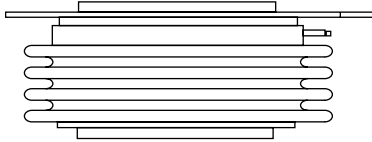


## Phase Control Thyristors (Hockey PUK Version), 990 A



TO-200AC (B-PUK)

**FEATURES**

- Center amplifying gate
- Metal case with ceramic insulator
- International standard case TO-200AC (B-PUK)
- Lead (Pb)-free
- Designed and qualified for industrial level


**RoHS  
COMPLIANT**
**PRODUCT SUMMARY**

$I_{T(AV)}$	990 A
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**TYPICAL APPLICATIONS**

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

**MAJOR RATINGS AND CHARACTERISTICS**

PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$		990	A
	$T_{hs}$	55	°C
$I_{T(RMS)}$		2000	A
	$T_{hs}$	25	°C
$I_{TSM}$	50 Hz	17 800	A
	60 Hz	18 700	
$I^2t$	50 Hz	1591	kA <sup>2</sup> s
	60 Hz	1452	
$V_{DRM}/V_{RRM}$		800 to 2000	V
$t_q$	Typical	150	µs
$T_J$		- 40 to 125	°C

**ELECTRICAL SPECIFICATIONS**
**VOLTAGE RATINGS**

TYPE NUMBER	VOLTAGE CODE	$V_{DRM}/V_{RRM}$ , MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK VOLTAGE V	$I_{DRM}/I_{RRM}$ MAXIMUM AT $T_J = T_J$ MAXIMUM mA
ST730C..L	08	800	900	80
	12	1200	1300	
	14	1400	1500	
	16	1600	1700	
	18	1800	1900	
	20	2000	2100	

ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current at heatsink temperature	$I_{T(AV)}$	180° conduction, half sine wave double side (single side) cooled		990 (375)	A
				55 (85)	°C
Maximum RMS on-state current	$I_{T(RMS)}$	DC at 25 °C heatsink temperature double side cooled		2000	
Maximum peak, one-cycle non-repetitive surge current	$I_{TSM}$	t = 10 ms	No voltage reapplied	17 800	A
		t = 8.3 ms		18 700	
		t = 10 ms	100 % $V_{RRM}$ reapplied	15 000	
		t = 8.3 ms		15 700	
Maximum $I^2t$ for fusing	$I^2t$	t = 10 ms	No voltage reapplied	1591	kA <sup>2</sup> s
		t = 8.3 ms		1452	
		t = 10 ms	100 % $V_{RRM}$ reapplied	1125	
		t = 8.3 ms		1027	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		15 910	kA <sup>2</sup> /s
Low level value of threshold voltage	$V_{T(TO)1}$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$ , $T_J = T_J$ maximum		0.98	V
High level value of threshold voltage	$V_{T(TO)2}$	$(I > \pi \times I_{T(AV)})$ , $T_J = T_J$ maximum		1.12	
Low level value of on-state slope resistance	$r_{t1}$	$(16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$ , $T_J = T_J$ maximum		0.32	mΩ
High level value of on-state slope resistance	$r_{t2}$	$(I > \pi \times I_{T(AV)})$ , $T_J = T_J$ maximum		0.27	
Maximum on-state voltage	$V_{TM}$	$I_{pk} = 2000$ A, $T_J = T_J$ maximum, $t_p = 10$ ms sine pulse		1.62	V
Maximum holding current	$I_H$	$T_J = 25$ °C, anode supply 12 V resistive load		600	mA
Typical latching current	$I_L$			1000	

SWITCHING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum non-repetitive rate of rise of turned-on current	$di/dt$	Gate drive 20 V, 20 Ω, $t_r \leq 1$ μs $T_J = T_J$ maximum, anode voltage $\leq 80\%$ $V_{DRM}$		1000	A/μs
Typical delay time	$t_d$	Gate current 1 A, $di_g/dt = 1$ A/μs $V_d = 0.67\%$ $V_{DRM}$ , $T_J = 25$ °C		1.0	μs
Typical turn-off time	$t_q$	$I_{TM} = 750$ A, $T_J = T_J$ maximum, $di/dt = 60$ A/μs, $V_R = 50$ V, $dV/dt = 20$ V/μs, gate 0 V 100 Ω, $t_p = 500$ μs		150	

