

## PHASE CONTROL THYRISTORS

## Hockey Puk Version

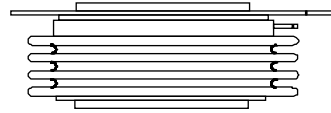
### Features

- Center amplifying gate
- Metal case with ceramic insulator
- International standard case A-24 (K-PUK)
- High profile hockey-puk

### Typical Applications

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

1473A



case style A-24 (K-PUK)

### Major Ratings and Characteristics

Parameters	ST1000C..K	Units	
$I_{T(AV)}$	1473	A	
@ $T_{hs}$	55	°C	
$I_{T(RMS)}$	2913	A	
@ $T_{hs}$	25	°C	
$I_{TSM}$	@ 50Hz	20.0	KA
	@ 60Hz	21.2	KA
$i^2t$	@ 50Hz	2000	KA <sup>2</sup> s
	@ 60Hz	1865	KA <sup>2</sup> s
$i^2\sqrt{t}$		20000	KA <sup>2</sup> /s
$V_{DRM}/V_{RRM}$ range	1200 to 2600	V	
$t_q$ typical	300	µs	
$T_J$ range	-40 to 125	°C	

**ELECTRICAL SPECIFICATIONS**

Voltage Ratings

Type number	Voltage Code	V <sub>RRM</sub> , maximum repetitive peak reverse voltage V	V <sub>RSM</sub> , maximum non-repetitive peak rev. voltage V	I <sub>RRM</sub> max. @ T <sub>J</sub> = 125°C mA
ST1000C..K	12	1200	1300	100
	16	1600	1700	
	20	2000	2100	
	22	2200	2300	
	24	2400	2500	
	26	2600	2700	

On-state Conduction

Parameter	ST1000C..K	Units	Conditions
I <sub>T(AV)</sub> Maximum average on-state current @ Heatsink temperature	1473 (630)	A	180° conduction, half sine wave
	55 (85)	°C	Double side (single side) cooled
I <sub>T(RMS)</sub> Maximum RMS on-state current	6540	A	DC @ 25°C heatsink temp. double side cooled
I <sub>TSM</sub> Maximum peak, one-cycle, non-repetitive surge current	20.0	KA	t = 10ms No voltage
	21.2		t = 8.3ms reapplied
	17.0		t = 10ms 100% V <sub>RRM</sub>
	18.1		t = 8.3ms reapplied
I <sup>2</sup> t Maximum I <sup>2</sup> t for fusing	2000	KA <sup>2</sup> s	t = 10ms No voltage
	1865		t = 8.3ms reapplied
	1445		t = 10ms 100% V <sub>RRM</sub>
	1360		t = 8.3ms reapplied
I <sup>2</sup> √t Maximum I <sup>2</sup> √t for fusing	20000	KA <sup>2</sup> √s	t = 0.1 to 10ms, no voltage reapplied
V <sub>T(TO)1</sub> Low level value of threshold voltage	0.950	V	(16.7% × π × I <sub>T(AV)</sub> < I < π × I <sub>T(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.
V <sub>T(TO)2</sub> High level value of threshold voltage	1.024		(I > π × I <sub>T(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.
r <sub>t1</sub> Low level value of on-state slope resistance	0.283	mΩ	(16.7% × π × I <sub>T(AV)</sub> < I < π × I <sub>T(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.
r <sub>t2</sub> High level value of on-state slope resistance	0.265		(I > π × I <sub>T(AV)</sub> ), T <sub>J</sub> = T <sub>J</sub> max.
V <sub>TM</sub> Maximum on-state voltage drop	1.80	V	I <sub>pk</sub> = 3000A, T <sub>J</sub> = 125°C, t <sub>p</sub> = 10ms sine pulse
I <sub>H</sub> Maximum holding current	600	mA	T <sub>J</sub> = 25°C, anode supply 12V resistive load
I <sub>L</sub> Typical latching current	1000		

