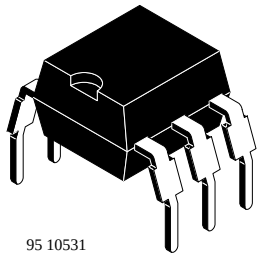
K3050P(G) Series

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.



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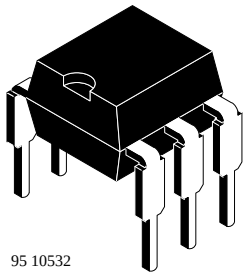

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Applications

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 naib voltages ≤ 600 V according to VDE 0884, table 2, suitable for:

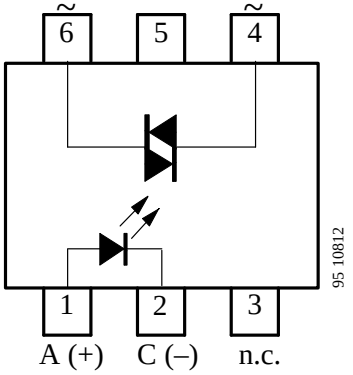
  Monitors, air conditioners, line switches, solid state relays, microwaves.

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 kV peak
- Isolation test voltage (partial discharge test voltage)
  V_{pd} = 1.6 kV
- Rated isolation voltage (RMS includes DC)
  V_{IOWM} = 600 V_{RMS} (848 V peak)
- Rated recurring peak voltage (repetitive)
  V_{IORM} = 600 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 **T**racking **I**ndex: **CTI** = 275
- Peak off state voltage
  V_{DRM} = 600 V min
- On state RMS current
  I_{TRMS} = 100 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	$t_p \le 10$ µs	I_{FSM}	3	A
Power dissipation	$T_{amb} \le 25°C$	P_{tot}	100	mW
Junction temperature		T_j	125	°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	$t_p \le 10$ ms	I_{TMS}	1.2	A
Collector peak on state current	$t_p/T = 0.01$, $t_p \le 100$ µs	I_{TP}	2	A
Power dissipation	$T_{amb} \le 25°C$	P_{tot}	300	mW
Junction temperature		T_j	125	°C

Coupler

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

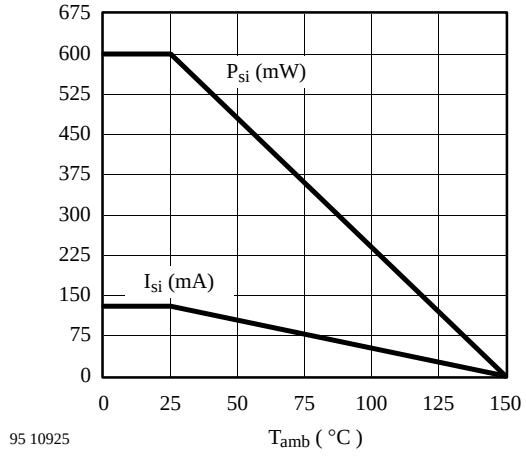
Parameters	Test Conditions	Symbol	Value	Unit
Power dissipation	$T_{amb} \leq 25°C$	P_{si}	600	mW

Coupler

Parameters	Test Conditions	Symbol	Value	Unit
Rated impulse voltage		V_{IOTM}	6	kV
Safety temperature		T_{si}	150	°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°C

Input (Emitter)

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

Output (Detector)

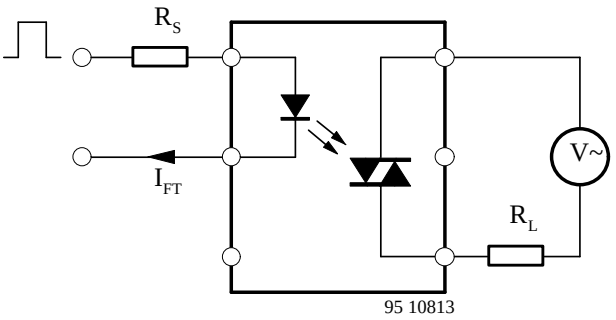
Parameters	Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Off state output terminal voltage	I_{DRM} = 100 nA	V_{DRM}	600			V
Peak on state voltage	I_{TM} = 100 mA, I_{FT} = 30 mA	V_{TM}		1.5	3	V
Critical rate of rise of off state voltage	I_F = 0, V_S = 240 V_{RMS} I_F = 30 mA, V_S = 60 V_{RMS}	$(dv/dt)_{cr}$ [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 Hz, t = 1 s		V_{IO} [4]	3.75			kV
Emitter diode trigger current	V_T = 6 V, R_L = 150 Ω	K3051P(G) K3052P(G)	I_{FT} I_{FT}		10 5	15 10	mA mA
Holding current	I_F = 10 mA, $V_S \geq$ 3 V		I_H		1		mA