BLOCKING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum critical rate of rise of off-state voltage	$dV/dt$	$T_J = T_J$ maximum linear to 80 % rated $V_{DRM}$		500	V/μs
Maximum peak reverse and off-state leakage current	$I_{RRM}$ , $I_{DRM}$	$T_J = T_J$ maximum, rated $V_{DRM}/V_{RRM}$ applied		80	mA



TRIGGERING						
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES		UNITS	
			TYP.	MAX.		
Maximum peak gate power	$P_{GM}$	$T_J = T_J$ maximum, $t_p \leq 5$ ms	10.0		W	
Maximum average gate power	$P_{G(AV)}$	$T_J = T_J$ maximum, $f = 50$ Hz, $d\% = 50$	2.0			
Maximum peak positive gate current	$I_{GM}$	$T_J = T_J$ maximum, $t_p \leq 5$ ms	3.0		A	
Maximum peak positive gate voltage	$+V_{GM}$	$T_J = T_J$ maximum, $t_p \leq 5$ ms	20		V	
Maximum peak negative gate voltage	$-V_{GM}$		5.0			
DC gate current required to trigger	$I_{GT}$	Maximum required gate trigger/ current/voltage are the lowest value which will trigger all units 12 V anode to cathode applied	$T_J = -40$ °C	200	-	mA
			$T_J = 25$ °C	100	200	
			$T_J = 125$ °C	50	-	
DC gate voltage required to trigger	$V_{GT}$	Maximum required gate trigger/ current/voltage are the lowest value which will trigger all units 12 V anode to cathode applied	$T_J = -40$ °C	2.5	-	V
			$T_J = 25$ °C	1.8	3.0	
			$T_J = 125$ °C	1.1	-	
DC gate current not to trigger	$I_{GD}$	$T_J = T_J$ maximum	10		mA	
DC gate voltage not to trigger	$V_{GD}$		0.25		V	

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum operating junction temperature range	$T_J$		- 40 to 125	°C
Maximum storage temperature range	$T_{Stg}$		- 40 to 150	
Maximum thermal resistance, junction to heatsink	$R_{thJ-hs}$	DC operation single side cooled	0.073	K/W
		DC operation double side cooled	0.031	
Maximum thermal resistance, case to heatsink	$R_{thC-hs}$	DC operation single side cooled	0.011	
		DC operation double side cooled	0.006	
Mounting force, $\pm 10$ %			14 700 (1500)	N (kg)
Approximate weight			255	g
Case style		See dimensions - link at the end of datasheet	TO-200AC (B-PUK)	

$\Delta R_{thJ-hs}$ CONDUCTION						
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION		TEST CONDITIONS	UNITS
	SINGLE SIDE	DOUBLE SIDE	SINGLE SIDE	DOUBLE SIDE		
180°	0.009	0.009	0.006	0.006	$T_J = T_J$ maximum	K/W
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		

**Note**

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

# ST730CLPbF Series



Vishay High Power Products Phase Control Thyristors  
(Hockey PUK Version), 990 A

