



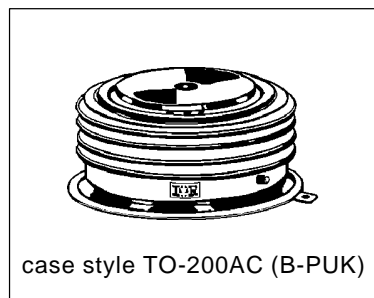
DISCRETE POWER DIODES and THYRISTORS
DATA BOOK

PHASE CONTROL THYRISTORS
Hockey Puk Version
Features

- Center amplifying gate
- Metal case with ceramic insulator
- International standard case TO-200AC (B-PUK)

560A
Typical Applications

- DC motor controls
- Controlled DC power supplies
- AC controllers



case style TO-200AC (B-PUK)

Major Ratings and Characteristics

Parameters	ST300C..L	Units	
$I_{T(AV)}$	560	A	
@ T_{hs}	55	°C	
$I_{T(RMS)}$	1115	A	
@ T_{hs}	25	°C	
I_{TSM}	@ 50Hz	8000	A
	@ 60Hz	8380	A
I^2t	@ 50Hz	320	KA ² s
	@ 60Hz	292	KA ² s
V_{DRM}/V_{RRM}	400 to 2000	V	
t_q	typical	100	μs
T_J	- 40 to 125	°C	

ST300C..L Series

ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{DRM}/V_{RRM} , max. repetitive peak and off-state voltage V	V_{RSM} , maximum non-repetitive peak voltage V	I_{DRM}/I_{RRM} max. @ $T_J = T_J$ max mA
ST300C..L	04	400	500	50
	08	800	900	
	12	1200	1300	
	16	1600	1700	
	18	1800	1900	
	20	2000	2100	

On-state Conduction

Parameter	ST300C..L	Units	Conditions		
$I_{T(AV)}$ Max. average on-state current @ Heatsink temperature	560 (275)	A	180° conduction, half sine wave double side (single side) cooled		
	55 (75)	°C			
$I_{T(RMS)}$ Max. RMS on-state current	1115	A	DC @ 25°C heatsink temperature double side cooled		
I_{TSM} Max. peak, one-cycle non-repetitive surge current	8000		t = 10ms	No voltage reappplied	
	8380		t = 8.3ms	Sinusoidal half wave, Initial $T_J = T_J$ max.	
	6730		t = 10ms		100% V_{RRM} reappplied
	7040		t = 8.3ms		reappplied
I^2t Maximum I^2t for fusing	320		KA ² s		t = 10ms
	292			t = 8.3ms	reappplied
	226			t = 10ms	100% V_{RRM} reappplied
	207	t = 8.3ms		reappplied	
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	3200	KA ² √s	t = 0.1 to 10ms, no voltage reappplied		
$V_{T(TO)1}$ Low level value of threshold voltage	0.97	V	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$, $T_J = T_J$ max.		
$V_{T(TO)2}$ High level value of threshold voltage	0.98		$(I > \pi \times I_{T(AV)})$, $T_J = T_J$ max.		
r_{t1} Low level value of on-state slope resistance	0.74	mΩ	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$, $T_J = T_J$ max.		
r_{t2} High level value of on-state slope resistance	0.73		$(I > \pi \times I_{T(AV)})$, $T_J = T_J$ max.		
V_{TM} Max. on-state voltage	2.18	V	$I_{pk} = 1635A$, $T_J = T_J$ max, $t_p = 10ms$ sine pulse		
I_H Maximum holding current	600	mA	$T_J = 25^\circ C$, anode supply 12V resistive load		
I_L Typical latching current	1000				