**Switching**

Parameter	ST1000C..K	Units	Conditions
di/dt Maximum non repetitive rate of rise of turned-on current	1000	A/μs	Gate drive 20V, 20Ω, t <sub>r</sub> ≤ 1μs T <sub>J</sub> = T <sub>J</sub> max., anode voltage ≤ 80% V <sub>DRM</sub>
t <sub>d</sub> Typical delay time	1.9	μs	Gate current 1A, di <sub>g</sub> /dt = 1A/μs V <sub>d</sub> = 0.67% V <sub>DRM</sub> , T <sub>J</sub> = 25°C
t <sub>q</sub> Typical turn-off time	300	A/μs	I <sub>TM</sub> = 550A, T <sub>J</sub> = T <sub>J</sub> max, di/dt = 40A/μs, V <sub>r</sub> = 50V dv/dt = 20V/μs, Gate 0V 100Ω, t <sub>p</sub> ≤ 500μs

**Blocking**

Parameter	ST1000C..K	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/μs	T <sub>J</sub> = T <sub>J</sub> max., linear to 80% rated V <sub>DRM</sub>
I <sub>RRM</sub> I <sub>DRM</sub> Maximum peak reverse and off-state leakage current	100	μs	T <sub>J</sub> = T <sub>J</sub> max., rated V <sub>DRM</sub> /V <sub>RRM</sub> applied

**Triggering**

Parameter	ST1000C..K		Units	Conditions	
P <sub>GM</sub> Maximum peak gate power	16		W	T <sub>J</sub> = T <sub>J</sub> max., t <sub>p</sub> ≤ 5ms	
P <sub>G(AV)</sub> Maximum peak average gate power	3		W	T <sub>J</sub> = T <sub>J</sub> max., f = 50Hz, d% = 50	
I <sub>GM</sub> Maximum peak positive gate current	3.0		A	T <sub>J</sub> = T <sub>J</sub> max., t <sub>p</sub> ≤ 5ms	
+ V <sub>GM</sub> Maximum peak positive gate voltage	20		V	T <sub>J</sub> = T <sub>J</sub> max., t <sub>p</sub> ≤ 5ms	
- V <sub>GM</sub> Maximum peak negative gate voltage	5.0		V		
I <sub>GT</sub> DC gate current required to trigger	TYP.	MAX.	mA		T <sub>J</sub> = -40°C
	200	-			T <sub>J</sub> = 25°C
	100	200		T <sub>J</sub> = 125°C	
V <sub>GT</sub> DC gate voltage required to trigger	1.4	-	V	T <sub>J</sub> = -40°C	
	1.1	3.0	V	T <sub>J</sub> = 25°C	
	0.9	-	V	T <sub>J</sub> = 125°C	
I <sub>GD</sub> DC gate current not to trigger	10		mA	T <sub>J</sub> = T <sub>J</sub> max. Max. gate current / voltage not to trigger is the max. value which will not trigger any units with rated V <sub>DRM</sub> anode-to-cathode applied	
V <sub>GD</sub> DC gate voltage not to trigger	0.25		V		

## ST1000C..K Series

Bulletin I25202 rev. A 01/00

International  
**IRF** Rectifier

### Thermal and Mechanical Specifications

Parameter	ST1000C..K	Units	Conditions
$T_J$ Max. junction 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	0.042	K/W	DC operation single side cooled
	0.021		DC operation double side cooled
$R_{thC-hs}$ Max. thermal resistance, case to heatsink	0.006	K/W	DC operation single side cooled
	0.003		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 table

### $\Delta R_{thJC}$ Conduction

(The following table shows the increment of thermal resistance  $R_{thJC}$  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°	0.003	0.003	0.002	0.002	K/W	$T_J = T_J \text{ max.}$
120°	0.004	0.004	0.004	0.004		
90°	0.005	0.005	0.005	0.005		
60°	0.007	0.007	0.007	0.007		
30°	0.012	0.012	0.012	0.012		

### Ordering Information Table

Device Code							
ST	100	0	C	26	K	1	
①	②	③	④	⑤	⑥	⑦	⑧
<b>1</b>	- Thyristor	<b>2</b>	- Essential part number	<b>3</b>	- 0 = Converter grade	<b>4</b>	- C = Ceramic Puk
<b>5</b>	- Voltage code: Code x 100 = $V_{RRM}$ (See Voltage Ratings Table)	<b>6</b>	- K = Puk Case A-24 (K-PUK)	<b>7</b>	- 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)
<b>8</b>	- Critical dv/dt: None = 500V/ $\mu$ sec (Standard selection)					L	= 1000V/ $\mu$ sec (Special selection)

