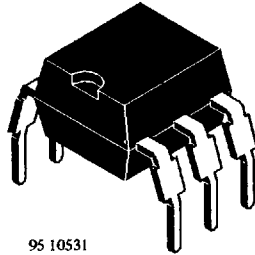


Optocoupler with Phototriac Output

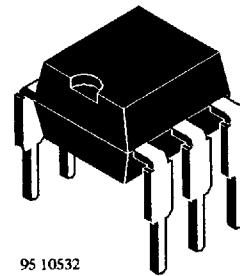
Description

The K3050P(G) Series consist of a phototriac optically coupled to a gallium arsenide infrared emitting diode in a 6 lead plastic dual inline packages.

The elements are mounted in opposite position (face to face) with a distance of > 0.4 mm.



95 10531



95 10532

Applications

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

- for application class I - IV at main voltages ≤ 300 V;
- for application class I - III at main voltages ≤ 600 V according to VDE 0884, table 2, suitable for:

Monitors, air conditioners, line switches, solid state relays, microwaves.

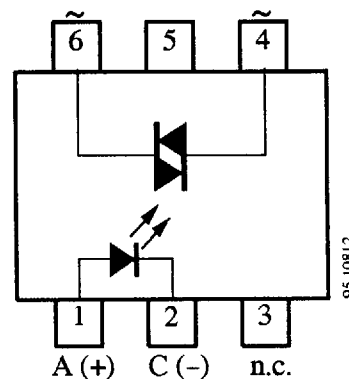
These couplers perform safety functions according to following equipment standards:

- **VDE 0884**
Optocoupler providing protective separation
- **VDE 0804**
Telecommunication apparatus and data processing
- **VDE 0805/IEC 435**
data processing equipment
- **VDE 0806/IEC 950**
office machines
- **VDE 0860/IEC 65**
safety for mains operated electronic and related apparatus for household



0884

Pin Connection



Note: Pin 5 must not be connected

K3050P(G) Series

Features

According to VDE 0884

- Rated impulse voltage (transient overvoltage)
 $V_{IOTM} = 6 \text{ kV peak}$
- Isolation test voltage (partial discharge test voltage)
 $V_{pd} = 1.6 \text{ kV}$
- Rated isolation voltage (RMS includes DC)
 $V_{IOWM} = 600 \text{ V}_{RMS} (848 \text{ V peak})$
- Rated recurring peak voltage (repetitive)
 $V_{IORM} = 600 \text{ V}_{RMS}$
- Isolation materials according to UL 94
- Thickness through insulation > 0.4 mm
- Further approvals:
BS EN 60065 (BS 415), BS EN 60950 (BS 7002),
UL 1577, File No. E 76222
- Creeping current resistance according to
VDE 0303/IEC 112
Comparative Tracking Index: CTI = 275
- Peak off state voltage
 $V_{DRM} = 600 \text{ V min}$
- On state RMS current
 $I_{TRMS} = 100 \text{ mA max}$
- I_{FT} offered into 2 groups

Absolute Maximum Ratings

Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Reverse voltage		V_R	6	V
Forward current		I_F	60	mA
Forward surge current	$t_p \leq 10 \mu\text{s}$	I_{FSM}	3	A
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_{tot}	100	mW
Junction temperature		T_j	125	$^\circ\text{C}$

Output (Detector)

Parameters	Test Conditions	Symbol	Value	Unit
Off state output terminal voltage		V_{DRM}	600	V
On state RMS current		I_{TRMS}	100	mA
Peak surge current	$t_p \leq 10 \text{ ms}$	I_{TMS}	1.2	A
Collector peak on state current	$t_p/T = 0.01, t_p \leq 100 \mu\text{s}$	I_{TP}	2	A
Power dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_{tot}	300	mW
Junction temperature		T_j	125	$^\circ\text{C}$

Coupler

Parameters	Test Conditions	Symbol	Value	Unit
Isolation test voltage (RMS)		$V_{IO}^{1)}$	3.75	kV
Total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_{tot}	330	mW
Ambient temperature range		T_{amb}	-40 to +100	$^\circ\text{C}$
Storage temperature range		T_{stg}	-55 to +125	$^\circ\text{C}$
Soldering temperature	2 mm from case, $t \leq 10 \text{ s}$	T_{sd}	260	$^\circ\text{C}$