ST300C..L Series

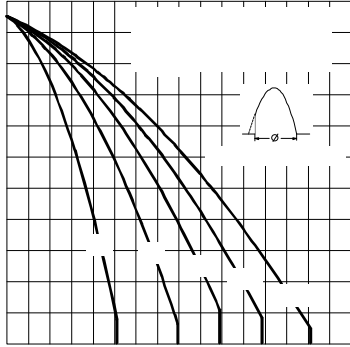


Fig. 3 - Current Ratings Characteristics

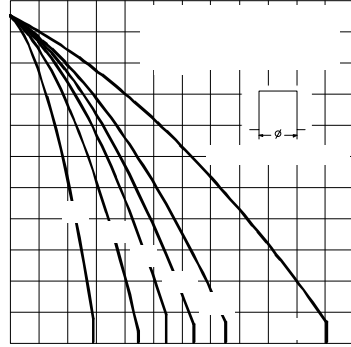


Fig. 4 - Current Ratings Characteristics

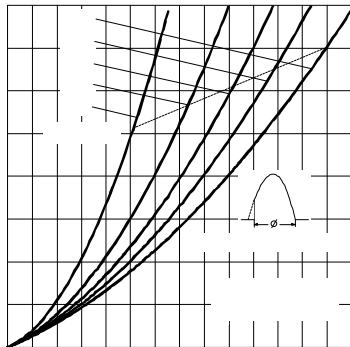


Fig. 5 - On-state Power Loss Characteristics

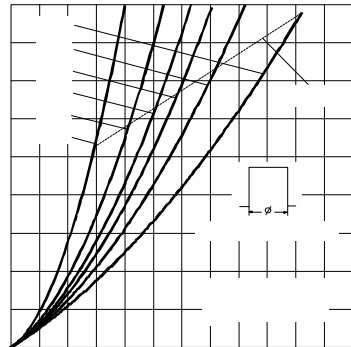


Fig. 6 - On-state Power Loss Characteristics

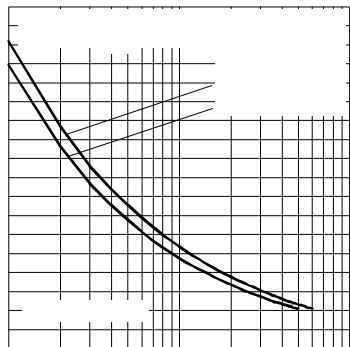


Fig. 7 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

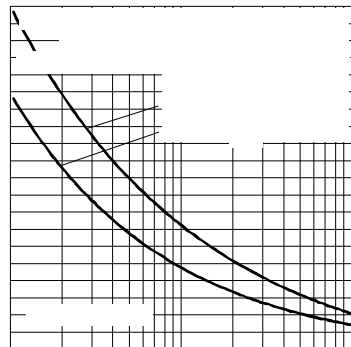


Fig. 8 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

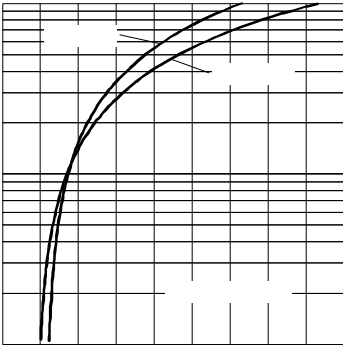


Fig. 9 - On-state Voltage Drop Characteristics

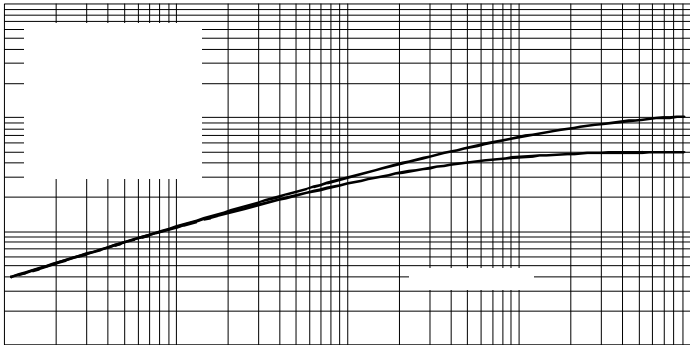


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

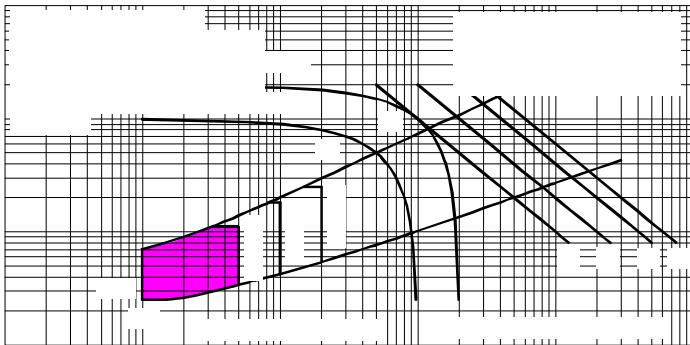


Fig. 11 - Gate Characteristics

Switching

Parameter	ST300C..L	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	1000	A/ μ s	Gate drive 20V, 20 Ω , $t_r \leq 1\mu$ s $T_J = T_J$ max, anode voltage $\leq 80\% V_{DRM}$
t_d Typical delay time	1.0	μ s	Gate current 1A, $di_g/dt = 1A/\mu$ s $V_d = 0.67\% V_{DRM}$, $T_J = 25^\circ$ C
t_q Typical turn-off time	100		$I_{TM} = 550A$, $T_J = T_J$ max, $di/dt = 40A/\mu$ s, $V_R = 50V$ $dv/dt = 20V/\mu$ s, Gate 0V 100 Ω , $t_p = 500\mu$ s

Blocking

Parameter	ST300C..L	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/ μ s	$T_J = T_J$ max, linear to 80% rated V_{DRM}
I_{RRM} I_{DRM} Max. peak reverse and off-state leakage current	50	mA	$T_J = T_J$ max, rated V_{DRM}/V_{RRM} applied

Triggering

Parameter	ST300C..L		Units	Conditions
