Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

High Power Thyristor
Hockey Puk Version
S-PUK Series 4400PS

Types : 4400 PS 320

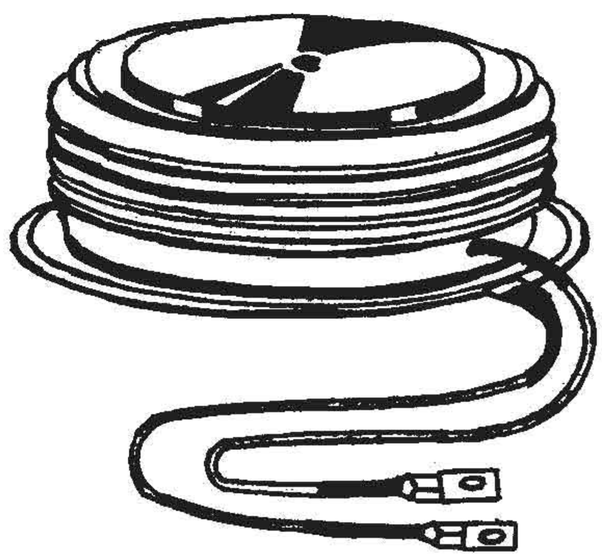
FEATURES

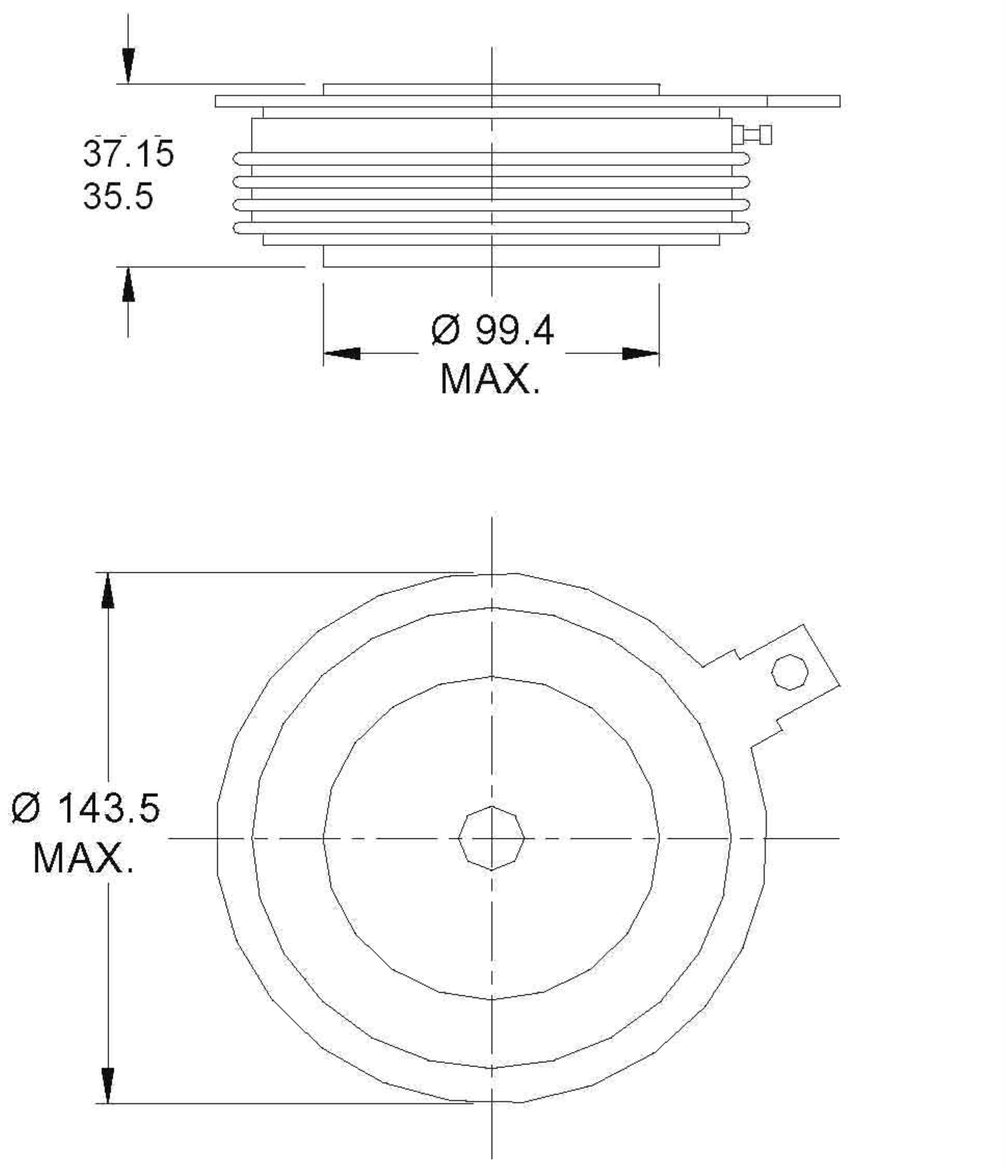
- *Center amplifying gate.*
- *Metal case with ceramic insulator*
- *High profile hockey - puk.*

