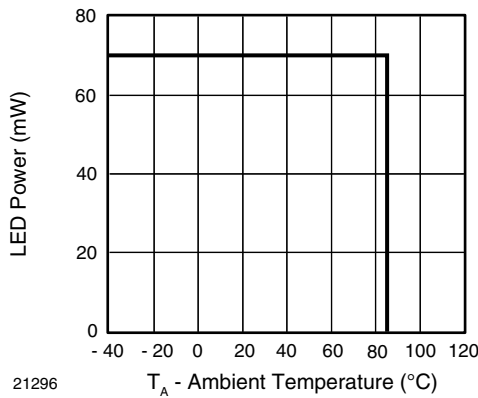
ABSOLUTE MAXIMUM RATING CURVES


Fig. 1 - Power Dissipation vs. Temperature

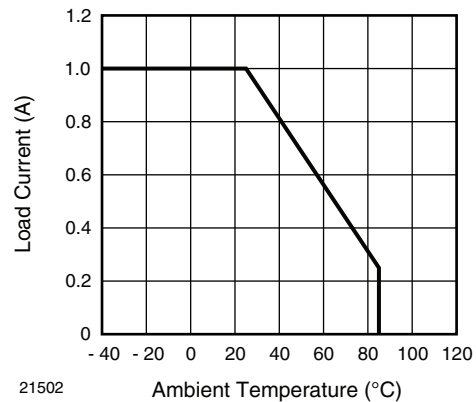


Fig. 2 - Allowable Load Current vs. Ambient Temperature

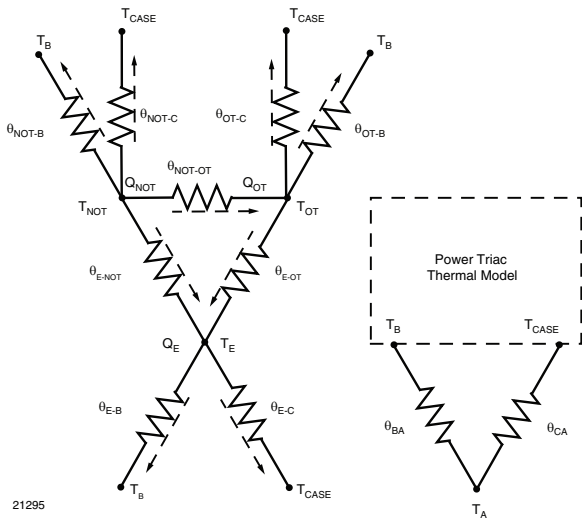
Note

- The allowable load current was calculated out under a given operating conditions and only for reference:
LED power: $Q_E = 0.015\text{ W}$, θ_{BA} (4-layer) = $30\text{ }^{\circ}\text{C/W}$

THERMAL CHARACTERISTICS			
PARAMETER	SYMBOL	VALUE	UNIT
Maximum LED junction temperature	T_{jmax}	105	$^{\circ}\text{C}$
Maximum NOT junction temperature	T_{jmax}	105	$^{\circ}\text{C}$
Thermal resistance, junction NOT to bord	θ_{NOT-B}	75	$^{\circ}\text{C/W}$
Thermal resistance, junction NOT to case	θ_{NOT-C}	150	$^{\circ}\text{C/W}$
Thermal resistance, junction OT to board	θ_{OT-B}	158	$^{\circ}\text{C/W}$
Thermal resistance, junction OT to case	θ_{OT-C}	157	$^{\circ}\text{C/W}$
Thermal resistance, junction emitter to board	θ_{E-B}	149	$^{\circ}\text{C/W}$
Thermal resistance, junction emitter to case	θ_{E-C}	161	$^{\circ}\text{C/W}$
Thermal resistance, junction NOT to junction OT	θ_{NOT-OT}	243	$^{\circ}\text{C/W}$
Thermal resistance, junction emitter to junction NOT	θ_{E-NOT}	420	$^{\circ}\text{C/W}$
Thermal resistance, junction emitter to junction OT	θ_{E-OT}	235	$^{\circ}\text{C/W}$
Thermal resistance, case to ambient	θ_{CA}	130	$^{\circ}\text{C/W}$

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 Power Phototriac application note.