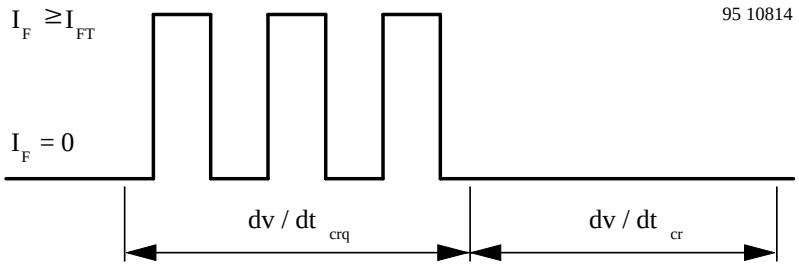
[3] See test circuit

[4] related to standard climate 23/50 DIN 50014



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

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_{cr} 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

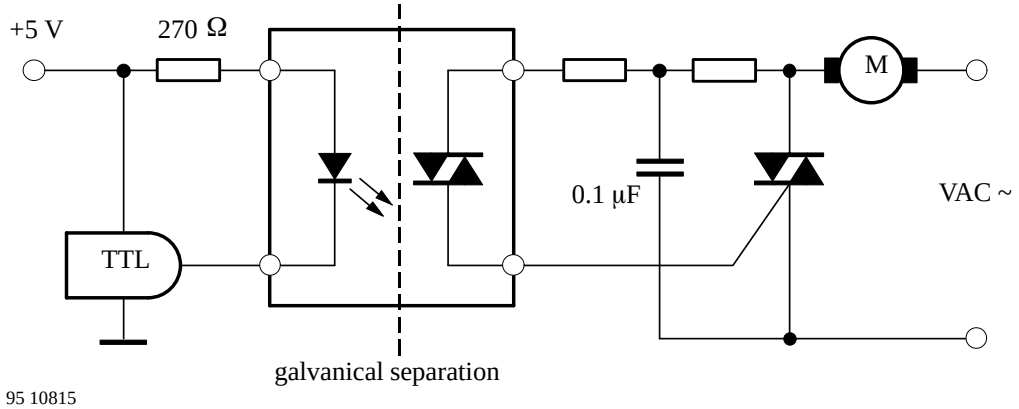


Figure 3. Motor control circuit

Insulation Rated Parameters (according to VDE 0884)

Parameters		Test Conditions	Symbol	Min.	Typ.	Max.	Unit
Partial discharge test voltage	Routine test	100%, t_{test} = 1 s	V_{pd}	1.6			kV
	Lot test (sample test)	t_{Tr} = 10 s, t_{test} = 60 s see figure 4	V_{IOTM}	6			kV
			V_{pd}	1.6			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 (only construction test)	R_{IO}	10^{9}			Ω

