

SILICON CONTROLLED RECTIFIERS

High Power Thyristor Hockey Puk Version K-PUK Series 1700PK

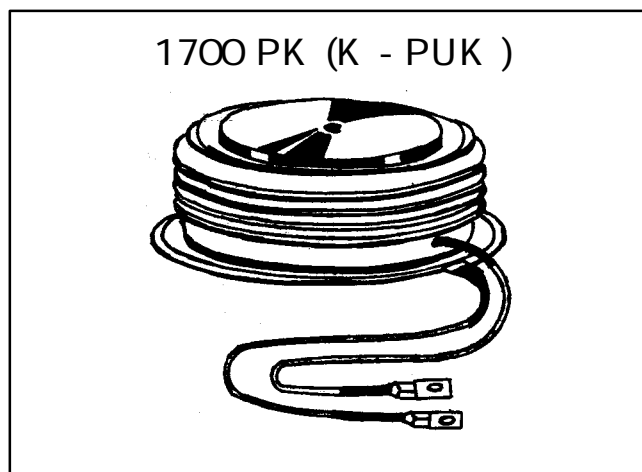
Types : 1700PK 40 to 1700PK 180

FEATURES

- ❖ Center amplifying gate.
- ❖ Metal case with ceramic insulator
- ❖ International standard case A-24.
- ❖ High profile hockey - puk.

TYPICAL APPLICATIONS

- ❖ DC motor control (e.g. for machine tools).
- ❖ Controlled rectifiers (e.g. for battery charging, Uninterrupted Power Supply).
- ❖ AC controllers (e.g. for temperature control, lights control).



MAJOR RATINGS & CHARACTERISTICS

Parameters	1700PK	Units
$I_{T(AV)}$	1745	A
@ T_{hs}	55	°C
$I_{T(RMS)}$	3200	A
@ T_{hs}	25	°C
I_{TSM} @ 50 Hz	33500	A
I^2t @ 50 Hz	5615	KA ² s
V_{DRM}/V_{RRM}	600 to 1800	V
t_q typical	200	μs
T_J	-40 to 125	°C

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ELECTRICAL SPECIFICATION VOLTAGE RATINGS

Type Number	Voltage Code	V_{RRM}/V_{DRM} max. repetitive peak and off-state voltage V	V_{RSM} max. non-repetitive peak voltage V	I_{DRM}/I_{RRM} max. @ 125°C mA
1700PK	60	600	700	100
	80	800	900	
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	
	180	1800	1900	

ON-STATE CONDUCTION

	Parameter	1700PK	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current @ heat sink temperature	1745(710)	A	180° conduction, half sine wave double side (single side) cooled	
		55(85)	°C		
$I_{T(RMS)}$	Max. RMS on-state current	3200	A	@ 25°C heat sink temperature (double side cooled)	
I_{TSM}	Max. peak one cycle non-repetitive surge current	33500		A	t = 10ms No voltage reapplied
		28200			t = 10ms 100% V_{RRM} reapplied
I^2t	Maximum I^2t for fusing	5615	kA ² s	t = 10ms No voltage reapplied	
		3971		t = 10ms 100% V_{RRM} reapplied	
I^2t	Maximum I^2t for fusing	56150	kA ² s	t = 0.1 to 10ms. No voltage reapplied.	
$V_{T(TO1)}$	Low level value of threshold voltage	0.93	V	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max.	
$V_{T(TO2)}$	High level value of threshold voltage	1.02		$(\pi \times I_{F(AV)} < I < 20 \times \pi \times I_{F(AV)})$, $T_J = T_J$ max.	
$r_{\theta 1}$	Low level value of on state slope resistance	0.17	mΩ	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ max.	
$r_{\theta 2}$	High level value of on state slope resistance	0.16		$(\pi \times I_{F(AV)} < I < 20 \times \pi \times I_{F(AV)})$, $T_J = T_J$ max.	
V_{TM}	Max. on state voltage	1.62	V	$I_{pk} = 4000A$, $T_J = T_J$ max., $t_p = 10ms$ sine pulse	
I_H	Maximum holding current	600	mA	$T_J = 25°C$, anode supply 12V resistive load	
I_L	Latching current	1000			

