



DISCRETE POWER DIODES and THYRISTORS
DATA BOOK



ST183C..C SERIES

INVERTER GRADE THYRISTORS

Hockey Puk Version

Features

- Metal case with ceramic insulator
- International standard case TO-200AB (A-PUK)
- All diffused design
- Center amplifying gate
- Guaranteed high dV/dt
- Guaranteed high dI/dt
- High surge current capability
- Low thermal impedance
- High speed performance

370A

Typical Applications

- Inverters
- Choppers
- Induction heating
- All types of force-commutated converters



case style TO-200AB (A-PUK)

Major Ratings and Characteristics

Parameters	ST183C..C	Units
$I_{T(AV)}$	370	A
@ T_{hs}	55	°C
$I_{T(RMS)}$	690	A
@ T_{hs}	25	°C
I_{TSM} @ 50Hz	4900	A
@ 60Hz	5130	A
I^2t @ 50Hz	120	KA ² s
@ 60Hz	110	KA ² s
V_{DRM}/V_{RRM}	400 to 800	V
t_q range	10 to 20	μs
T_J	- 40 to 125	°C

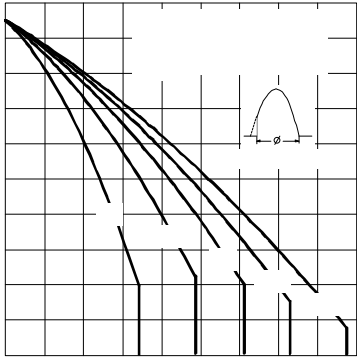


Fig. 3 - Current Ratings Characteristics

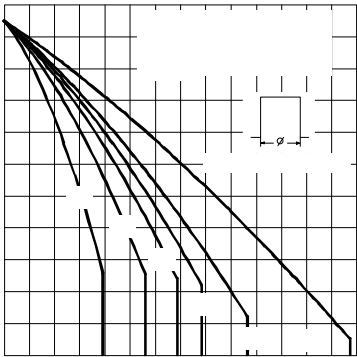


