Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

High Power Thyristor
Hockey Puk Version

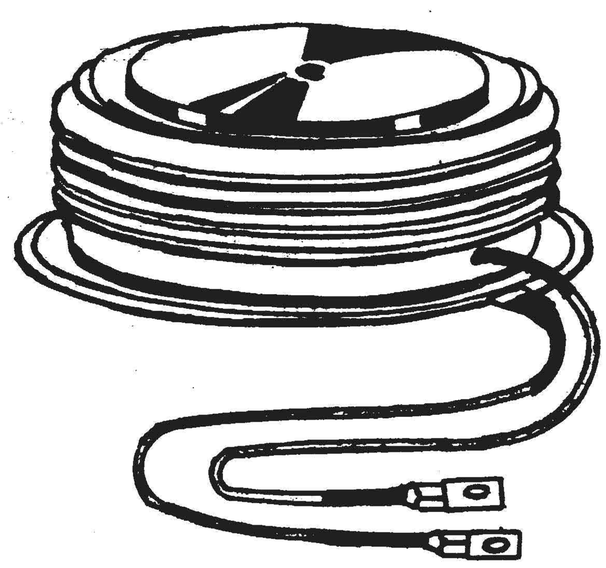
Q-PUK/R-PUK Series 2000PQ/PR

Types : 2000 PQ/PR
350 to 450

FEATURES

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

(Q/R - 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 and Characteristics

Parameter		2000 PQ/PR	Units
$I_{T(AV)}$		2000	A
	@ T_{hs}	55	^0C
$I_{T(RMS)}$		3140	A
	@ T_{hs}	55	^0C
I_{TSM}	@ 50 Hz	24400	A
I^2t	@ 50 Hz	2977	KA^2S
V_{DRM} / V_{RRM}		3500 to 4500	V
t_q	typical	400	µs
T_J		-40 to 125	^0C

ELECTRICAL SPECIFICATIONS

Types : 2000PQ/PR

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
2000PQ/PR	350	3500/3500	3600	100
	380	3800/3800	3900	
	410	4100/4100	4200	
	450	4500/4500	4600	

On - state Conduction

	Parameter	2000PQ/PR	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	2000	A	180° conduction, half sine wave	
	@ Heatsink temperature	55	°C	double side cooled	
$I_{T(RMS)}$	Max RMS on-state current	3140	A	DC@55°C heatsink temperature double side cooled	
I_{TSM}	Max. peak, one-cycle non-repetitive surge current	24400	A	t = 10 ms	Sinusoidal half wave, Initial T_J=T_J max.
I^2t	Maximum I^2t for fusing	2977	KA^2s	t = 10 ms	
$V_{T(TO)}$	Threshold voltage	1.35	V	T_J=T_J max	
r_t	On-state slope resistance	0.32	mΩ	T_J=T_J max.	
V_{TM}	Max. on state voltage	1.85	V	I_{PK} = 2000A,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	Maximum latching current	1000	mA		

Types : 2000PQ/PR

Switching

	Parameter	2000PQ/PR	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	400	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	2000PQ/PR	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	100	mA	$T_J = T_J$ max. rated V_{DRM} /V_{RRM} applied

*Higher dv/dt is available on request

Triggering

	Parameter	2000PQ/PR	Units	Conditions
P_{GM}	Maximum peak gate power	30	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		
I_{GT}	DC gate current required to trigger	250 MAX.	mA	$T_J = 25°C$
V_{GT}	DC gate voltage required to trigger	3.0 MAX.	V	$T_J = 25°C$

Max.required gate trigger/ current/voltage are the lowest value which will trigger all units 12 V anode-to-cathode applied

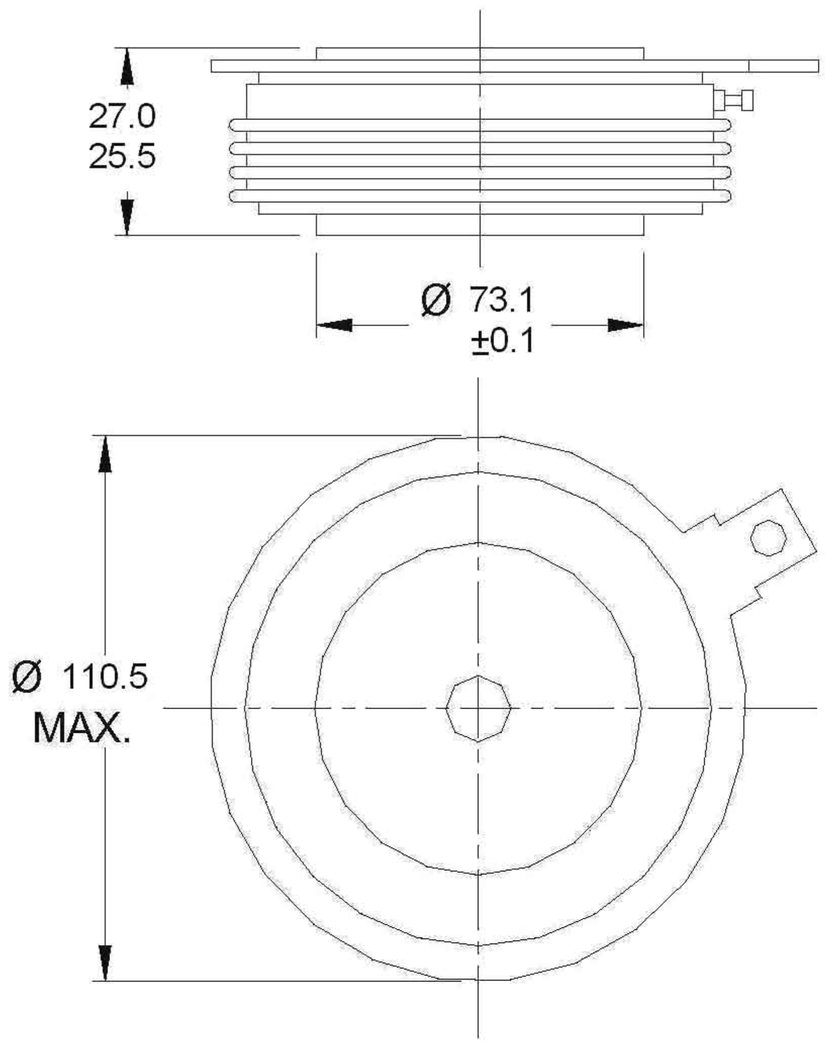
I_{GD}	DC gate current not to trigger	10	mA	$T_J = T_J$ max.	Max. gate current/voltage not to trigger is the max. value which will not trigger any unit with rated V_{DRM} anode-to-cathode applied
V_{GD}	DC gate voltage not to trigger	0.25	V		

Types : 2000PQ/PR

Thermal and Mechanical Specifications

	Parameter	2000PQ/PR	Units	Conditions
T_J	Max.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	0.012	K/W	DC operation double side cooled
F	Mounting force, ± 10%	40	KN	
wt	Approximate weight	1050/1500	g	
	Case style	Q-PUK/R-PUK		See Outline Table

(Q - PUK)



(R - PUK)