Thermal Model

- NOT: Non-opto-triac
- OT: Opto-triac
- T_B : Board temperature
- T_{CASE} : Case temperature
- T_A : Ambient temperature
- θ_{BA} : Thermal resistance, board to ambient
- Q_E : LED power dissipation
- Q_{OT} : OT power dissipation
- Q_{NOT} : NOT power dissipation

ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
LED trigger current	$V_T = 6\text{ V}$	I_{FT}			10	mA
Input reverse current	$V_R = 5\text{ V}$	I_R			10	μA
LED forward voltage	$I_F = 10\text{ mA}$	V_F	0.9		1.4	V
OUTPUT						
Peak on-state voltage	$I_{TM} = 1.5\text{ A}$	V_{TM}			1.7	V
Repetitive peak off-state current	$V_{DRM} = 600\text{ V}$, $T_A = 110\text{ }^\circ\text{C}$, 60 Hz	I_{DRM}			100	μA
Holding current	$R_L = 100\ \Omega$	I_H			25	mA
Critical rate of rise of off-state voltage	$V_{IN} = 400\text{ V}$ (fig. 3)	dV/dt_{cr}		210		$\text{V}/\mu\text{s}$
Critical rate of rise of commutating voltage	$V_{IN} = 240\text{ V}_{RMS}$, $I_T = 1\text{ A}_{RMS}$ (fig. 3)	dV/dt_{crq}		0.9		$\text{V}/\mu\text{s}$

Note

- 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.

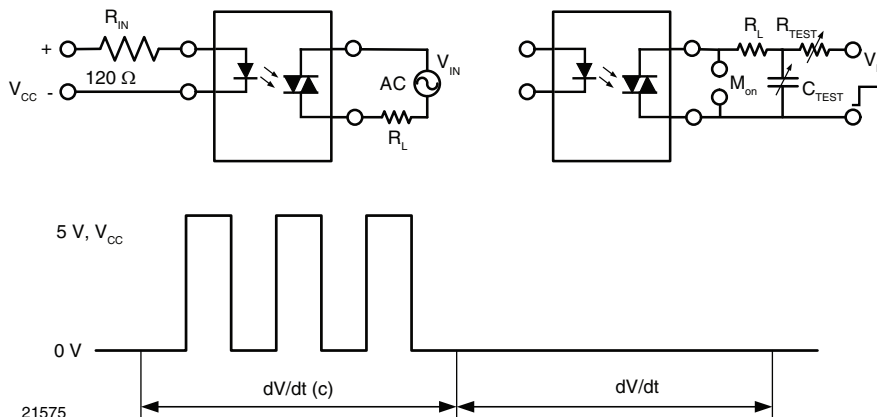


Fig. 3 - dV/dt Test Circuit



RECOMMENDED OPERATING CONDITIONS						
PARAMETER		TEST CONDITION	SYMBOL	MIN.	MAX.	UNIT
Forward current at on-state		Input	$I_{F(ON)}$	10	20	mA
Forward current at off-state			$I_{F(OFF)}$	0	0.1	mA
Load supply voltage		Output	With snubber (0.022 μ F, 47 Ω)	$V_{OUT(RMS)}$	240	V
On-state RMS current	$T_A = 40\text{ }^\circ\text{C}$		On 4-layer PCB ($R_{BA} = 30\text{ }^\circ\text{C/W}$)	$I_{OUT(RMS)}$	0.8	A
	$T_A = 60\text{ }^\circ\text{C}$	0.6			A	
Frequency			f	50	60	Hz
Operating temperature				- 40	85	$^\circ\text{C}$

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		
Tracking resistance (comparative tracking index)		Insulation group IIIa	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 $^\circ\text{C}$		$V_{IO} = 500\text{ V}$	R_{IS}			$\geq 10^{12}$	Ω
Insulation resistance at T_S		$V_{IO} = 500\text{ V}$	R_{IS}			$\geq 10^9$	Ω
Insulation resistance at 100 $^\circ\text{C}$		$V_{IO} = 500\text{ V}$	R_{IS}			$\geq 10^{11}$	Ω
Partial discharge test voltage		Method b, $V_{pd} = V_{IORM} \times 1.6$	V_{pd}			1424	V_{peak}
Safety limiting values - maximum values allowed in the event of a failure	Output power		P_{SO}			2	W
	Input current		I_{SI}			150	mA
	Case temperature		T_{SI}			165	$^\circ\text{C}$
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

- This phototriac coupler is suitable for 'safe electrical insulation' only within the safety ratings. Compliance with safety ratings shall be ensured by means of protective circuits.