1) related to standard climate 23/50 DIN 50014

Maximum Safety Ratings ²⁾ (according to VDE 0884)

Input (Emitter)

Parameters	Test Conditions	Symbol	Value	Unit
Forward current		I_{si}	130	mA

Output (Detector)

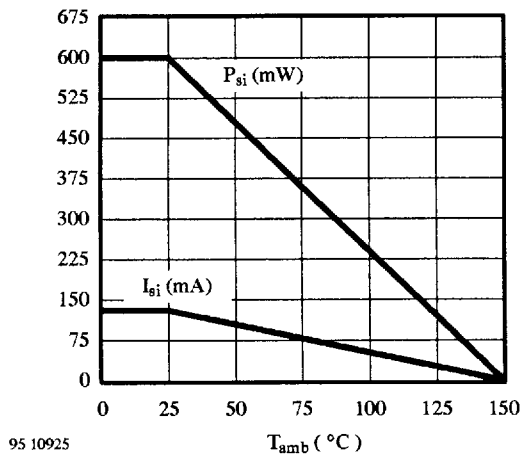
Parameters	Test Conditions	Symbol	Value	Unit
Power dissipation	$T_{amb} \leq 25^{\circ}\text{C}$	P_{si}	600	mW

Coupler

Parameters	Test Conditions	Symbol	Value	Unit
Rated impulse voltage		V_{IOTM}	6	kV
Safety temperature		T_{si}	150	$^{\circ}\text{C}$

- ²⁾ This device is used for protective separation against electrical shock only within the maximum safety ratings. This must be ensured by protective circuits in the applications.

Derating Diagram



K3050P(G) Series

Electrical Characteristics

$T_{amb} = 25^{\circ}\text{C}$

Input (Emitter)

Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 50 \text{ mA}$	V_F		1.25	1.6	V
Breakdown voltage	$I_C = 10 \mu\text{A}$	$V_{(BR)}$	5			V
Junction capacitance	$V_R = 0, f = 1 \text{ MHz}$	C_j		50		pF

Output (Detector)

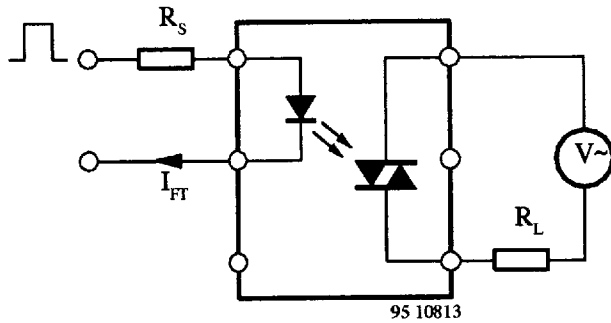
Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Off state output terminal voltage	$I_{DRM} = 100 \mu\text{A}$	V_{DRM}	600			V
Peak on state voltage	$I_{TM} = 100 \text{ mA},$ $I_{FT} = 30 \text{ mA}$	V_{TM}		1.5	3	V
Critical rate of rise of off state voltage	$I_F = 0, V_S = 240 \text{ V}_{RMS}$ $I_F = 30 \text{ mA},$ $V_S = 60 \text{ V}_{RMS}$	$(dv/dt)_{cr}^{3)}$ $(dv/dt)_{crq}^{3)}$	0.13	50 0.25		V/ μs V/ μs

Coupler

Parameters	Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
AC Isolation test voltage (RMS)	$f = 50 \text{ Hz}, t = 1 \text{ s}$		$V_{IO}^{4)}$	3.75			kV
Emitter diode trigger current	$V_T = 6 \text{ V},$ $R_L = 150 \Omega$	K3051P(G)	I_{FT}		10	15	mA
		K3052P(G)	I_{FT}		5	10	mA
Holding current	$I_F = 10 \text{ mA},$ $V_S \geq 3 \text{ V}$		I_H		1		mA

