BTW63 SERIES

FAST TURN-OFF THYRISTORS

Glass-passivated, asymmetrical, fast turn-off, forward blocking thyristors (ASCR) in TO-48 envelopes, suitable for operation in fast power inverters. For reverse-blocking operation use with a series diode, for reverse-conducting operation use with an anti-parallel diode.
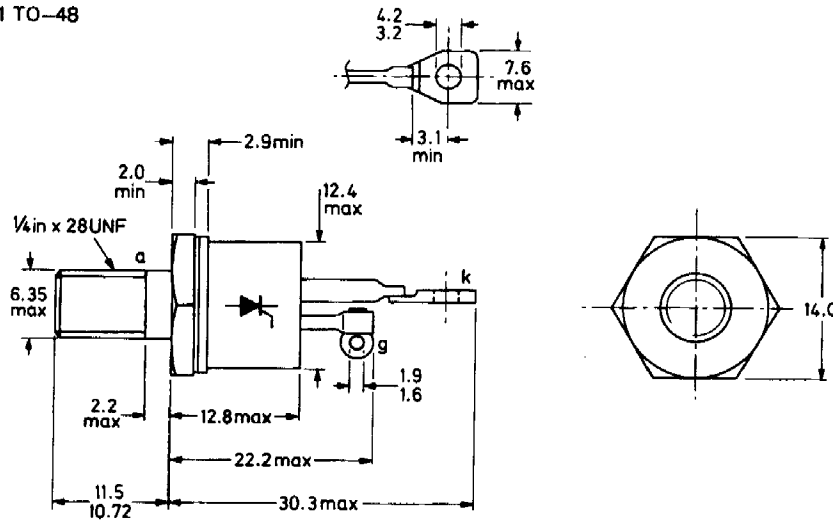
QUICK REFERENCE DATA

			BTW63–600R	800R	1000R	
Repetitive peak off-state voltage	V_{DRM}	max.	600	800	1000	V
Average on-state current	$I_{T(AV)}$	max.		25		A
Repetitive peak on-state current	I_{TRM}	max.		250		A
Circuit-commutated turn-off time						
suffix K	t_q	<		4		μs
suffix N	t_q	<		6		μs
suffix P	t_q	<		8		μs

MECHANICAL DATA

Dimensions in mm

Fig.1 TO–48

Net mass: 14 g
Diameter of clearance hole: max. 6.5 mm
Accessories supplied on request

Supplied with device: 1 nut, 1 lock washer.
Torque on nut: min. 1.7 Nm (17 kg cm)
                        max. 3.5 Nm (35 kg cm)
Nut dimensions across the flats: 11.1 mm

Quality Semi-Conductors

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RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC134)

→ Anode to cathode			BTW63−600R	800R	1000R	
Transient off-state voltage	V_{DSM}	max.	800	1000	1000	V
Repetitive peak off-state voltage	V_{DRM}	max.	600	800	1000	V
Continuous off-state voltage	V_D	max.	500	650	700	V
Transient reverse voltage ($t_p \leqslant 5\ \mu s$)	V_{RSM}	max.		15		V
Average on-state current (averaged over any 20 ms period) up to $T_{mb} = 75\ ^oC$	$I_{T(AV)}$	max.		25		A
at $T_{mb} = 85\ ^oC$	$I_{T(AV)}$	max.		22		A
R.M.S. on-state current	$I_{T(RMS)}$	max.		40		A
Repetitive peak on-state current; $t_p = 50\ \mu s$; $\delta = 0.05$	I_{TRM}	max.		250		A
Non-repetitive peak on-state current $T_j = 125\ ^oC$ prior to surge; $t = 10$ ms; half sine-wave	I_{TSM}	max.		370		A
$I^2 t$ for fusing; $t = 10$ ms	$I^2 t$	max.		700		$A^2 s$
→ Rate of rise of on-state current after triggering with $I_G = 1.25$ A; $I_T = 80$ A	dI_T/dt	max.		1000		$A/\mu s$

Gate to cathode

Average power dissipation (averaged over any 20 ms period)	$P_{G(AV)}$	max.	1	W
Peak power dissipation; $t = 10\ \mu s$	P_{GM}	max.	10	W

Temperatures

Storage temperature	T_{stg}		−40 to +125	^oC
Operating junction temperature	T_j	max.	125	^oC

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j-mb}$	=	0.9	K/W
From mounting base to heatsink with heatsink compound	$R_{th\ mb-h}$	=	0.2	K/W

OPERATING NOTE

The terminals should be neither 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
$I_T = 50$ A; $T_j = 25$ °C V_T <   2.6   V*

Off-state current
$V_D = V_{Dmax}$; $T_j = 125$ °C I_D <   6.0   mA

Holding current; $T_j = 25$ °C I_H <   400   mA

Gate to cathode

Voltage that will trigger all devices
$V_D = 12$ V; $T_j = 25$ °C V_{GT} >   2.0   V

Current that will trigger all devices
$V_D = 12$ V; $T_j = 25$ °C I_{GT} >   250   mA

Switching characteristics (see Fig.5)

Circuit commutated turn-off time

$dV_D/dt = 500$ V/µs (linear to V_{DRMmax});

$R_{GK} = 10$ Ω; $V_G = 0$; $T_j = 125$ °C;
when switched from $I_T = 100$ A; $t_p = 150$ µs

$-dI_T/dt = 50$ A/µs
suffix K t_q <   6   µs
suffix N t_q <   9   µs
suffix P t_q <   12   µs

$-dI_T/dt = 10$ A/µs
suffix K t_q <   4   µs
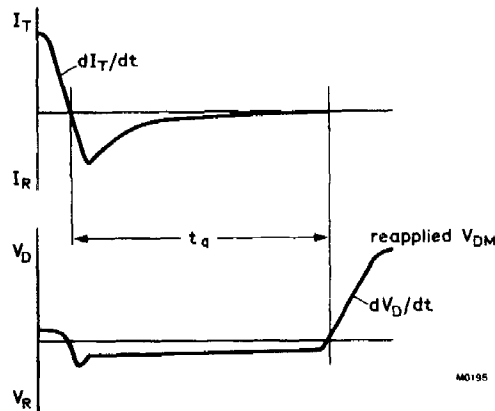suffix N t_q <   6   µs
suffix P t_q <   8   µs

Fig.2 Circuit-commutated turn-off time definition.

*Measured under pulse conditions to avoid excessive dissipation.

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Fig.3 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.

$$a = \text{form factor} = \frac{I_{T(RMS)}}{I_{T(AV)}}$$