T-41-87

CNR 21

TELEFUNKEN electronic
Creative Technologies

Optically Coupled Triac Driver

Construction: Emitter: GaAs Infrared Emitting Diode
Detector: Silicon Planar Triac Bi-directional (Double thyristor)

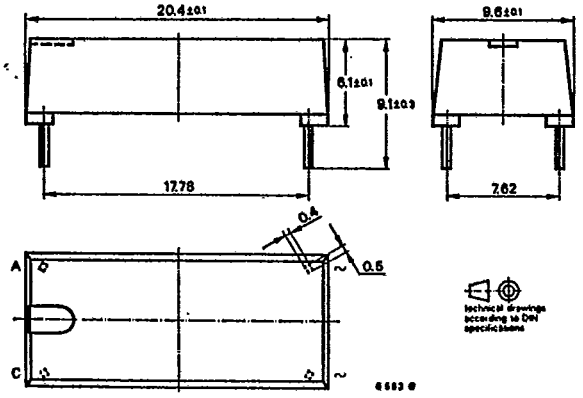
Applications:
- Use in bureau machines,complying the conditions according to VDE 0806/IEC 380: Higher isolation and protection against line voltage
- Use in electromedical equipment according to VDE 0750/T1 6/77 § 28.2: Performance of the double insulation and voltage stability requirements
- Use in radio, television and Video recorder according to VDE 0860/IEC 65 dated 8.81 Section 9.3.8 and Section 10. Tab. 2 and 4: Performance of 10 kV DC isolation voltage, voltage stability and double insulation requirements
- Use in electric equipment for houshold according to VDE 0700/IEC 335 § 29: Performance of 2 mm thickness through insulation requirements

Features:
- VDE-Certificate VDE 0883[1)]
- UL-recognized - File Nr. 76414
- Isolation test voltage: 15 kV
- Nominal isolation operating voltage according to VDE 0110 B/2.79

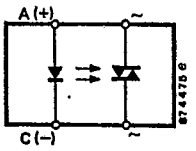
	VAC	VDC
Group B	1000	1200
Group C	750	900

- Creeping current resistance of isolation material according to VDE 0303/DIN 53480: KB ≧ 150
- Isolation material according to UL 94 – Flammability class
- Test class 25/100/21 DIN 40045
- Very low coupling capacity, typ. 0.2 pF – therefore high noise voltage resistant
- Large rate of rise (*dv/dt*)
- High forward peak off-state voltage (repetitive)

Dimensions in mm



Pin connections



Creeping distance ≧ 17 mm
Air path ≧ 17 mm

Plastic case
Weight max. 1.5 g

[1)] VDE-Approval is applied

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Absolute maximum ratings

Emitter			
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 $T_{amb} \leq 25$ °C	P_V	100	mW
Junction temperature	T_j	100	°C
Detector			
Off-state output terminal voltage	V_{DRM}	400	V
On-state RMS current	I_{TRMS}	100	mA
Peak surge current, non-repetitive $t_p \leq 10$ ms	I_{TSM}	1.5	A
Power dissipation $T_{amb} \leq 25$ °C	P_V	300	mW
Junction temperature	T_j	100	°C
Coupled device			
DC isolation test voltage	V_{is} [1]	15	kV
Total power dissipation $T_{amb} \leq 25$ °C	P_{tot}	350	mW
Ambient temperature range	T_{amb}	−40...+85	°C
Storage temperature range	T_{stg}	−55...+100	°C
Soldering temperature 2 mm from case, $t \leq 5$ s	T_{sd}	260	°C

Electrical characteristics $T_{amb} = 25$ °C		Min.	Typ.	Max.	
Emitter					
Forward voltage $I_F = 50$ mA	V_F		1.25	1.6	V
Breakdown voltage $I_R = 100$ µA	$V_{(BR)}$	5			V
Junction capacity $V_R = 0$, f = 1 MHz	C_j		50		pF