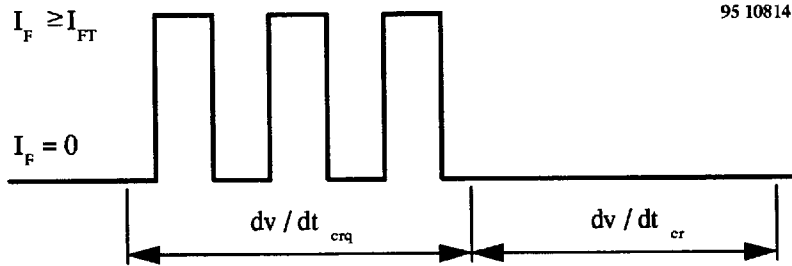
3) See test circuit

4) related to standard climate 23/50 DIN 50014



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)
 $R_L = 2 \text{ k}\Omega$

Figure 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 will cause no switching from the off-state on the on-state

dv/dt_{crq}

Highest value of the "rate of rise of commutating voltage" which will not switch on the device again, after the voltage has decreased to zero and the trigger current is switched from I_{FT} to zero

Figure 2.

Application

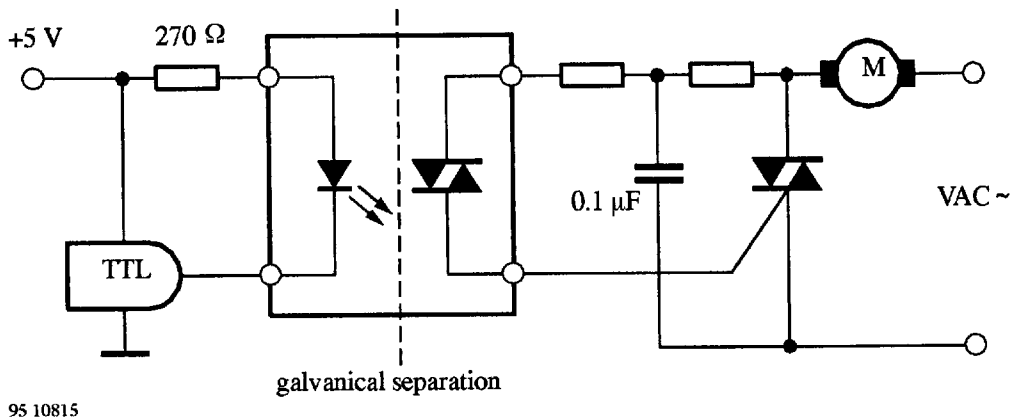


Figure 3. Motor control circuit

Insulation Rated Parameters (according to VDE 0884)

Parameters		Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Partial discharge test voltage	Routine test	100%, $t_{\text{test}} = 1 \text{ s}$	V_{pd}	1.6			kV
	Lot test (sample test)	$t_{\text{Tr}} = 10 \text{ s}$, $t_{\text{test}} = 60 \text{ s}$ see figure 4	V_{IOTM} V_{pd}	6 1.6			kV kV
Insulation resistance		$V_{\text{IO}} = 500 \text{ V}$	R_{IO}	10^{12}			Ω
	$V_{\text{IO}} = 500 \text{ V}$, $T_{\text{amb}} = 100^\circ\text{C}$	R_{IO}	10^{11}			Ω	
	$V_{\text{IO}} = 500 \text{ V}$, $T_{\text{amb}} = 150^\circ\text{C}$ (only construction test)	R_{IO}	10^9			Ω	

