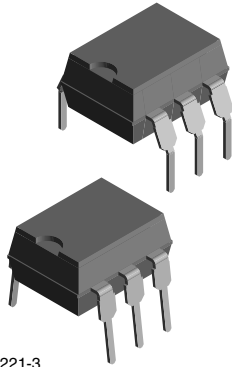
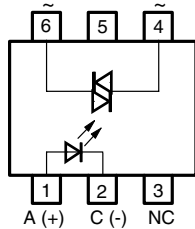


Optocoupler, Phototriac Output, 250 V_{DRM}



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

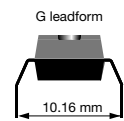
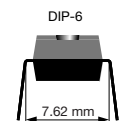
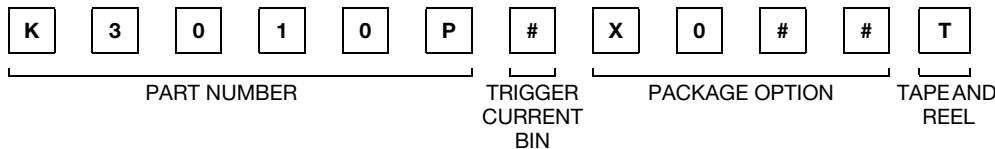


APPLICATIONS

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

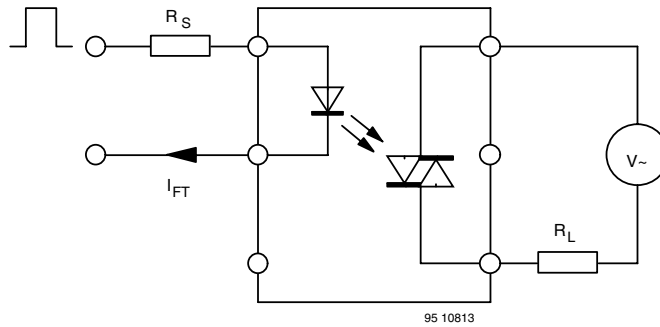
Notes

- ⁽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 _{ocr}		10		nA
			dV/dt _{ocrq}	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

