THYRISTOR TETRODE

The BRY39 is a planar p-n-p-n trigger device in a TO-72 metal envelope, intended for use in switching applications such as relay and lamp drivers, sensing network for temperature, etc.

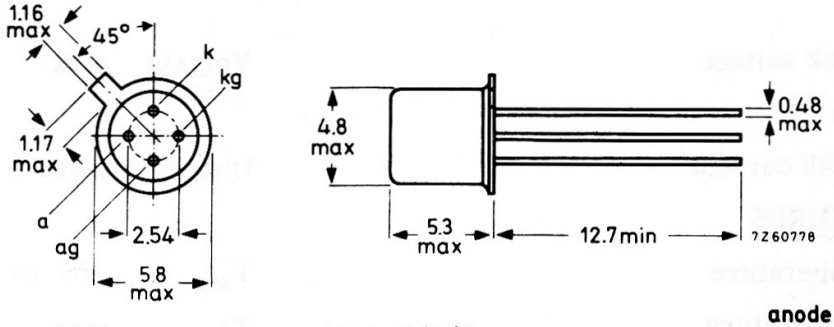
For the applications of the BRY39 as SCS see Handbook Part 3, section SWITCHING TRANSISTORS and as PROGRAMMABLE UNIJUNCTION TRANSISTOR see Handbook Part 3, section SWITCHING TRANSISTORS.

QUICK REFERENCE DATA					
Continuous voltages	$V_D = V_R$		max.	70	V
Repetitive peak voltages	$V_{DRM} = V_{RRM}$		max.	70	V
On-state current up to T_{case} = 85 °C		I_T	max.	250	mA
Non-repetitive peak on-state current t = 10 µs; T_j = 150 °C prior to surge		I_{TSM}	max.	3	A
Junction temperature		T_j	max.	150	°C
Rate of rise of on-state current		$\frac{dI_T}{dt}$	max.	20	A/µs

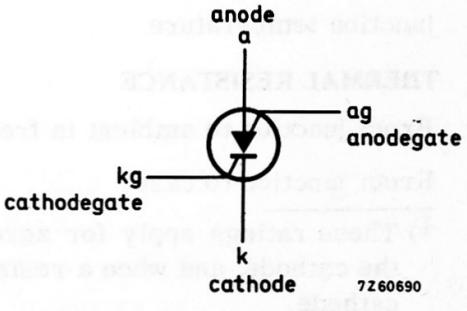
MECHANICAL DATA Dimensions in mm

Anodegate connected to case

TO-72



Accessories supplied on request: 56246; 56263



MEANING OF SYMBOLS

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

ANODE TO CATHODE

Voltages [1]

Continuous voltages	$V_D = V_R$	max.	70	V
Repetitive peak voltages	$V_{DRM} = V_{RRM}$	max.	70	V
Non-repetitive peak voltages	$V_{DSM} = V_{RSM}$	max.	70	V

Currents

On-state current (d.c.) up to T_{case} = 85 °C	I_T	max.	250	mA
up to T_{amb} = 25 °C	I_T	max.	175	mA
Repetitive peak on-state current $t = 10\ \mu s; \delta = 0.01$	I_{TRM}	max.	2.5	A
Non-repetitive peak on-state current $t = 10\ \mu s$; 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

CATHODEGATE TO CATHODE

Voltage

Reverse peak voltage	V_{RGKM}	max.	5	V

Current

Forward peak current	I_{FGKM}	max.	100	mA

ANODEGATE TO ANODE

Voltage

Reverse peak voltage	V_{RGAM}	max.	70	V

Current

Forward peak 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	$R_{th\ j-a}$	=	0.45	°C/mW
From junction to case	$R_{th\ j-c}$	=	0.15	°C/mW

[1] These ratings apply for zero or negative bias on the cathodegate with respect to the cathode, and when a resistor $R \leq 10\ k\Omega$ is connected between cathodegate and cathode.

CHARACTERISTICS

ANODE TO CATHODE

Voltages

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 [1]	$\frac{dV_D}{dt}$ [1]			

Currents

Peak reverse current V_{RM} = 70 V; T_j = 25 °C	I_{RM}	typ. <	1 100	nA nA
T_j = 150 °C	I_{RM}	<	2	µA
Peak off-state current V_{DM} = 70 V; T_j = 25 °C	I_{DM}	typ. <	1 100	nA nA
T_j = 150 °C	I_{DM}	<	2	µA
Holding current; R_{GK} = 10 kΩ; R_{GA} = 220 kΩ; T_j = 25 °C	I_H	<	250	µA

CATHODEGATE TO CATHODE

Voltages

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

Current

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

ANODEGATE TO ANODE

Voltages

Voltage that will trigger all devices V_D = 6 V; T_j = 25 °C	V_{GAT}	>	1	V

Current

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

[1] The dV_D/dt is unlimited when the anodegate lead is returned to the anode supply voltage through a current limiting resistor.

