THYRISTOR TETRODE

The BRY39T is a planar p-n-p-n trigger device in a TO—72 metal envelope, intended for use in low-power switching applications such as relay and lamp drivers, sensing network for temperature and as a trigger device for thyristors and triacs.
For BRY39P and BRY39S see 'Small signal transistors' handbook.

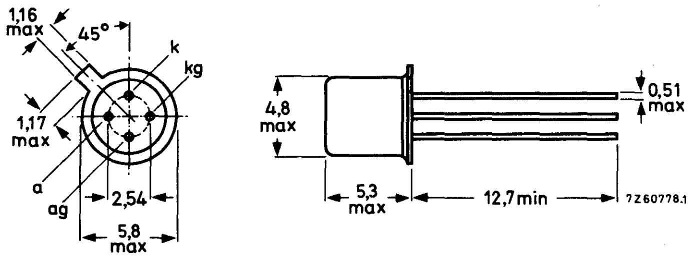
QUICK REFERENCE DATA

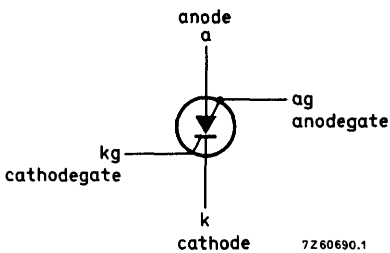
Repetitive peak voltages	$V_{DRM} = V_{RRM}$	max.	70	V
Average on-state current	$I_{T(AV)}$	max.	250	mA
Non-repetitive peak on-state current	I_{TSM}	max.	3	A

MECHANICAL DATA

Dimensions in mm

Fig.1 TO—72; Anode gate connected to case.





Accessories supplied on request: 56246 (distance disc)

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Anode to cathode

Non-repetitive peak voltages	$V_{DSM} = V_{RSM}$	max.	70	V*
Repetitive peak voltages	$V_{DRM} = V_{RRM}$	max.	70	V*
Continuous voltages	$V_D = V_R$	max.	70	V*
Average on-state current up to T_{case} = 85 °C	$I_{T(AV)}$	max.	250	mA
in free air up to T_{amb} = 25 °C	$I_{T(AV)}$	max.	175	mA
Repetitive peak on-state current t = 10 μs; δ = 0.01	I_{TRM}	max.	2.5	A
Non-repetitive peak on-state current t = 10 μs; T_j = 150 °C prior to surge	I_{TSM}	max.	3	A
Rate of rise of on-state current after triggering to I_T = 2.5 A	$\frac{dI_T}{dt}$	max.	20	A/μs

Cathode gate to cathode

Peak reverse voltage	V_{RGKM}	max.	5	V
Peak forward current	I_{FGKM}	max.	100	mA

Anode gate to anode

Peak reverse voltage	V_{RGAM}	max.	70	V
Peak forward current	I_{FGAM}	max.	100	mA

Temperatures

Storage temperature	T_{stg}		−65 to +200	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	0.45	°C/mW
From junction to case	$R_{th\ j\text{-}c}$	=	0.15	°C/mW

*These ratings apply for zero or negative bias on the cathode gate with respect to the cathode, and when a resistor R ⩽ 10 kΩ is connected between cathode gate and cathode.

CHARACTERISTICS

Anode to cathode

On-state voltage				
I_T = 100 mA; T_j = 25 °C	V_T	<	1.4	V*
Rate of rise of off-state voltage that will not trigger any device	$\frac{dV_D}{dt}$**			
Reverse current		typ.	1	nA
V_R = 70 V; T_j = 25 °C	I_R	<	100	nA
T_j = 150 °C	I_R	<	2	μA
Off-state current		typ.	1	nA
V_D = 70 V; T_j = 25 °C	I_D	<	100	nA
T_j = 150 °C	I_D	<	2	μA
Holding current				
R_{GK} = 10 kΩ; R_{GA} = 220 kΩ; T_j = 25 °C	I_H	<	250	μA

Cathode gate to cathode

Voltage that will trigger all devices				
V_D = 6 V; T_j = 25 °C	V_{GKT}	>	0.5	V
Current that will trigger all devices				
V_D = 6 V; T_j = 25 °C	I_{GKT}	>	1	μA

Anode gate to anode

Voltage that will trigger all devices				
V_D = 6 V; T_j = 25 °C	$-V_{GAT}$	>	1	V
Current that will trigger all devices				
V_D = 6 V; R_{GK} = 10 kΩ; T_j = 25 °C	$-I_{GAT}$	>	100	μA

*Measured under pulse conditions to avoid excessive dissipation.