P_{GM} Maximum peak gate power	10.0		W	$T_J = T_J$ max, $t_p \leq 5$ ms
$P_{G(AV)}$ Maximum average gate power	2.0			$T_J = T_J$ max, $f = 50$ Hz, $d\% = 50$
I_{GM} Max. peak positive gate current	3.0		A	$T_J = T_J$ max, $t_p \leq 5$ ms
$+V_{GM}$ Maximum peak positive gate voltage	20		V	$T_J = T_J$ max, $t_p \leq 5$ ms
$-V_{GM}$ Maximum peak negative gate voltage	5.0			
I_{GT} DC gate current required to trigger	TYP.	MAX.	mA	$T_J = -40^\circ$ C $T_J = 25^\circ$ C $T_J = 125^\circ$ C Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied
	200	-		
	100	200		
V_{GT} DC gate voltage required to trigger	50	-	V	$T_J = -40^\circ$ C $T_J = 25^\circ$ C $T_J = 125^\circ$ C
	2.5	-		
	1.8	3.0		
I_{GD} DC gate current not to trigger	10.0		mA	$T_J = T_J$ max
	0.25			
V_{GD} DC gate voltage not to trigger	0.25		V	Max. gate current/voltage not to trigger is the max. value which will not trigger any unit with rated V_{DRM} anode-to-cathode applied

ST300C..L Series

Thermal and Mechanical Specification

Parameter	ST300C..L	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	0.11 0.05	K/W	DC operation single side cooled DC operation double side cooled
R _{thC-hs} Max. thermal resistance, case to heatsink	0.011 0.006	K/W	DC operation single side cooled DC operation double side cooled
F Mounting force, ± 10%	9800 (1000)	N (Kg)	
wt Approximate weight	250	g	
Case style	TO - 200AC (B-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°	0.012	0.010	0.008	0.008	K/W	T _J = T _J max.
120°	0.014	0.015	0.014	0.014		
90°	0.018	0.018	0.019	0.019		
60°	0.026	0.027	0.027	0.028		
30°	0.045	0.046	0.046	0.046		

