TRIACS

Silicon triacs in metal envelopes, intended for industrial single-phase and three-phase inductive load applications such as regenerative motor control systems. They are also suitable for furnace temperature control and static switching systems.
Two grades of commutation performance are available, 30 V/μs at 25 A/ms (suffix H) and 30 V/μs at 50 A/ms (suffix J).

QUICK REFERENCE DATA

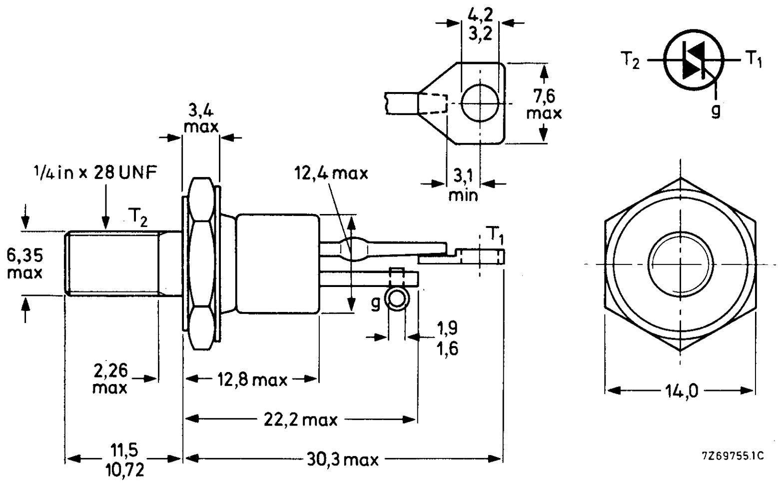
			BTX94-400	600	800	1000	1200	
Repetitive peak off-state voltage	V_{DRM}	max.	400	600	800	1000	1200	V

R.M.S. on-state current	$I_{T(RMS)}$	max.	25	A
Non-repetitive peak on-state current	I_{TSM}	max.	250	A
Rate of rise of commutating voltage that will not trigger any device (see page 3)	dV_{com}/dt	<	30	V/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: 56264A
(mica washer, insulating ring, soldering tag)

Torque on nut: min. 1,7 Nm (17 kg cm)
max. 3,5 Nm (35 kg cm)
Supplied with the device:
1 nut, 1 lock washer
Nut dimensions across the flats; 11,1 mm

RATINGS

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

Voltages (in either direction) *

			BTX94-400	600	800	1000	1200	
Non-repetitive peak off-state voltage ($t \leqslant 10$ ms)	V_{DSM}	max.	400	600	800	1000	1200	V **
Repetitive peak off-state voltage	V_{DRM}	max.	400	600	800	1000	1200	V
Crest working off-state voltage	V_{DWM}	max.	200	400	600	700	800	V

Currents (in either direction)

R.M.S. on-state current (conduction angle 360°) at T_{mb} = 85 °C	$I_{T(RMS)}$	max.	25	A
Repetitive peak on-state current	I_{TRM}	max.	100	A
Non-repetitive peak on-state current T_j = 125 °C prior to surge; t = 20 ms; full sine-wave	I_{TSM}	max.	250	A
I^2t for fusing (t = 10 ms)	I^2t	max.	320	A^2s
Rate of rise of on-state current after triggering with I_G = 750 mA to I_T = 100 A	dI_T/dt	max.	50	A/μs

Gate to terminal 1

Power dissipation

Average power dissipation (averaged over any 20 ms period)	$P_{G(AV)}$	max.	1	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				
full-cycle operation	$R_{th\ j\text{-}mb}$	=	1,0	°C/W
half-cycle operation	$R_{th\ j\text{-}mb}$	=	2,0	°C/W
From mounting base to heatsink with heatsink compound	$R_{th\ mb\text{-}h}$	=	0,2	°C/W
Transient thermal impedance; t = 1 ms	$Z_{th\ j\text{-}mb}$	=	0,12	°C/W

* To ensure thermal stability: $R_{th\ j\text{-}a} < 3,5$ °C/W (full-cycle or half-cycle operation). For smaller heatsinks $T_{j\ max}$ should be derated (see Figs 2 and 3).

** Although not recommended, higher off-state voltages may be applied without damage, but the triac may switch into the on-state. The rate of rise of on-state current should not exceed 50 A/μs.