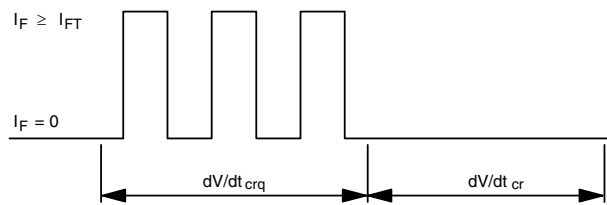
Notes

- ⁽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

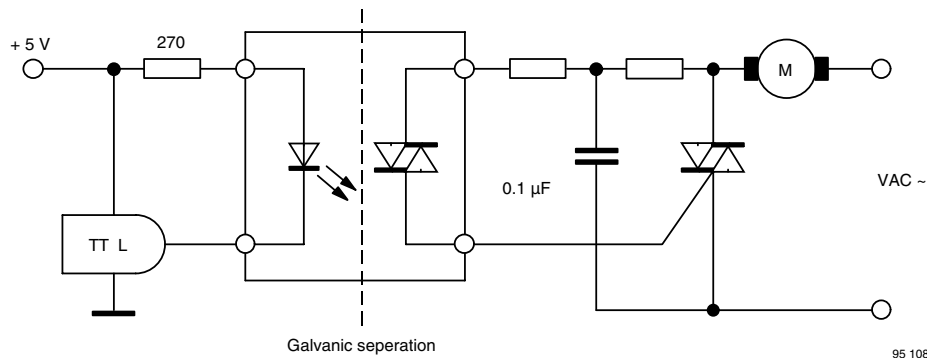


Fig. 3 - Motor Control Circuit

95 10815

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

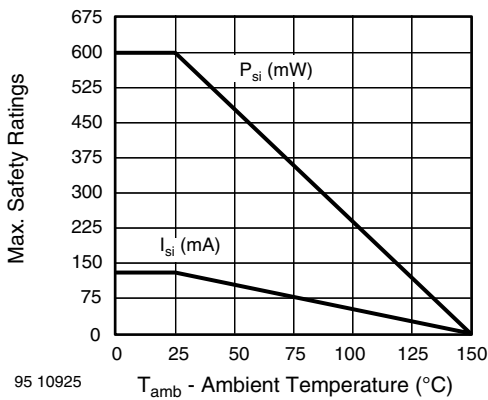


Fig. 4 - Safety Parameter Derating Diagram

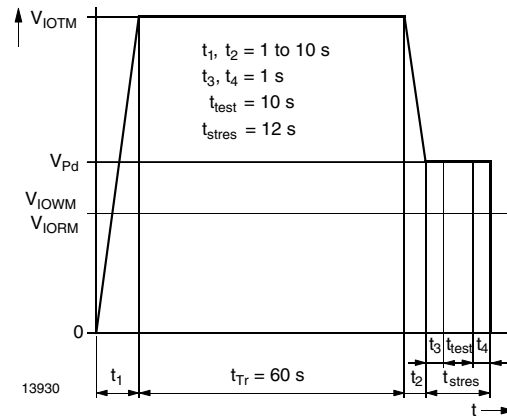


Fig. 5 - Test Pulse Diagram for Sample Test according to DIN EN60747-5-5/DIN EN60747-; IEC 60747