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

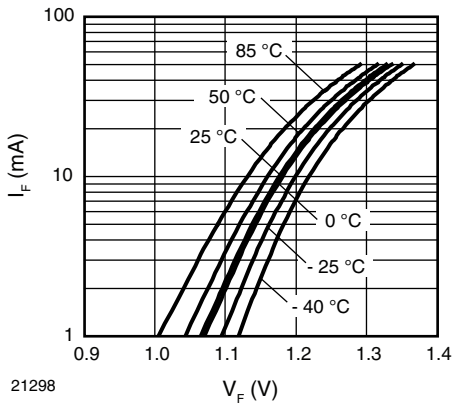


Fig. 4 - Forward Current vs. Forward Voltage

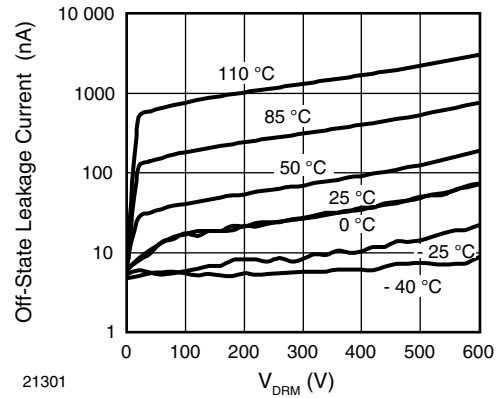


Fig. 7 - Off-State Leakage Current vs. Voltage

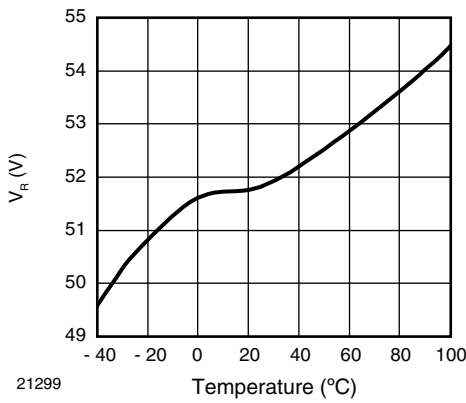


Fig. 5 - Diode Reverse Voltage vs. Temperature

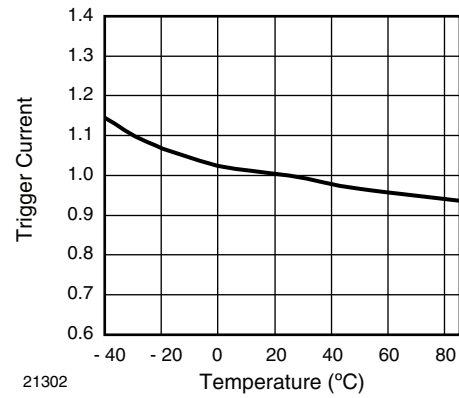


Fig. 8 - Normalized Trigger Input Current vs. Temperature

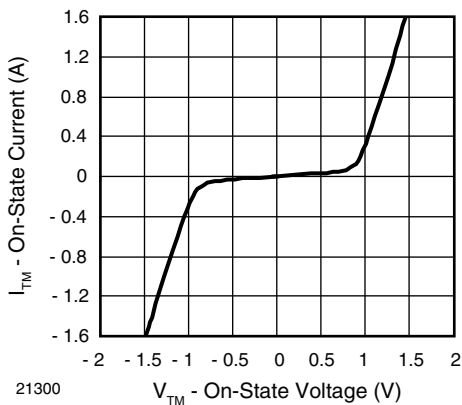


Fig. 6 - On-State Current vs. On State Voltage

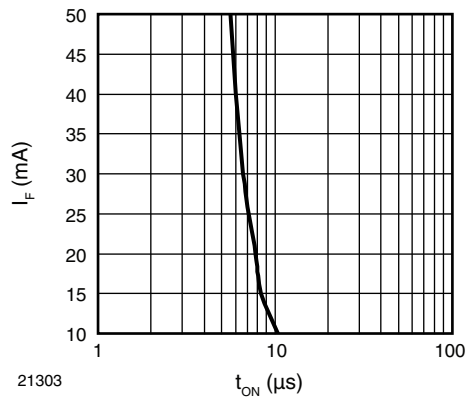