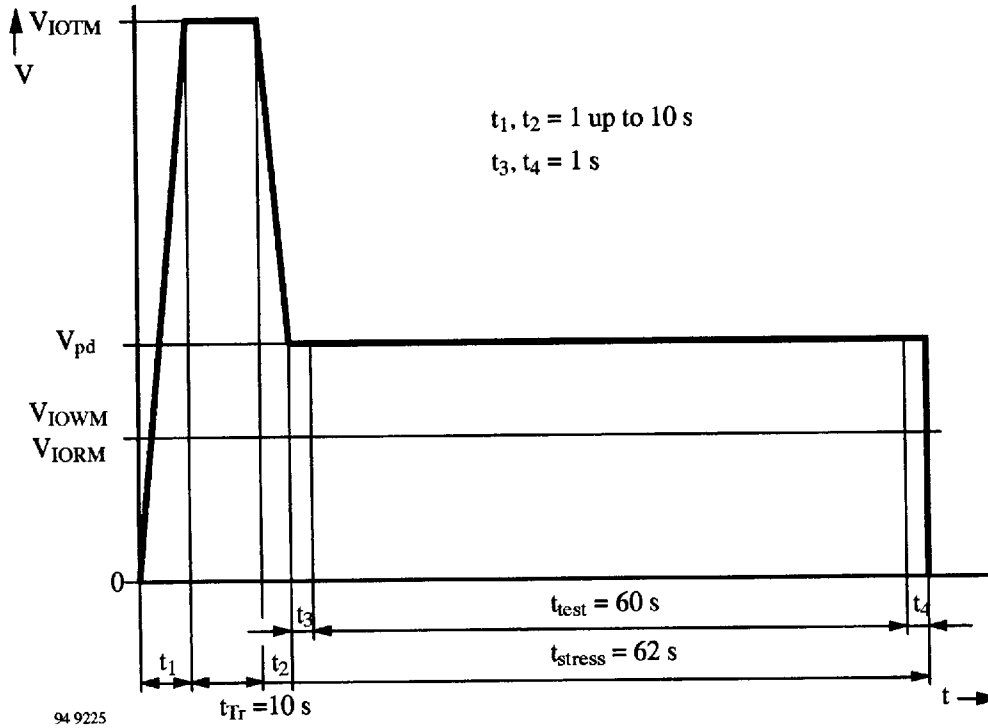
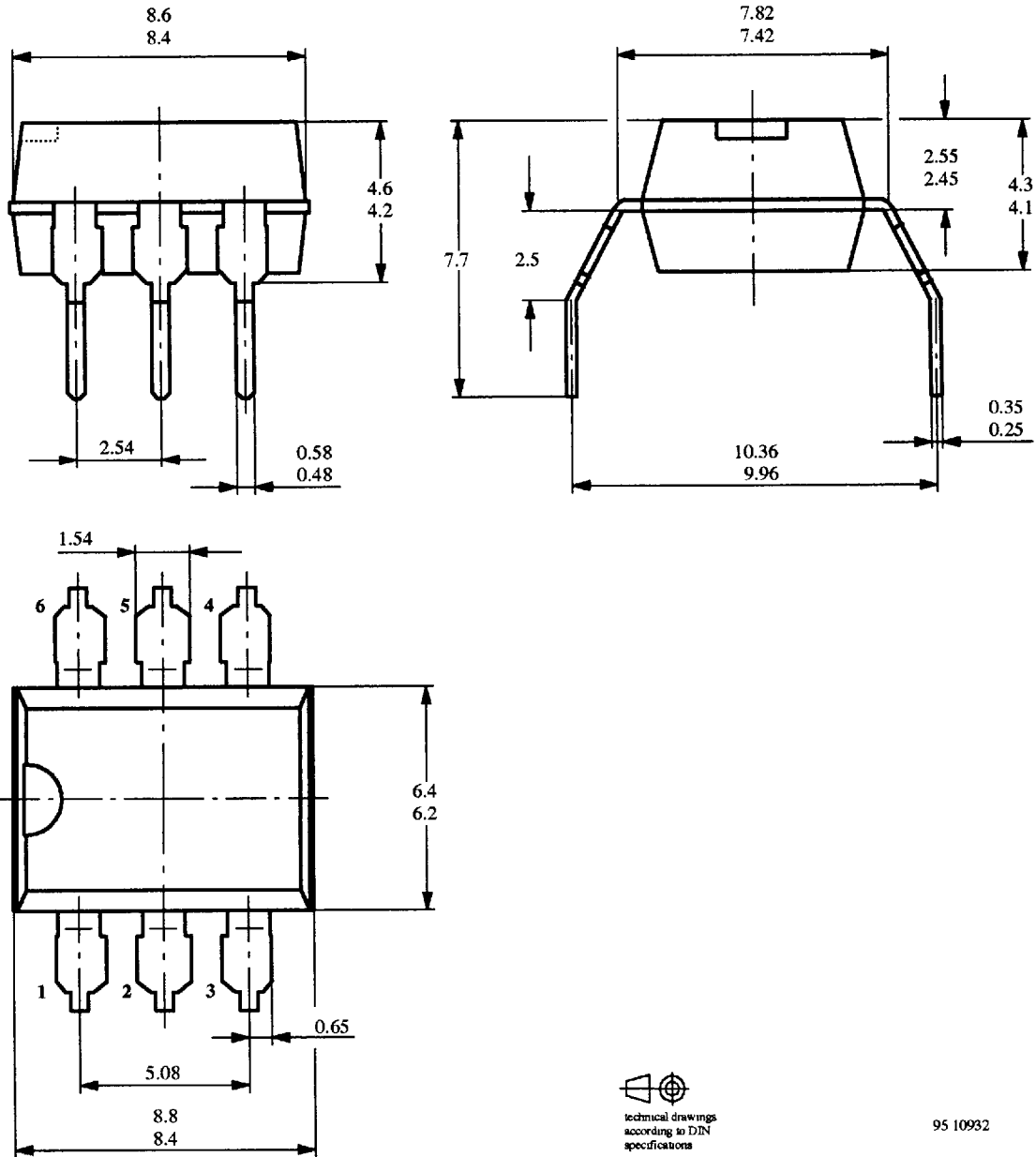