SWITCHING CHARACTERISTICS

Turn-on time ($t_{on} = t_d + t_r$)

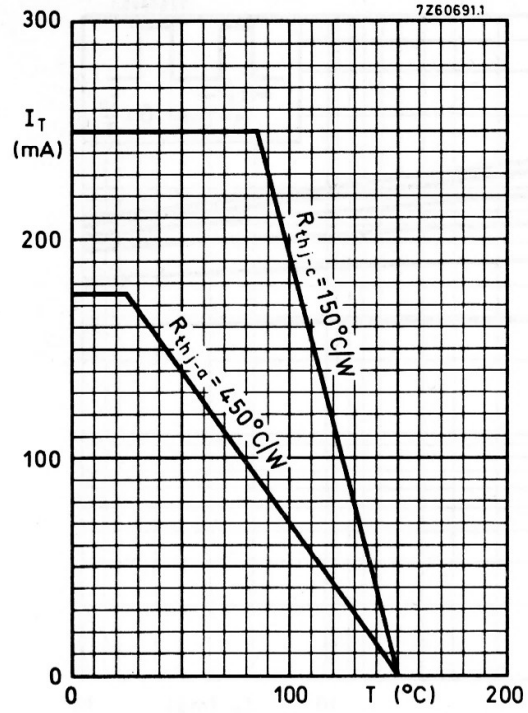
V_D = 15 V; I_T = 150 mA

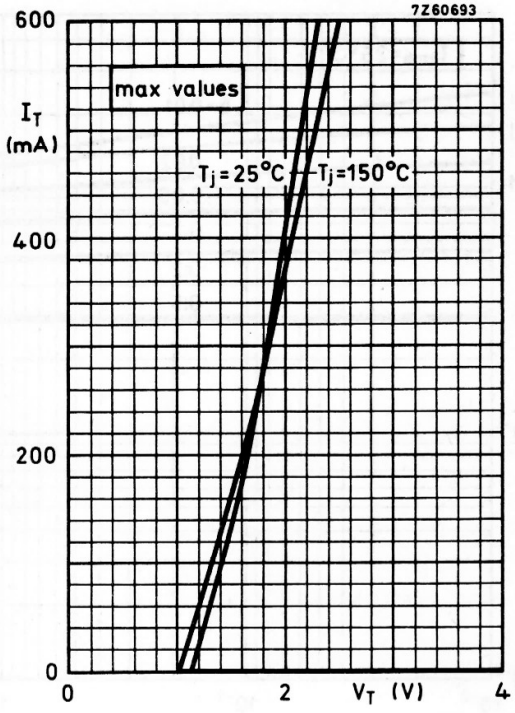
R_{GK} = 10 kΩ; T_j = 25 °C $\quad t_{on} < 300$ ns

