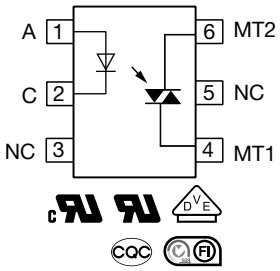
Optocoupler, Phototriac Output, Non-Zero Crossing, 250 V_{DRM}

22897-1



FEATURES

- 250 V blocking voltage
- Wide range of trigger current
- 100 mA_{RMS} on-state current
- Wide temperature range -55 °C to +100 °C
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

LINKS TO ADDITIONAL RESOURCES

3D Models | Design Tools | Related Documents | SPICE Models | Footprints | Schematics

DESCRIPTION

The K301xP series consists of a phototriac optically coupled to a gallium arsenide infrared-emitting diode in a 6-lead plastic dual inline package.

The non-zero crossing functionality enables full wave control. Featuring galvanic and electrical noise isolation, the output is able to directly switch AC loads or drive medium to high power TRIACs.

APPLICATIONS

- Power TRIAC driver
- Isolated AC load switch
- Air condition
- Heaters
- White goods
- Industrial controls
- Office equipment

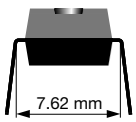
AGENCY APPROVALS

- UL
- cUL
- DIN EN 60747-5-5 (VDE 0884-5)
- CQC: GB4943-1-2011
- CQC: GB8898-2011
- FIMKO

ORDERING INFORMATION

K	3	0	1	X	P
PART NUMBER				TRIGGER CURRENT I_{FT}	

DIP-6



AGENCY CERTIFIED / PACKAGE	TRIGGER CURRENT, I_{FT}	
VDE, cUL, CQC, FIMKO	5 mA	15 mA
DIP-6	K3012P	K3010P

Note

- Additional options may be possible, please contact sales office

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
INPUT				
Reverse voltage		V_R	5	V
Forward current		I_F	80	mA
Forward surge current	$t_p \leq 10$ µs	I_{FSM}	3	A
Power dissipation		P_{diss}	100	mW
Junction temperature		T_j	125	°C
OUTPUT				
Off state output terminal voltage		V_{DRM}	250	V
On state RMS current		I_{TRM}	100	mA
Peak surge current, non-repetitive	$t_p \leq 10$ ms	I_{TMS}	1.5	A
Power dissipation		P_{diss}	300	mW
Junction temperature		T_j	125	°C
COUPLER				
Total power dissipation		P_{tot}	350	mW
Storage temperature range		T_{stg}	-55 to +150	°C
Ambient temperature range		T_{amb}	-55 to +100	°C
Soldering temperature	2 mm from case, t ≤ 10 s	T_{sld}	260	°C

Note

- 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

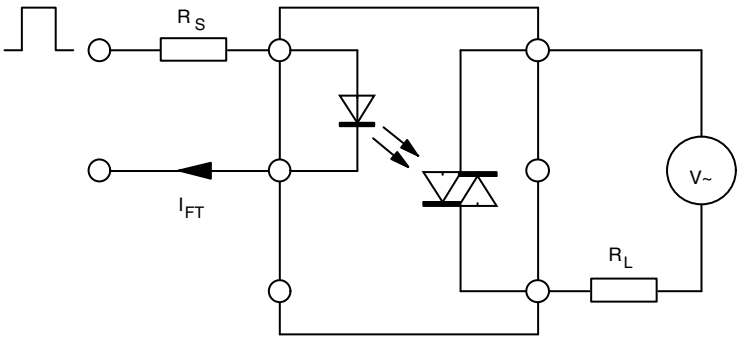
ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
INPUT							
Forward voltage	I_F = 50 mA		V_F	-	1.25	1.6	V
Junction capacitance	V_R = 0, f = 1 MHz		C_j	-	50	-	pF
OUTPUT							
Forward peak off-state voltage (repetitive)	I_{RDM} = 100 nA		V_{DRM} (1)	250	-	-	V
Peak on-state voltage	I_{TM} = 100 mA		V_{TM}	-	1.5	3	V
Critical rate of rise of off-state voltage	I_{FT} = 0, I_{FT} = 30 mA		dV/dt_{cr}	-	10	-	V/µs
			dV/dt_{crq}	0.1	0.2	-	V/µs
COUPLER (2)							
Collector emitter trigger current	V_S = 3 V, R_L = 150 Ω	K3010P	I_{FT}	-	8	15	mA
		K3012P	I_{FT}	-	2	5	mA
Holding current	I_F = 10 mA, $V_S \geq 3$ V		I_H	-	100	-	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