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).*

4400 PS (S - PUK)





All dimension in millimeters

Major Ratings and Characteristics

Parameter		4400 PS	Units
$I_{T(AV)}$		4400	A
	@ T_{hs}	55	℃
$I_{T(RMS)}$		6908	A
	@ T_{hs}	55	℃
I_{TSM}	@ 50 Hz	56	KA
I^2t	@ 50 Hz	15900	KA^2s
V_{DRM}/V_{RRM}		3200	V
t_q	typical	500	µs
T_J		125	℃

ELECTRICAL SPECIFICATIONS

4400 PS 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
4400PS	270	2700/2700	2800	100
	280	2800/2800	2900	
	290	2900/2900	3000	
	300	3000/3000	3100	
	310	3100/3100	3200	
	320	3200/3200	3300	

On - state Conduction

	Parameter	4400PS	Units	Conditions		
$I_{T(AV)}$	Max. average on-state current	4400	A	180° conduction, half sine wave		
	@ Heatsink temperature	55	°C	double side cooled		
$I_{T(RMS)}$	Max RMS on-state current	6908	A	DC@55°C heatsink temperature double side cooled		
I_{TSM}	Max. peak, one-cycle non-repetitive surge current	56	KA	t = 10 ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J=T_J$ max.
I^2t	Maximum I^2t for fusing	15900	KA^2s	t = 10 ms	No voltage reapplied	
$V_{T(TO)}$	Threshold voltage	0.94	V	$T_J=T_J$ max		
r_t	On-state slope resistance	0.12	mΩ	$T_J=T_J$ max.		
V_{TM}	Max. on state voltage	1.50	V	I_{PK} = 4000A,$T_J=T_J$ max, t_P = 10 ms sine pulse		
I_H	Maximum holding current	400	mA	T_J = 25°C , anode supply 12 V resistive load		
I_L	Typical latching current	1000	mA	T_J = 25°C , anode supply 12 V resistive load		

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Switching

	Parameter	4400PS	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	4400PS	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	300	mA	$T_J = T_J$ max. rated V_{DRM} /V_{RRM} applied

Triggering

	Parameter	4400PS		Units	Conditions	
P_{GM}	Maximum peak gate power	50		W	$T_J = T_J$ max., $t_p \leq 5$ ms	
$P_{G(AV)}$	Maximum average gate power	5			$T_J = T_J$ 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	400 300 100	- 300 -	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	3.0 4.0 1.5	- 4.0 -	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	4400PS	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	0.007	K/W	DC operation double side cooled
F	Mounting force, ± 10% ,	65	KN	
wt.	Approximate weight	3000	g	
	Case style	S-PUK		See Outline Table