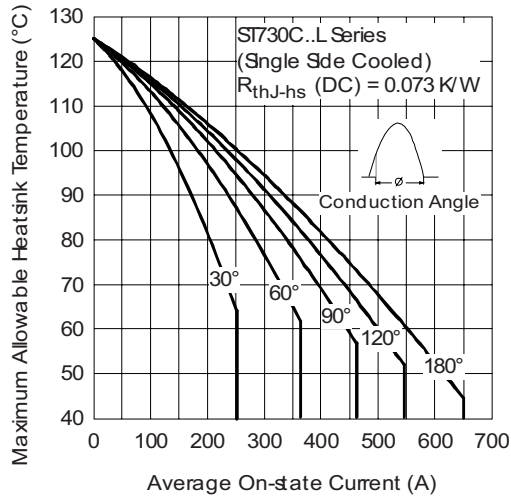


Fig. 1 - Current Ratings Characteristics

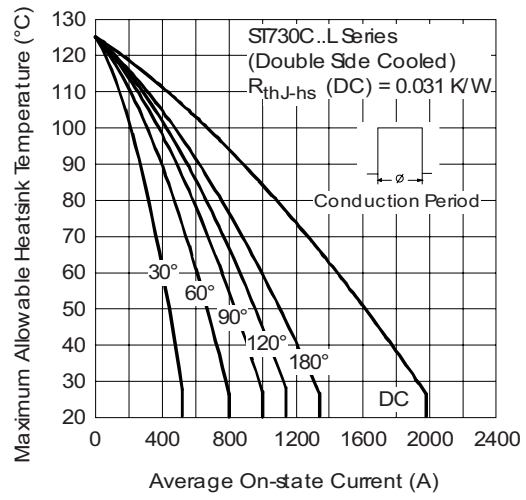


Fig. 4 - Current Ratings Characteristics

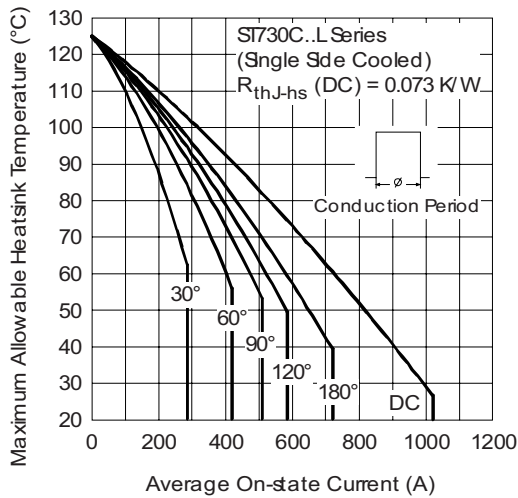


Fig. 2 - Current Ratings Characteristics

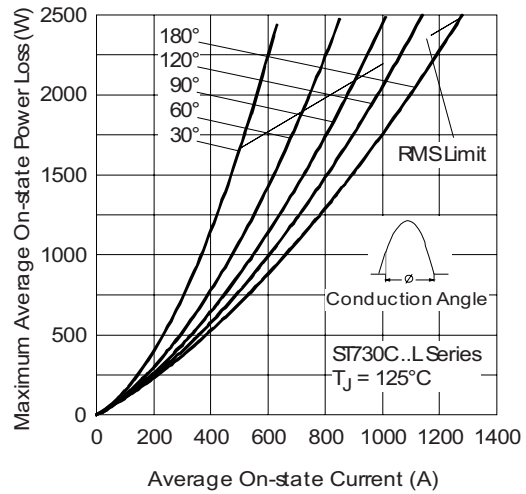


Fig. 5 - On-State Power Loss Characteristics

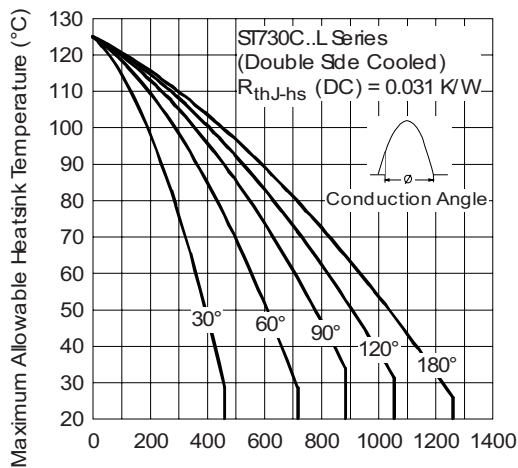


Fig. 3 - Current Ratings Characteristics

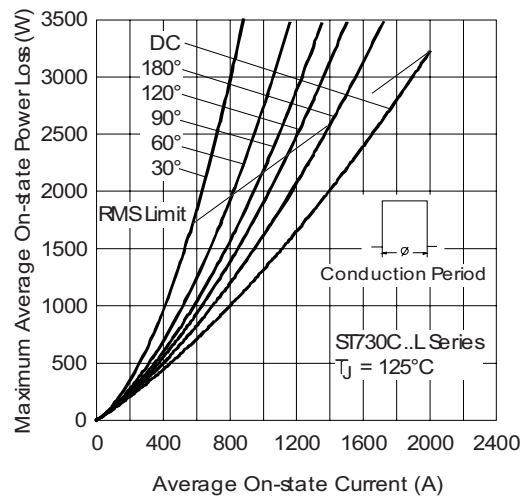


Fig. 6 - On-State Power Loss Characteristics