CHARACTERISTICS

Polarities, positive or negative, are identified with respect to T_1.

Voltages (in either direction)

On-state voltage $I_T = 50$ A; $T_j = 25$ °C	V_T	<	2 V *
Rate of rise of off-state voltage that will not trigger any device; exponential method; $V_D = 2/3\ V_{DRMmax}$; $T_j = 125$ °C	dV_D/dt	<	100 V/µs

Rate of rise of commutating voltage that will not trigger any device; $I_{T(RMS)} = 25$ A; $V_D = V_{DWMmax}$; $T_{mb} = 85$ °C

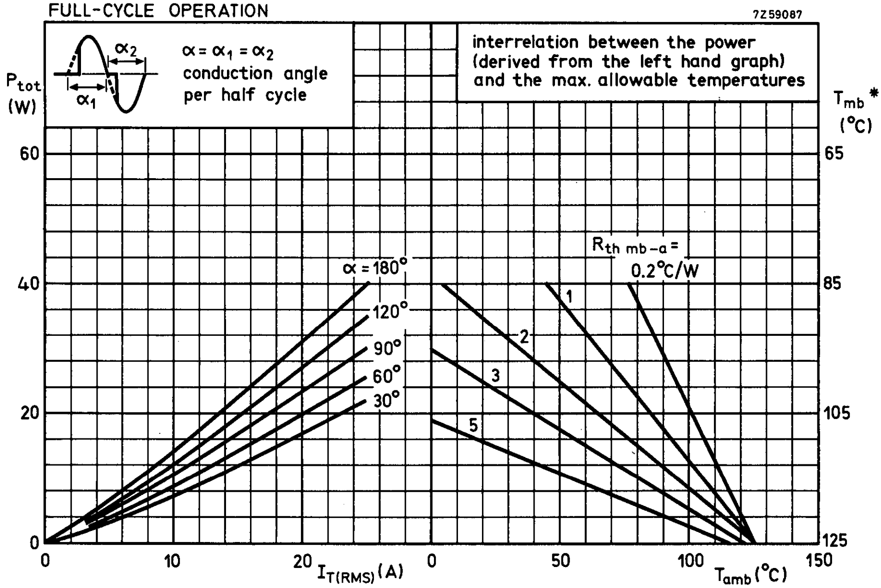
	dV_{com}/dt (V/µs)	$-dI_T/dt$ (A/ms)
BTX94-400H to 1200H	< 30	25
BTX94-400J to 1200J	< 30	50 ←

Currents (in either direction)

Off-state current $V_D = V_{DWMmax}$; $T_j = 125$ °C	I_D	<	5 mA

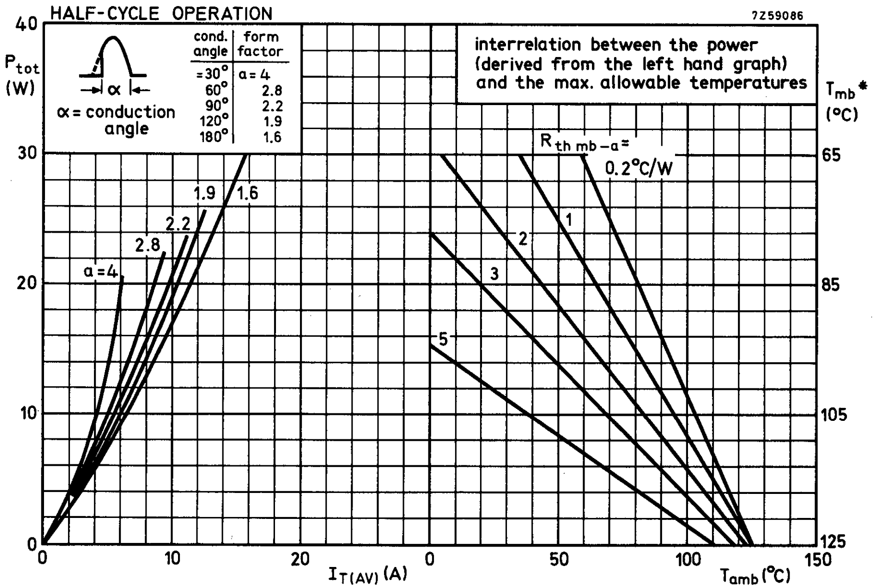
		T_2 pos.	T_2 neg.
Latching current; $T_j = 25$ °C			
G positive	I_L	< 150	150 mA
G negative	I_L	< 350	150 mA
Gate to terminal 1			
Voltage and current that will trigger all devices $V_D = 12$ V; $T_j = 25$ °C			
G positive	V_{GT}	> 3,0	5,0 V
	I_{GT}	> 150	200 mA
G negative	$-V_{GT}$	> 3,0	3,0 V
	$-I_{GT}$	> 150	150 mA