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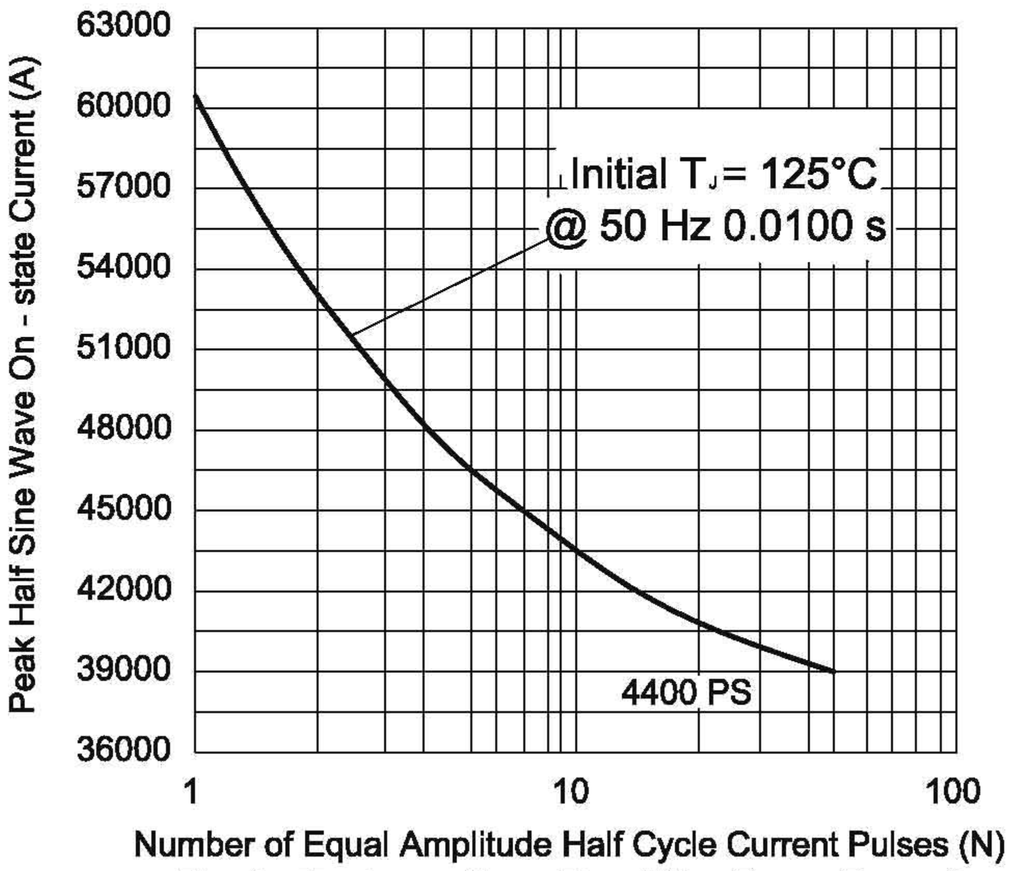