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

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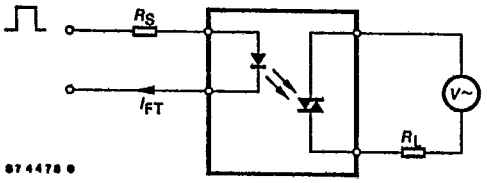
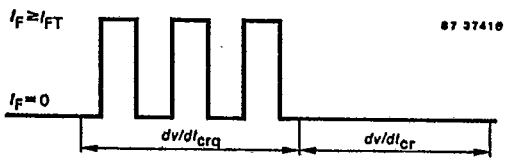
Detetector		Min.	Typ.	Max.	
Forward peak off-state voltage (repetetive)					
I_{DRM} = 1 µA	V_{DRM} [2]	400			V
Peak on-state voltage					
I_{TM} = 100 mA	V_{TM}		1.8	3	V
Critical rate of rise of off-state voltage, see test circuit					
I_{FT} = 0	dv/dt_{cr}		10		V/µs
I_{FT} = 30 mA	dv/dt_{crq}	0.1	0.2		V/µs
Coupled device					
DC isolation test voltage					
t = 1 min.	V_{is} [1]	15			kV
Isolation resistance					
V_{IO} = 1 kV, 40 % relative humidity	R_{is} [1]		10^{12}		Ω
Emitting diode trigger current					
$V_s \geq 3$ V, R_L = 150 Ω	I_{FT}		15	30	mA
Holding current					
$V_S \geq 3$ V, I_F = 10 mA	I_H		100		µA



Test circuit for: dv/dt_{cr} and dv/dt_{crq}

Test conditions:
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



dv/dt_{cr} : Highest value of the "rate of rise of off-state voltage" which will cause no switching from the off- state to the on-state

dv/dt_{crq} : Highest value of "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

[1] related to standard climate 23/50 DIN 50014 [2] Test voltage must be applied within dv/dt ratings

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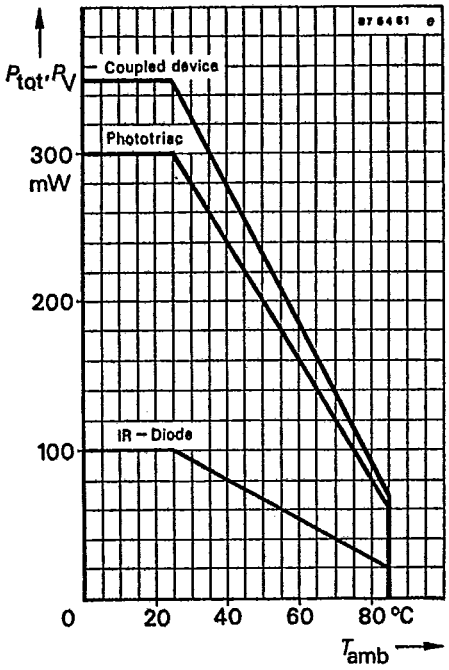
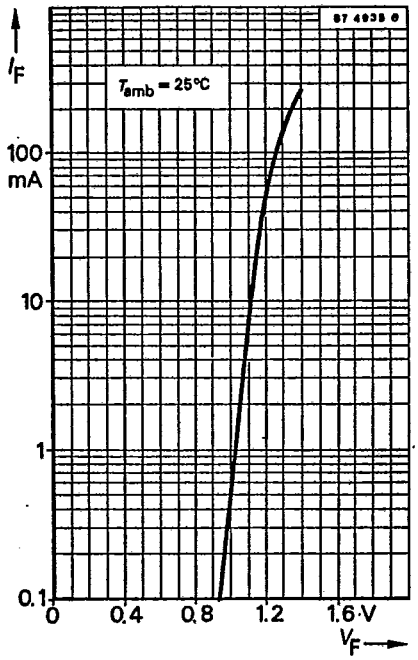
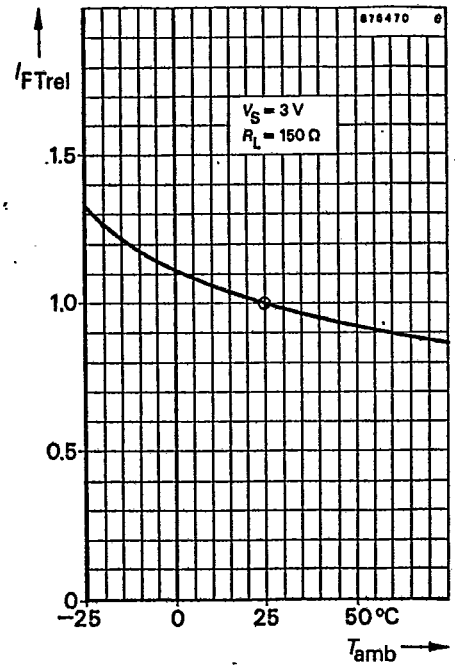
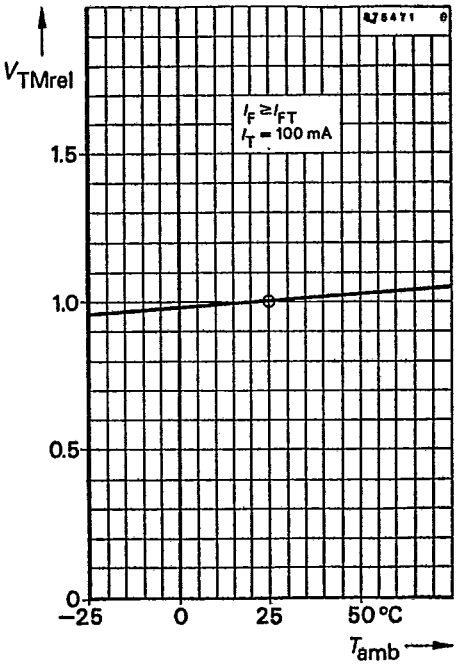

