

International
IR Rectifier

ST730C..L SERIES

PHASE CONTROL THYRISTORS

Hockey Puk Version

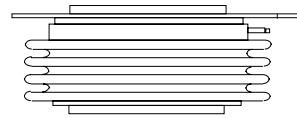
Features

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

990A

Typical Applications

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



case style TO-200AC (B-PUK)

Major Ratings and Characteristics

Parameters	ST730C..L	Units
$I_{T(AV)}$	990	A
@ T_{hs}	55	°C
$I_{T(RMS)}$	2000	A
@ T_{hs}	25	°C
I_{TSM} @ 50Hz	17800	A
@ 60Hz	18700	A
I^2t @ 50Hz	1591	KA ² s
@ 60Hz	1452	KA ² s
V_{DRM}/V_{RRM}	800 to 2000	V
t_q typical	150	μs
T_J	- 40 to 125	°C

ST730C..L Series

Bulletin I25191 rev. D 04/03

International
IR Rectifier

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
ST730C..L	08	800	900	80
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	
	18	1800	1900	
	20	2000	2100	

On-state Conduction

Parameter	ST730C..L	Units	Conditions
$I_{T(AV)}$ Max. average on-state current @ Heatsink temperature	990 (375) 55 (85)	A °C	180° conduction, half sine wave double side (single side) cooled
$I_{T(RMS)}$ Max. RMS on-state current	2000		DC @ 25°C heatsink temperature double side cooled
I_{TSM} Max. peak, one-cycle non-repetitive surge current	17800	A	t = 10ms No voltage
	18700		t = 8.3ms reappplied
	15000		t = 10ms 100% V_{RRM}
	15700		t = 8.3ms reappplied
I^2t Maximum I^2t for fusing	1591	KA ² s	t = 10ms No voltage
	1452		t = 8.3ms reappplied
	1125		t = 10ms 100% V_{RRM}
	1027		t = 8.3ms reappplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	15910	KA ² √s	t = 0.1 to 10ms, no voltage reappplied
$V_{T(TO)1}$ Low level value of threshold voltage	0.98	V	(16.7% x π x $I_{T(AV)}$) < I < π x $I_{T(AV)}$, $T_J = T_J \text{ max}$.
$V_{T(TO)2}$ High level value of threshold voltage	1.12		(I > π x $I_{T(AV)}$), $T_J = T_J \text{ max}$.
r_{t1} Low level value of on-state slope resistance	0.32	mΩ	(16.7% x π x $I_{T(AV)}$) < I < π x $I_{T(AV)}$, $T_J = T_J \text{ max}$.
r_{t2} High level value of on-state slope resistance	0.27		(I > π x $I_{T(AV)}$), $T_J = T_J \text{ max}$.
V_{TM} Max. on-state voltage	1.62	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	ST730C..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	ST730C..L	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/ μ s	$T_J = T_J \text{ max. linear to } 80\% \text{ rated } V_{\text{DRM}}$
I_{DRM} I_{RRM} Max. peak reverse and off-state leakage current	80	mA	$T_J = T_J \text{ max, rated } V_{\text{DRM}}/V_{\text{RRM}} \text{ applied}$

Triggering

Parameter	ST730C..L	Units	Conditions
P_{GM} Maximum peak gate power	10.0	W	$T_J = T_J \text{ max, } t_p \leq 5\text{ms}$
$P_{\text{G(AV)}}$ Maximum average gate power	2.0		$T_J = T_J \text{ max, } f = 50\text{Hz, } d\% = 50$
I_{GM} Max. peak positive gate current	3.0	A	$T_J = T_J \text{ max, } t_p \leq 5\text{ms}$
$+V_{\text{GM}}$ Maximum peak positive gate voltage	20	V	$T_J = T_J \text{ max, } t_p \leq 5\text{ms}$
$-V_{\text{GM}}$ Maximum peak negative gate voltage	5.0		
I_{GT} DC gate current required to trigger	TYP. 200	mA	$T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 12V anode-to-cathode applied
	-		
	100 50		
V_{GT} DC gate voltage required to trigger	2.5	V	$T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
	1.8		
	1.1		
I_{GD} DC gate current not to trigger	10	mA	$T_J = T_J \text{ max}$ 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	