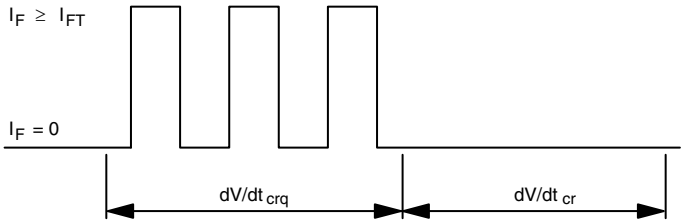
(1) Test voltage must be applied within dV/dt ratings

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



Test condition:
dV/dt_{cr}
V_S = 2/3 V_{DRM}
(sine wave)
R_L = 33 kΩ
dV/dt_{crq}
$V_{eff.}$ = 30 V
(sine wave)
R_L = 2 kΩ

Fig. 1 - Test Circuit for dV/dt_{cr} and dV/dt_{crq}



dV/dt_{cr} Highest value of the "rate of rise of off-state voltage" which does not cause any switching from the off state to the on state

dV/dt_{crq} Highest value of the "rate of rise of communicating voltage" which does not switch on the device again, after the voltage has decreased to zero and the trigger current is switched from I_{FT} to zero

95 10814

Fig. 2

SAFETY AND INSULATION RATINGS (T_{amb} = 25 °C, unless otherwise specified)				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Climatic classification	According to IEC 68 part 1		55 / 100 / 21	
Pollution degree	According to DIN VDE 0109		2	
Comparative tracking index	Insulation group IIIa	CTI	175	
Maximum rated withstanding isolation voltage	According to UL1577, t = 1 min	V_{ISO}	4420	V_{RMS}
Tested withstanding isolation voltage	According to UL1577, t = 1 s	V_{ISO}	5300	V_{RMS}
Maximum transient isolation voltage	According to DIN EN 60747-5-5	V_{IOTM}	8000	V_{peak}
Maximum repetitive peak isolation voltage	According to DIN EN 60747-5-5	V_{IORM}	890	V_{peak}
Isolation resistance	T_{amb} = 25 °C, V_{IO} = 500 V	R_{IO}	≥ 10^{12}	Ω
	T_{amb} = 100 °C, V_{IO} = 500 V	R_{IO}	≥ 10^{11}	Ω
Output safety power		P_{SO}	265	mW
Input safety current		I_{SI}	130	mA
Input safety temperature		T_S	150	°C
Creepage distance	DIP-6		≥ 7	mm
Clearance distance			≥ 7	mm
Insulation thickness		DTI	≥ 0.4	mm
Input to output test voltage, method A	V_{IORM} x 1.6 = V_{PR}, 100 % sample test with t_M = 10 s, partial discharge < 5 pC	V_{PR}	1424	V_{peak}

Note

- According to DIN EN60747-5-5 (see figure 4). This optocoupler is suitable for safe electrical isolation only within the safety ratings. Compliance with the safety ratings shall be ensured by means of suitable protective circuits

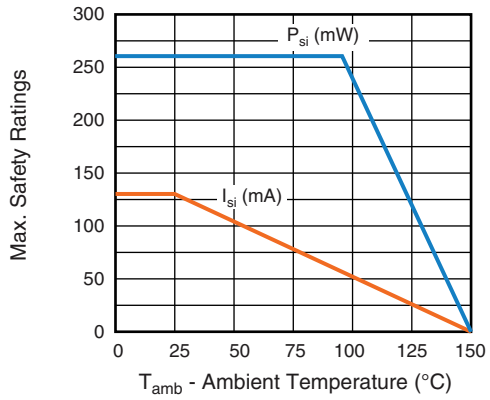


Fig. 3 - Safety Parameter Derating Diagram

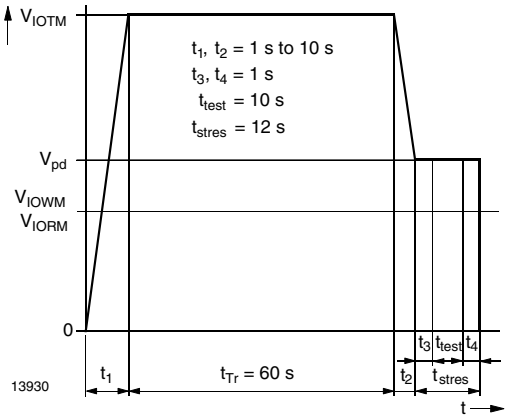


Fig. 4 - Test Pulse Diagram for Sample Test according to DIN EN60747-5-5 / DIN EN60747-; IEC 60747