Outline Table

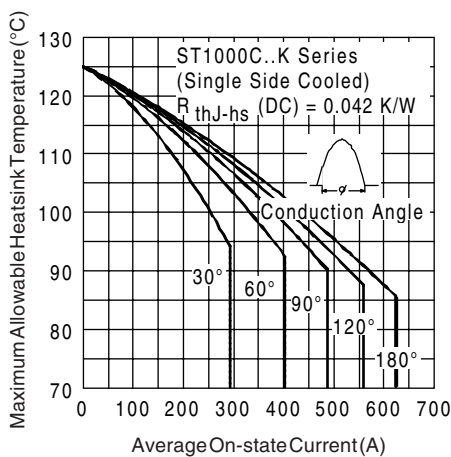
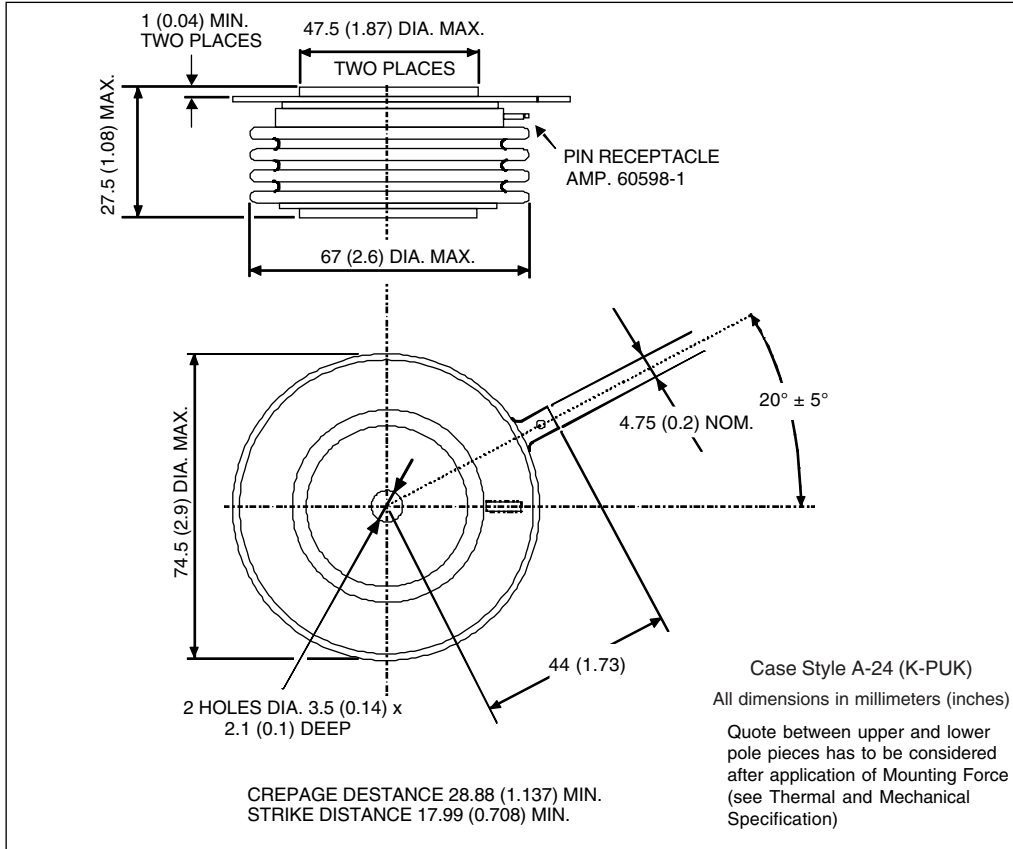