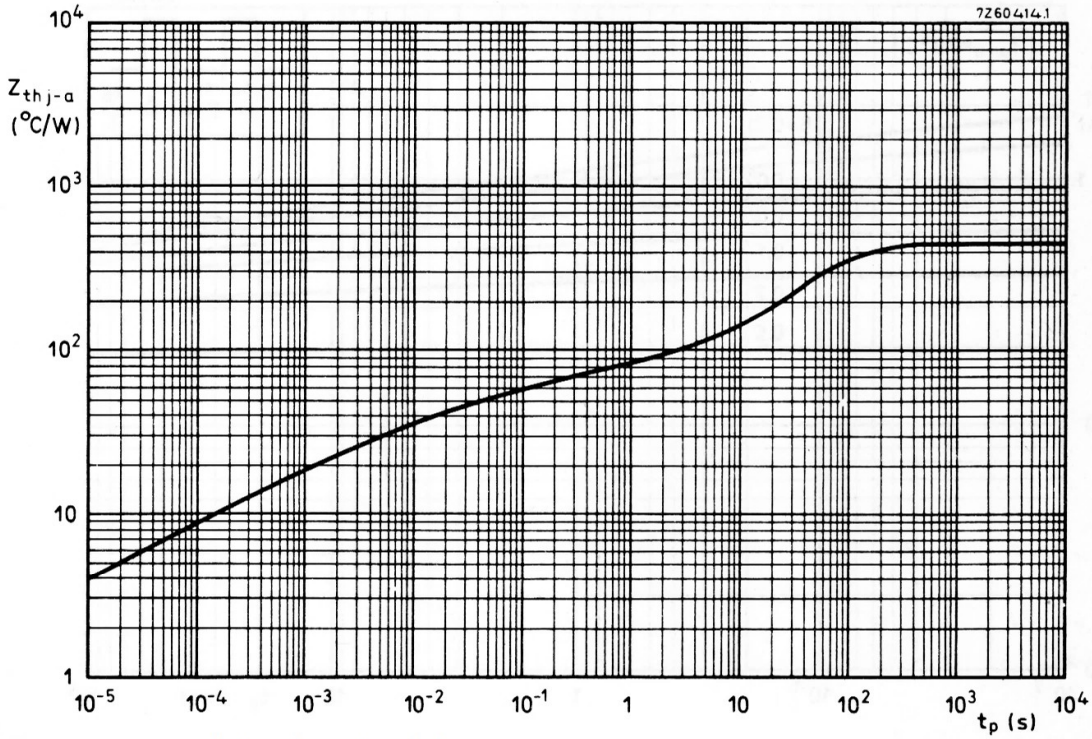
Circuit-commutated turn-off time

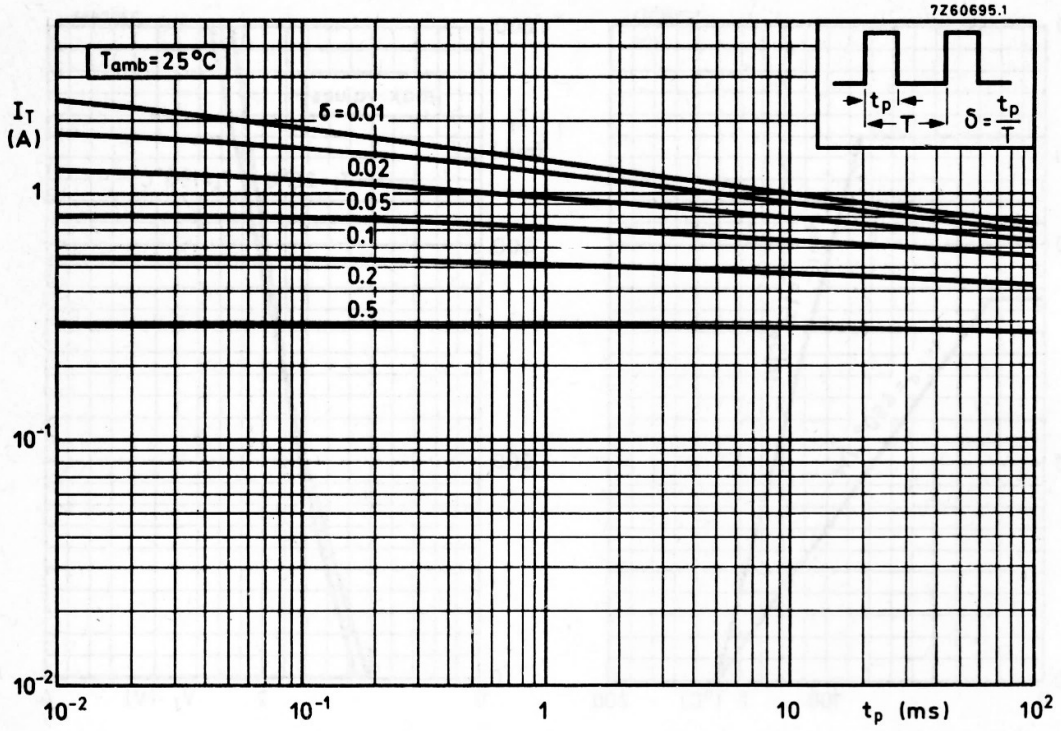
$V_D = V_R$ = 15 V; I_T = 150 mA

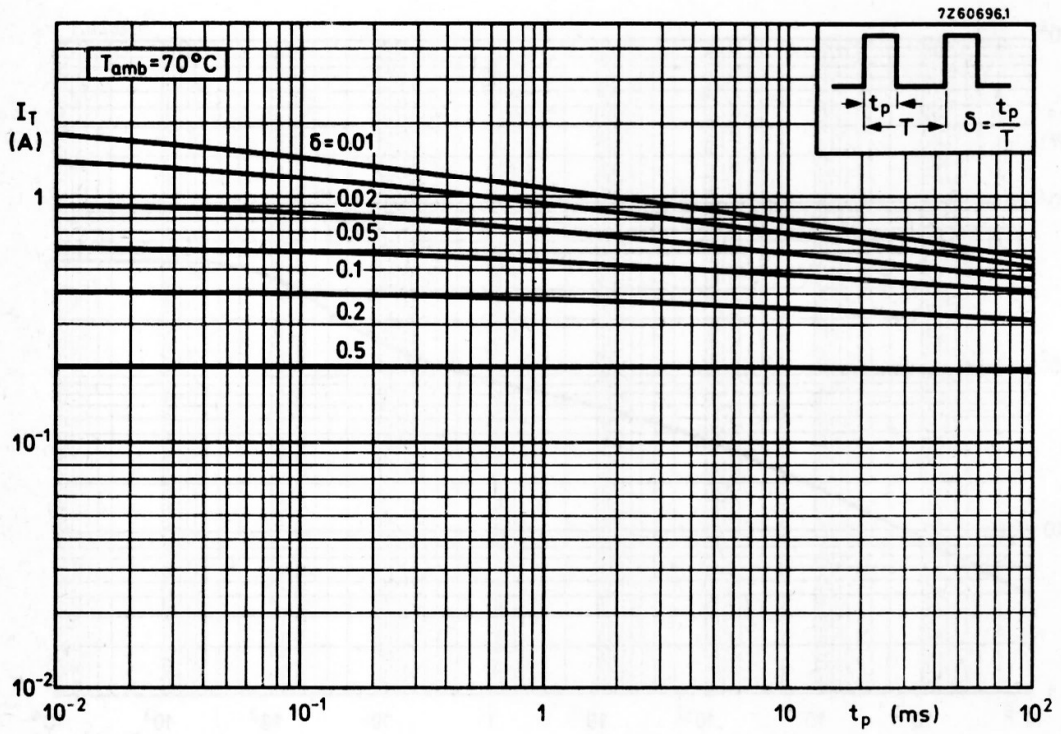
R_{GK} = 10 kΩ; T_j = 25 °C $\quad t_{off} < 3$ μs