SWITCHING

	Parameter	1700PK	Units	Conditions
di/dt	Max. non-repetitive rate of rise of turned-on current	1000	A/μs	Gate drive 20V, 20Ω, $t_r \leq 1 \mu s$ $T_J = T_J$ max., anode voltage $\leq 80\% V_{DRM}$
t_d	Typical delay time	1.9	μs	Gate current 1A, $di_g/dt = 1A/\mu s$ $V_d = 0.67 V_{DRM}$, $T_J = 25°C$
t_q	Typical turn-off time	200		$I_{TM} = 550A$, $T_J = T_J$ max., $di/dt = 40A/\mu s$, $V_R = 50V$ $dv/dt = 20V/\mu s$, Gate 0V 100Ω, $t_p = 50\mu s$

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BLOCKING

	Parameter	1700PK	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	1000	V/ μ s	$T_J = T_J \text{ max.}$, linear to 80% rated V_{DRM}
I_{RRM} I_{DRM}	Max. peak reverse and off-state leakage current	100	mA	$T_J = T_J \text{ max.}$, rated V_{DRM} N_{RRM} applied

TRIGGERING

	Parameter	1700PK		Units	Conditions
P_{GM}	Maximum peak gate power	16.0		W	$T_J = T_J \text{ max.}$, $t_p \leq 5\text{ms}$
$P_{G(AV)}$	Maximum average gate power	3.0			$T_J = T_J \text{ max.}$, $f = 50\text{Hz}$, $d\% = 50$
I_{GM}	Max. peak positive gate current	3.0		A	$T_J = T_J \text{ max.}$, $t_p \leq 5\text{ms}$
$+V_{GM}$	Max. peak positive gate voltage	20		V	$T_J = T_J \text{ max.}$, $t_p \leq 5\text{ms}$
$-V_{GM}$	Max. peak negative gate voltage	5.0			
I_{GT}	DC gate current required to trigger	TYP.	MAX.	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.
		200	--		
		100	200		
V_{GT}	DC gate voltage required to trigger	1.4	--	V	$T_J = -40^\circ\text{C}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$
		1.1	3.0		
		0.9	--		
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			

THERMAL AND MECHANICAL SPECIFICATION

	Parameter	1700PK	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	$^\circ\text{C}$	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJ-hs}	Max. thermal resistance, junction to heat sink	0.042	K/W	DC operation single side cooled
		0.021		DC operation double side cooled
F	Mounting force, $\pm 10\%$	24500 (2500)	N (kg)	
wt	Approximate weight	425	g	
	Case style	A-24 (K-PUK)		See outline

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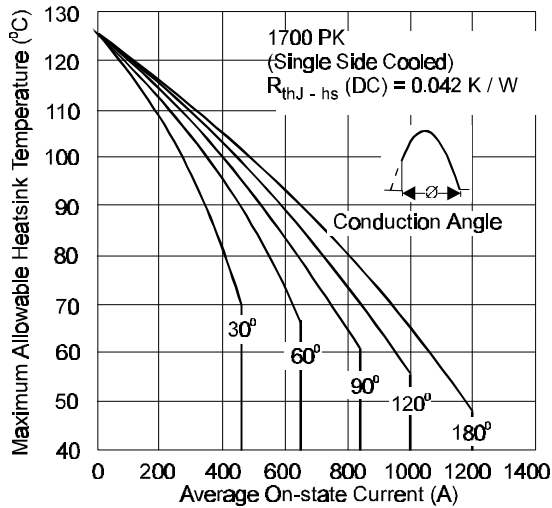