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

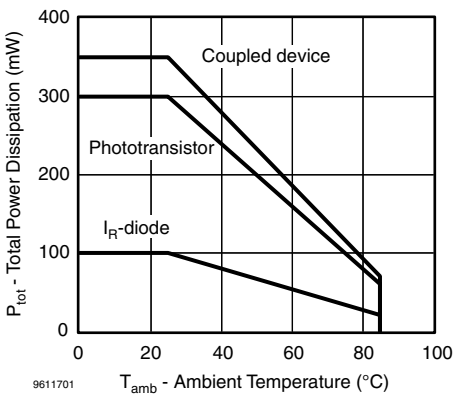


Fig. 6 - Total Power Dissipation vs. Ambient Temperature

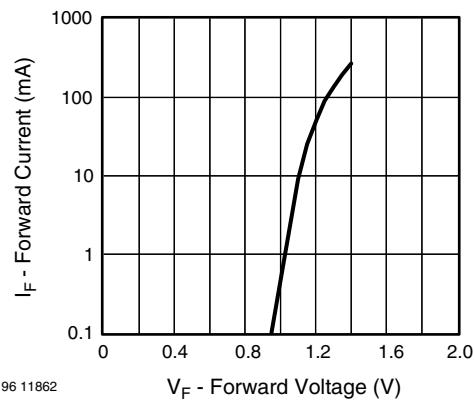


Fig. 7 - Forward Current vs. Forward Voltage

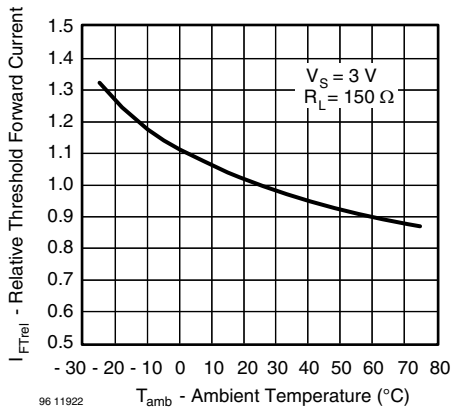


Fig. 8 - Relative Threshold Forward Current vs. Ambient Temperature

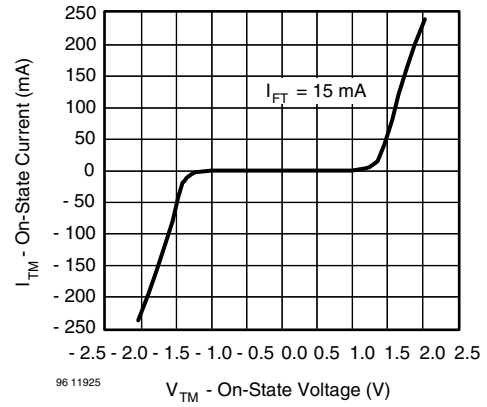


Fig. 11 - Collector Current vs. Forward Current

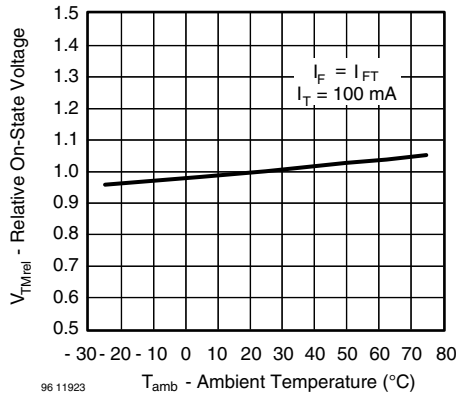


Fig. 9 - Relative On-State vs. Ambient Temperature

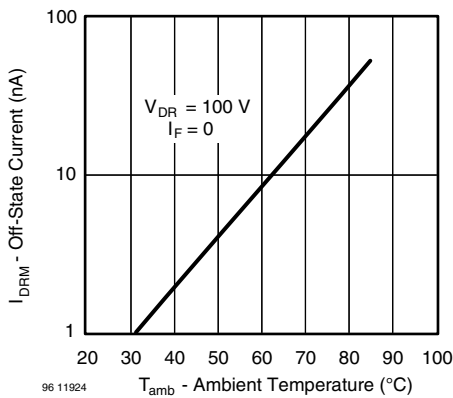


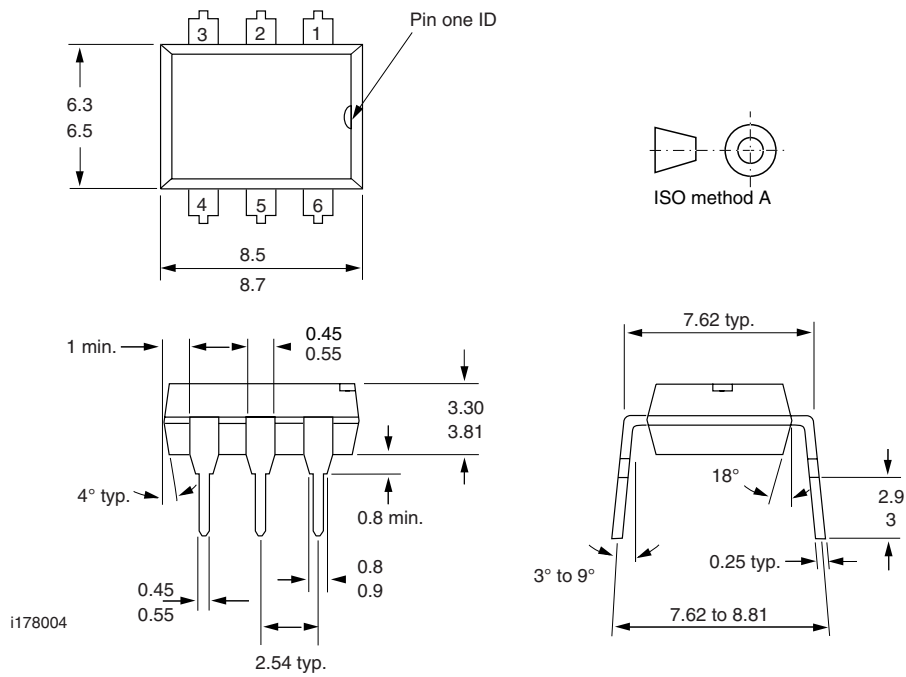
Fig. 10 - Off-State Current vs. Ambient Temperature

K3010P, K3010PG Series

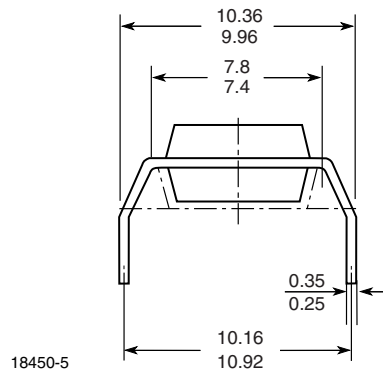
Vishay Semiconductors Optocoupler, Phototriac Output, 250 V_{DRM}



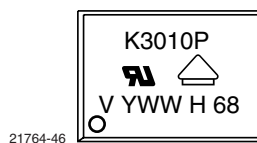
PACKAGE DIMENSIONS millimeters



G Series



PACKAGE MARKING



Note

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



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