
DISCRETE POWER DIODES and THYRISTORS
DATA BOOK



ST700C..L SERIES

PHASE CONTROL THYRISTORS

Hockey Puk Version

Features

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

Typical Applications

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

Major Ratings and Characteristics

Parameters	ST700C..L	Units
$I_{T(AV)}$	910	A
@ T_{hs}	55	°C
$I_{T(RMS)}$	1857	A
@ T_{hs}	25	°C
I_{TSM} @ 50Hz	15700	A
@ 60Hz	16400	A
I^2t @ 50Hz	1232	KA ² s
@ 60Hz	1125	KA ² s
V_{DRM}/V_{RRM}	1200 to 2200	V
t_q typical	150	μs
T_J	- 40 to 125	°C

910A



case style TO-200AC (B-PUK)

ST700C..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. @ $T_J = T_J \text{ max}$ mA
ST700C..L	12	1200	1300	80
	16	1600	1700	
	18	1800	1900	
	20	2000	2100	
	22	2200	2300	

On-state Conduction

Parameter	ST700C..L	Units	Conditions
$I_{T(AV)}$ Max. average on-state current @ Heatsink temperature	910 (355)	A	180° conduction, half sine wave
	55 (85)	°C	double side (single side) cooled
$I_{T(RMS)}$ Max. RMS on-state current	1857	A	DC @ 25°C heatsink temperature double side cooled
I_{TSM} Max. peak, one-cycle non-repetitive surge current	15700		t = 10ms No voltage
	16400		t = 8.3ms reapplied
	13200		t = 10ms 100% V_{RRM}
	13800		t = 8.3ms reapplied
I^2t Maximum I^2t for fusing	1232	KA ² s	t = 10ms No voltage
	1125		t = 8.3ms reapplied
	871		t = 10ms 100% V_{RRM}
	795		t = 8.3ms reapplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	12321	KA ² √s	t = 0.1 to 10ms, no voltage reapplied
$V_{T(TO)1}$ Low level value of threshold voltage	1.00	V	(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	1.13		($I > \pi \times I_{T(AV)}$), $T_J = T_J \text{ max.}$
r_{t1} Low level value of on-state slope resistance	0.40	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 on-state slope resistance	0.35		($I > \pi \times I_{T(AV)}$), $T_J = T_J \text{ max.}$
V_{TM} Max. on-state voltage	1.80	V	$I_{pk} = 2000A$, $T_J = T_J \text{ max.}$, $t_p = 10ms$ 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		

Switching

Parameter	ST700C..L	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	1000	A/μs	Gate drive 20V, 20Ω, $t_r \leq 1\mu s$ $T_J = T_J \text{ max}$, anode voltage $\leq 80\% V_{DRM}$
t_d Typical delay time	1.0	μs	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	150		$I_{TM} = 750A$, $T_J = T_J \text{ max}$, $di/dt = 60A/\mu s$, $V_R = 50V$ $dv/dt = 20V/\mu s$, Gate 0V 100Ω, $t_p = 500\mu s$

Blocking

Parameter	ST700C..L	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% rated V_{DRM}
I_{DRM} I_{RRM} Max. peak reverse and off-state leakage current	80	mA	$T_J = T_J \text{ max}$, rated V_{DRM}/V_{RRM} applied

Triggering

Parameter		ST700C..L		Units	Conditions	
P _{GM}	Maximum peak gate power	10.0		W	T _J = T _J max, t _p ≤ 5ms	
P _{G(AV)}	Maximum average gate power	2.0			T _J = T _J max, f = 50Hz, d% = 50	
I _{GM}	Max. peak positive gate current	3.0		A	T _J = T _J max, t _p ≤ 5ms	
+V _{GM}	Maximum peak positive gate voltage	20		V	T _J = T _J max, t _p ≤ 5ms	
-V _{GM}	Maximum peak negative gate voltage	5.0				
I _{GT}	DC gate current required to trigger	TYP.	MAX.	mA	T _J = - 40°C T _J = 25°C T _J = 125°C Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied	
		200	-			
		100	200			
		50	-			
V _{GT}	DC gate voltage required to trigger	2.5	-	V	T _J = - 40°C T _J = 25°C T _J = 125°C	
		1.8	3.0			
		1.1	-			
I _{GD}	DC gate current not to trigger	10		mA	T _J = T _J max 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	
V _{GD}	DC gate voltage not to trigger	0.25		V		