Fig. 4 - Current Ratings Characteristics

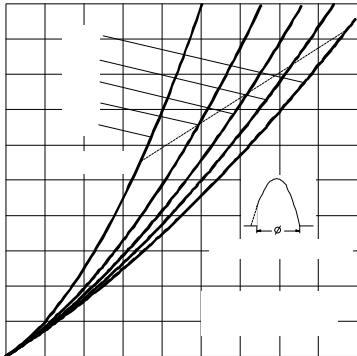


Fig. 5 - On-state Power Loss Characteristics

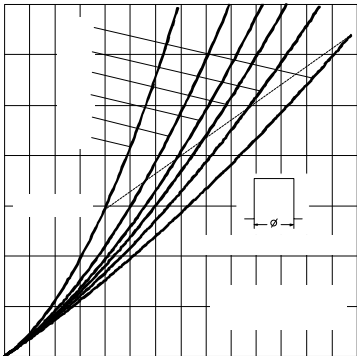


Fig. 6 - On-state Power Loss Characteristics

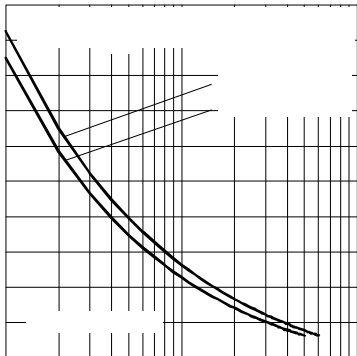


Fig. 7 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

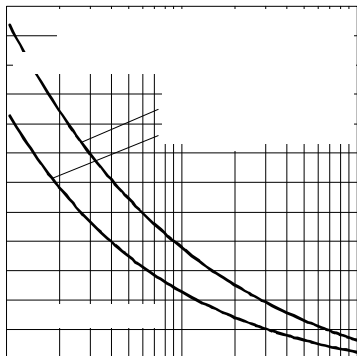


Fig. 8 - Maximum Non-repetitive Surge Current
Single and Double Side Cooled

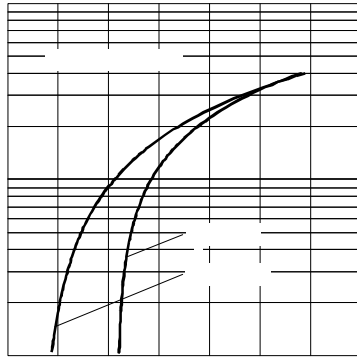


Fig. 9 - On-state Voltage Drop Characteristics

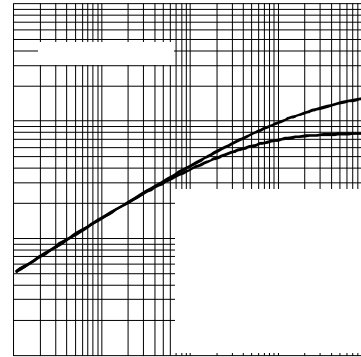


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

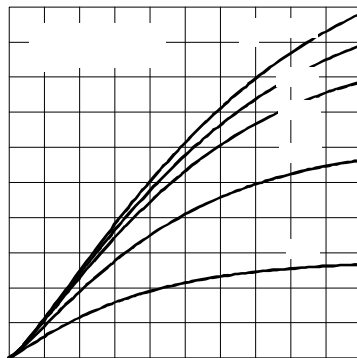


Fig. 11 - Reverse Recovered Charge Characteristics

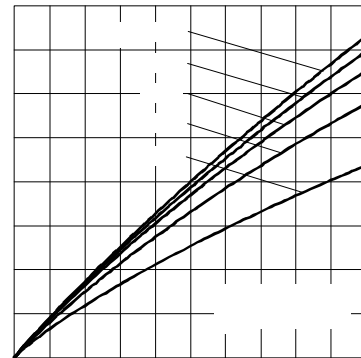


Fig. 12 - Reverse Recovery Current Characteristics

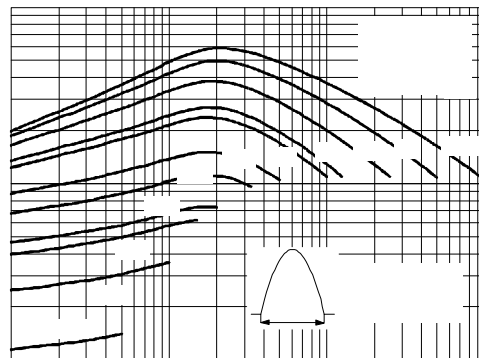
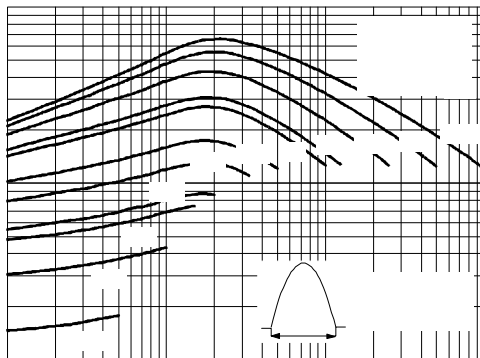


