SILICON THYRISTORS

The BTX18series is a range of p-gate reverse blocking thyristors, in a TO-5 metal envelope, intended for use in general low power applications up to 1 A average on-state current

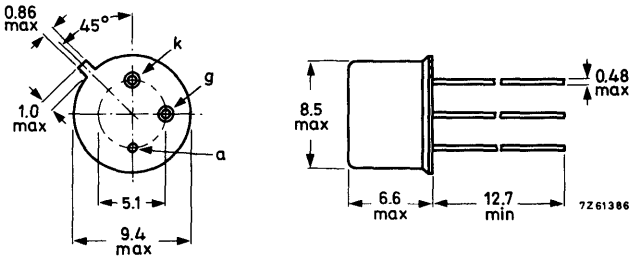
QUICK REFERENCE DATA

			BTX18-	100	200	300	400	500	
Crest working reverse voltage	V_{RWM}	max.		100	200	300	400	500	V
Crest working off-state voltage	V_{DWM}	max.		100	200	300	400	500	V
Average on-state current up to T_{case} = 105 °C	$I_{T(AV)}$	max.				1.0			A
T_{amb} = 60 °C; in free air	$I_{T(AV)}$	max.				250			mA
Non-repetitive peak on-state current t = 10 ms; T_j = 125 °C prior to surge	I_{TSM}	max.				10			A
Junction temperature	T_j	max.				125			°C

MECHANICAL DATA Dimensions in mm

Anode connected to the case

TO-39



Accessories **supplied on request: 56218; 56245.**

All information applies to frequencies up to 400 Hz

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

ANODE TO CATHODE

Voltages [1]		BTX18-	100	200	300	400	500	
Continuous reverse voltage	V_R	max.	100	200	300	400	500	V
Crest working reverse voltage	V_{RWM}	max.	100	200	300	400	500	V
Repetitive peak reverse voltage (δ = 0.01; f = 50 Hz)	V_{RRM}	max.	120	240	350	500	600	V
Non-repetitive peak reverse voltage ($t \leq 10$ ms)	V_{RSM}	max.	120	240	350	500	600	V
Continuous off-state voltage	V_D	max.	100	200	300	400	500	V
Crest working off-state voltage	V_{DWM}	max.	100	200	300	400	500	V
Repetitive peak off-state voltage (δ = 0.01; f = 50 Hz)	V_{DRM}	max.	120	240	350	500	600	V [2]
Non-repetitive peak off-state voltage ($t \leq 10$ ms)	V_{DSM}	max.	120	240	350	500	600	V [2]

Currents

Average on-state current (averaged over any 20 ms period) up to T_{case} = 105 °C	$I_{T(AV)}$	max.	1.0	A
at T_{amb} = 60 °C	$I_{T(AV)}$	max.	250	mA
On-state current (d.c.) T_{case} = 100 °C	I_T	max.	1.6	A
R.M.S. on-state current	$I_{T(RMS)}$	max.	1.6	A
Repetitive peak on-state current	I_{TRM}	max.	10	A
Non-repetitive peak on-state current (t = 10 ms, half sinewave)	I_{TSM}	max.	10	A

1) These ratings apply for zero or negative bias on the gate with respect to the cathode, and when a resistor $R \leq 1$ kΩ is connected between gate and cathode.

2) The device is not suitable for operation in the forward breakover mode.

RATINGS

GATE TO CATHODE (with 1 kΩ resistor between gate and cathode)

Voltages

Forward peak voltage	V_{FGM}	max.	10	V
Reverse peak voltage	V_{RGM}	max.	5	V

Current

Forward peak current	I_{FGM}	max.	0.2	A

Power dissipation

Average power dissipation (averaged over any 20 ms period)	$P_{G(AV)}$	max.	0.05	W
Peak power dissipation	P_{GM}	max.	0.5	W

TEMPERATURES

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

THERMAL RESISTANCE

From junction to case	$R_{th\ j-c}$	=	10	°C/W
From junction to ambient	$R_{th\ j-a}$	=	200	°C/W
Transient thermal resistance (t = 10 ms)	$Z_{th\ j-c}$	=	2.5	°C/W

CHARACTERISTICS

ANODE TO CATHODE

Voltages

		BTX18-	100	200	300	400	500	
On-state voltage								
I_T = 1.0 A; T_j = 25 °C	V_T		< 1.5	1.5	1.5	1.5	1.5	V [1]
Rate of rise of off-state voltage that will not trigger any device RGK = 1 kΩ; T_j = 125 °C	$\frac{dV_D}{dt}$		See page 6					

Currents

Peak reverse current								
$V_{RM} = V_{RWMmax}$; T_j = 125 °C	I_{RM}	<	800	400	275	200	160	μA
Peak off-state current								
$V_{DM} = V_{DWMmax}$; T_j = 125 °C	I_{DM}	<	800	400	275	200	160	μA

1) V_T is measured along the leads at 1 cm from the case.