Ordering Information Table

Device Code							
ST	30	0	C	20	L	1	
①	②	③	④	⑤	⑥	⑦	⑧
1	- Thyristor	2	- Essential part number	3	- 0 = Converter grade	4	- C = Ceramic Puk
5	- Voltage code: Code x 100 = V _{RRM} (See Voltage Rating Table)	6	- L = Puk Case TO-200AC (B-PUK)	7	- 0 = Eyelet terminals (Gate and Auxiliary Cathode Unsoldered Leads) 1 = Fast-on terminals (Gate and Auxiliary Cathode Unsoldered Leads) 2 = Eyelet terminals (Gate and Auxiliary Cathode Soldered Leads) 3 = Fast-on terminals (Gate and Auxiliary Cathode Soldered Leads)	8	- Critical dv/dt: None = 500V/μsec (Standard value) L = 1000V/μsec (Special selection)

Outline Table

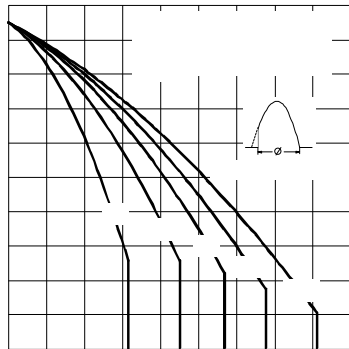
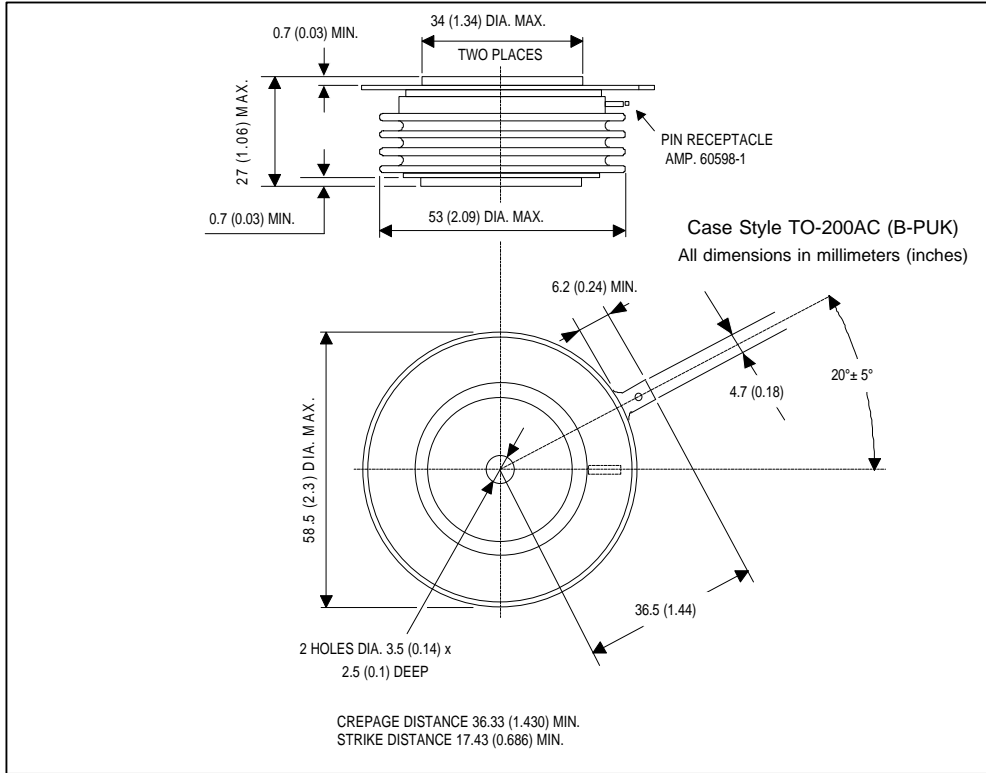


Fig. 1 - Current Ratings Characteristics

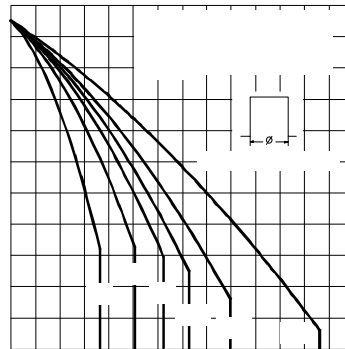


Fig. 2 - Current Ratings Characteristics