P_{tot}, P_V
Coupled device
Phototriac
300 mW
200
100
IR – Diode
0
20
40
60
80 °C
T_{amb}


I_F
T_{amb} = 25°C
100 mA
10
1
0.1
0
0.4
0.8
1.2
1.6 V
V_F


I_{FTrel}
V_S = 3 V
R_L = 150 Ω
1.5
1.0
0.5
0
–25
0
25
50 °C
T_{amb}


V_{TMrel}
$I_F \geq I_{FT}$
I_T = 100 mA
1.5
1.0
0.5
0
–25
0
25
50 °C
T_{amb}

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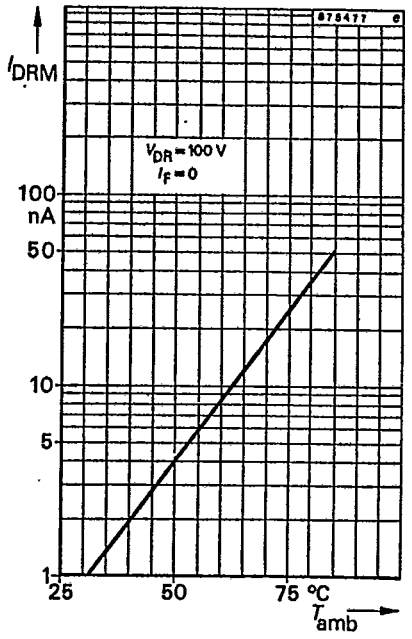
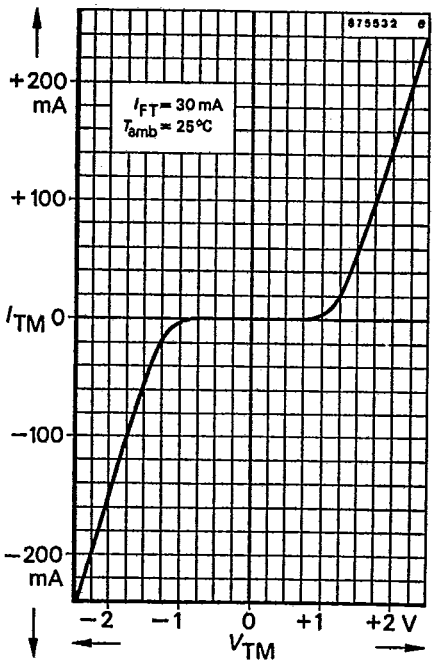
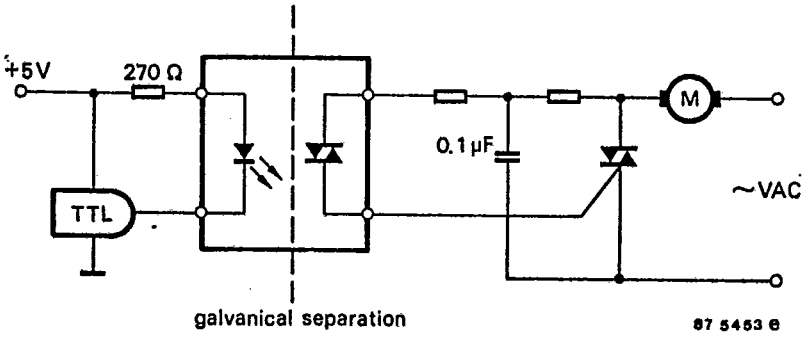




Application



Motor control circuit