Fig. 13 - Frequency Characteristics

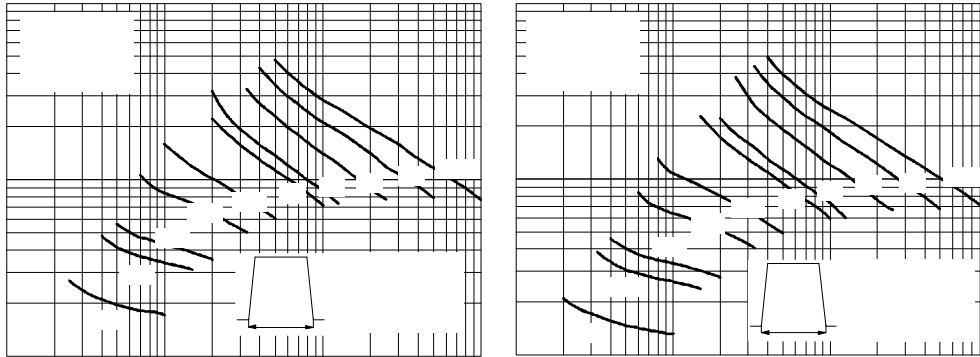


Fig. 14 - Frequency Characteristics

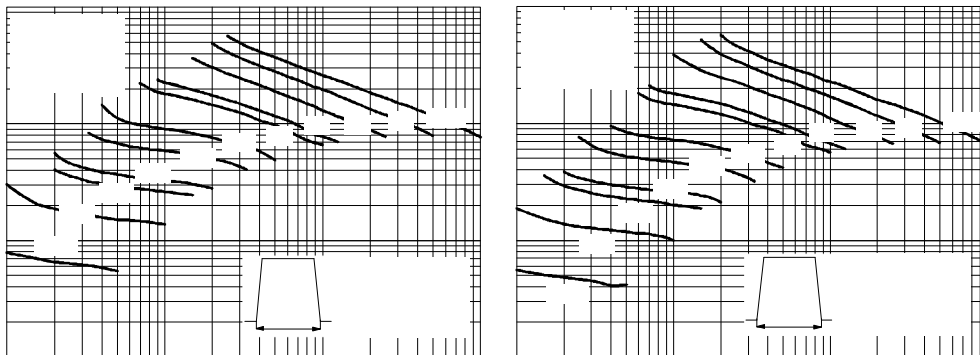


Fig. 15 - Frequency Characteristics

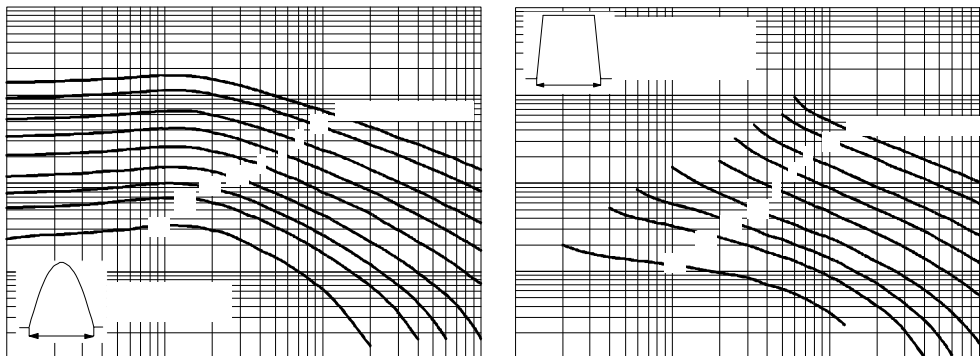


Fig. 16 - Maximum On-state Energy Power Loss Characteristics

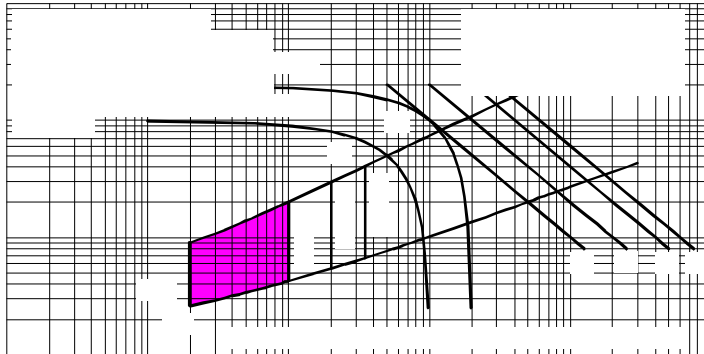


Fig. 17 - Gate Characteristics

On-state Conduction

Parameter	ST183C..C	Units	Conditions
V_{TM} Max. peak on-state voltage	1.80	V	$I_{TM} = 600A$, $T_J = T_J \text{ max}$, $t_p = 10\text{ms}$ sine wave pulse
$V_{T(TO)1}$ Low level value of threshold voltage	1.40		$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$, $T_J = T_J \text{ max}$.
$V_{T(TO)2}$ High level value of threshold voltage	1.45		$(I > \pi \times I_{T(AV)})$, $T_J = T_J \text{ max}$.
r_{t1} Low level value of forward slope resistance	0.67	mΩ	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$, $T_J = T_J \text{ max}$.
r_{t2} High level value of forward slope resistance	0.58		$(I > \pi \times I_{T(AV)})$, $T_J = T_J \text{ max}$.
I_H Maximum holding current	600	mA	$T_J = 25^\circ\text{C}$, $I_T > 30A$
I_L Typical latching current	1000		$T_J = 25^\circ\text{C}$, $V_A = 12V$, $R_a = 6\Omega$, $I_G = 1A$

