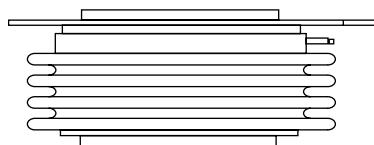


Phase Control Thyristors (Hockey PUK Version), 990 A



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



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^2s
	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	

ST730CLPbF Series

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



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}	$t = 10 \text{ ms}$	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	17 800	A	
		$t = 8.3 \text{ ms}$			18 700		
		$t = 10 \text{ ms}$	100 % V_{RRM} reapplied		15 000		
		$t = 8.3 \text{ ms}$			15 700		
Maximum I^2t for fusing	I^2t	$t = 10 \text{ ms}$	No voltage reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	1591	kA ² s	
		$t = 8.3 \text{ ms}$			1452		
		$t = 10 \text{ ms}$	100 % V_{RRM} reapplied		1125		
		$t = 8.3 \text{ ms}$			1027		
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1 \text{ to } 10 \text{ ms}$, no voltage reapplied			15 910	kA ² √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}	$I_{pk} = 2000 \text{ A}$, $T_J = T_J$ maximum, $t_p = 10 \text{ ms}$ sine pulse			1.62	V	
Maximum holding current	I_H	$T_J = 25 \text{ °C}$, 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	dl/dt	$Gate \text{ drive } 20 \text{ V}$, 20Ω , $t_r \leq 1 \mu\text{s}$ $T_J = T_J$ maximum, anode voltage $\leq 80\% V_{DRM}$			1000	A/μs
Typical delay time	t_d	$Gate \text{ current } 1 \text{ A}$, $dl_g/dt = 1 \text{ A}/\mu\text{s}$ $V_d = 0.67\% V_{DRM}$, $T_J = 25 \text{ °C}$			1.0	μs
Typical turn-off time	t_q	$I_{TM} = 750 \text{ A}$, $T_J = T_J$ maximum, $dl/dt = 60 \text{ A}/\mu\text{s}$, $V_R = 50 \text{ V}$, $dV/dt = 20 \text{ V}/\mu\text{s}$, gate 0 V 100Ω , $t_p = 500 \mu\text{s}$			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



ST730CLPbF Series

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

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}	$T_J = -40$ °C	Maximum required gate trigger/current/voltage are the lowest value which will trigger all units 12 V anode to cathode applied		200	mA
		$T_J = 25$ °C			100	
		$T_J = 125$ °C			50	
DC gate voltage required to trigger	V_{GT}	$T_J = -40$ °C	12 V anode to cathode applied		2.5	V
		$T_J = 25$ °C			1.8	
		$T_J = 125$ °C			1.1	
DC gate current not to trigger	I_{GD}	$T_J = T_J$ maximum	Maximum gate current/voltage not to trigger is the maximum value which will not trigger any unit with rated V_{DRM} anode to cathode applied		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, ± 10 %				14 700 (1500)	N (kg)
Approximate weight				255	g
Case style		See dimensions - link at the end of datasheet		TO-200AC (B-PUK)	