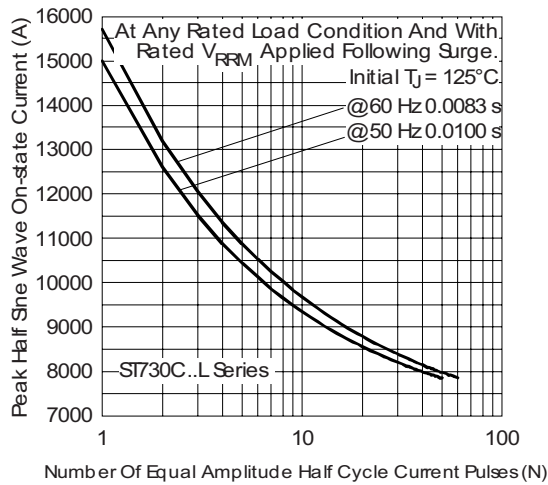


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

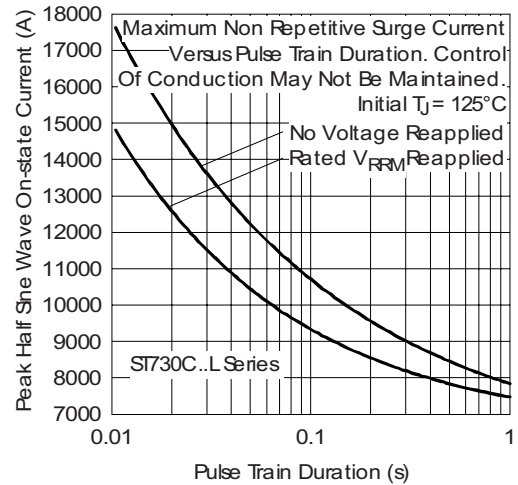


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

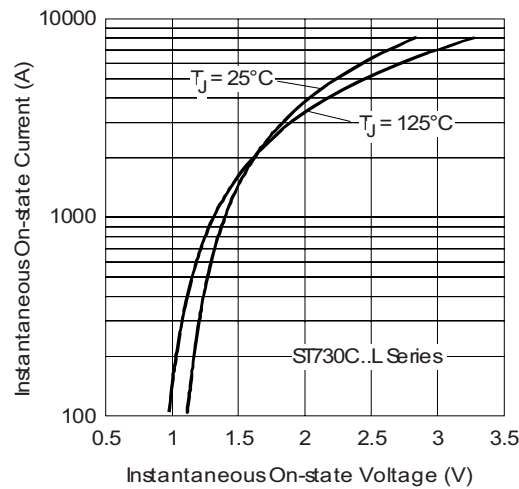


Fig. 9 - On-State Voltage Drop Characteristics

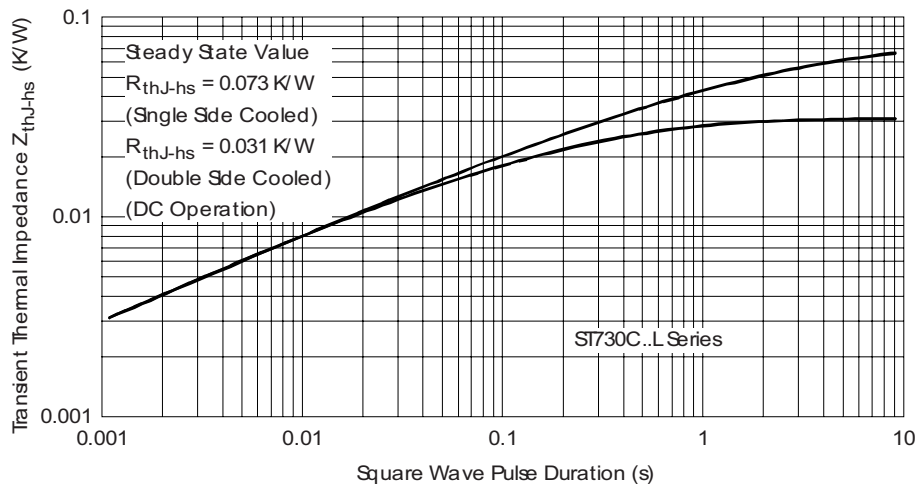


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics

# ST730CLPbF Series



Vishay High Power Products Phase Control Thyristors  
(Hockey PUK Version), 990 A