Figure 4. Test pulse diagram for sample test according to DIN VDE 0884

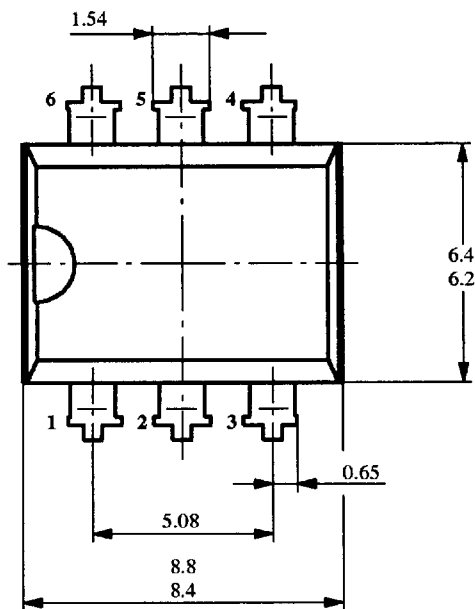
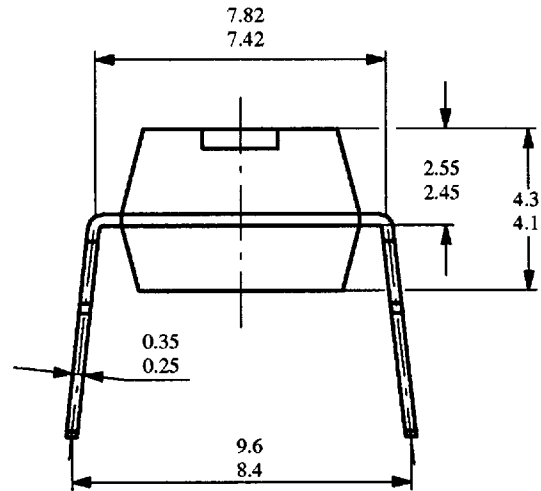
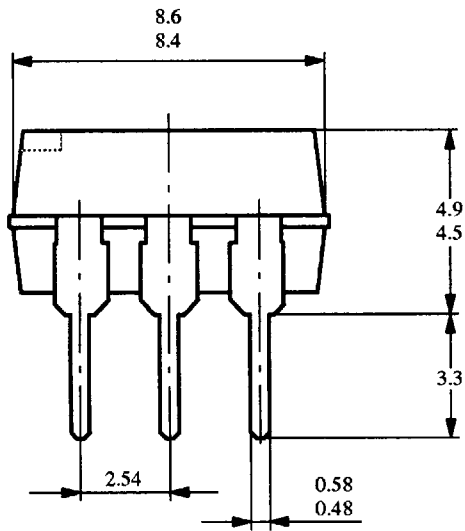
Dimensions in mm

Leadform 10.16 mm (G-type)



K3050P(G) Series

Dimensions in mm




technical drawings
according to DIN
specifications

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