**The dV_D/dt is unlimited when the anode gate lead is returned to the supply voltage through a current limiting resistor.

Switching characteristics

Gate-controlled turn-on time ($t_{gt} = t_d + t_r$) when switched from V_D = 15 V to I_T = 150 mA; I_{GK} = 5 μA; dI_{GK}/dt = 5 μA/μs; T_j = 25 °C	t_{gt}	<	300	ns
Circuit-commutated turn-off time when switched from I_T = 150 mA to V_R = 15 V; $-dI_T/dt$ = 3 A/μs; dV_D/dt = 70 V/μs; V_D = 15 V	t_q	<	3	μs

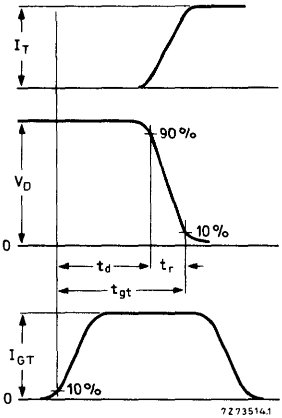


Fig.2 Gate-controlled turn-on time definition..

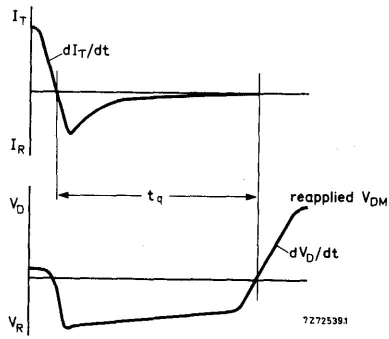


Fig.3 Circuit-commutated turn-off time definition.

