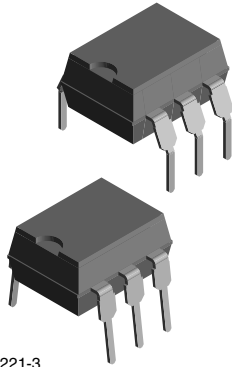
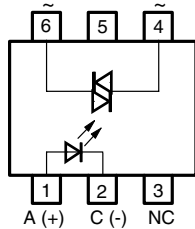


Optocoupler, Phototriac Output, 250 V_{DRM}



17221-3

Note: pin 5 must not be connected



17221-2

DESCRIPTION

The K3010P, K3010PG series consists of a photo-transistor optically coupled to a gallium arsenide infrared-emitting diode in a 6-pin plastic dual in-line package

VDE STANDARDS

These couplers perform safety functions according to the following equipment standards:

- **DIN EN60747-5-5 (VDE0884)**
Optocoupler for electrical safety requirements
- **IEC 60950/EN60950**
Office machines (applied for reinforced isolation for mains voltage $\leq 400 V_{RMS}$)
- **VDE0804**
Telecommunication apparatus and data processing
- **IEC 60065**
Safety for mains-operated electronic and related household apparatus

AGENCY APPROVALS

- UL1577, file no. E52744 system code H, double protection
- BSI: BS EN60065:2002 and IEC 60065:2001, certificate number 7955. An BS EN60950-1:2006 certificate number 7956
- DIN EN60747-5-5 (VDE0884)

FEATURES

- Isolation materials according to UL 94 V-O
- Pollution degree 2 (DIN/VDE0110 resp. IEC 60664)
- Climatic classification 55/100/21 (IEC 60068 part 1)
- Special construction: therefore, extra low coupling capacity of typical 0.2 pF, high common mode rejection
- I_{FT} offered in 3 groups
- Rated impulse voltage (transient overvoltage) $V_{IOTM} = 6 kV_{peak}$
- Isolation test voltage, $5300 V_{RMS}, t = 1 s$
- Creepage current resistance according to VDE0303/IEC 60112 comparative tracking index: $CTI = 175$
- Thickness through insulation $\geq 0.75 mm$
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC

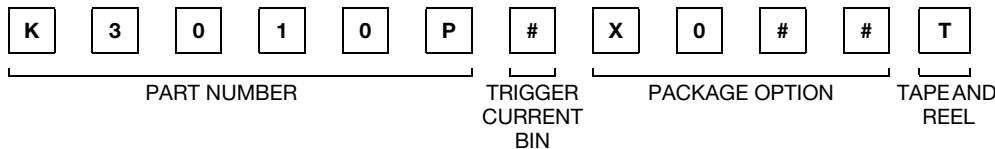


APPLICATIONS

Circuits for safe protective separation against electrical shock according to safety class II (reinforced isolation):

- for appl. class I - IV at mains voltage $\leq 300 V$
- for appl. class I - IV at mains voltage $\leq 600 V$ according to DIN EN60747-5-5 (VDE0884), suitable for:
 - Monitors
 - Air conditioners
 - Line switches
 - Solid state relay
 - Microwave

ORDERING INFORMATION



AGENCY CERTIFIED/PACKAGE	TRIGGER CURRENT, I_{FT}		
	5 mA	10 mA	15 mA
VDE, cUL, BSI			
DIP-6	K3012P	K3011P	K3010P
DIP-6, 400 mil	K3012PG	K3011PG	K3010PG
SMD-6, option 7	K3012P-X007T	K3012P-X007T	K3012P-X007T

Note

- G = leadform 10.16 mm; G is not marked on the body.

K3010P, K3010PG Series



Vishay Semiconductors Optocoupler, Phototriac Output, 250 V_{DRM}

ABSOLUTE MAXIMUM RATINGS ⁽¹⁾ (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 ≤ 10 μs	I _{FSM}	3	A
Power dissipation		P _{diss}	100	mW
Junction temperature		T _j	100	°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 ≤ 10 ms	I _{TMS}	1.5	A
Power dissipation		P _{diss}	300	mW
Junction temperature		T _j	100	°C
COUPLER				
Isolation test voltage (RMS)	t = 1 s	V _{ISO}	5300	V _{RMS}
Total power dissipation		P _{tot}	350	mW
Ambient temperature range		T _{amb}	- 40 to + 85	°C
Storage temperature range		T _{stg}	- 55 to + 100	°C
Soldering temperature ⁽²⁾	2 mm from case, t ≤ 10 s	T _{sld}	260	°C

