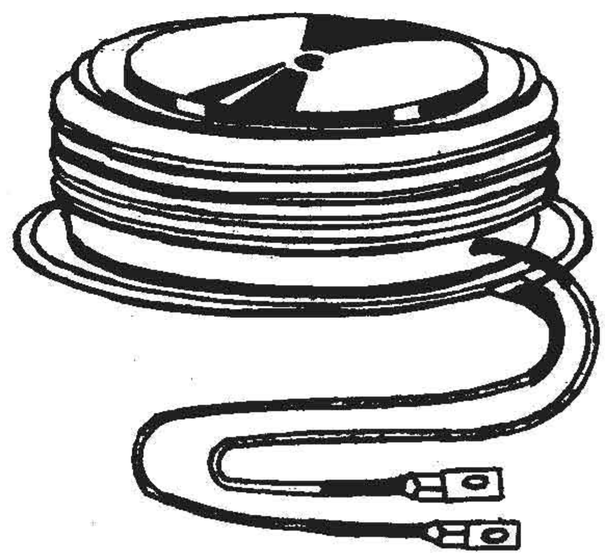
Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

High Power Thyristor
Hockey Puk Version
Q/R-PUK Series 3000 PR/PQ

Type : 3000 PR/PQ 200 to 350

(R/Q-PUK)



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).*

Major Ratings and Characteristics

Parameter		3000 PR/PQ	Units
$I_{T(AV)}$		3000	A
	@ T_{hs}	55	℃
$I_{T(RMS)}$		4710	A
	@ T_{hs}	55	℃
I_{TSM}	@ 50 Hz	52	KA
I^2t	@ 50 Hz	13520	KA^2s
V_{DRM}/V_{RRM}		2000 to 3500	V
t_q	typical	400	µs
T_J		-40 to 125	℃

ELECTRICAL SPECIFICATIONS

Type : 3000 PR/PQ

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
3000PR/PQ	200	2000/2000	2100	300
	240	2400/2400	2500	
	280	2800/2800	2900	
	320	3200/3200	3300	
	350	3500/3500	3600	

On - state Conduction

	Parameter	30000PR/PQ	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	3000	A	180° conduction, half sine wave	
	@ Heatsink temperature	55	°C	double side cooled	
$I_{T(RMS)}$	Max RMS on-state current	4710	A	DC@55°C heatsink temperature double side cooled	
I_{TSM}	Max. peak, one-cycle non-repetitive surge current	52	KA	t = 10 ms	Sinusoidal half wave, Initial $T_J=T_J$ max.
I^2t	Maximum I^2t for fusing	13520	KA^2s	t = 10 ms	
$V_{T(TO)}$	Threshold voltage	0.88	V	$T_J=T_J$ max	
r_t	On-state slope resistance	0.14	mΩ	$T_J=T_J$ max.	
V_{TM}	Max. on state voltage	1.55	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	T_J = 25°C , anode supply 12 V resistive load	

Type : 3000 PR/PQ 350

Switching

	Parameter	3000 PR/PQ	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	3000 PR/PQ	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

*Higher dv/dt is available on request

Triggering

	Parameter	3000 PR/PQ	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 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 MAX.	V	T_J = 25°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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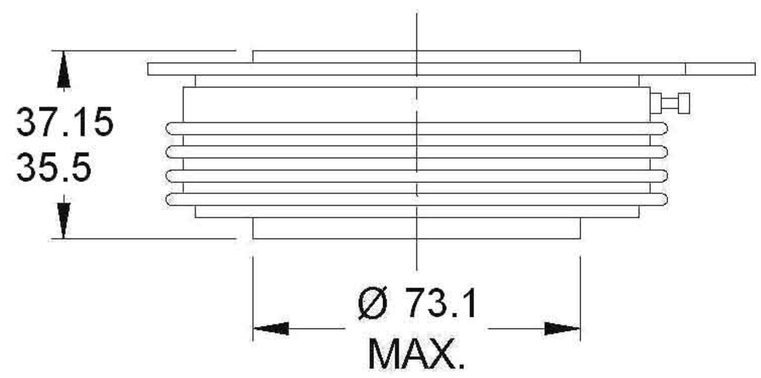
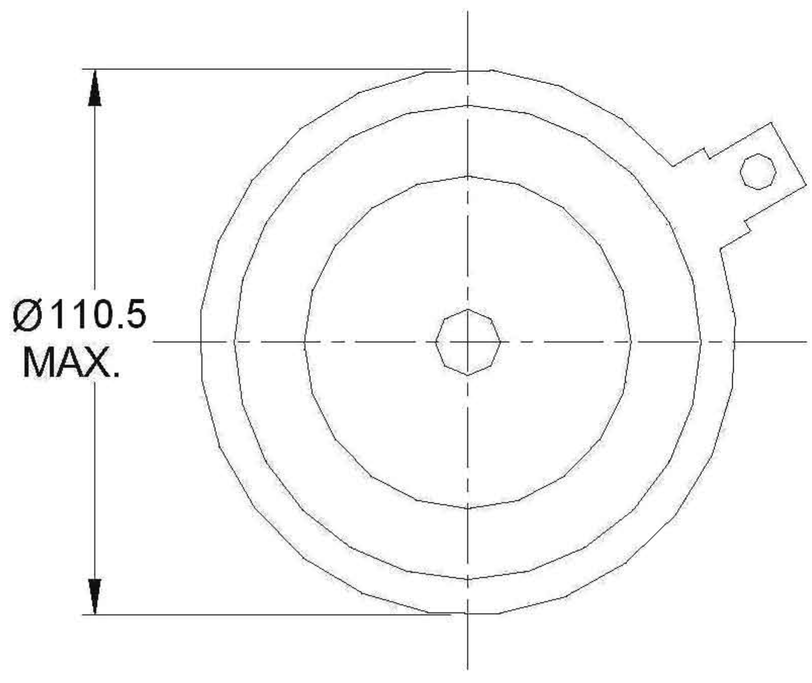
Thermal and Mechanical Specifications