Fig. 1 - Current Ratings Characteristics

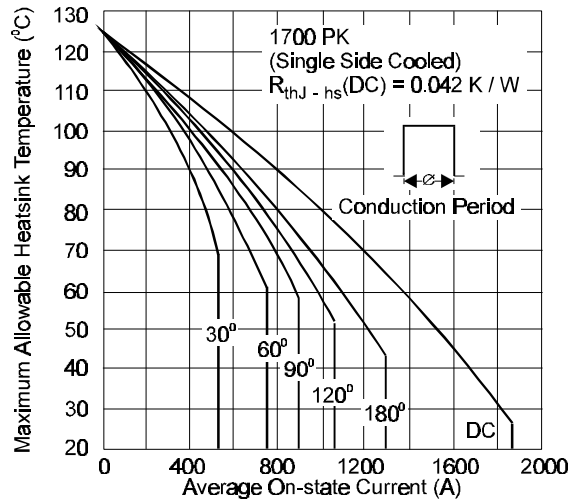


Fig. 2 - Current Ratings Characteristics

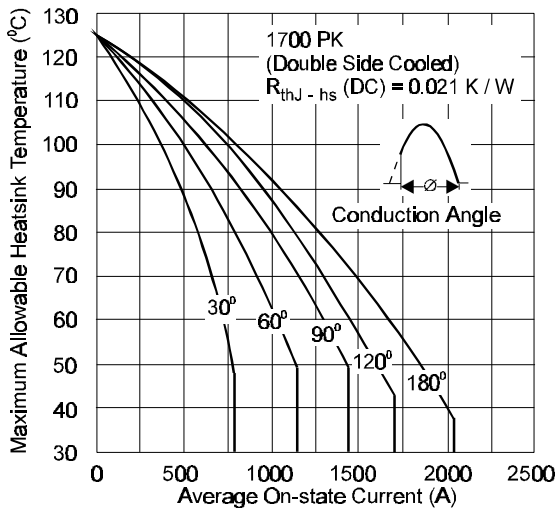


Fig. 3 - Current Ratings Characteristics

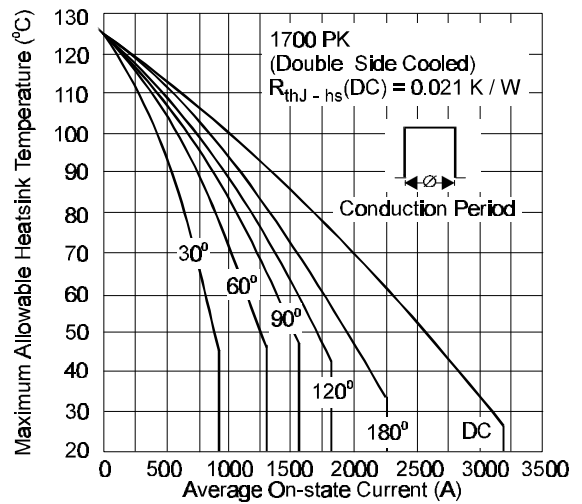


Fig. 4 - Current Ratings Characteristics

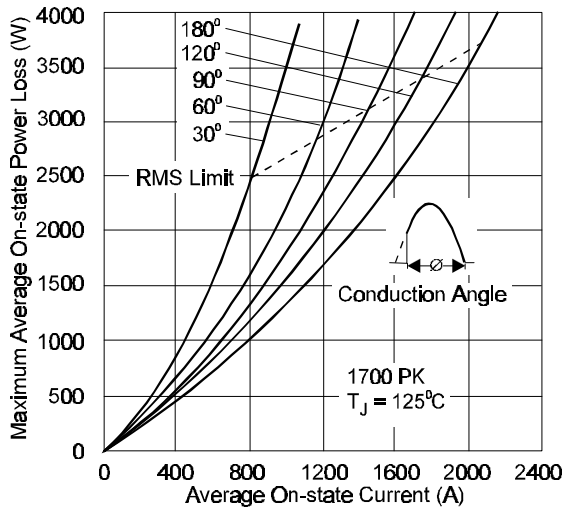


Fig. 5 - On-state Power Loss Characteristics

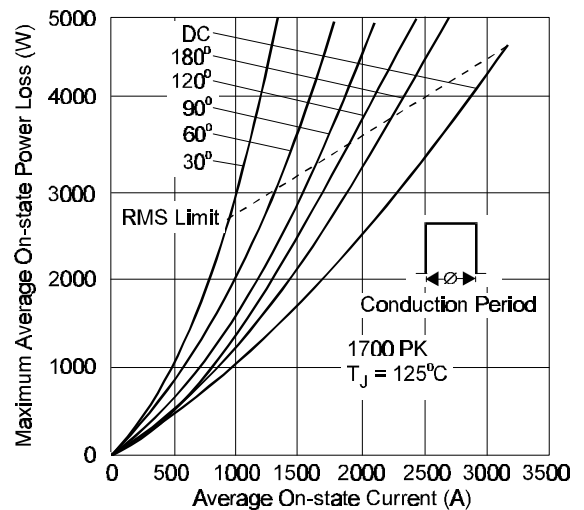


Fig. 6 - On-state Power Loss Characteristics

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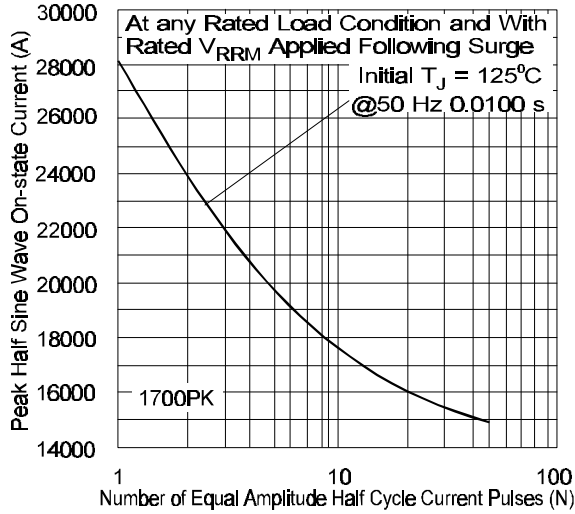


