

BTW42 SERIES

THYRISTORS

Glass-passivated silicon thyristors in metal envelopes with high dV_D/dt capabilities. They are intended for use in power control circuits and switching systems where high transients can occur (e.g. phase control in three-phase systems).

The series consists of reverse polarity types (anode to stud) identified by a suffix R: BTW42-600R to 1000R.

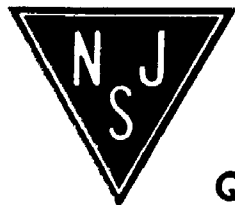
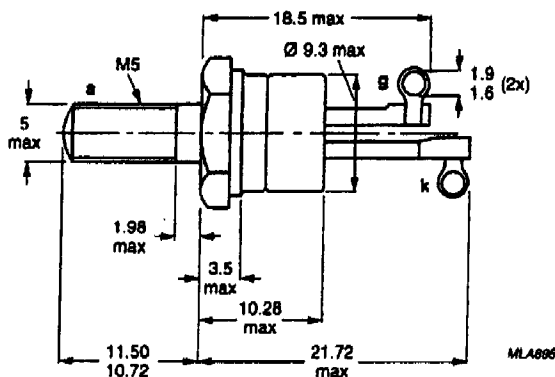
QUICK REFERENCE DATA

		BTW42-600R 800R 1000R				
Repetitive peak voltages	V_{DRM}/V_{RRM}	max.	600	800	1000	V
Average on-state current	$I_T(AV)$	max.		10		A
R.M.S. on-state current	$I_T(RMS)$	max.		16		A
Non-repetitive peak on-state current	I_{TSM}	max.		150		A
Rate of rise of off-state voltage that will not trigger any device	dV_D/dt	<		500		V/ μs
On request (see Ordering Note)	dV_D/dt	<		1000		V/ μs

MECHANICAL DATA

Dimensions in mm

Fig.1 TO-64



RATINGS

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

Anode to cathode

		BTW42-600R	800R	1000R
Non-repetitive peak voltages ($t \leq 10$ ms)	V_{DSM}/V_{RSM}	max. 600	800	1000 V
Repetitive peak voltages	V_{DRM}/V_{RRM}	max. 600	800	1000 V
Crest working voltages	V_{DWM}/V_{RWM}	max. 400	600	700 V*
Average on-state current (averaged over any 20 ms period) up to $T_{mb} = 85$ °C	$I_T(AV)$		max.	10 A
R.M.S. on-state current	$I_T(RMS)$		max.	16 A
Repetitive peak on-state current	I_{TRM}		max.	75 A
Non-repetitive peak on-state current; $t = 10$ ms; half sine-wave; $T_j = 125$ °C prior to surge; with reapplied V_{RWMmax}	I_{TSM}		max.	150 A
I^2t for fusing ($t = 10$ ms)	I^2t		max.	112 A ² s
Rate of rise of on-state current after triggering with $I_G = 250$ mA to $I_T = 25$ A; $dI_G/dt = 0,25$ A/ μ s	dI_T/dt		max.	50 A/ μ s

Gate to cathode

Average power dissipation (averaged over any 20 ms period)	$P_G(AV)$	max.	0,5 W
Peak power dissipation	P_{GM}	max.	5 W

Temperatures

Storage temperature	T_{stg}	-55 to + 125 °C
Junction temperature	T_j	max. 125 °C

THERMAL RESISTANCE

From junction to mounting base	$R_{th j-mb}$	=	1,8 K/W
From mounting base to heatsink with heatsink compound	$R_{th mb-h}$	=	0,5 K/W
From junction to ambient in free air	$R_{th j-a}$	=	45 K/W
Transient thermal impedance ($t = 1$ ms)	$Z_{th j-mb}$	=	0,1 K/W

OPERATING NOTE

The terminals should neither be bent nor twisted; they should be soldered into the circuit so that there is no strain on them.

During soldering the heat conduction to the junction should be kept to a minimum.

CHARACTERISTICS

Anode to cathode

On-state voltage (measured under pulse conditions)

$$I_T = 20 \text{ A}; T_j = 25 \text{ }^\circ\text{C}$$

$$V_T < 2 \text{ V}$$

Rate of rise of off-state voltage that will not trigger any device; exponential method;

$$V_D = 2/3 V_{DRMmax}; T_j = 125 \text{ }^\circ\text{C}$$

$$dV_D/dt < 500 \text{ V}/\mu\text{s}$$

Reverse current

$$V_R = V_{RWMmax}; T_j = 125 \text{ }^\circ\text{C}$$

$$I_R < 3 \text{ mA}$$

Off-state current

$$V_D = V_{DWMmax}; T_j = 125 \text{ }^\circ\text{C}$$

$$I_D < 3 \text{ mA}$$

Latching current; $T_j = 25 \text{ }^\circ\text{C}$

$$I_L < 150 \text{ mA}$$

Holding current; $T_j = 25 \text{ }^\circ\text{C}$

$$I_H < 75 \text{ mA}$$

Gate to cathode

Voltage that will trigger all devices

$$V_D = 6 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$$

$$V_{GT} > 1.5 \text{ V}$$

Voltage that will not trigger any device

$$V_D = V_{DRMmax}; T_j = 125 \text{ }^\circ\text{C}$$

$$V_{GD} < 200 \text{ mV}$$

Current that will trigger all devices

$$V_D = 6 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$$

$$I_{GT} > 50 \text{ mA}$$

Switching characteristics

Gate-controlled turn-on time ($t_{gt} = t_d + t_r$) when

switched from $V_D = V_{DRMmax}$ to $I_T = 40 \text{ A}$;

$$I_{GT} = 100 \text{ mA}; dI_G/dt = 5 \text{ A}/\mu\text{s}; T_j = 25 \text{ }^\circ\text{C}$$

$$t_{gt} \text{ typ. } 2 \text{ } \mu\text{s}$$

Circuit-commutated turn-off time when switched

from $I_T = 40 \text{ A}$ to $V_R > 50 \text{ V}$ with

$$-dI_T/dt = 10 \text{ A}/\mu\text{s}; dV_D/dt = 50 \text{ V}/\mu\text{s}; T_j = 115 \text{ }^\circ\text{C}$$

$$t_q \text{ typ. } 35 \text{ } \mu\text{s}$$