CHARACTERISTICS (continued)

Latching current; T_j = 125 °C	I_L	typ.	10	mA
Holding current; T_j = 25 °C	I_H	<	5.0	mA [1]

GATE TO CATHODE

Voltages

Voltage that will trigger all devices; T_j = 25 °C	V_{GT}	>	2.0	V
Voltage that will not trigger any device; T_j = 125 °C	V_{GD}	<	200	mV

Current

Current that will trigger all devices; T_j = 25 °C	I_{GT}	>	5.0	mA

SWITCHING CHARACTERISTICS

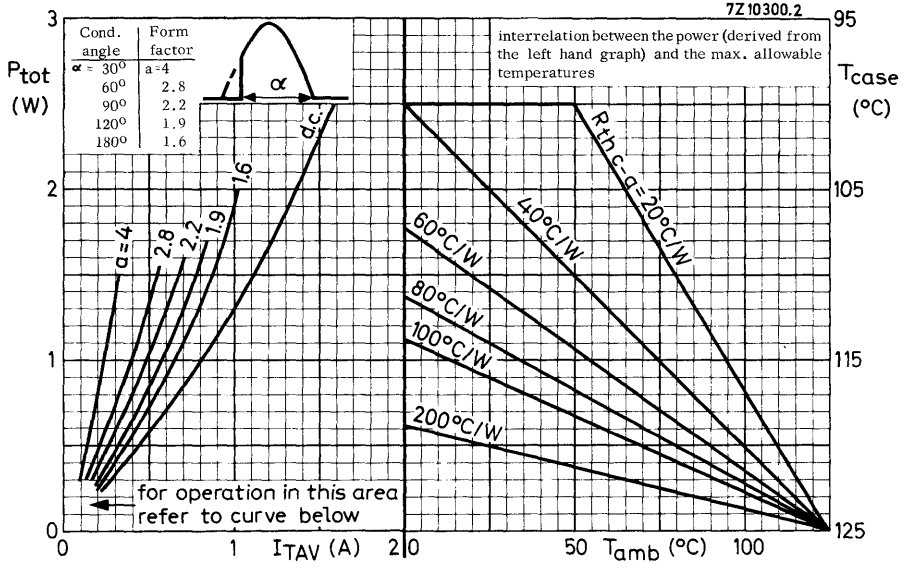
Turn off time when switched from

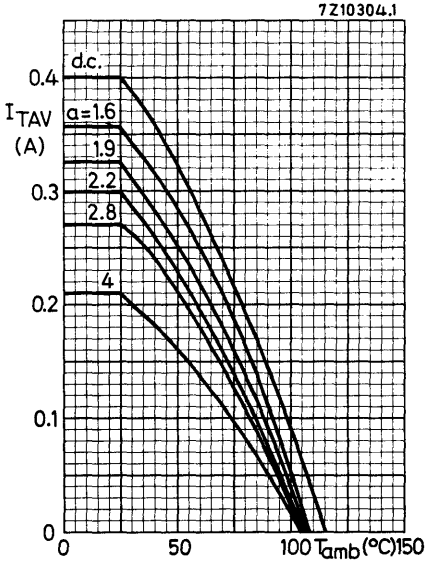
I_T = 300 mA to I_R = 175 mA; T_j = 25 °C	t_q	typ.	20	µs
T_j = 125 °C	t_q	typ.	35	µs

NOTES

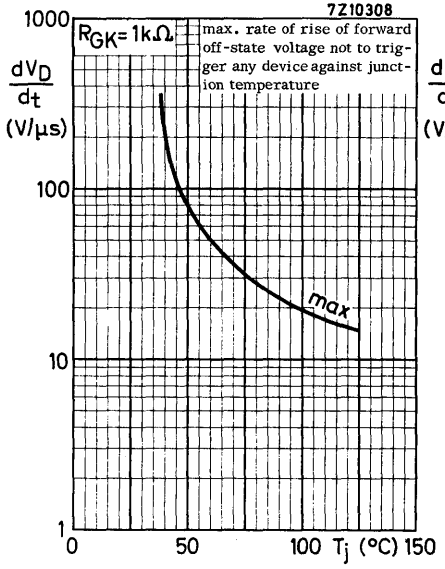
1. When using a soldering iron the thyristor may be soldered directly into the circuit, but the heat conduction to the junction should be kept to a minimum by using a thermal shunt.
2. Thyristors may be dip soldered at a solder temperature of 245 °C, for a maximum soldering time of 5 seconds. The case temperature during dip soldering must not at any time exceed the maximum storage temperature. These recommendations apply to a thyristor mounted flush on a board with punched-through holes, or spaced 1.5 mm above a board having plated-through holes.
3. Care should be taken not to bend the leads nearer than 1.5 mm from the seal.