Fig. 7 - Maximum Non-Repetitive Surge Current

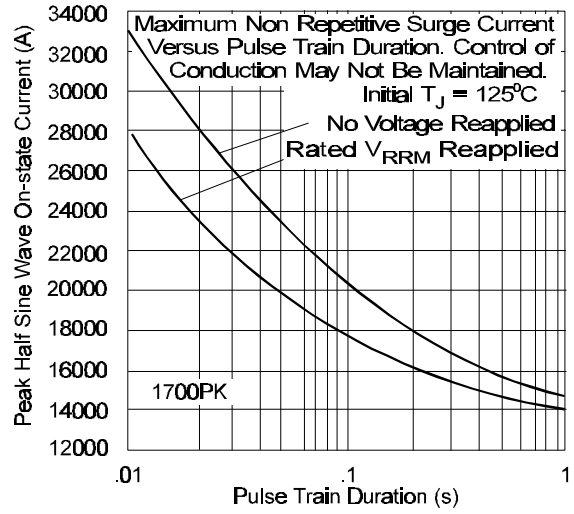


Fig. 8 - Maximum Non-Repetitive Surge Current

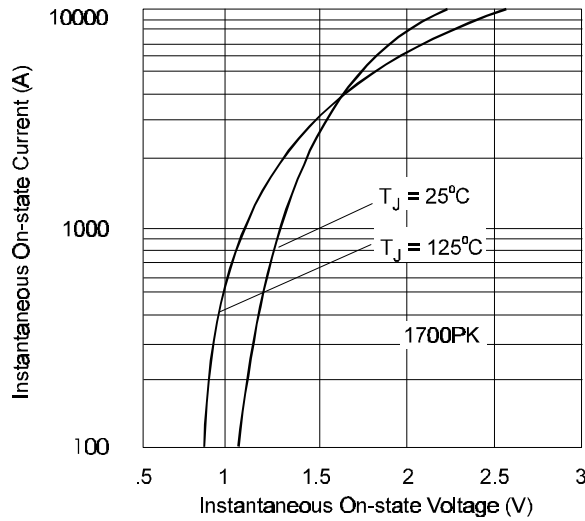


Fig. 9 - On-state Voltage Drop Characteristics

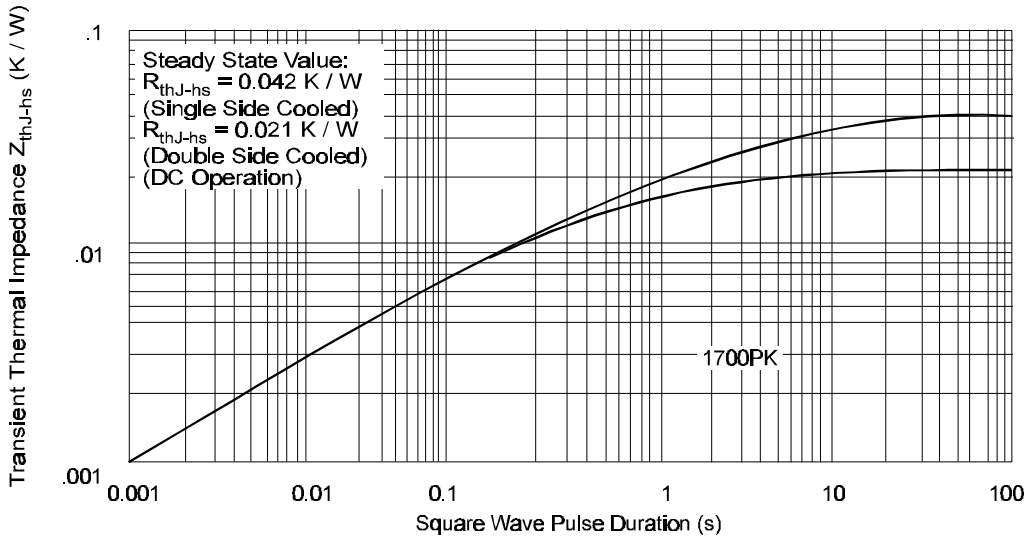


Fig. 10 - Thermal Impedance Z_{thJ-hs} Characteristics