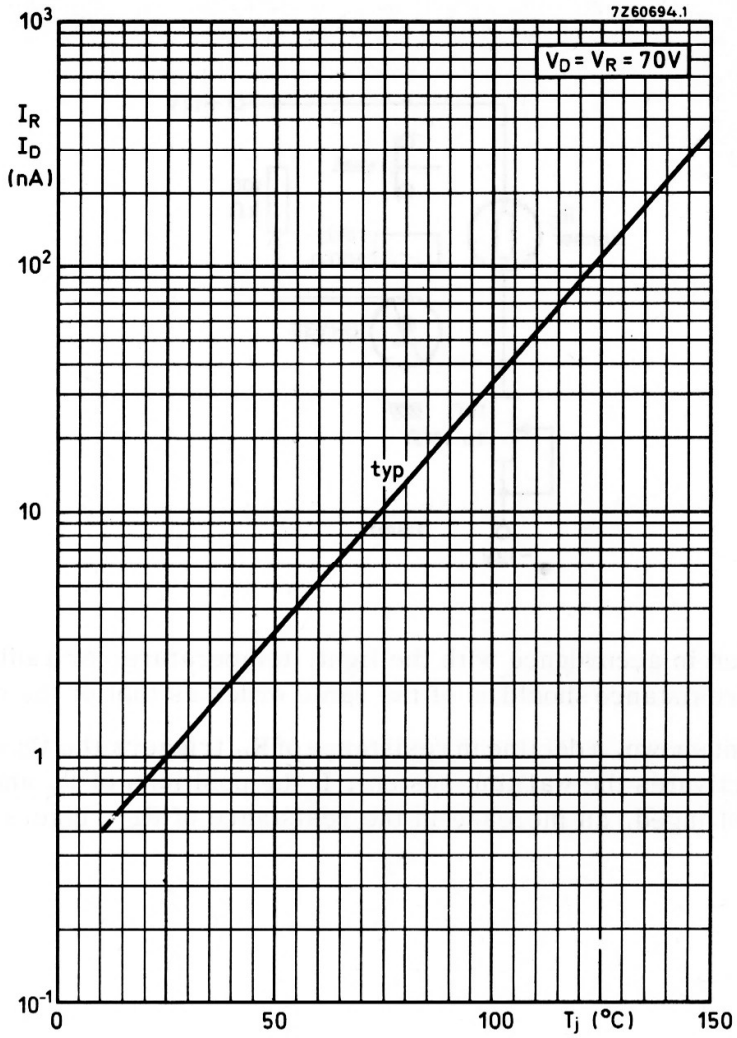






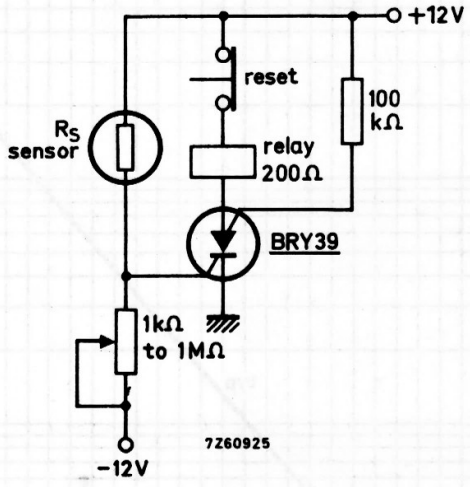






APPLICATION INFORMATION

Sensing network



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.