Thermal and Mechanical Specification

Parameter	ST730C..L	Units	Conditions
T_J Max. operating temperature range	-40 to 125	$^\circ\text{C}$	
T_{stg} Max. storage temperature range	-40 to 150		
$R_{\text{thJ-hs}}$ Max. thermal resistance, junction to heatsink	0.073 0.031	K/W	DC operation single side cooled DC operation double side cooled
$R_{\text{thC-hs}}$ 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, $\pm 10\%$	14700 (1500)	N (Kg)	
wt Approximate weight	255	g	
Case style	TO-200AC (B-PUK)		See Outline Table

ST730C..L Series

Bulletin I25191 rev. D 04/03

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	$T_J = T_{J \text{ max.}}$
120°	0.011	0.011	0.010	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

ST	73	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/ μ sec (Standard selection)
L = 1000V/ μ sec (Special selection)

Outline Table

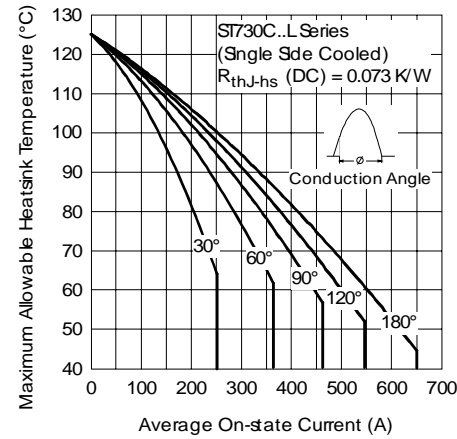
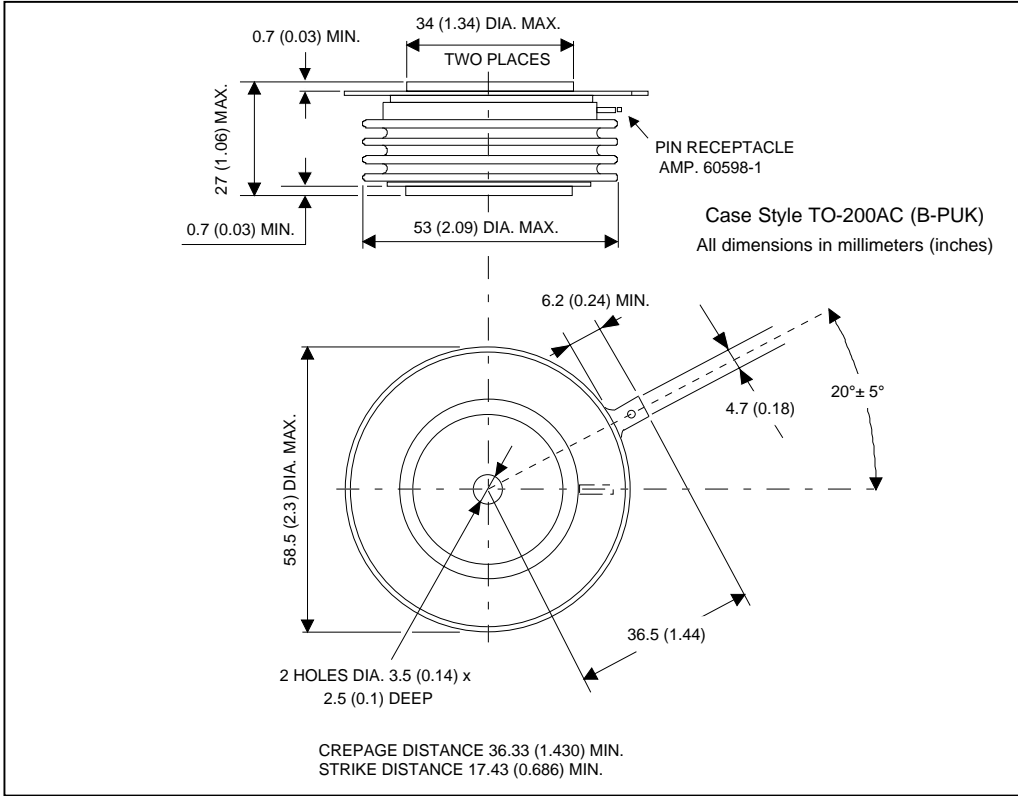


