Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

High Power Thyristor
Hockey Puk Version
K-PUK Series 800 PK

Types : 800 PK 410 TO 800 PK 450

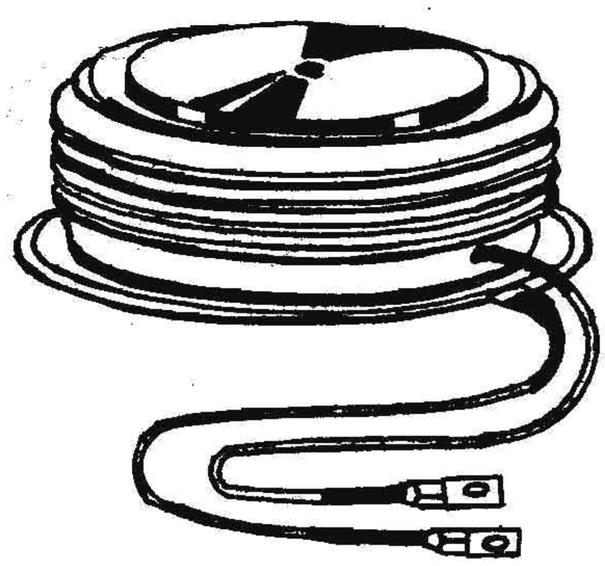
FEATURES

- *Center amplifying gate.*
- *Metal case with ceramic insulator*
- *High profile hockey - puk.*

TYPICAL APPLICATIONS

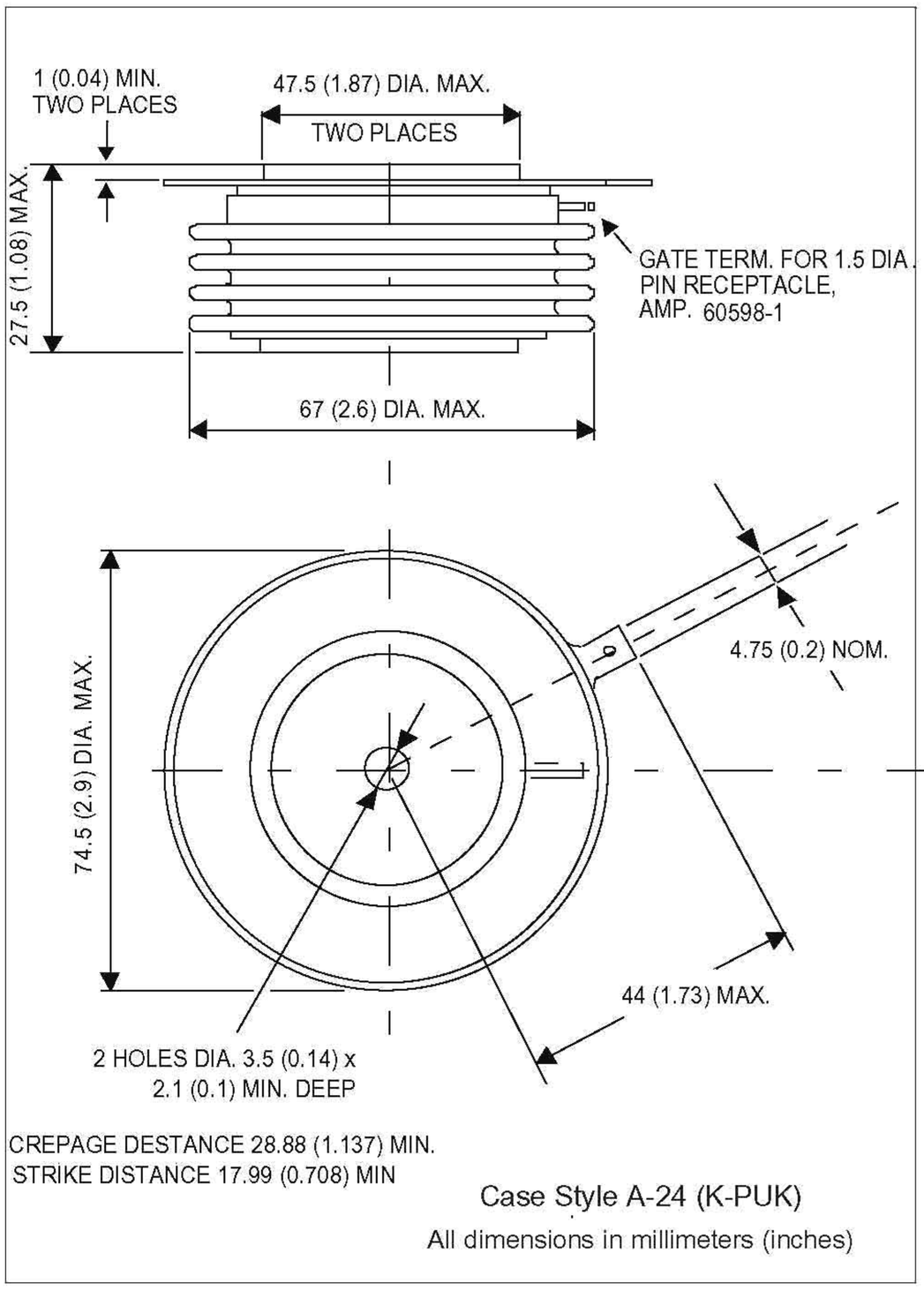
- *DC motor control (e.g. for machine tools).*
- *Controlled rectifiers (e.g. for battery charging, Uninterrupted Power Supply).*
- *AC controllers (e.g. for temperature control, lights control).*