* Measured under pulse conditions to avoid excessive dissipation.



* T_{mb}-scale is for comparison purposes only and is correct only for $R_{th\ mb-a} \leq 2.5\ °C/W$

Fig. 2.



* T_{mb}-scale is for comparison purposes only and is correct only for $R_{th\ mb-a} \leq 1.5\ °C/W$

Fig. 3.

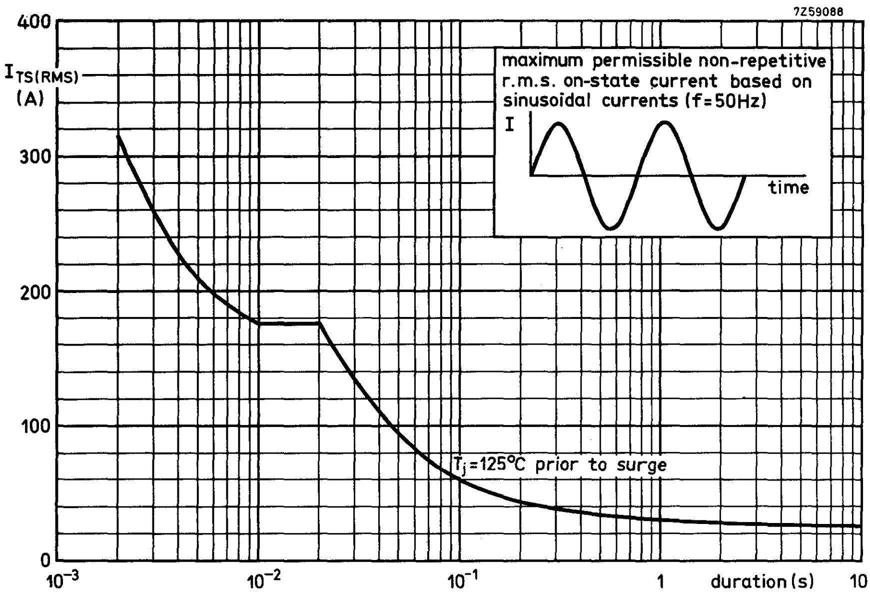

7Z59088
400
$I_{TS(RMS)}$
(A)
300
200
100
0
10^{-3}
10^{-2}
10^{-1}
1
duration (s)
10
maximum permissible non-repetitive r.m.s. on-state current based on sinusoidal currents (f=50Hz)
I
time
T_j=125°C prior to surge

Fig. 4.

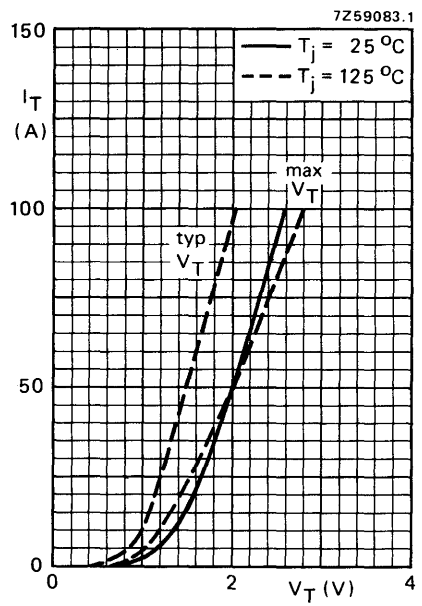

7Z59083.1
150
I_T
(A)
100
50
0
0
2
V_T (V)
4
T_j = 25 °C
T_j = 125 °C
typ V_T
max V_T

Fig. 5.