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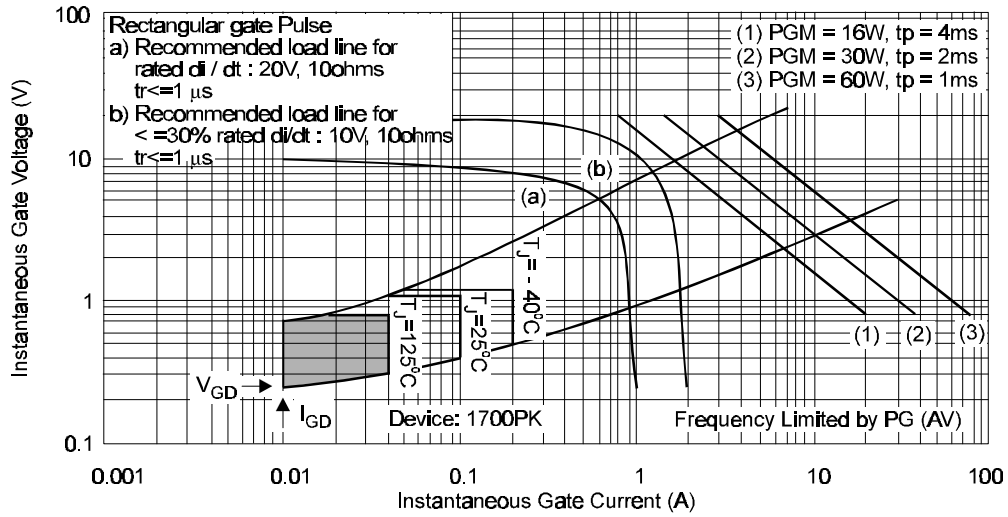
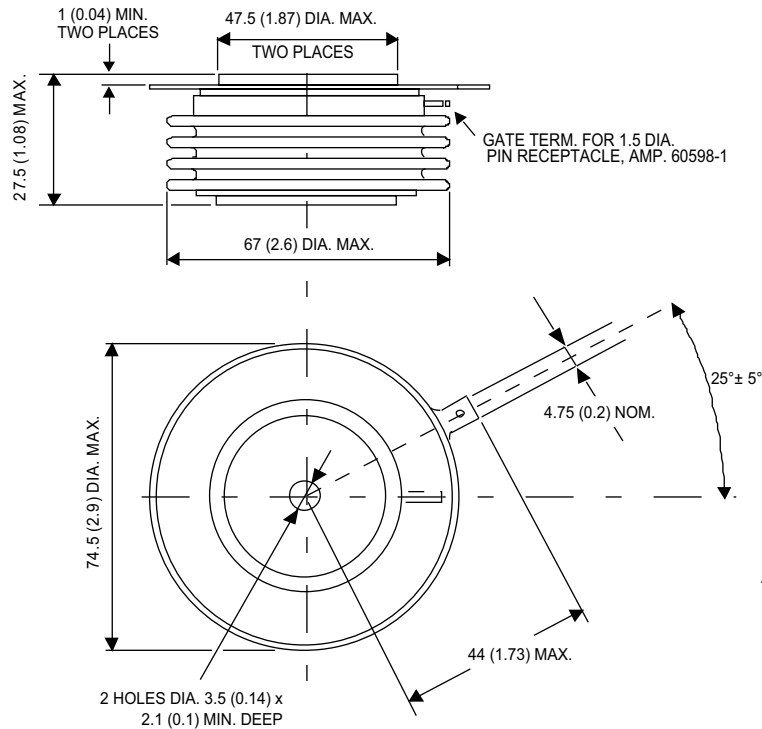


Fig.11 - Gate Characteristics

OUTLINE TABLE



Case Style A-24 (K-PUK)
 All dimensions in millimeters (inches)

CREPAGE DISTANCE 28.88 (1.137) MIN.
 STRIKE DISTANCE 17.99 (0.708) MIN.

Last Update : Mar. 2006