ΔR_{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

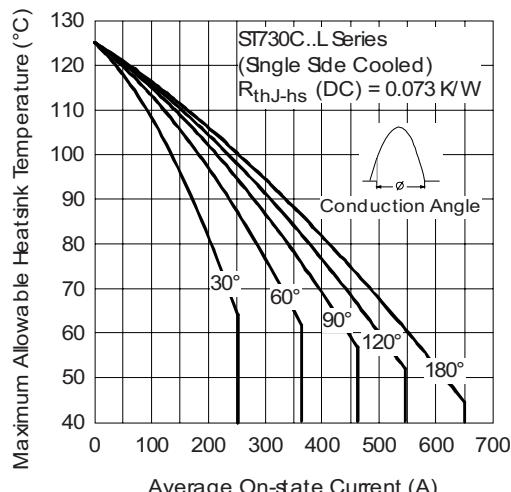


Fig. 1 - Current Ratings Characteristics

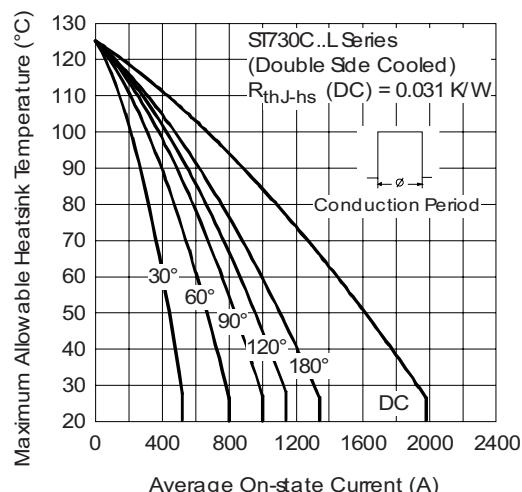


Fig. 4 - Current Ratings Characteristics

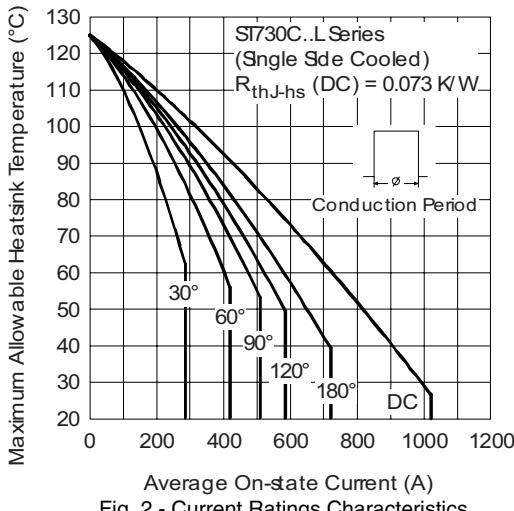


Fig. 2 - Current Ratings Characteristics

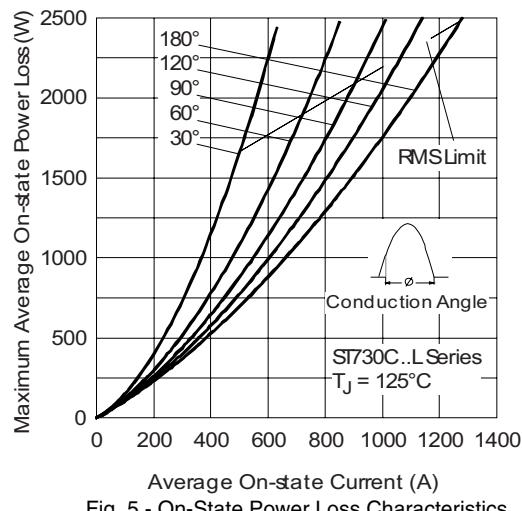


Fig. 5 - On-State Power Loss Characteristics

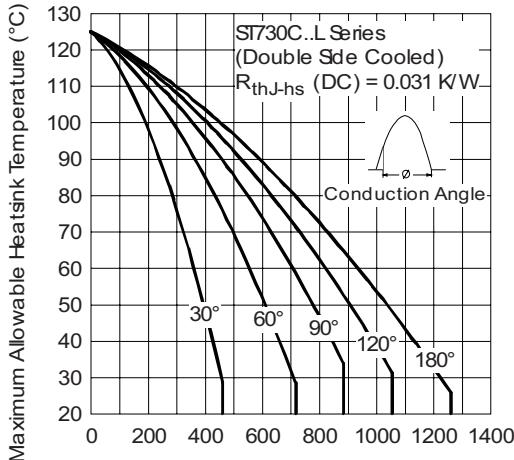


Fig. 3 - Current Ratings Characteristics

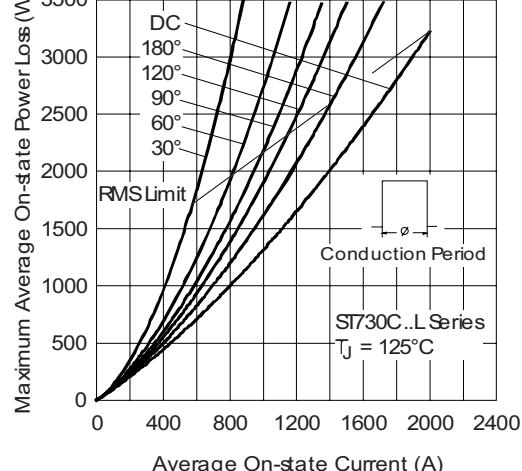


Fig. 6 - On-State Power Loss Characteristics

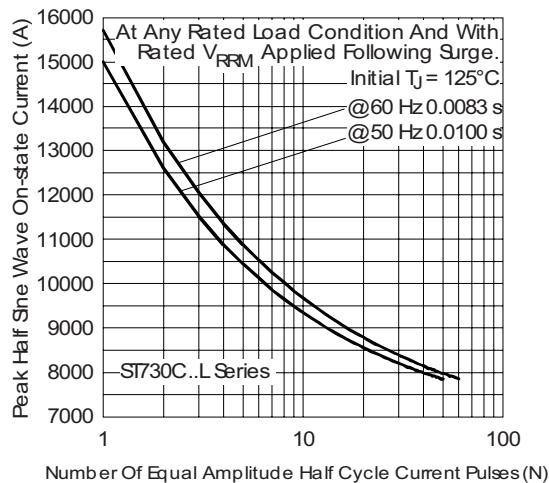