Fig. 1 - Current Ratings Characteristics

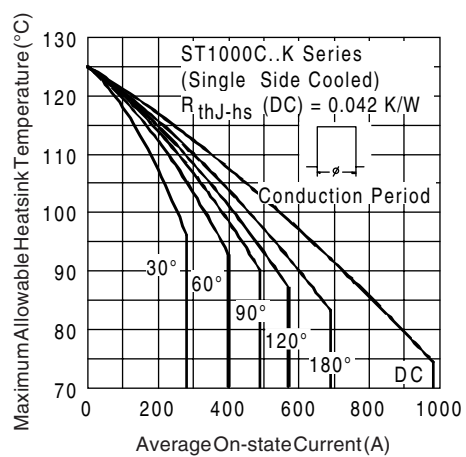


Fig. 2 - Current Ratings Characteristics

# ST1000C..K Series

Bulletin I25202 rev. A 01/00

International  
**IRF** Rectifier

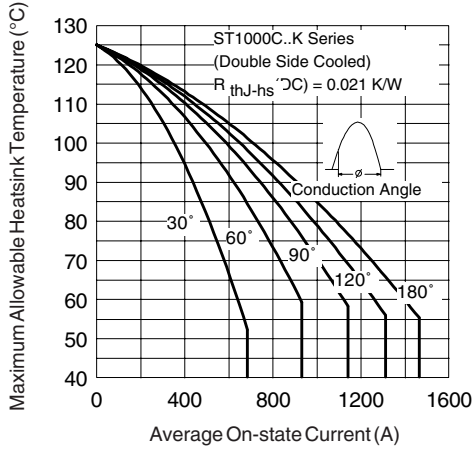


Fig. 3 - Current Ratings Characteristics

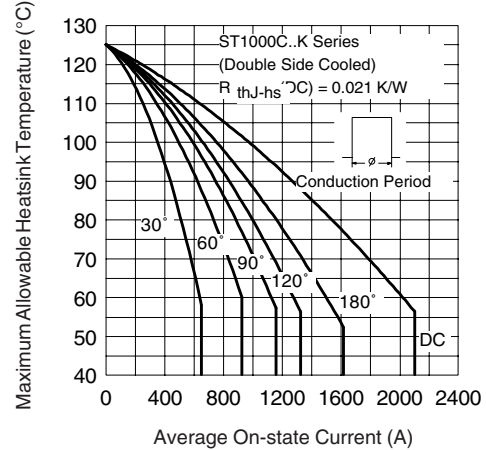


Fig. 4 - Current Ratings Characteristics

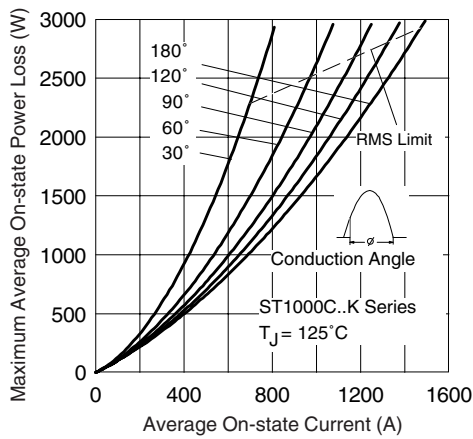


Fig. 5 - On-state Power Loss Characteristics

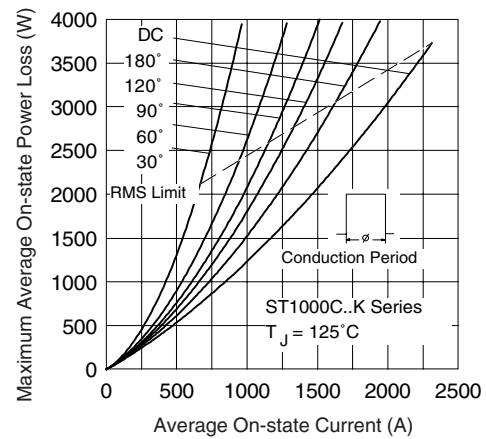