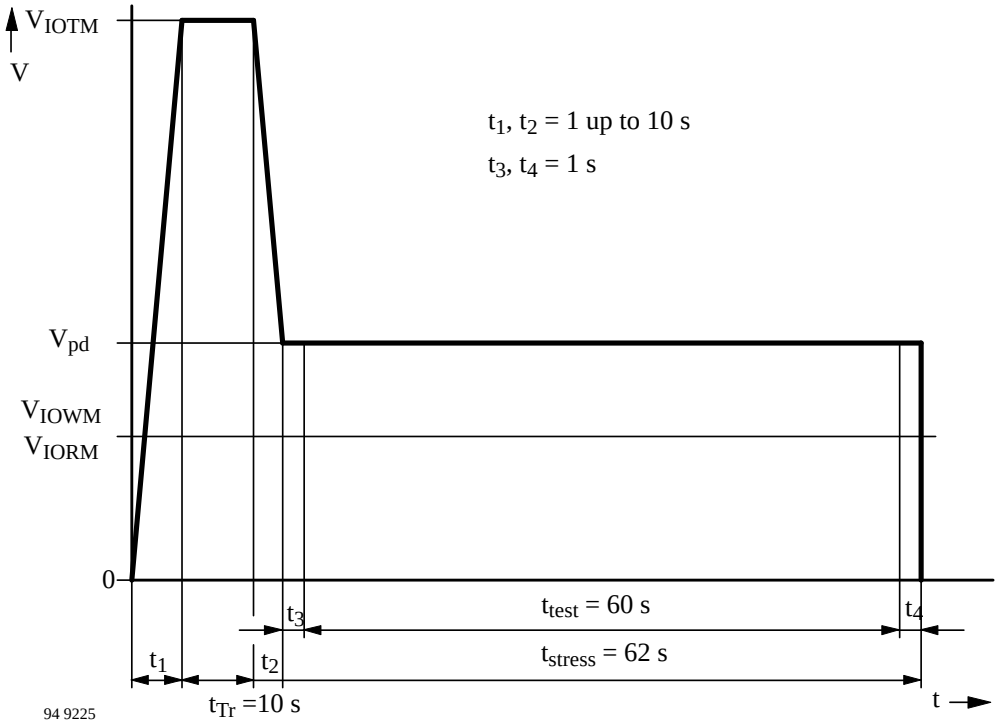
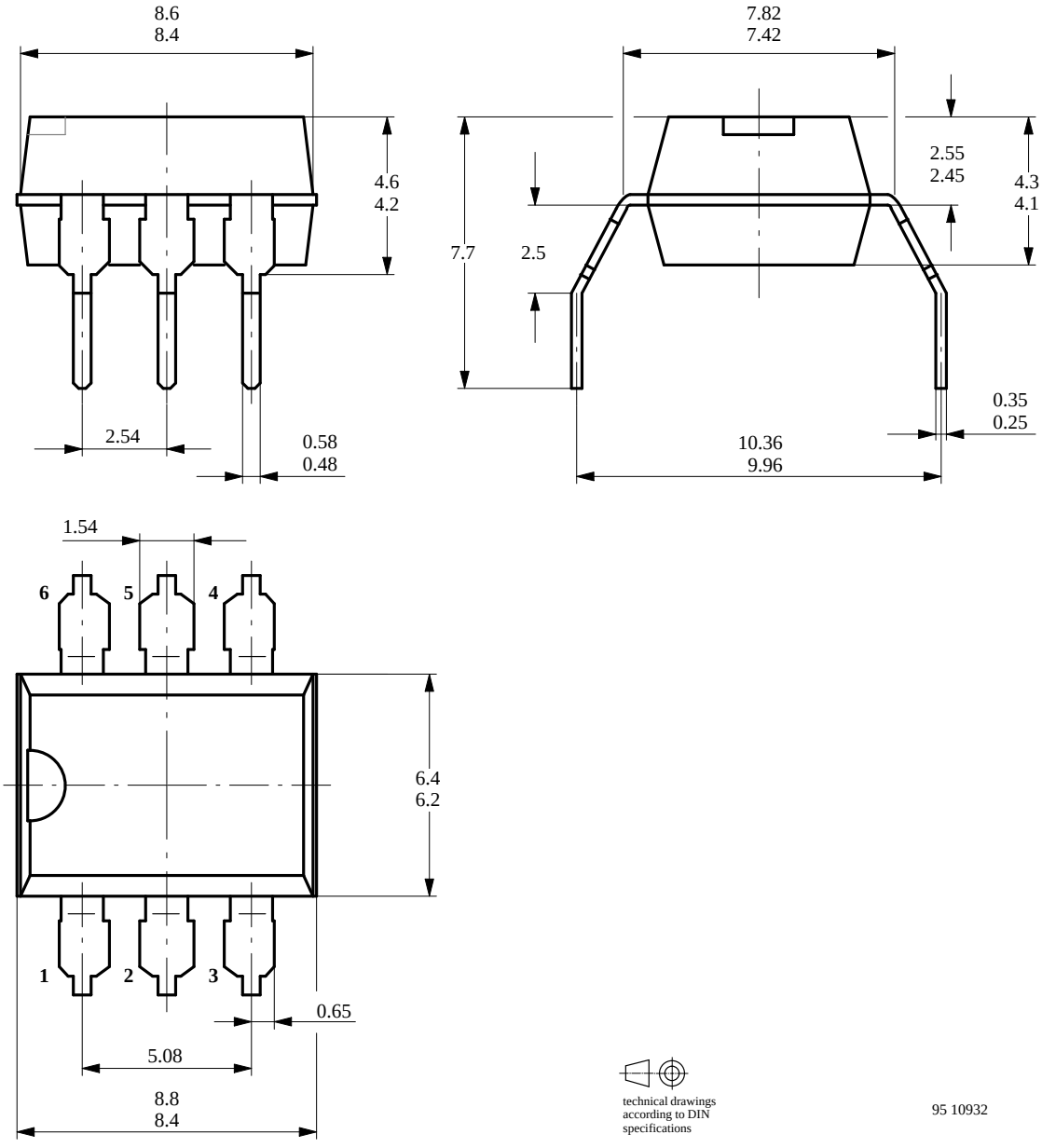