Fig. 9 - Trigger Input Current vs. Turn-on Time

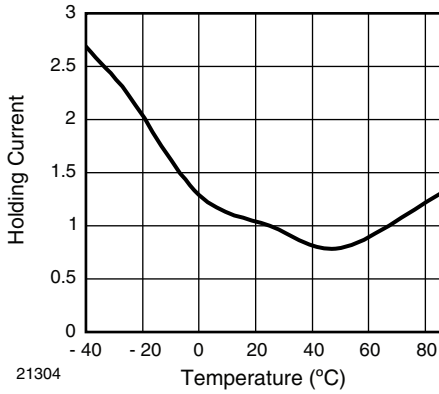


Fig. 10 - Normalized Holding Current vs. Temperature

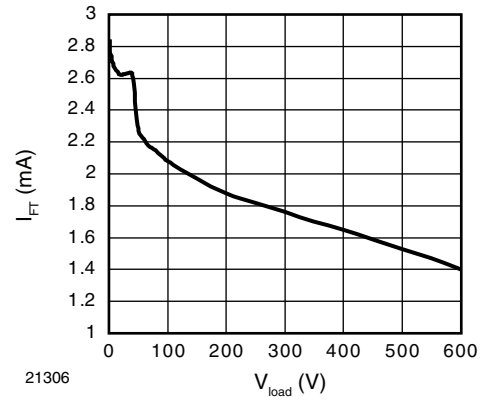


Fig. 12 - Trigger Current vs. Vload

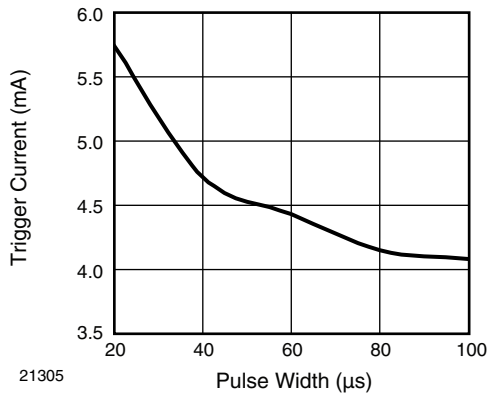
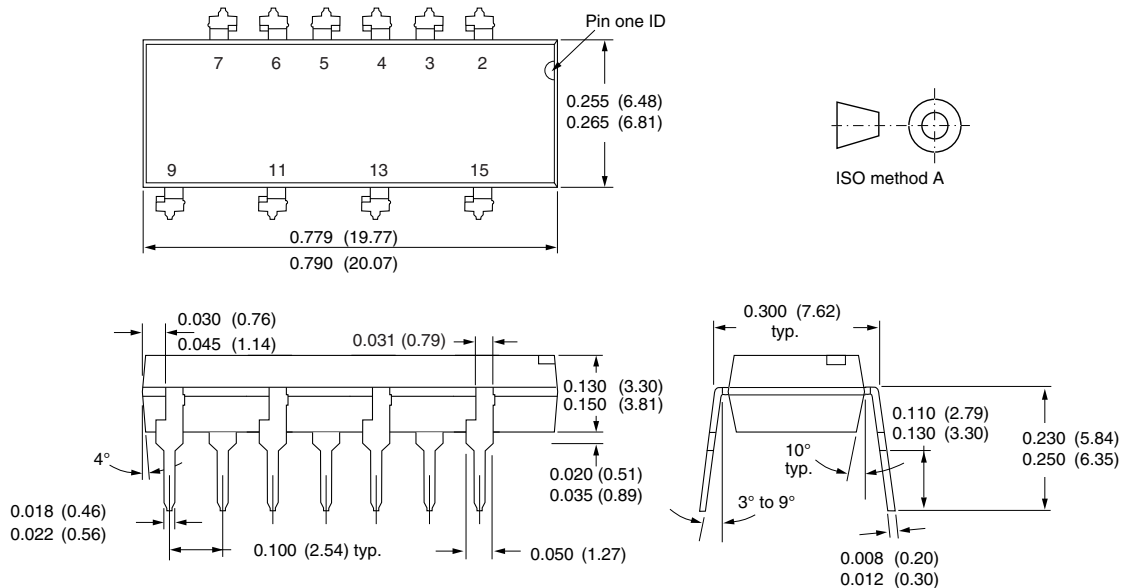


Fig. 11 - Trigger Current vs. Trigger Pulse Width

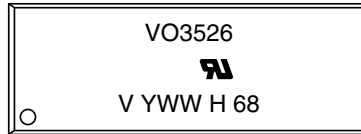
PACKAGE DIMENSIONS in inches (millimeters)



21083



PACKAGE MARKING





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