Fig. 1 - Current Ratings Characteristics

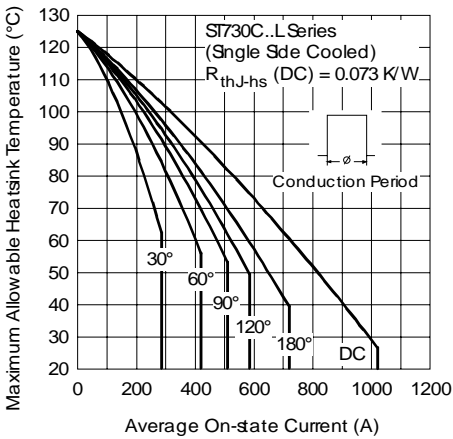


Fig. 2 - Current Ratings Characteristics

ST730C..L Series

Bulletin I25191 rev. D 04/03

International
IR Rectifier

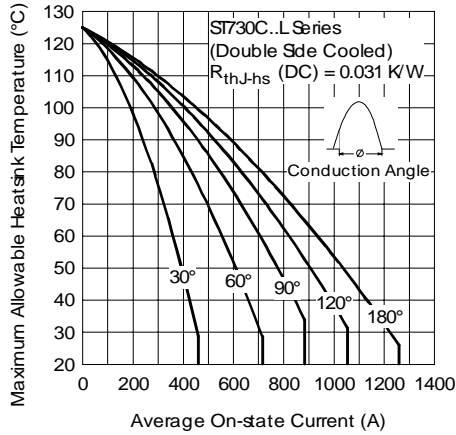


Fig. 3 - Current Ratings Characteristics

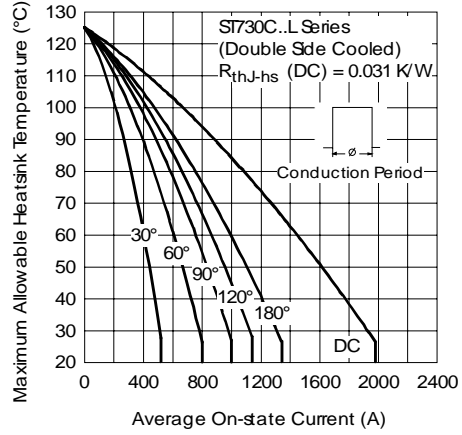


Fig. 4 - Current Ratings Characteristics

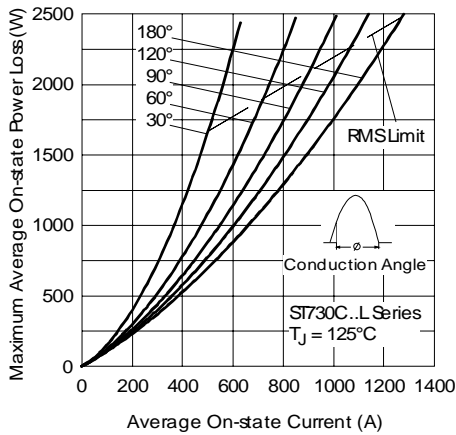


Fig. 5 - On-state Power Loss Characteristics

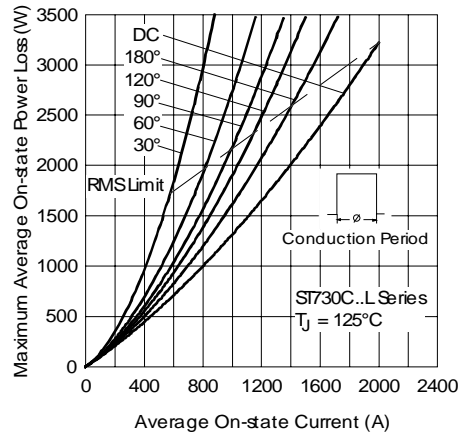


Fig. 6 - On-state Power Loss Characteristics

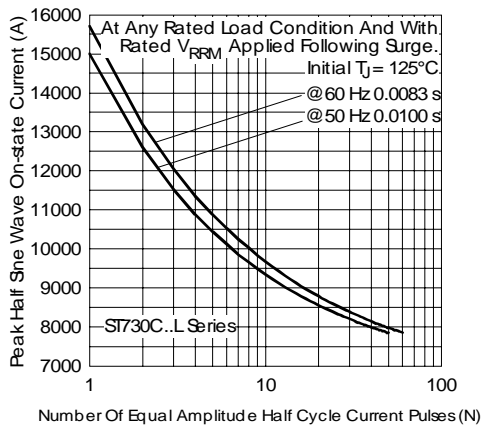