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

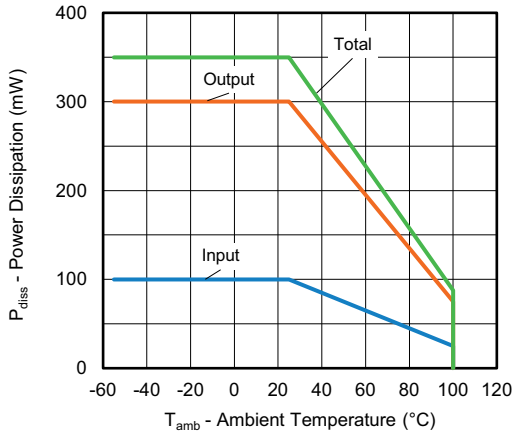


Fig. 5 - Total Power Dissipation vs. Ambient Temperature

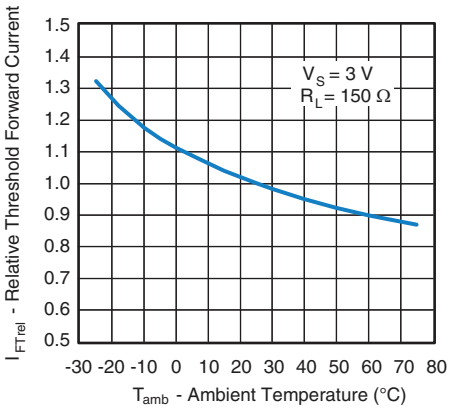


Fig. 7 - Relative Threshold Forward Current vs. Ambient Temperature

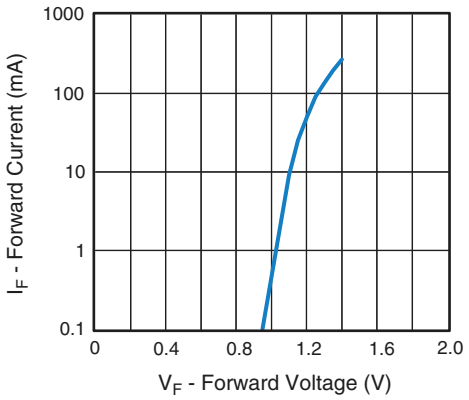


Fig. 6 - Forward Current vs. Forward Voltage

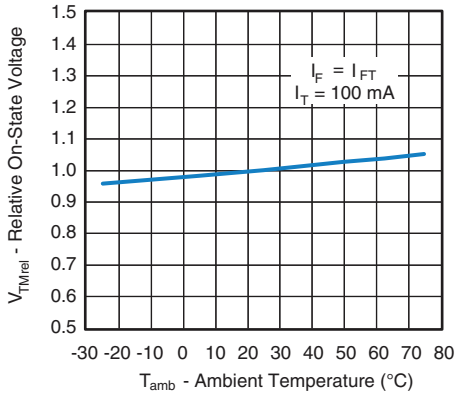


Fig. 8 - Relative On-State vs. Ambient Temperature

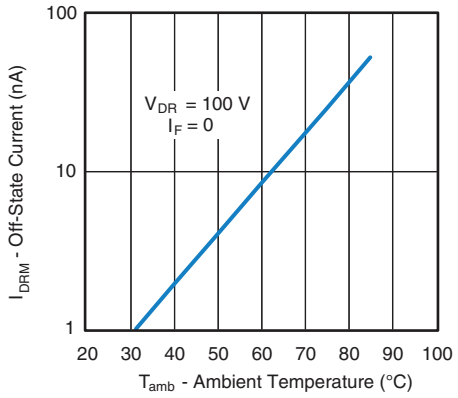