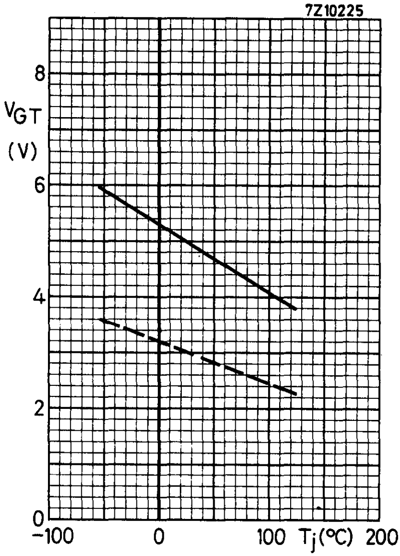


Fig. 6 Minimum gate voltage that will trigger all devices as a function of T_j.

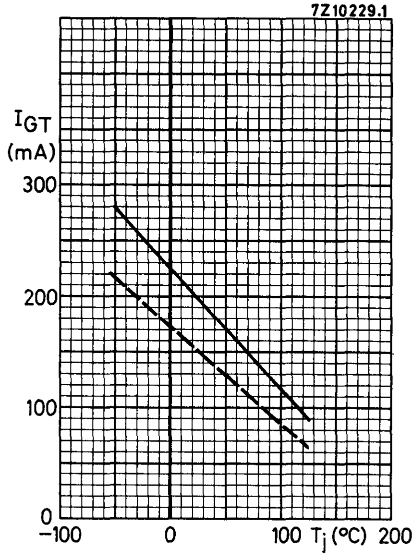


Fig. 7 Minimum gate current that will trigger all devices as a function of T_j.

Conditions for Figs 6 and 7:

——— T_2 negative, gate positive with respect to T_1
– – – all other conditions

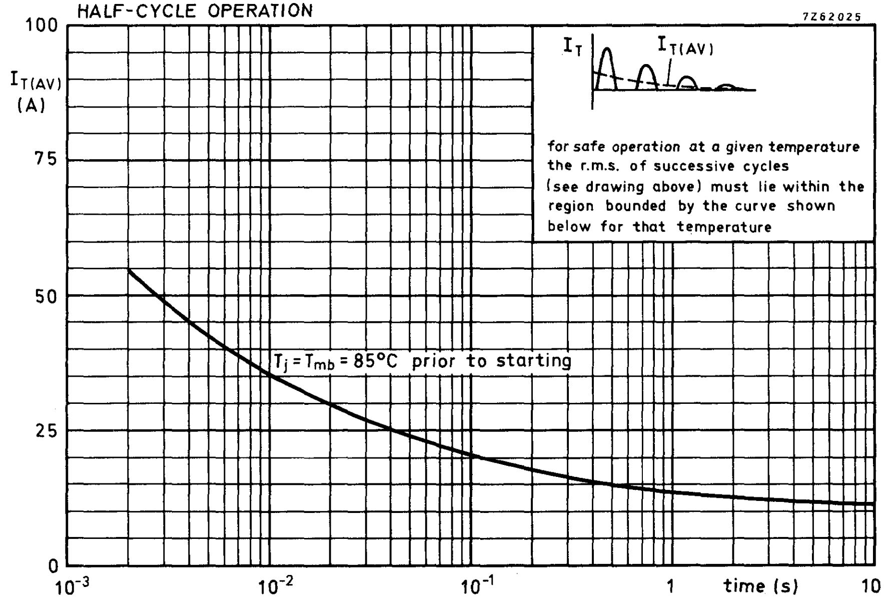

HALF-CYCLE OPERATION
7Z62025
100
I_T(AV)
(A)
75
50
25
0
10^-3
10^-2
10^-1
1
time (s)
10
I_T
I_T(AV)
for safe operation at a given temperature
the r.m.s. of successive cycles
(see drawing above) must lie within the
region bounded by the curve shown
below for that temperature
Tj = Tmb = 85°C prior to starting

Fig. 8.