800 PK (K - PUK)



Major Ratings and Characteristics

Parameter		800PK	Units
$I_{T(AV)}$		800	A
	@ T_{hs}	70	℃
$I_{T(RMS)}$		1600	A
	@ T_{hs}	70	℃
I_{TSM}	@ 50 Hz	8	kA
I^2t	@ 50 Hz	320	KA^2s
V_{DRM}/V_{RRM}		4500	V
t_q	typical	500	µs
T_J		125	℃



Case Style A-24 (K-PUK)

All dimensions in millimeters (inches)

ELECTRICAL SPECIFICATIONS

800 PK Series

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. @ $T_J = T_J$ max. mA
800 PK	410	4100 / 4100	4200	100
	420	4200 / 4200	4300	
	430	4300 / 4300	4400	
	440	4400 / 4400	4500	
	450	4500 / 4500	4600	

On - state Conduction

	Parameter	800 PK	Units	Conditions		
$I_{T(AV)}$	Max. average on-state current	800	A	180° conduction, half sine wave		
	@ Heatsink temperature	70	°C	double side (single side) cooled		
$I_{T(RMS)}$	Max RMS on-state current	1600	A	DC@25°C heatsink temperature double side cooled		
I_{TSM}	Max. peak, one-cycle non-repetitive surge current	8	kA	t = 10 ms	60% V_{RRM} reapplied	Sinusoidal half wave, Initial $T_J=T_J$ max.
I^2t	Maximum I^2t for fusing	320	KA^2s	t = 10 ms	100% V_{RRM} reapplied	
$V_{T(TO)}$	High level value of threshold voltage	1.14	V	(I> π x $I_{T(AV)}$),$T_J=T_J$ max		
r_t	High level value of on-state slope resistance	0.80	mΩ	(I> π x $I_{T(AV)}$),$T_J=T_J$ max.		
V_{TM}	Max. on state voltage	2.0	V	I_{PK} = 4000A,$T_J=T_J$ max, t_P = 10 ms sine pulse		
I_H	Maximum holding current	100	mA	T_J = 25°C , anode supply 12 V resistive load		
I_L	Typical latching current	400				