Fig. 1 - Maximum Non - Repetitive Surge Current

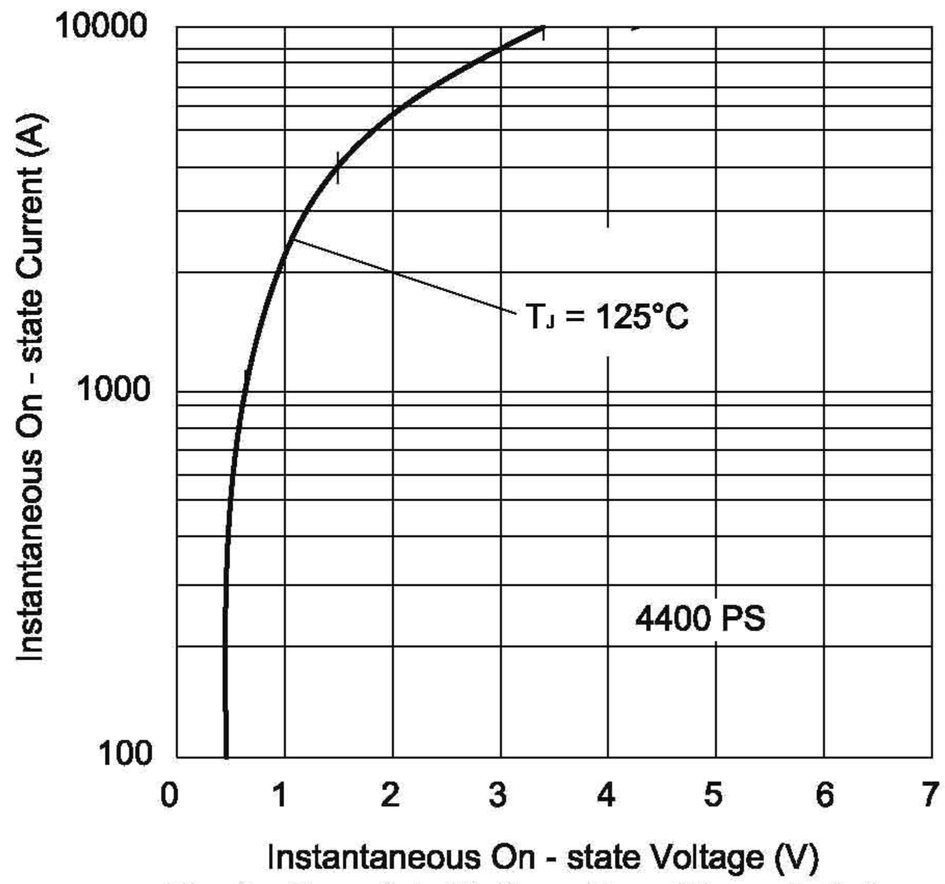

Fig. 2 - On - state Voltage Drop Characteristics

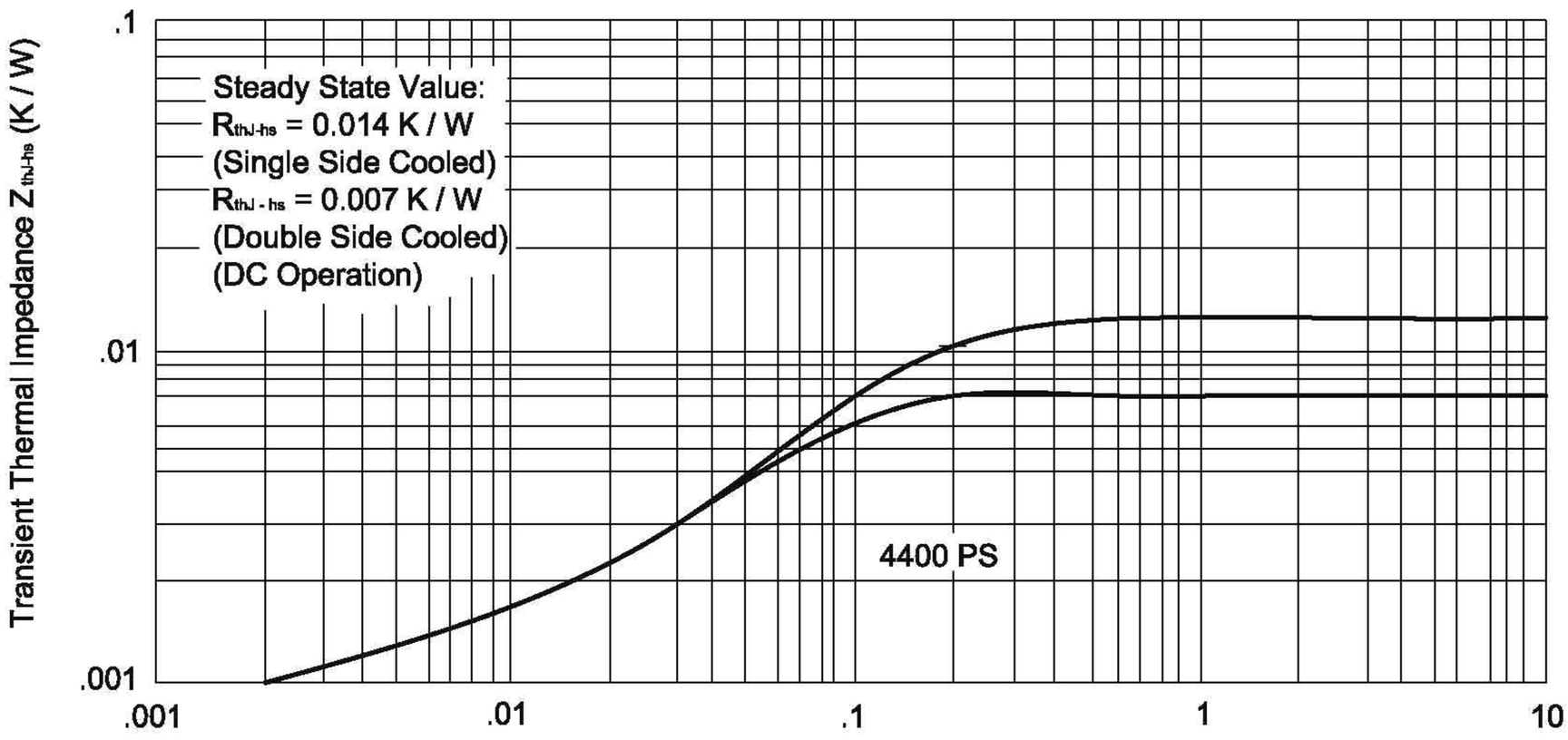

Fig. 3 - Thermal Impedance Z_{thJ-hs} Characteristics

Last update : Sept. 2007