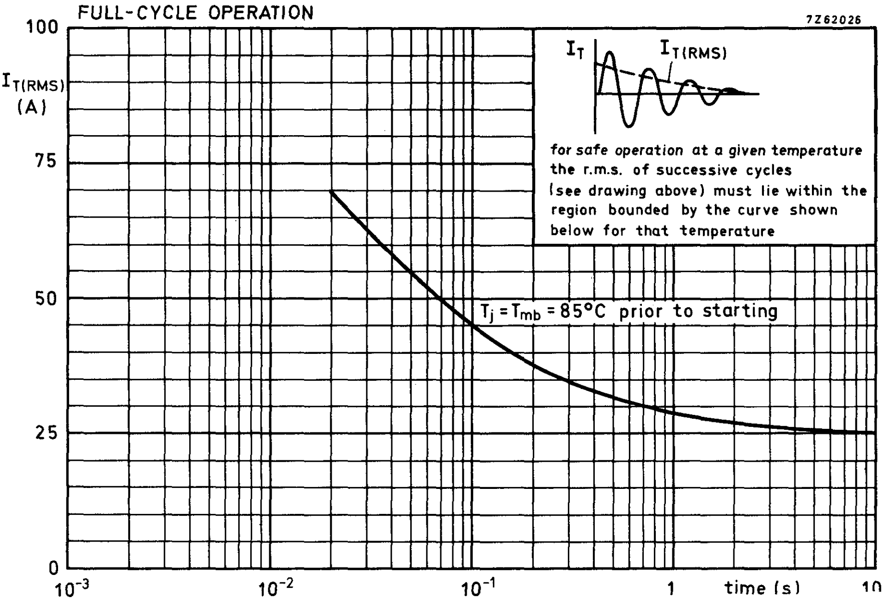

FULL-CYCLE OPERATION
7Z62026
100
I_T(RMS)
(A)
75
50
25
0
10^-3
10^-2
10^-1
1
time (s)
10
I_T
I_T(RMS)
for safe operation at a given temperature
the r.m.s. of successive cycles
(see drawing above) must lie within the
region bounded by the curve shown
below for that temperature
Tj = Tmb = 85°C prior to starting

Fig. 9.

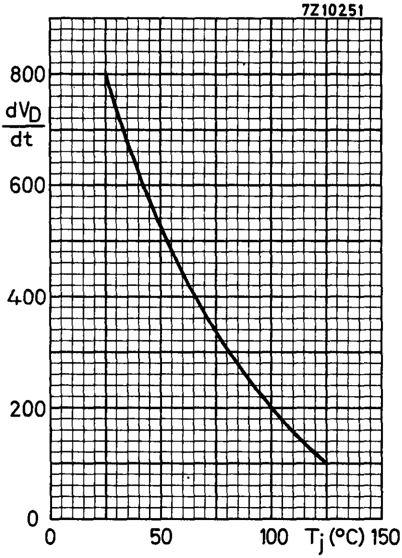


Fig. 10 Maximum rate of rise of off-state voltage that will not trigger any device (exponential method) as a function of T_j.

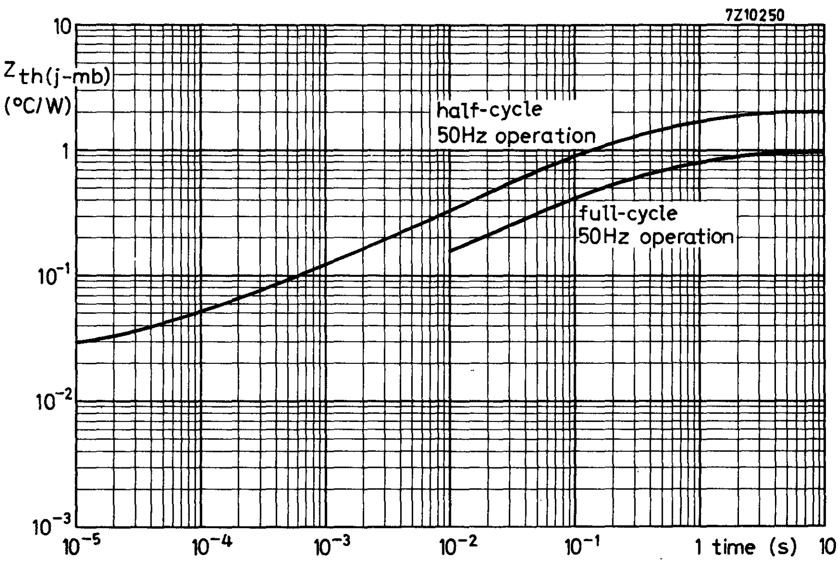


Fig. 11.