Fig. 6 - On-state Power Loss Characteristics

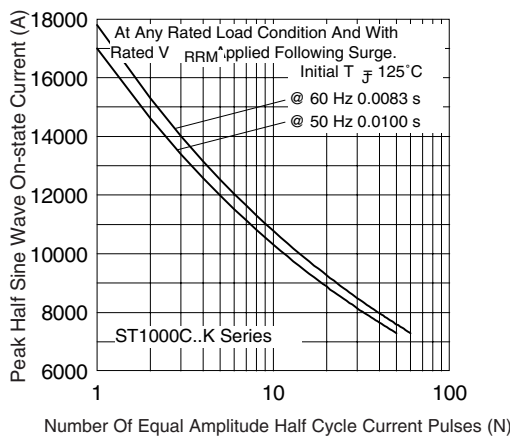


Fig. 7 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

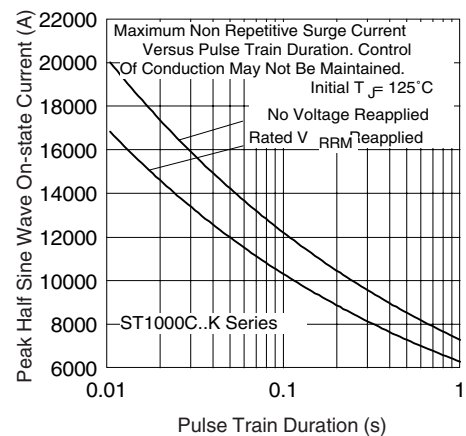


Fig. 8 - Maximum Non-Repetitive Surge Current Single and Double Side Cooled

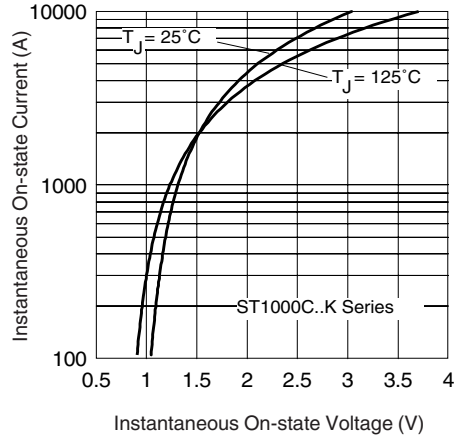


Fig. 9 - On-state Voltage Drop Characteristics

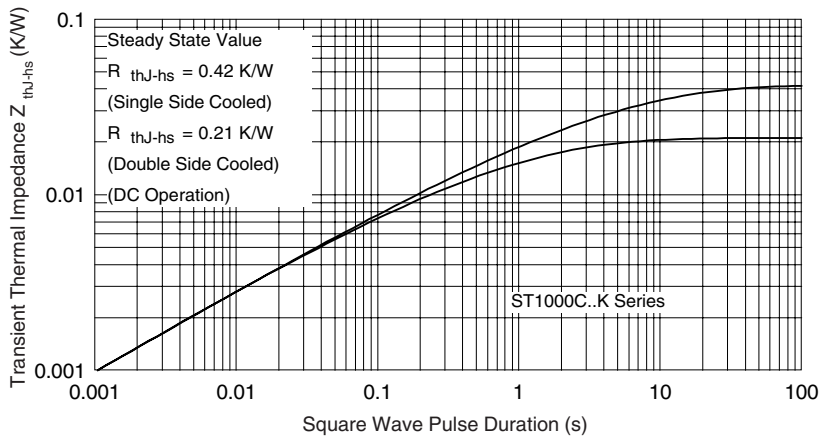


Fig. 10 - Thermal Impedance  $Z_{thJ-hs}$  Characteristics

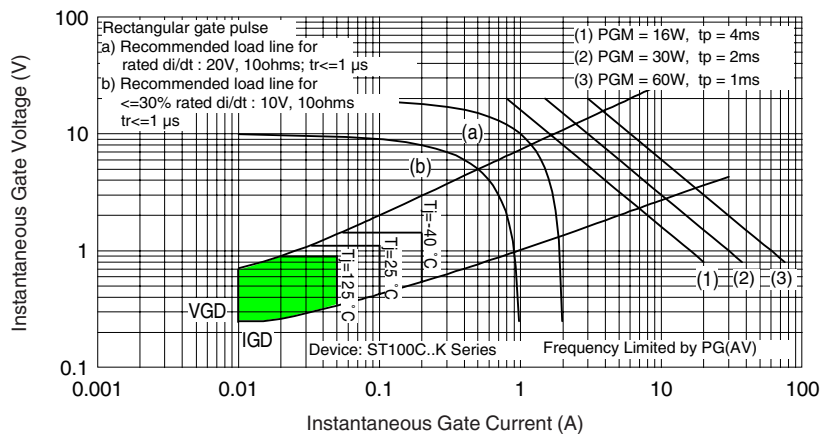


Fig. 11 - Gate Characteristics