Fig. 9 - Off-State Current vs. Ambient Temperature

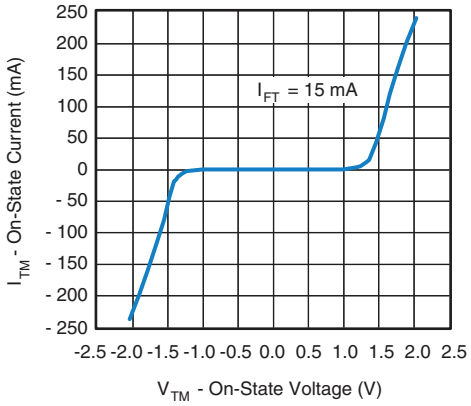
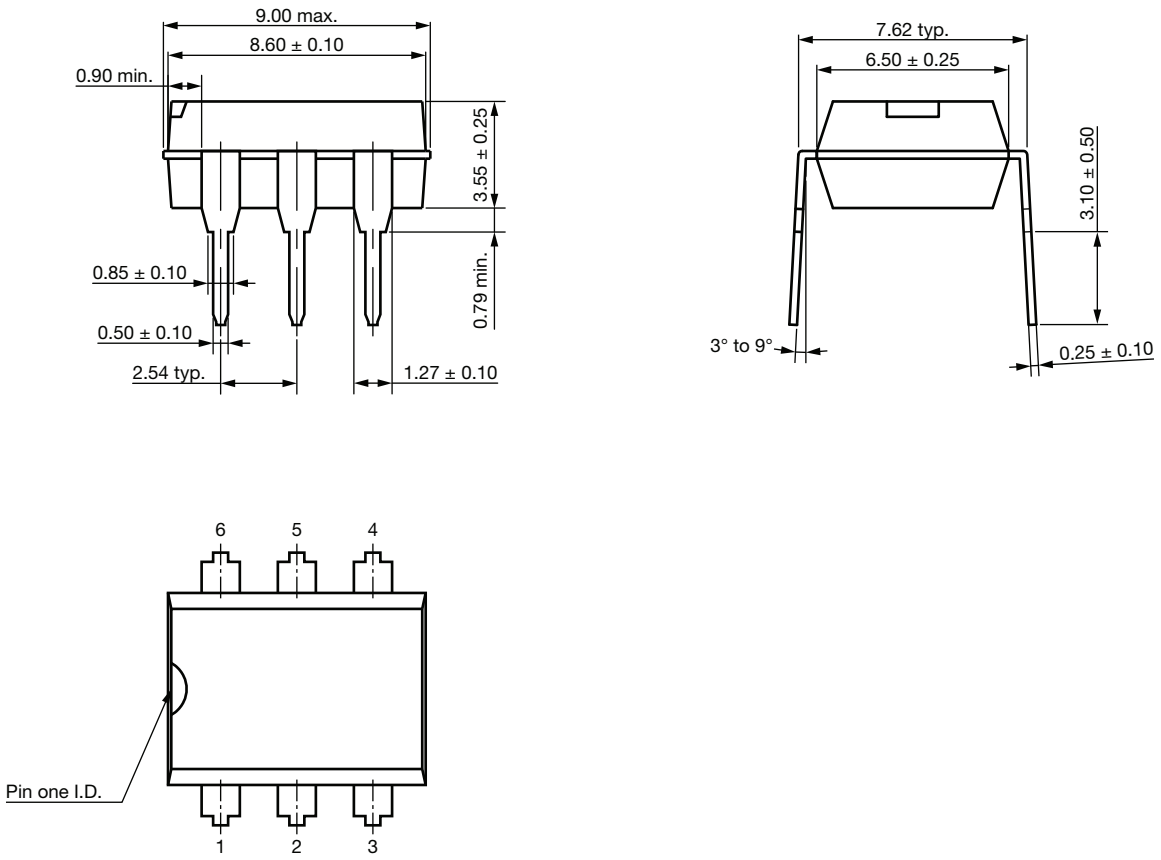


Fig. 10 - On-State Current vs. On-State Voltage

PACKAGE DIMENSIONS (in millimeters)

DIP-6



PACKAGE MARKING

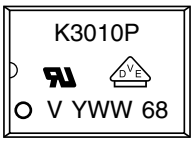


Fig. 11 - Example of K3010P

Notes

- "YWW" is the date code marking (Y = year code, WW = week code)
- The VDE logo is only marked on option1 parts

PACKING INFORMATION (in millimeters)