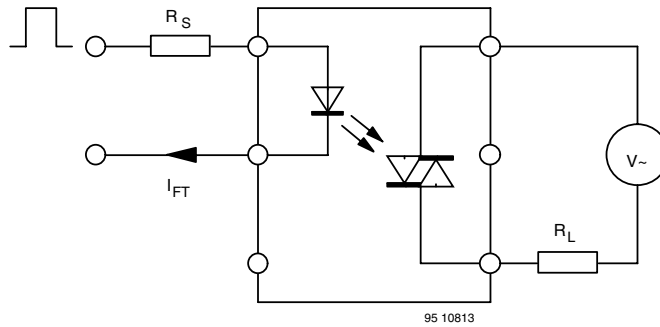
Notes

- ⁽¹⁾ 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.
- ⁽²⁾ Refer to wave profile for soldering conditions for through hole devices (DIP).

ELECTRICAL CHARACTERISTICS ⁽¹⁾ (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} ⁽²⁾	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 _{tr}		10		nA
			dV/dt _{trq}	0.1	0.2		nA
COUPLER ⁽³⁾							
Collector emitter saturation voltage	V _S = 3 V, R _L = 150 Ω	K3010P	I _{FT}		8	15	mA
		K3010PG	I _{FT}		8	15	mA
		K3011P	I _{FT}		5	10	mA
		K3011PG	I _{FT}		5	10	mA
		K3012P	I _{FT}		2	5	mA
		K3012PG	I _{FT}		2	5	mA
Holding current	I _F = 10 mA, V _S ≥ 3 V		I _H		100		μA

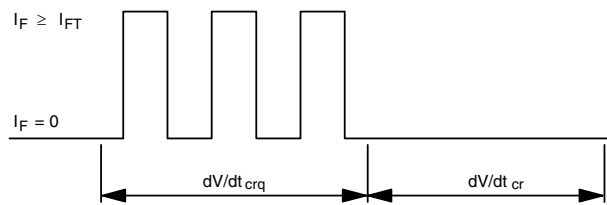
Notes

- ⁽¹⁾ 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.
- ⁽²⁾ Test voltage must be applied within dV/dt ratings.
- ⁽³⁾ I_{FT} is defined as a minimum trigger current.



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

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

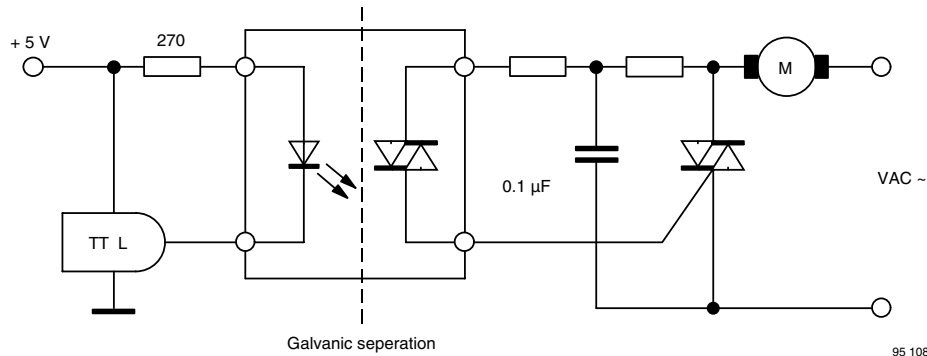


Fig. 3 - Motor Control Circuit

MAXIMUM SAFETY RATINGS ⁽¹⁾						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
INPUT						
Forward current		$I_{S, INPUT}$			130	mA
OUTPUT						
Power dissipation		$P_{S, OUTPUT}$			600	mW
COUPLER						
Rated transient voltage		V_{IOTM}			8	kV _{peak}
Safety temperature		T_{si}			175	°C
Isolation test voltage		V_{IORM}			890	V
		V_{IORM}			630	V _{RMS}

Note

⁽¹⁾ 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.

INSULATION RATED PARAMETERS						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Partial discharge test voltage - routine test	100 %, $t_{test} = 1$ s	V_{pd}	1.6			kV
		V_{IOTM}	6			kV
Partial discharge test voltage - lot test (sample test)	$t_{Tr} = 60$ s, $t_{test} = 10$ s, (see figure 5)	V_{pd}	1.3			kV
Insulation resistance	$V_{IO} = 500$ V	R_{IO}	10^{12}			Ω
	$V_{IO} = 500$ V, $T_{amb} = 100$ °C	R_{IO}	10^{11}			Ω
	$V_{IO} = 500$ V, $T_{amb} = 150$ °C (construction test only)	R_{IO}	10^9			Ω

