



Ruttonsha International Rectifier Ltd.

PHASE CONTROL THYRISTOR

Hockey Puk Version
Type: 470PB 430

FEATURES

- # Center amplifying gate.
- # Metal case with ceramic insulator.
- # International standard (B-PUK)
- # High profile hockey - puk.

TYPICAL APPLICATION

- # DC Motor control
- # Controlled dc power supplies
- # AC Controllers

MAJOR RATING & CHARACTERISTICS

Parameters		470PB	Units
$I_{T(AV)}$	@ 70°C	470	A
	@ 60°C	529	A
$I_{T(RMS)}$	@ 70°C	740	A
I_{TSM}	@ 50Hz	6.4×10^3	A
I^2t	@ 50Hz	204×10^3	A ² S
$V_{DRM} - V_{RRM}$		3800 to 4300	V
T_J		-40 to 125	°C

SILICON CONTROL RECTIFIER

ELECTRICAL SPECIFICATION 470PB SERIES

VOLTAGE RATINGS

Type Number	Voltage Code	V_{RMM}/V_{DRM} max. repetitive peak reverse voltage V	V_{RSM} max.Non-repetitive peak reverse voltage V	I_{DRM} / I_{RRM} max. @ 125°C Max. mA
470PB	380	3800	3900	100
	400	4000	4100	
	420	4200	4300	
	430	4300	4400	

ON-STATE CONDUCTION

	Parameter	470PB	Unit	Conditions	
$I_{T(AV)}$	Max, average on-state current @ Case temperature	470	A	180° conduction, half sine wave	
		70	°C		
		529	A		
		60	°C		
$I_{T(RMS)}$	Max, RMS on-state current @70°C	740	A	as AC switch	
I_{TSM}	Max, peak, one cycle on-state, non-repetitive surge current	6.4×10^3	A	$t = 10ms$	Sinusoidal half wave, Initial $T_j = T_j \text{ max.}$
I^2t	Maximum I^2t for fusing	204×10^5	A ² s	$t = 10ms$	Sinusoidal half wave, Initial $T_j = T_j \text{ max.}$
$V_{T(TO)}$	Threshold voltage	1.0	V	$T_j = T_j \text{ max.}$	
r_t	On-state slope resistance	1.5	mΩ	$T_j = T_j \text{ max,}$	
V_{TM}	Max, on-state voltage drop	1.78	V	$I_T = 500Amps, 125^\circ C$	
I_H	Holding current	200	mA	Anod supply = 5V, initial $I_r = 30\mu s, T_j = 25^\circ C$	
I_L	Latching current	500	mA	Anod supply = 5V, resistive load =1Ω, gate pulse : 10V, 100μs, $T_j = 25^\circ C$	

Switching

Maximum rated values

	Parameter	470PB			Unit	Conditions
		min	Typ	max.		
Q_{rr}	Reverse recovery charge	450		1400	μAs	$T_{vj} = 125^\circ C, I_{TRM} 2000A$ $V_R = 200 V$ $di/dt = - 1.5 A/\mu s$
I_{RM}	Reverse recovery current	25		40	A	
t_{gd}	Gate turn-on delay time			3	μs	$T_{vj} = 25^\circ C, V_D = 0.4 V_{RM}, I_{FG} = 2A, t_r = 0.5 \mu s$

BLOCKING

	Parameter	470PB	Unit	Conditions
dv/dt	Maximum critical rate of rise off-state voltage	1000	V/μs	$T_j = 125^\circ C$, exponential to 67% rated V_{DRM}
I_{RRM} I_{DRM}	Max. peak reverse and off-state leakage current	100	mA	$T_j = 125^\circ C$, rated V_{DRM} / V_{RRM} applied
di/dt	Repetitive Critical rate of rise of on-state current	100	A/μs	$T_j = 125^\circ C$

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TRIGGERING

	Parameter	470PB	Unit	Conditions
P_{GM}	Max, peak gate power	20	W	$T_j = 125^\circ\text{C}$, $t_p = 100\ \mu\text{s}$
$P_{G(AV)}$	Maximum average gate power	4		$T_j = 125^\circ\text{C}$, $f = 50\text{Hz}$, $d\% = 50$
I_{GM}	Max, peak positive gate current	3.0	A	$T_j = 125^\circ\text{C}$, $t_p \leq 5\text{ms}$
$+V_{GM}$	Max. peak positive gate voltage	20.0	V	$T_j = 125^\circ\text{C}$ $t_p \leq 5\text{ms}$
$-V_{GM}$	Max. peak negative gate voltage	5.0		
I_{GT}	DC gate current required to trigger	300	mA	$V_D = 12\text{V}$.
V_{GT}	DC gate voltage for to trigger	3.0	V	$V_D = 12\text{V}$.
I_{GD}	DC gate current not to trigger	10	mA	$T_j = T_j \text{ max.}$
V_{GD}	DC gate voltage not to trigger	0.3	V	
T_q	Typical turn-off time	600	μs	$I_{TM}=500\text{A}$, $di/dt=-10\text{A}/\mu\text{s}$ $V_R=50\text{V}$, Re-applied $dV/dt=30\text{V}/\mu\text{s}$ $T_j=125^\circ\text{C}$
T_d	Typical turn-off time	3.0	μs	$I_{TM}=50\text{A}$, $V_D = 67\% V_{DRM}$ Gate pulse $V_G=30\text{V}$, $R_G=10\text{ohm}$. $t_r=0.1\mu\text{s}$ $t_p=20\mu\text{s}$

THERMAL AND MECHANICAL SPECIFICATION

	Parameter	470PB	Unit	Conditions
T_j	Max, operating temperature range	-40 to 125	$^\circ\text{C}$	
T_{slg}	Max, storage temperature range	-40 to 140		
R_{thJ-c}	Max, thermal resistance, junction to case	36	K/kW	Double side cooled.
F	Mounting force $\pm 10\%$	10 to 12	kN	
W t	Approximate Weight	255	g	
	Case style	B-PUK		

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OUTLINE DIAGRAM

B-PUK