[1] Measured under the following conditions: Anode supply voltage = +6.0 V.
Initial on-state current after gate triggering = 50 mA.
The current is reduced until the device turns of.

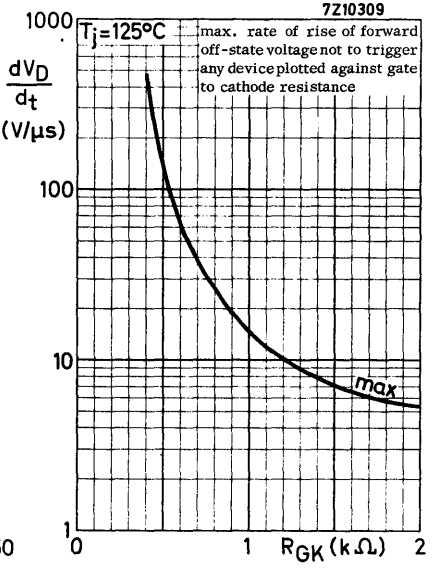

7Z10300.2
Cond. angle
Form factor
α = 30° a=4
60° 2.8
90° 2.2
120° 1.9
180° 1.6
α
d.c.
1.6
1.9
2.2
2.8
a=4
for operation in this area refer to curve below
Ptot (W)
ITAV (A)
interrelation between the power (derived from the left hand graph) and the max. allowable temperatures
Rth c-a=20°C/W
40°C/W
60°C/W
80°C/W
100°C/W
200°C/W
Tcase (°C)
Tamb (°C)


7Z10304.1
d.c.
a=1.6
1.9
2.2
2.8
4
ITAV (A)
Tamb (°C)