Fig. 7 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

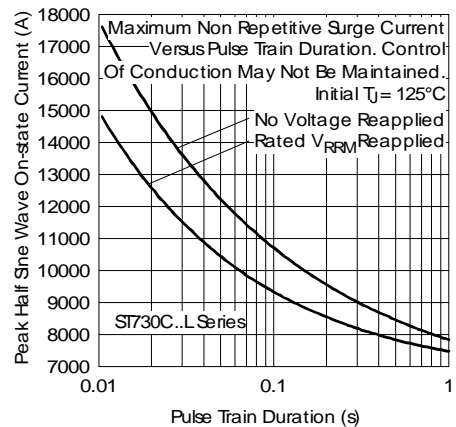


Fig. 8 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

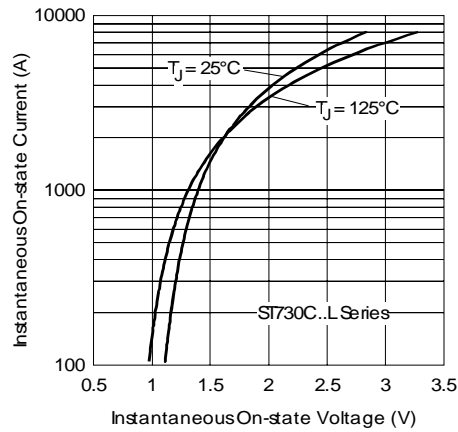


Fig. 9 - On-state Voltage Drop Characteristics

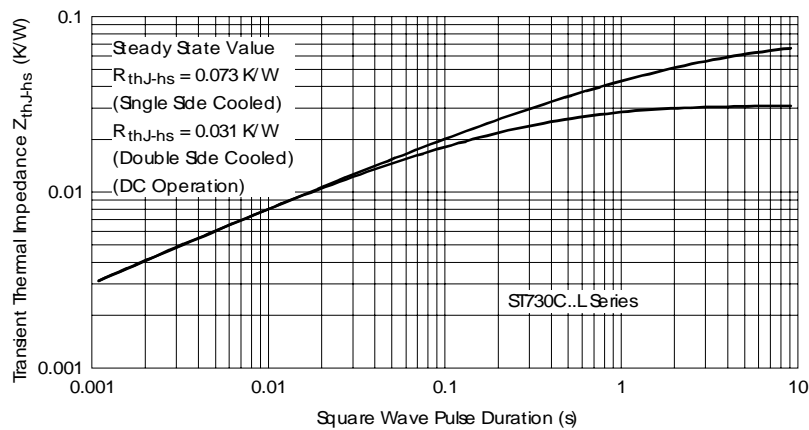


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

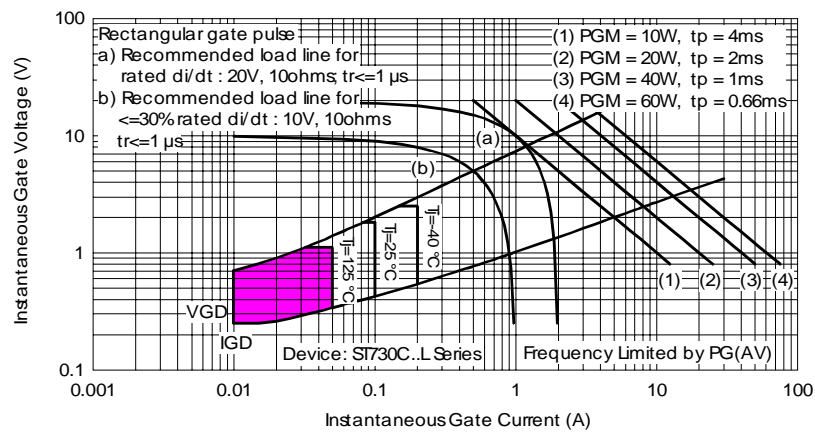


Fig. 11 - Gate Characteristics

ST730C..L Series

Bulletin I25191 rev. D 04/03

International
IOR Rectifier

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 04 /03