

## 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.

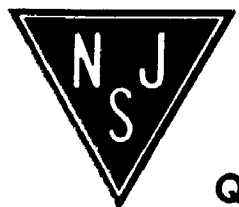
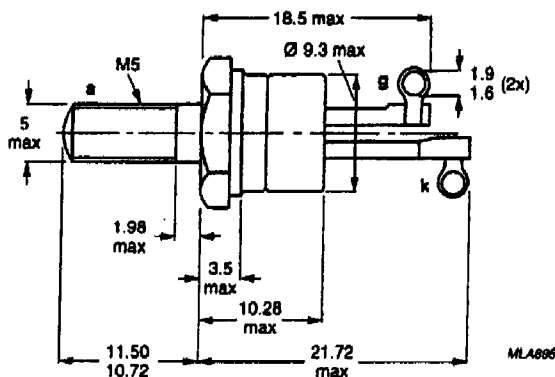
#### QUICK REFERENCE DATA

		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/ $\mu s$
On request (see Ordering Note)	$dV_D/dt$	<		1000		V/ $\mu s$

#### 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 <sup>2</sup> 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/ $\mu$ s	$dI_T/dt$		max. 50	A/ $\mu$ 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

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

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