ST700C..L Series

Thermal and Mechanical Specification

Parameter	ST700C..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	0.073 0.031	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%	14700 (1500)	N (Kg)	
wt Approximate weight	255	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°	0.009	0.009	0.006	0.006	K/W	T _J = T _J max.
120°	0.011	0.011	0.011	0.011		
90°	0.014	0.014	0.015	0.015		
60°	0.020	0.020	0.021	0.021		
30°	0.036	0.036	0.036	0.036		

Ordering Information Table

Device Code							
ST700C22L1 12345678							
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 selection) L = 1000V/μsec (Special selection)					

Outline Table

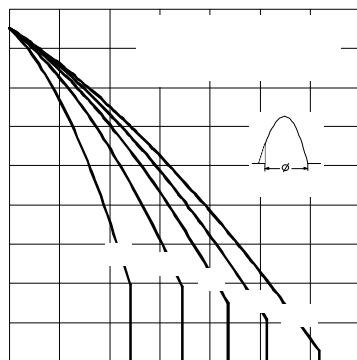
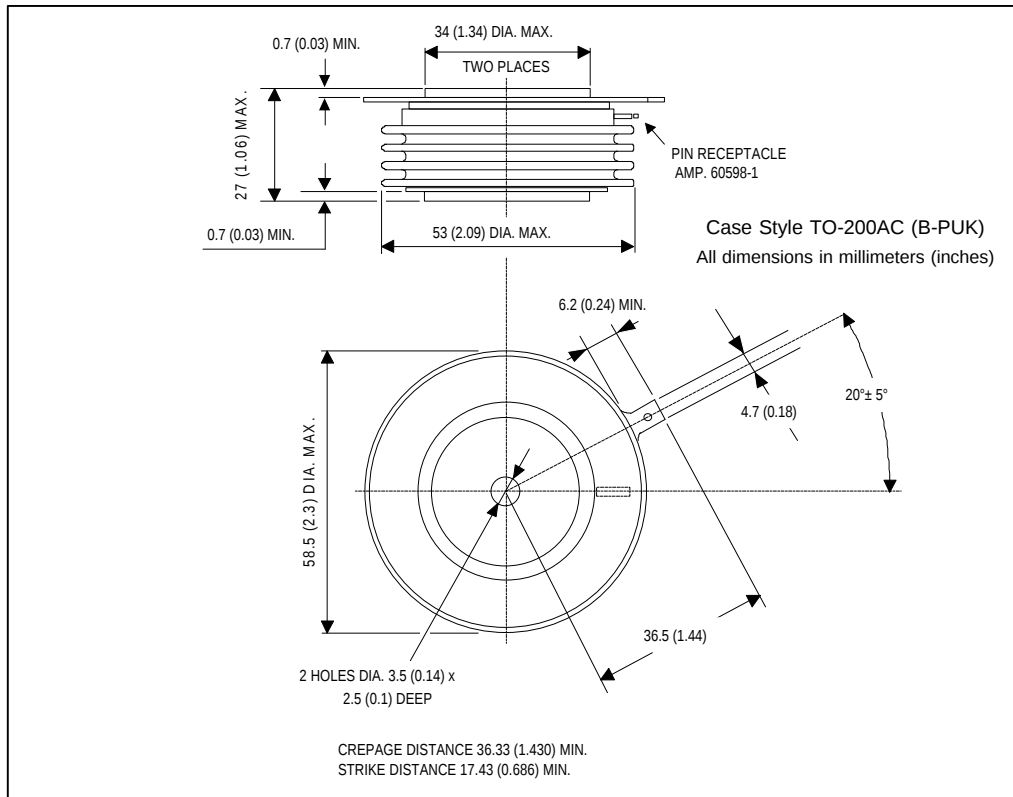


Fig. 1 - Current Ratings Characteristics

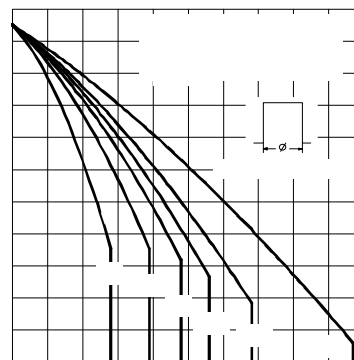


Fig. 2 - Current Ratings Characteristics