	Parameter	3000PR/PQ	Units	Conditions
T_J	Max.operating temperature range	-40 to 125	°C	
T_{stg}	Max.storage temperature range	-40 to 150		
$R_{thJ\text{-}hs}$	Max. thermal resistance, junction to heatsink	0.012	K/W	DC operation double side cooled
F	Mounting force, ± 10% ,	40	KN	
wt.	Approximate weight	1500/1050	g	
	Case style	**R/Q-PUK**		See Outline Table

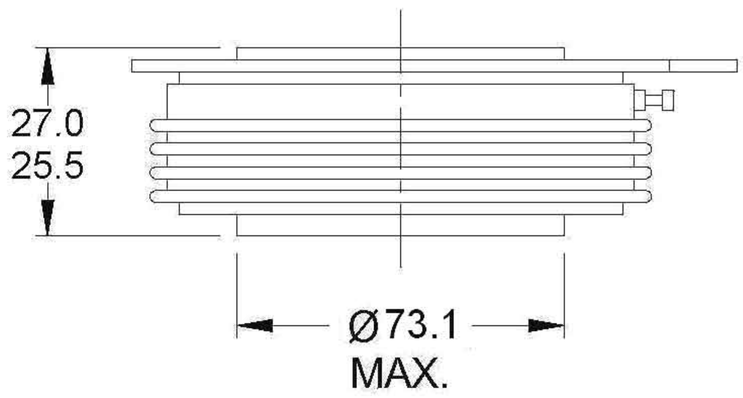
3000PR(R-PUK)

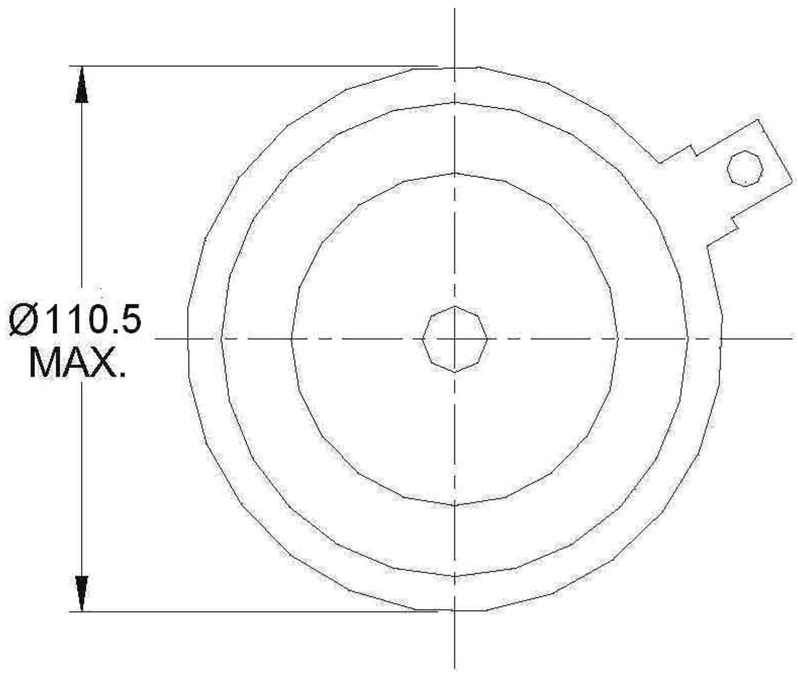




All dimension in millimeters

3000PQ (Q-PUK)





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