Tube

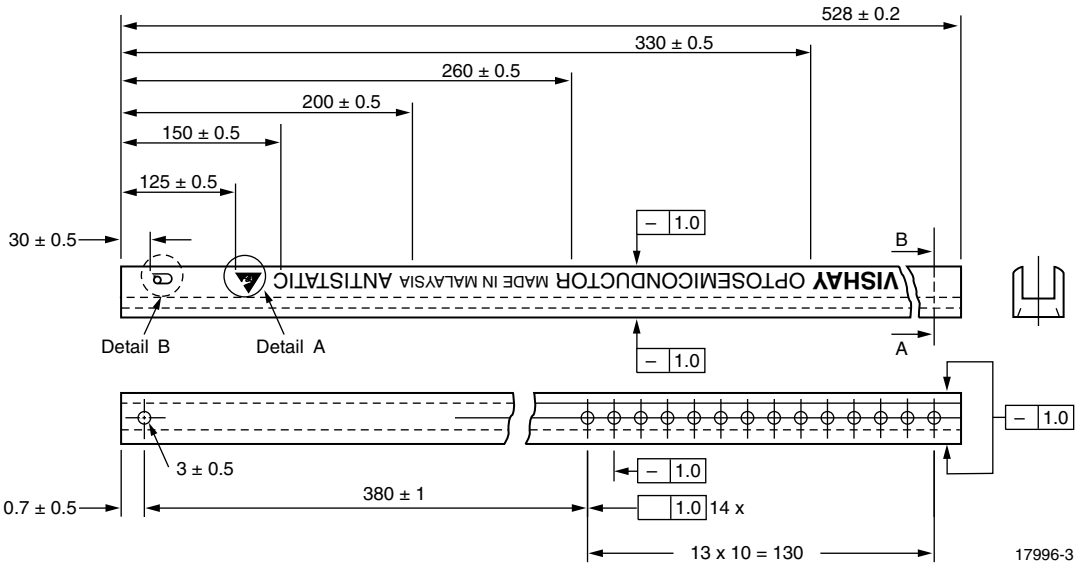


Fig. 12 - Shipping Tube Specifications for DIP Packages

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

DIP-6

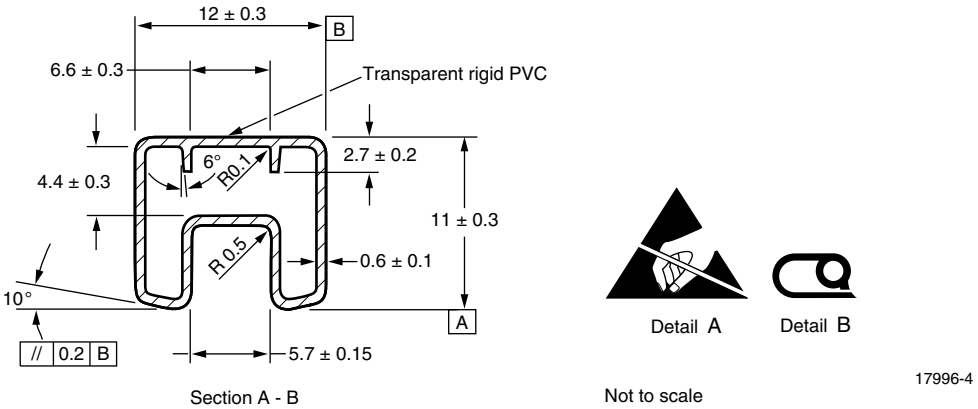


Fig. 13 - Tube Shipping Medium

SOLDER PROFILES

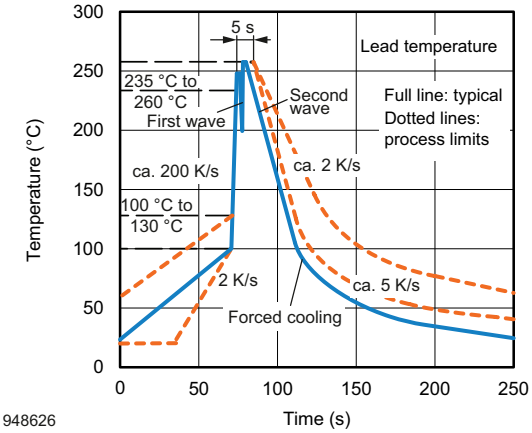


Fig. 14 - Wave Soldering Double Wave Profile
According to J-STD-020 for DIP Devices

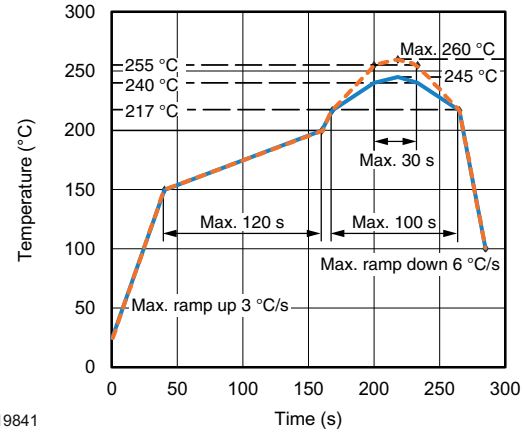


Fig. 15 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020 for SMD Devices

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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