Switching

Parameter	ST183C..C	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	1000	A/μs	$T_J = T_J \text{ max}$, $V_{DRM} = \text{rated } V_{DRM}$ $I_{TM} = 2 \times di/dt$
t_d Typical delay time	1.1	μs	$T_J = 25^\circ\text{C}$, $V_{DM} = \text{rated } V_{DRM}$, $I_{TM} = 50A$ DC, $t_p = 1\mu\text{s}$ Resistive load, Gate pulse: 10V, 5Ω source
t_q Max. turn-off time	Min 10 Max 20		$T_J = T_J \text{ max}$, $I_{TM} = 300A$, commutating $di/dt = 20A/\mu\text{s}$ $V_R = 50V$, $t_p = 500\mu\text{s}$, dv/dt : see table in device code

Blocking

Parameter	ST183C..C	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/μs	$T_J = T_J \text{ max}$. linear to 80% V_{DRM} , higher value available on request
I_{RRM} I_{DRM} Max. peak reverse and off-state leakage current	40	mA	$T_J = T_J \text{ max}$, rated V_{DRM}/V_{RRM} applied

Triggering

Parameter	ST183C..C	Units	Conditions
P_{GM} Maximum peak gate power	60	W	$T_J = T_J \text{ max}$, $f = 50\text{Hz}$, $d\% = 50$
$P_{G(AV)}$ Maximum average gate power	10		
I_{GM} Max. peak positive gate current	10	A	$T_J = T_J \text{ max}$, $t_p \leq 5\text{ms}$
$+V_{GM}$ Maximum peak positive gate voltage	20	V	$T_J = T_J \text{ max}$, $t_p \leq 5\text{ms}$
$-V_{GM}$ Maximum peak negative gate voltage	5		
I_{GT} Max. DC gate current required to trigger	200	mA	$T_J = 25^\circ\text{C}$, $V_A = 12V$, $R_a = 6\Omega$
V_{GT} Max. DC gate voltage required to trigger	3	V	
I_{GD} Max. DC gate current not to trigger	20	mA	$T_J = T_J \text{ max}$, rated V_{DRM} applied
V_{GD} Max. DC gate voltage not to trigger	0.25	V	

ST183C..C Series

Thermal and Mechanical Specification

Parameter	ST183C..C	Units	Conditions
T_J Max. operating temperature range	-40 to 125	°C	
T_{stg} Max. storage temperature range	-40 to 150		
R_{thJ-hs} Max. thermal resistance, junction to heatsink	0.17 0.08	K/W	DC operation single side cooled DC operation double side cooled
R_{thC-hs} Max. thermal resistance, case to heatsink	0.033 0.017	K/W	DC operation single side cooled DC operation double side cooled
F Mounting force, $\pm 10\%$	4900 (500)	N (Kg)	
wt Approximate weight	50	g	
Case style	TO - 200AB (A-PUK)		See Outline Table

ΔR_{thJ-hs} Conduction

(The following table shows the increment of thermal resistance R_{thJ-hs} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction		Rectangular conduction		Units	Conditions
	Single Side	Double Side	Single Side	Double Side		
180°	0.015	0.016	0.011	0.011	K/W	$T_J = T_{J \text{ max.}}$
120°	0.018	0.019	0.019	0.019		
90°	0.024	0.024	0.026	0.026		
60°	0.035	0.035	0.036	0.037		
30°	0.060	0.060	0.060	0.061		

Ordering Information Table

Device Code <table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td>ST</td><td>18</td><td>3</td><td>C</td><td>08</td><td>C</td><td>H</td><td>K</td><td>1</td><td></td></tr> </table> 12345678910										ST	18	3	C	08	C	H	K	1	
ST	18	3	C	08	C	H	K	1											
1 - Thyristor																			
2 - Essential part number																			
3 - 3 = Fast turn off																			
4 - C = Ceramic Puk																			
5 - Voltage code: Code x 100 = V_{RRM} (See Voltage Rating Table)																			
6 - C = Puk Case TO-200AB (A-PUK)																			
7 - Reapplied dv/dt code (for t_q test condition)																			
8 - t_q code																			
9 - 0 = Eyelet term. (Gate and Aux. Cathode Unsoldered Leads)																			
1 = Fast-on term. (Gate and Aux. Cathode Unsoldered Leads)																			
2 = Eyelet term. (Gate and Aux. Cathode Soldered Leads)																			
3 = Fast-on term. (Gate and Aux. Cathode Soldered Leads)																			
10 - Critical dv/dt:																			
None = 500V/ μ sec (Standard value)																			
L = 1000V/ μ sec (Special selection)																			

dv/dt - t_q combinations available					
dv/dt (V/ μ s)	20	50	100	200	400
t_q (μ s)	10	CN	DN	EN	FN* HN
	12	CM	DM	EM	FM HM
	15	CL	DL	EL	FL* HL
	18	CP	DP	EP	FP HP
	20	CK	DK	EK	FK HK

*Standard part number.
All other types available only on request.