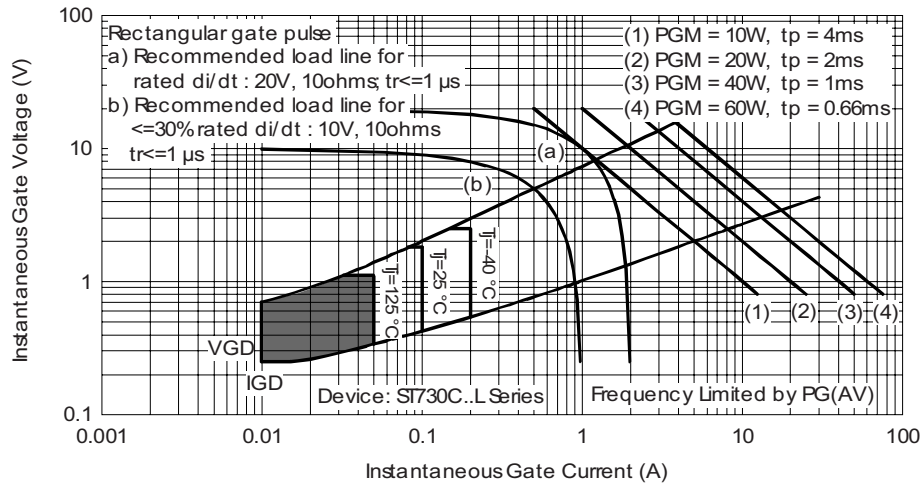


Fig. 11 - Gate Characteristics

## ORDERING INFORMATION TABLE

Device code	ST	73	0	C	20	L	1	-	PbF
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- ① - Thyristor
- ② - Essential part number
- ③ - 0 = Converter grade
- ④ - C = Ceramic PUK
- ⑤ - Voltage code x 100 =  $V_{RRM}$  (see Voltage Ratings 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 = 500 V/ $\mu s$  (standard selection)  
 • L = 1000 V/ $\mu s$  (special selection)
- ⑨ - Lead (Pb)-free

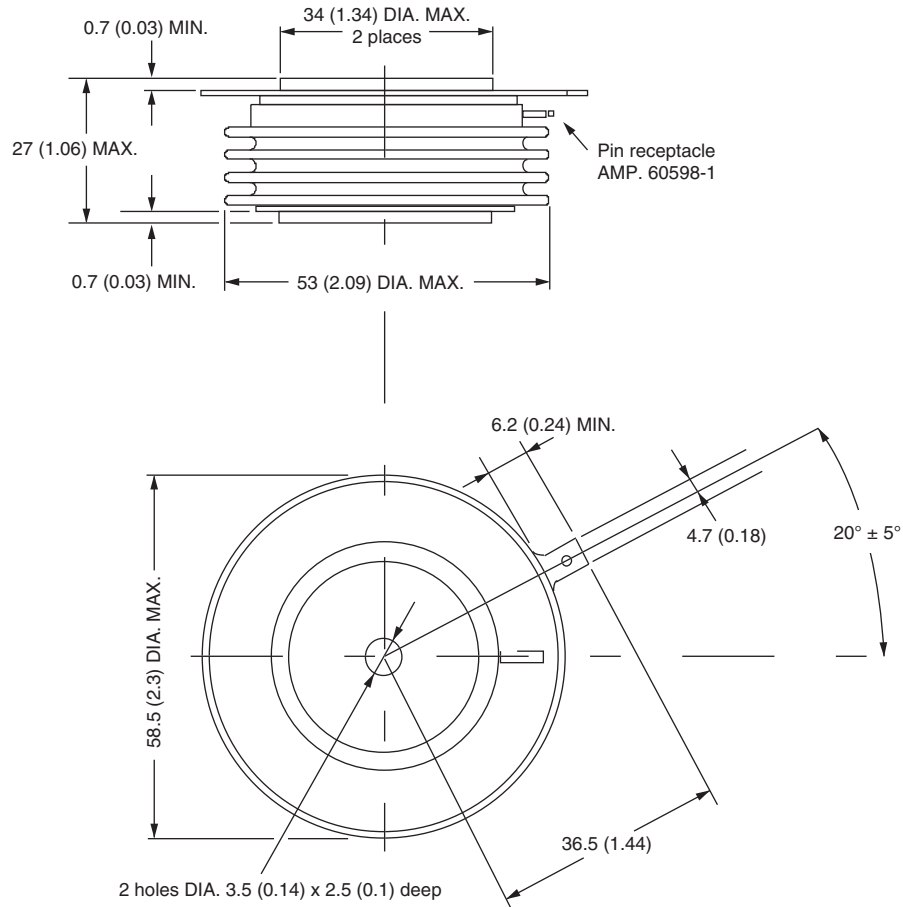
### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95076">http://www.vishay.com/doc?95076</a>
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## TO-200AC (B-PUK)

**DIMENSIONS** in millimeters (inches)

Creepage distance: 36.33 (1.430) minimum  
 Strike distance: 17.43 (0.686) minimum



Quote between upper and lower pole pieces has to be considered after application of mounting force (see thermal and mechanical specification)



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