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Switching

	Parameter	800 PK	Units	Conditions
di/dt	Max. non-repetitive rate of rise of turned-on current	100	A/µs	Gate drive 20V, 20Ω , $t_r \leq 1\mu s$ $T_J = T_J$ max. anode voltage ≤ 80% V_{DRM}
t_q	Typical turn-off time	500	µs	I_{TM} =1000A, $T_J = T_J$ max. di/dt = 40A/µs ,V_R = 75V dv/dt = 50V/µs, 0.5 V_{DRM} Reapplied , t_p = 500µs

Blocking

	Parameter	800 PK	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	500	V/µs	$T_J = T_J$ max. linear to 80% rated V_{DRM}
I_{RRM} I_{DRM}	Max. peak reverse and off-state leakage current	50	mA	$T_J = T_J$ max. rated V_{DRM} /V_{RRM} applied

Triggering

	Parameter	800 PK		Units	Conditions	
P_{GM}	Maximum peak gate power	16		W	$T_J = T_J$ max., $t_p \leq 5$ ms	
$P_{G(AV)}$	Maximum average gate power	3.0			$T_J = T_J$ max., f = 50Hz, d% = 50	
I_{GM}	Max. peak positive gate current	3.0		A	$T_J = T_J$ max., $t_p \leq 5$ ms	
$+V_{GM}$	Maximum peak positive gate voltage	20		V	$T_J = T_J$ max., $t_p \leq 5$ ms	
$-V_{GM}$	Maximum peak negative gate voltage	5.0				
		TYP.	MAX.			
I_{GT}	DC gate current required to trigger	200 100 50	- 200 -	mA	T_J = - 40°C T_J = 25°C T_J = 125°C	Max.required gate trigger/ current/voltage are the lowest value which will trigger all units 12 V anode-to-cathode applied
V_{GT}	DC gate voltage required to trigger	1.4 1.1 0.9	- -	V	T_J = - 40°C T_J = 25°C T_J = 125°C	
I_{GD}	DC gate current not to trigger	10		mA	$T_J = T_J$ 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		

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Thermal and Mechanical Specifications

	Parameter	800 PK	Units	Conditions
T_J	Max.operating temperature range	125	°C	
T_{stg}	Max.storage temperature range	150		
R_{thJ-hs}	Max. thermal resistance, junction to heatsink	0.050 0.025	K/W	DC operation single side cooled DC operation double side cooled
F	Mounting force, ± 10%	24.5	KN	
wt	Approximate weight	550	g	
Case style		K-PUK		See Outline Table

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Fig. 1 - FULL CYCLE AVERAGE POWER LOSS
VERSUS
PEAK CURRENT at 50/60 Hz
(plasma spreading and conduction loss)