Fig. 7 - Maximum Non-Repetitive Surge Current
 Single and Double Side Cooled

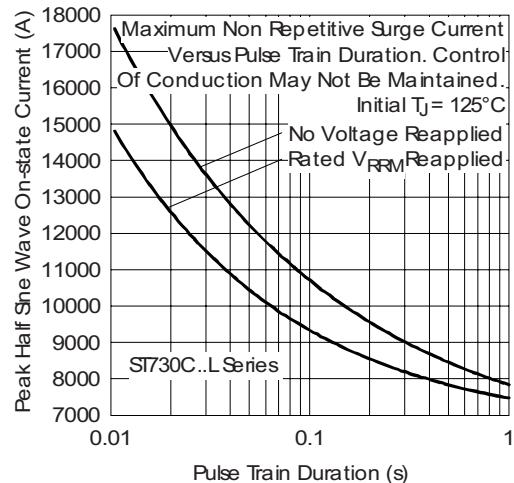


Fig. 8 - Maximum Non-Repetitive Surge Current
 Single and Double Side Cooled

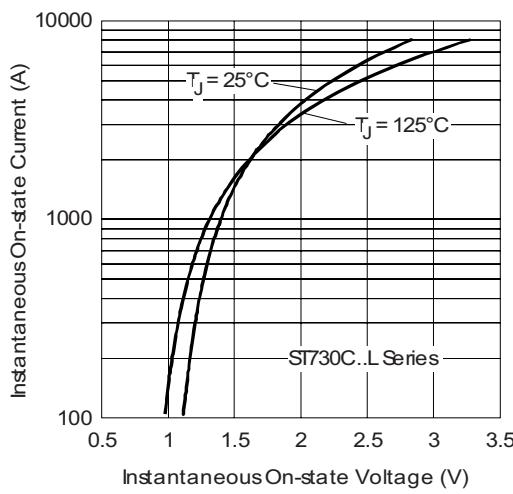


Fig. 9 - On-State Voltage Drop Characteristics

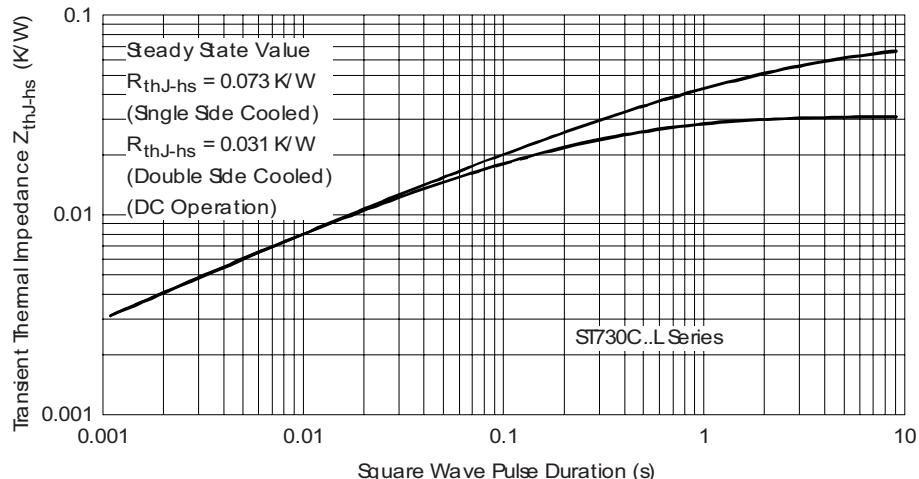


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

ST730CLPbF Series

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

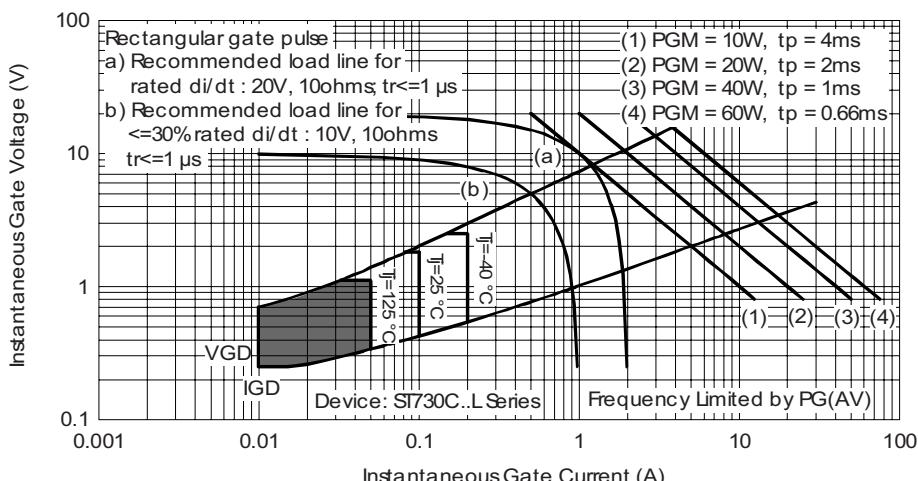


Fig. 11 - Gate Characteristics

ORDERING INFORMATION TABLE

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