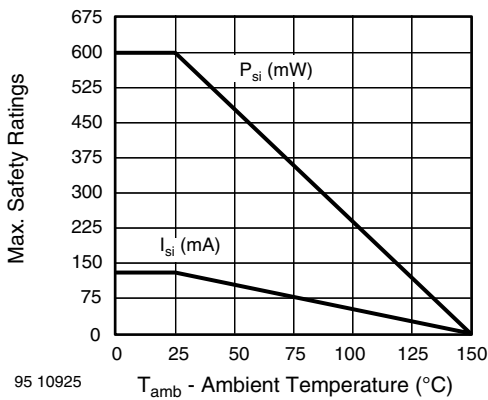


Fig. 4 - Safety Parameter Derating Diagram

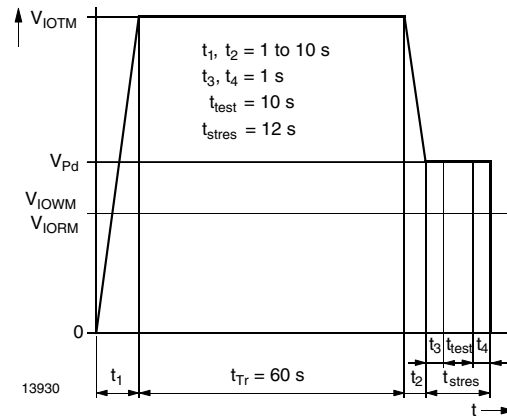


Fig. 5 - Test Pulse Diagram for Sample Test according to DIN EN60747-5-5/DIN EN60747-; IEC 60747