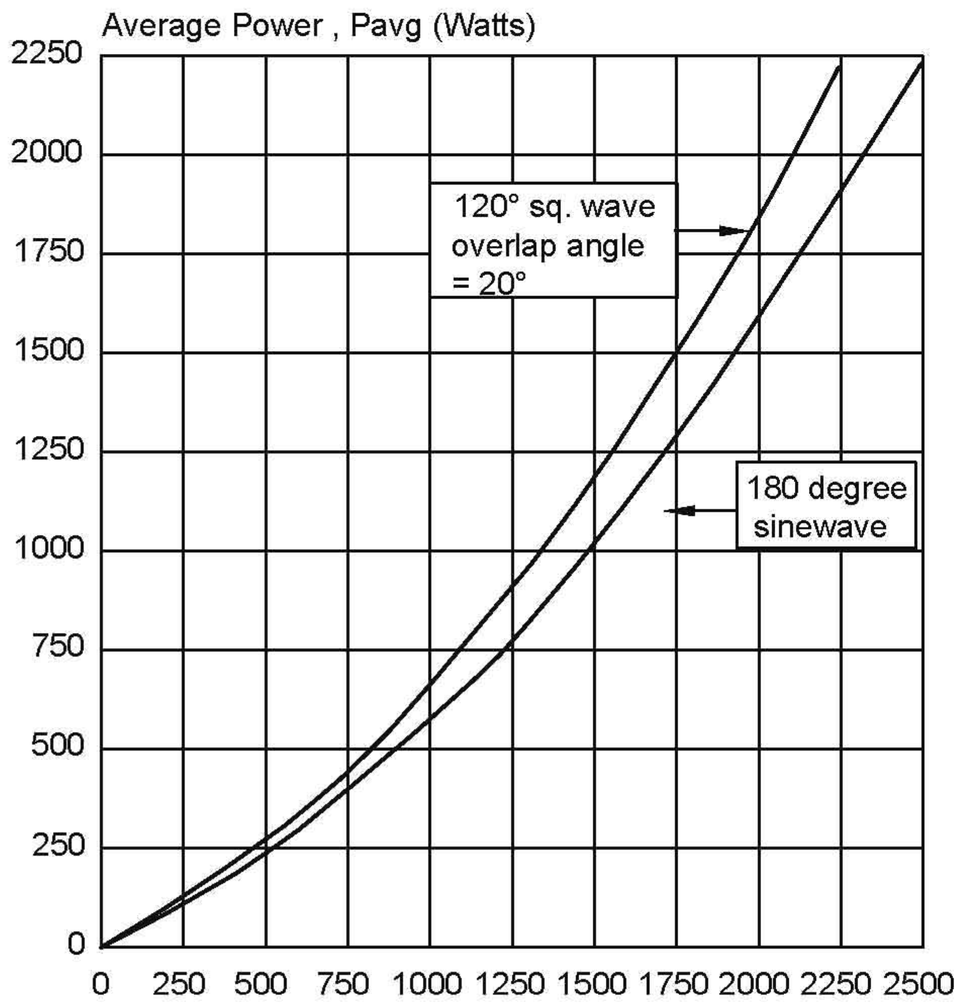


Fig. 2 - maximum peak recovery current
VERSUS
COMMUTATING di/dt

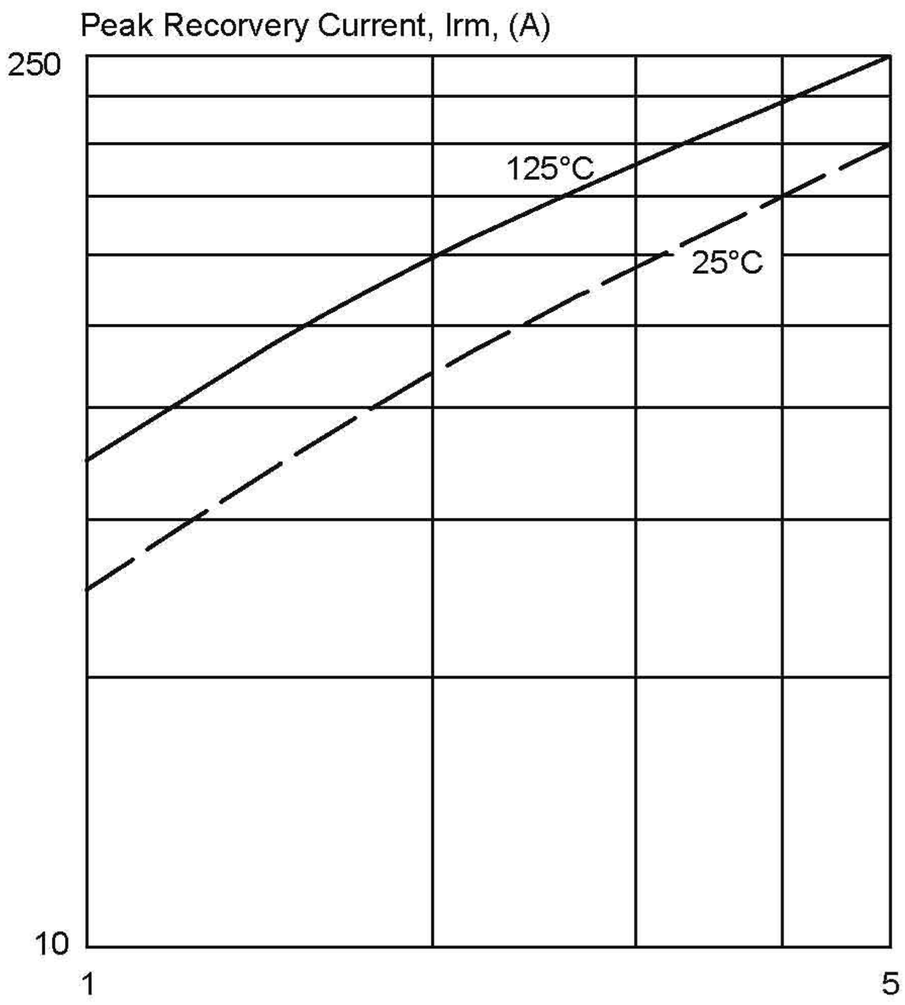