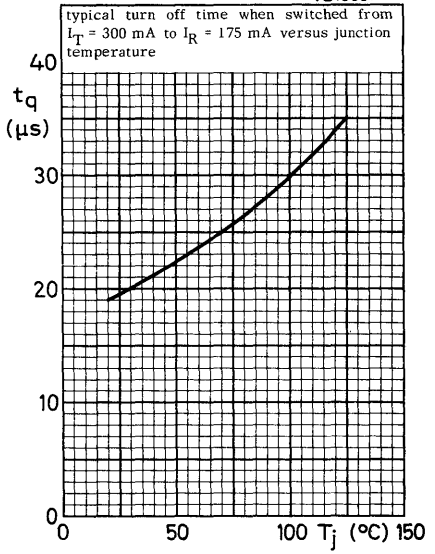
7Z10308

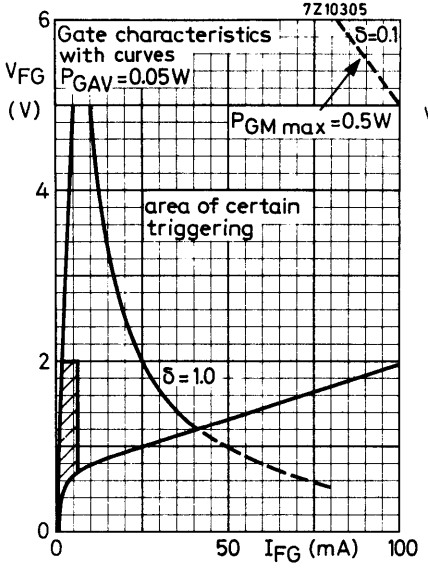


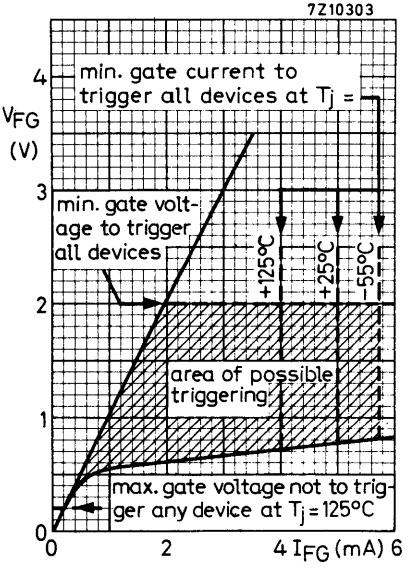
7Z10309

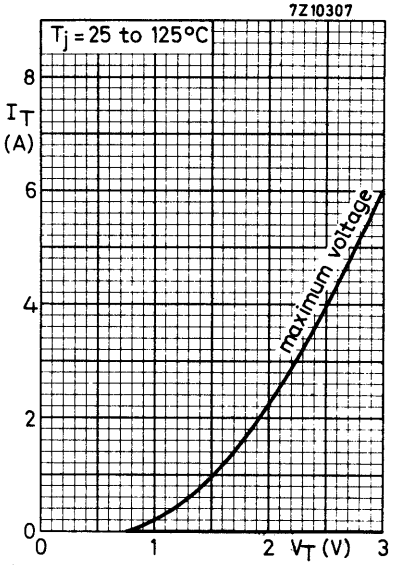


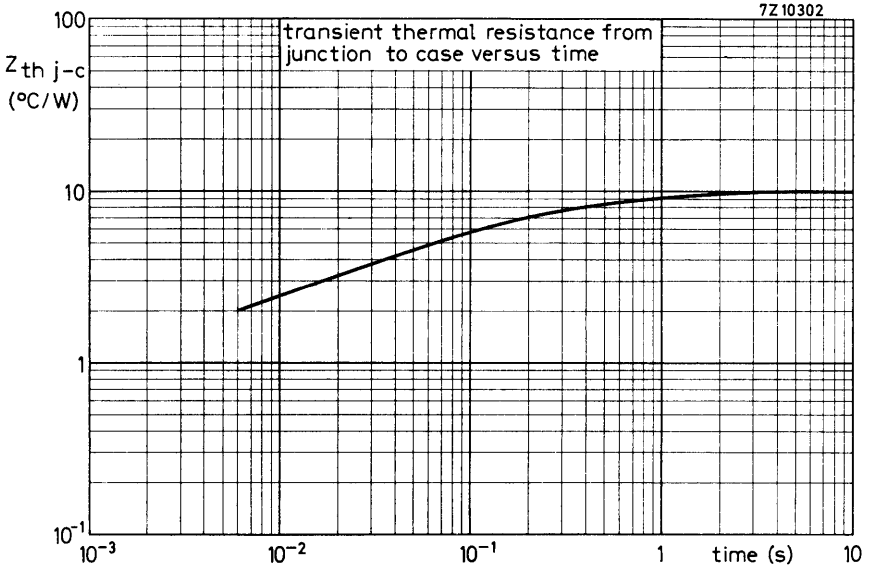
7Z10301

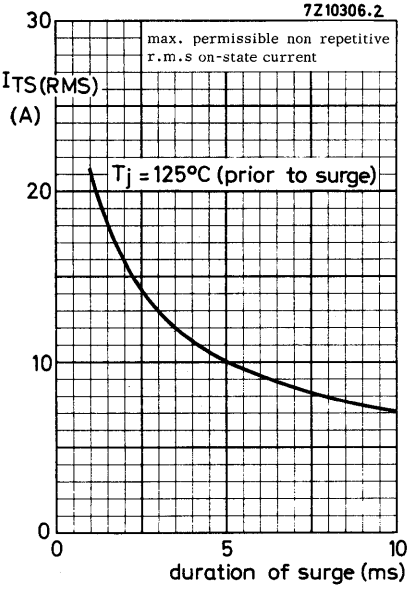



7Z10305
Gate characteristics with curves P_{GAV}=0.05W
δ=0.1
$P_{GM\ max}$=0.5W
area of certain triggering
δ=1.0
V_{FG} (V)
I_{FG} (mA)
0
50
100
2
4
6


7Z10303
min. gate current to trigger all devices at T_j =
min. gate voltage to trigger all devices
+125°C
+25°C
−55°C
area of possible triggering
max. gate voltage not to trigger any device at T_j=125°C
V_{FG} (V)
I_{FG} (mA)
0
2
4
6
1
3


7Z10307
T_j = 25 to 125°C
maximum voltage
I_T (A)
V_T (V)
0
1
2
3
4
6
8


7Z10302
transient thermal resistance from junction to case versus time
Z th j-c (°C/W)
100
10
1
10⁻¹
10⁻³
10⁻²
10⁻¹
1
10
time (s)


7Z10306.2
max. permissible non repetitive r.m.s on-state current
ITS(RMS) (A)
Tj = 125°C (prior to surge)
30
20
10
0
0
5
10
duration of surge (ms)