Figure 4. Test pulse diagram for sample test according to DIN VDE 0884

Dimensions in mm

Leadform 10.16. mm (G-type)



technical drawings
according to DIN
specifications

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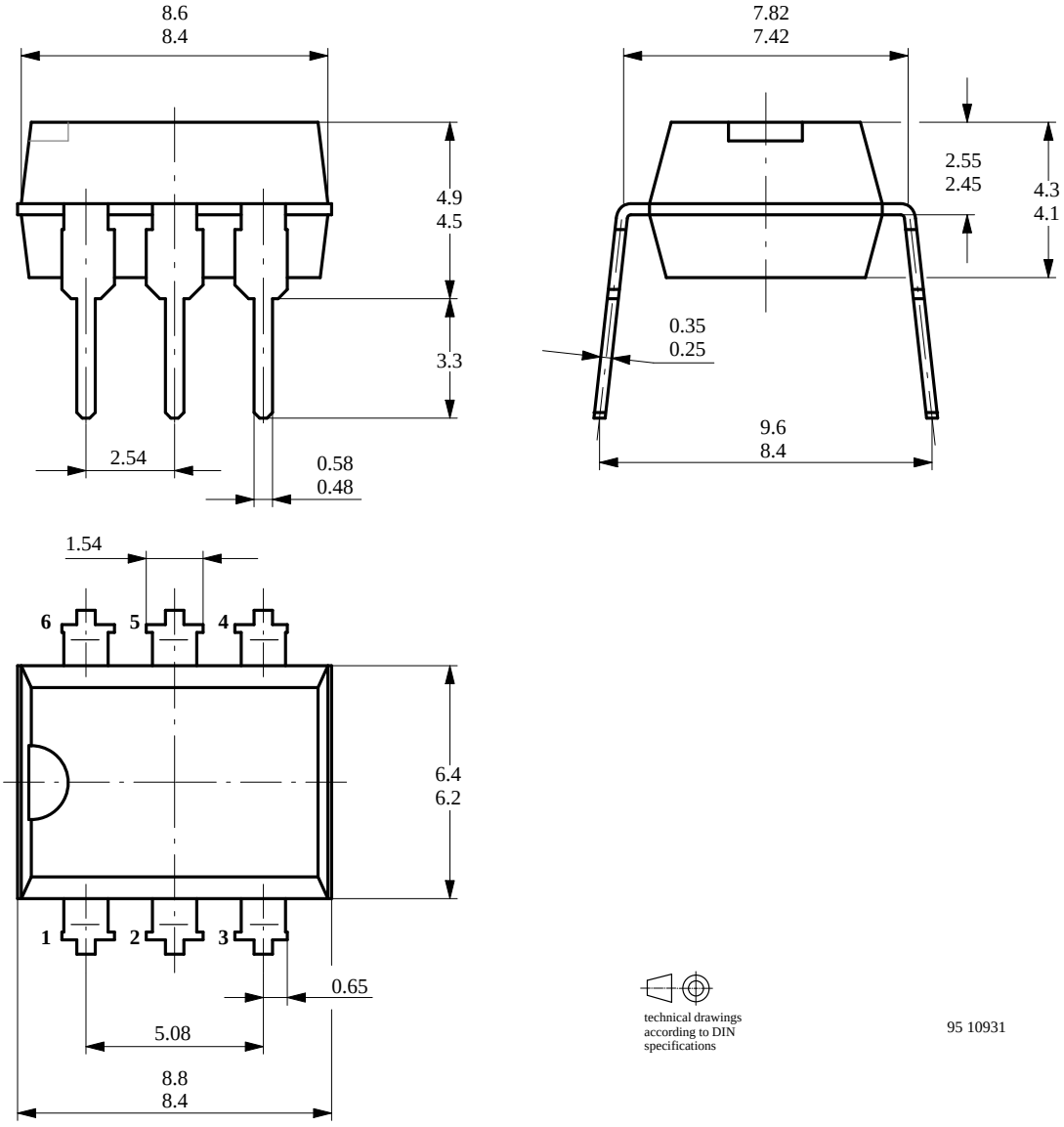
K3050P(G) Series

Dimensions in mm



technical drawings
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Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423