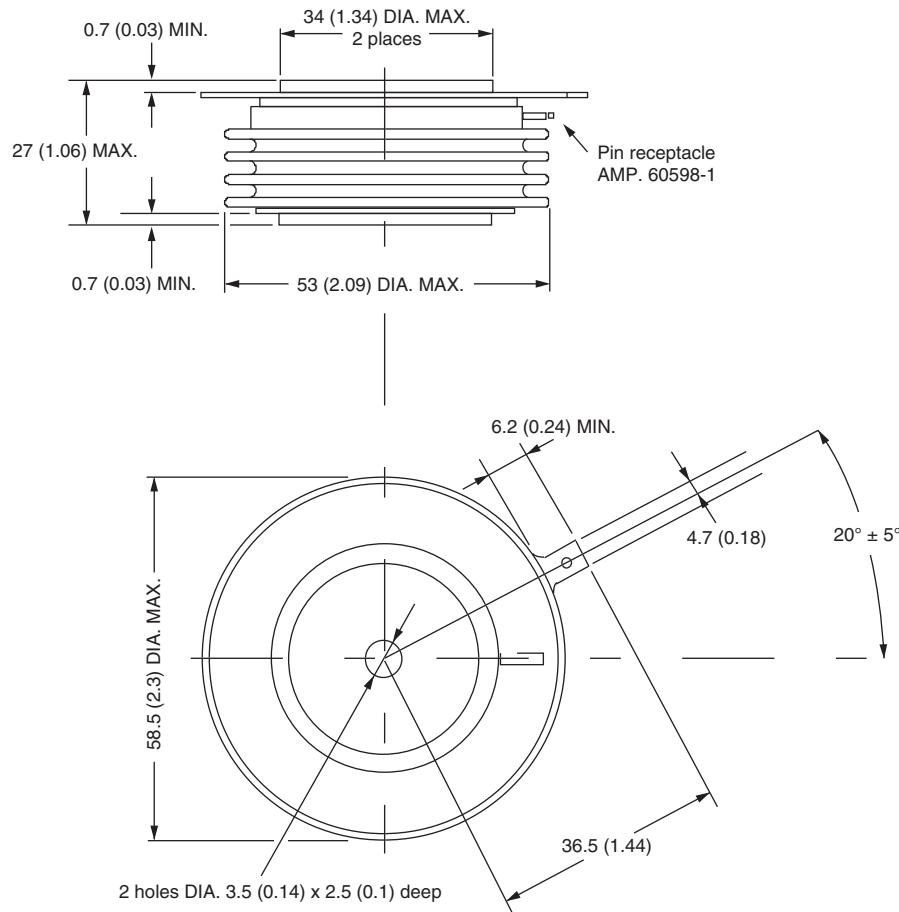
- 1** - Thyristor
- 2** - Essential part number
- 3** - 0 = Converter grade
- 4** - C = Ceramic PUK
- 5** - Voltage code x 100 = V_{RRM} (see Voltage Ratings table)
- 6** - L = PUK case TO-200AC (B-PUK)
- 7** - 0 = Eyelet terminals (gate and auxiliary cathode unsoldered leads)
1 = Fast-on terminals (gate 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/ μ s (standard selection)
• L = 1000 V/ μ s (special selection)
- 9** - Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95076

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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