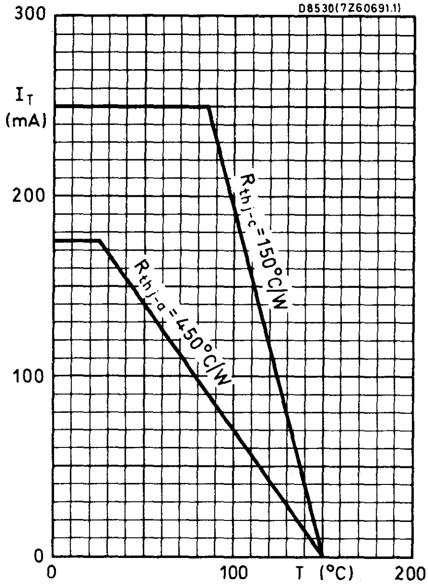


Fig.4

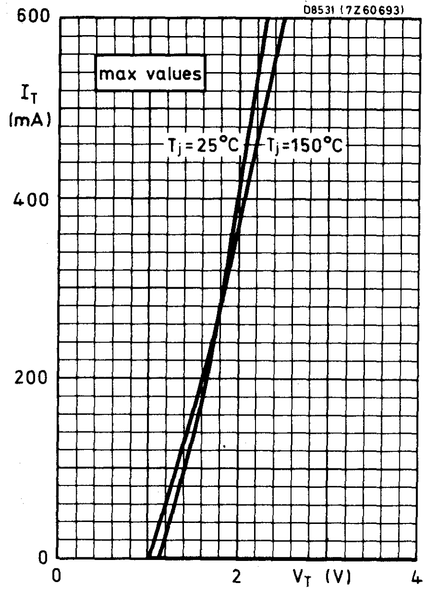


Fig.5

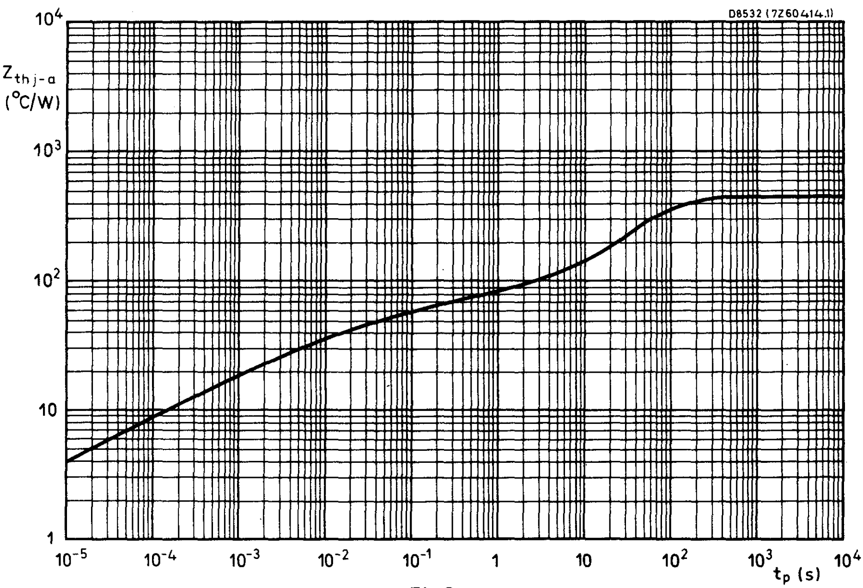


Fig.6

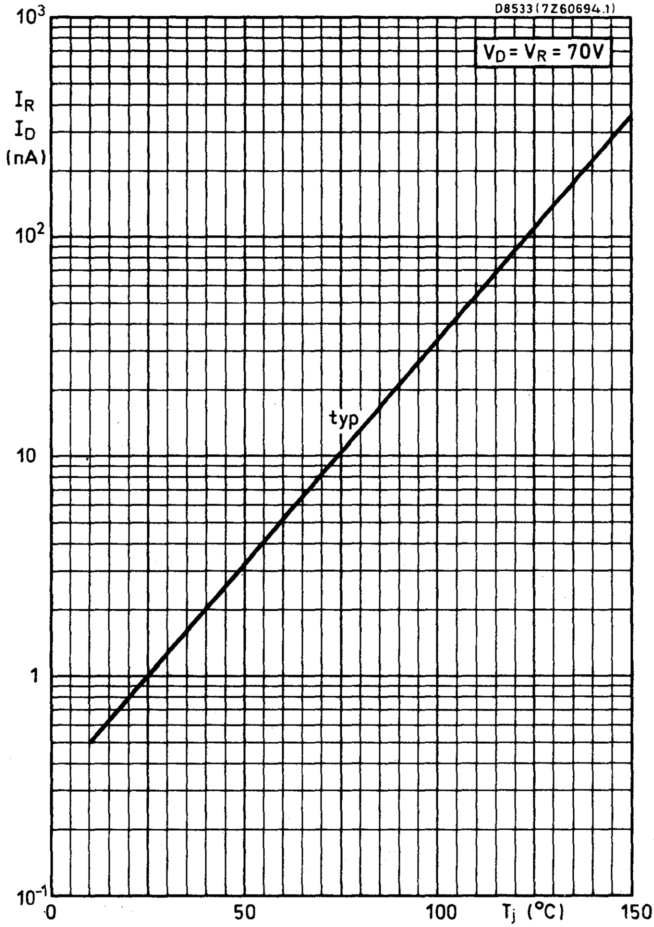

D8533 (7Z60694.1)
$V_D = V_R = 70V$
I_R
I_D
(nA)
10^3
10^2
10
1
10^{-1}
typ
0
50
100
150
T_j (°C)

Fig.7

APPLICATION INFORMATION

Sensing network

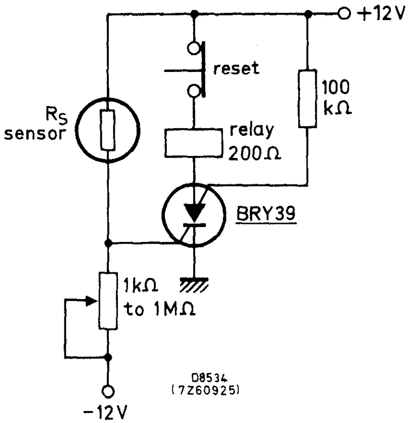


Fig.8

R_S must be chosen in accordance with the light, temperature, or radiation intensity to be sensed; its resistance should be of the same order as that of the potentiometer.
In the arrangement shown, a decline in resistance of R_S triggers the thyristor, closing the relay that activates the warning system. If the positions of R_S and the potentiometer are interchanged, an increase in the resistance of R_S triggers the thyristor.