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

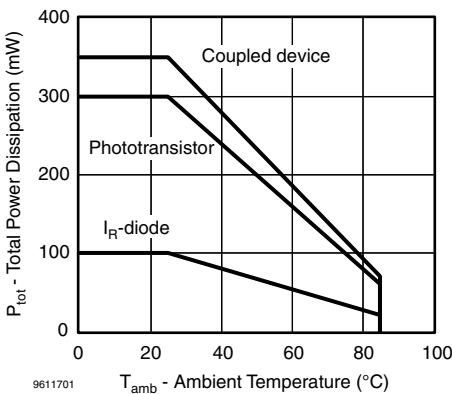


Fig. 6 - Total Power Dissipation vs. Ambient Temperature

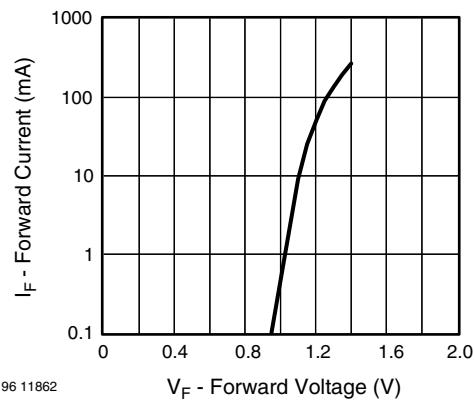


Fig. 7 - Forward Current vs. Forward Voltage

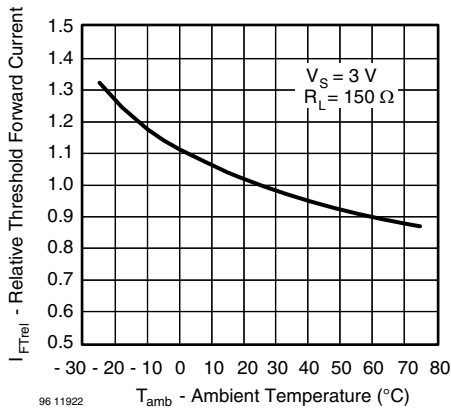


Fig. 8 - Relative Threshold Forward Current vs. Ambient Temperature

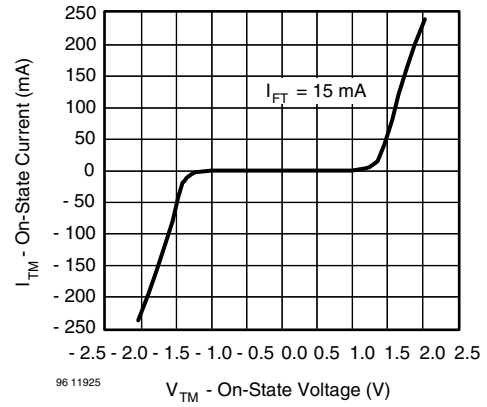


Fig. 11 - Collector Current vs. Forward Current

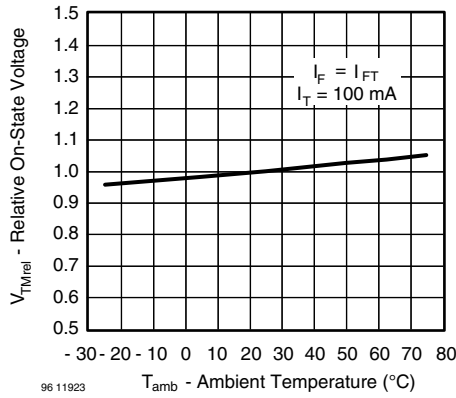


Fig. 9 - Relative On-State vs. Ambient Temperature

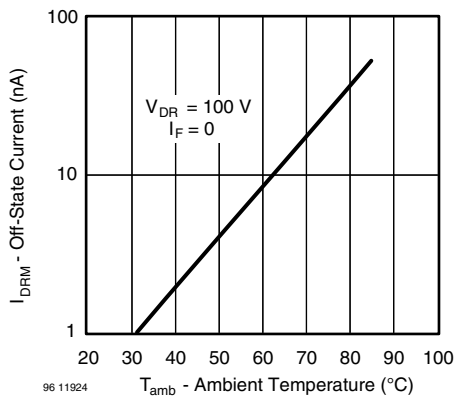


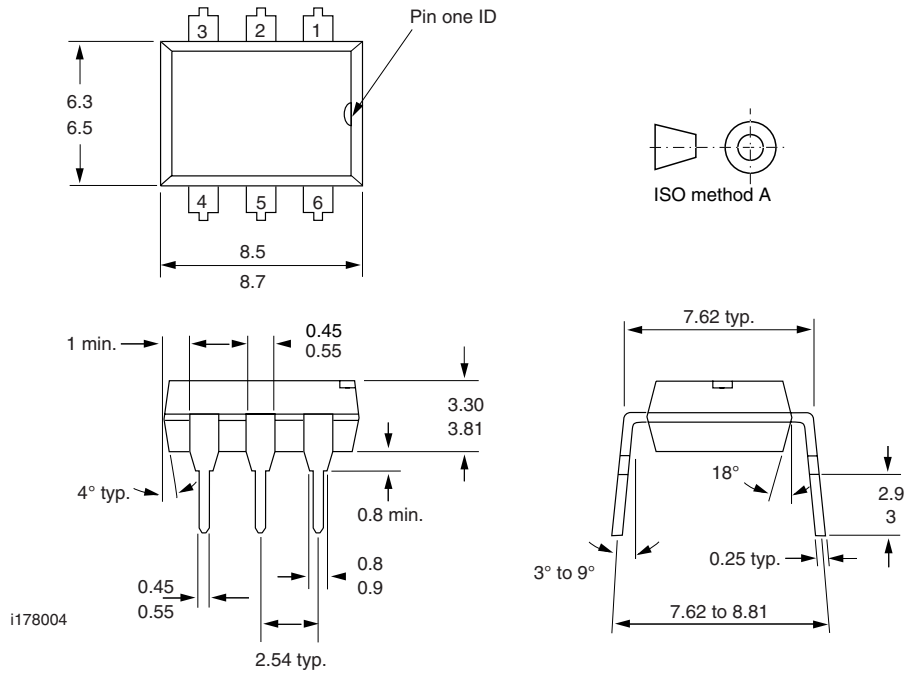
Fig. 10 - Off-State Current vs. Ambient Temperature

K3010P, K3010PG Series

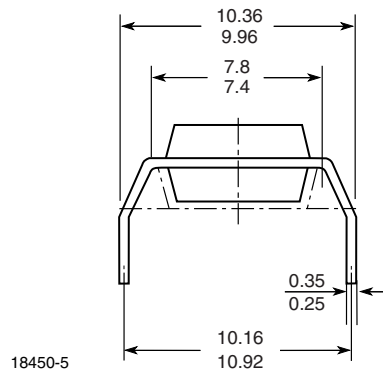
Vishay Semiconductors Optocoupler, Phototriac Output, 250 V_{DRM}



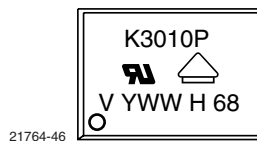
PACKAGE DIMENSIONS millimeters



G Series



PACKAGE MARKING



Note

- The "G" of the G lead-form type is not marked on the body.



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk and agree to fully indemnify and hold Vishay and its distributors harmless from and against any and all claims, liabilities, expenses and damages arising or resulting in connection with such use or sale, including attorneys fees, even if such claim alleges that Vishay or its distributor was negligent regarding the design or manufacture of the part. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.