Fig. 3 - ON-STATE CHARACTERISTIC
Temperature Dependence

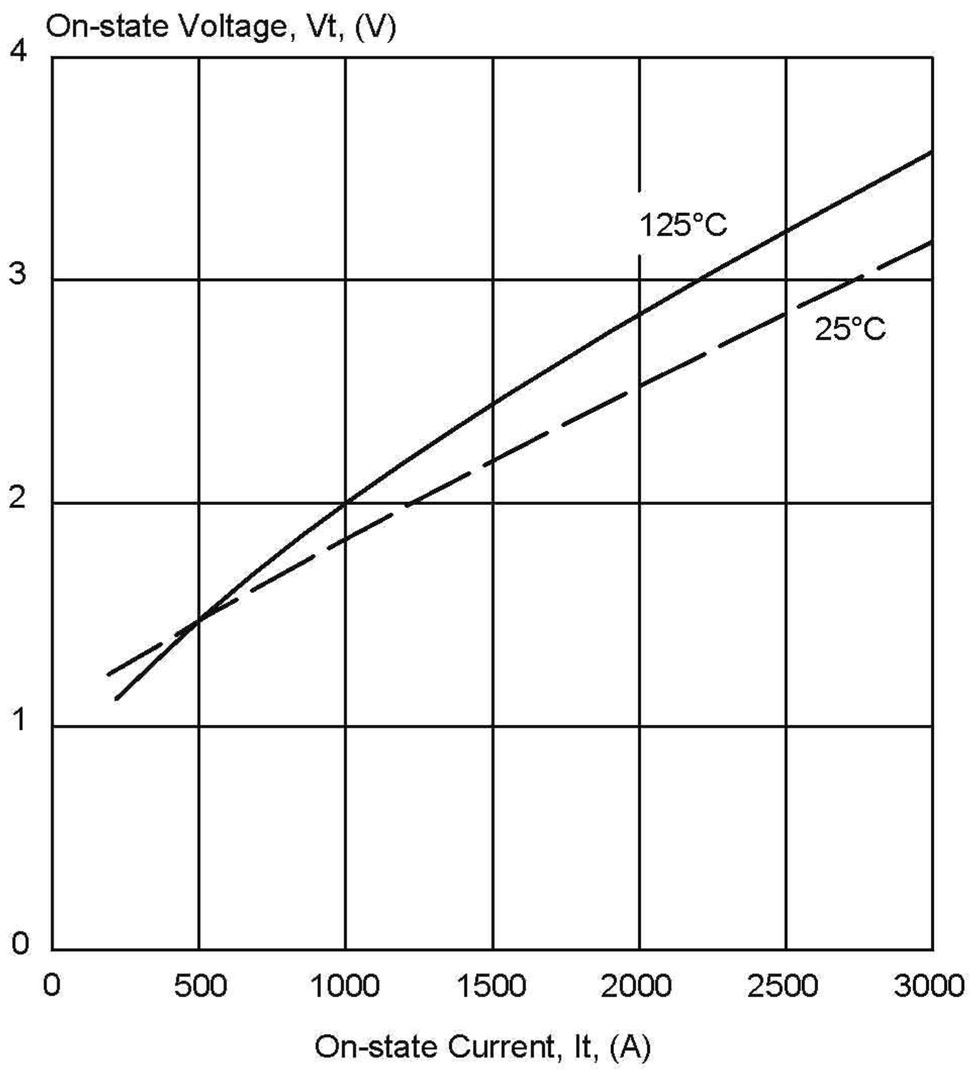
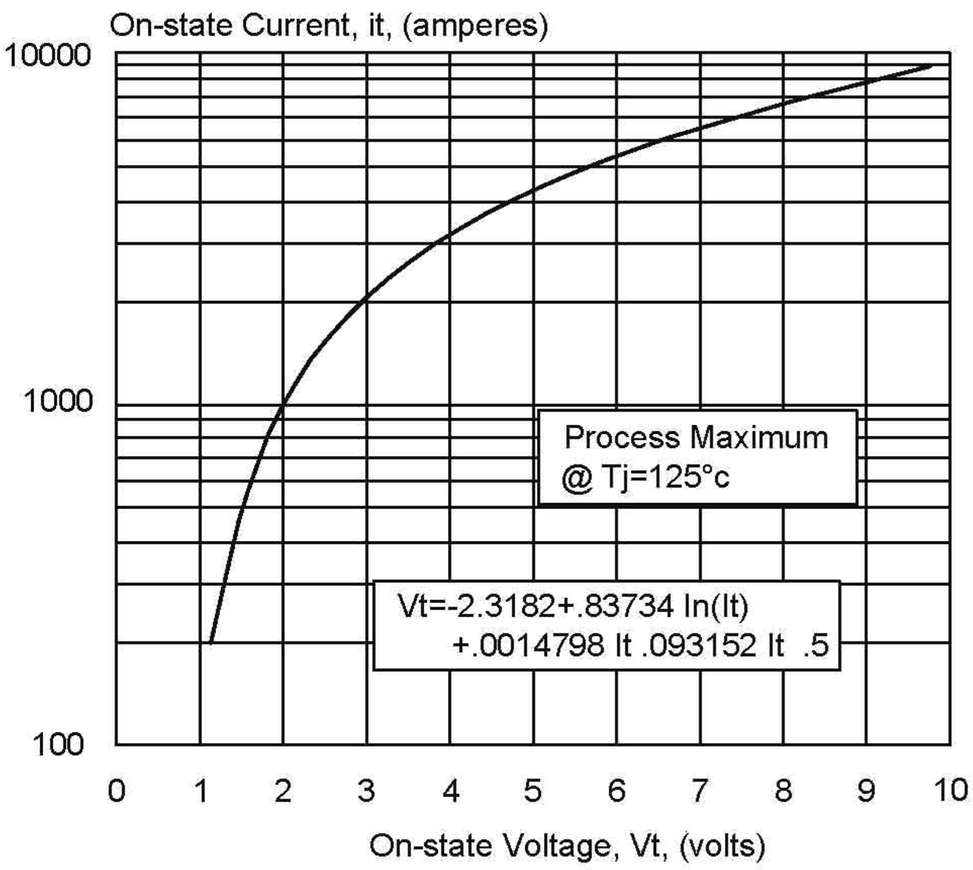


Fig. 4 - ON-STATE CHARACTERISTIC



GATE SUPPLY REQUIREMENTS

Open circuit voltage	30 V
Short circuit current	3 A
-rise time	0.5us
Pulse duration (min)	20us

Last update : Sept.2007