Outline Table

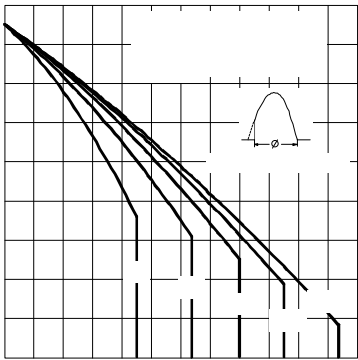
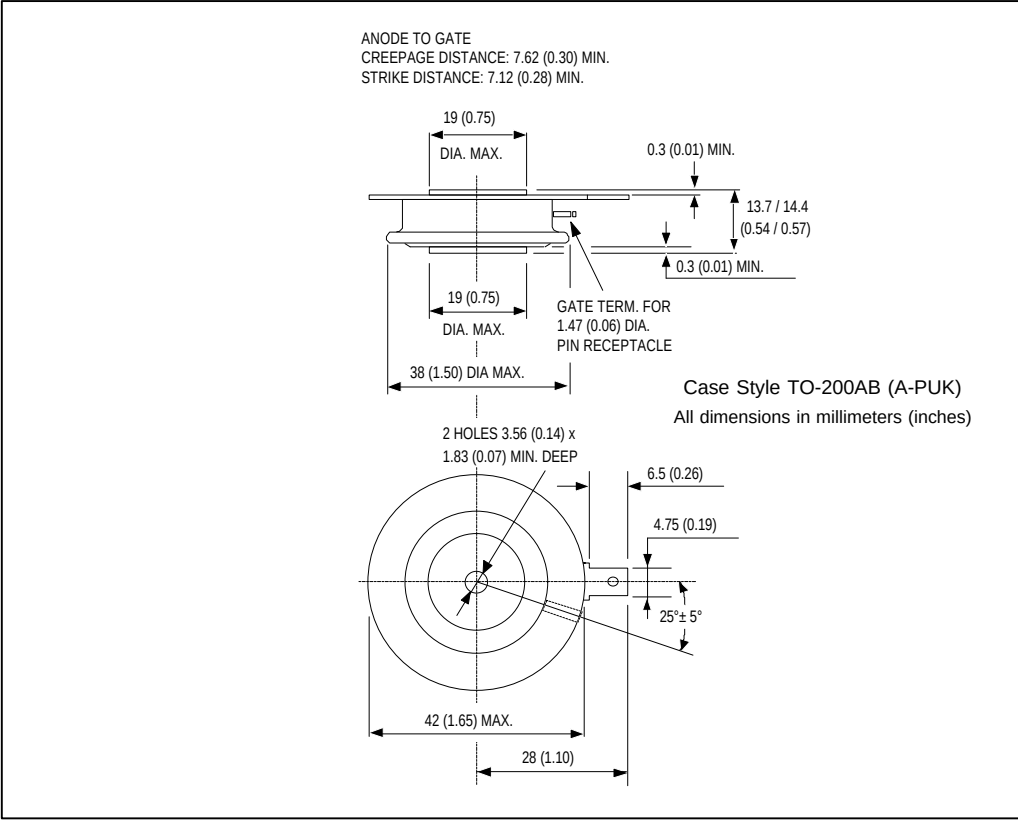


Fig. 1 - Current Ratings Characteristics

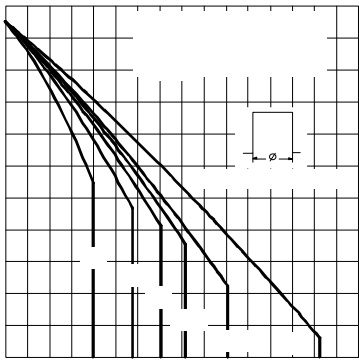


Fig. 2 - Current Ratings Characteristics