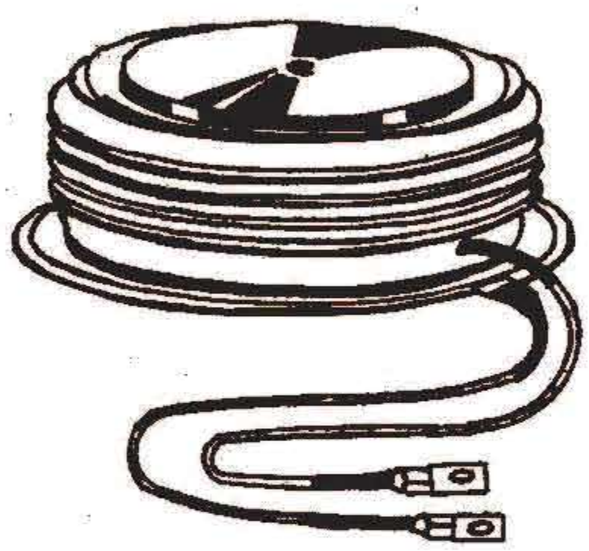
Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

High Power Thyristor
Hockey Puk Version
K-PUK Series 2200PK

Types : 2200PK 20 to 2200PK 60

2200 PK (K - PUK)



FEATURES

- *Center amplifying gate.*
- *Metal case with ceramic insulator*
- *International standard case A-24.*
- *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 & CHARACTERISTICS

Parameters		2200PK	Units
$I_{T(AV)}$		2310	A
	@ T_{hs}	55	^0C
$I_{T(RMS)}$		3626	A
	@ T_{hs}	55	^0C
I_{TSM}	@ 50 Hz	42500	A
I^2t	@ 50 Hz	9027	KA^2s
V_{DRM} / V_{RRM}		200 to 600	V
t_q	typical	200	µs
T_J		-40 to 125	^0C

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2200PK..Series

ON-STATE CONDUCTION

Type Number	Voltage Code	V_{RRM} / V_{DRM}, max. repetitive peak and off-state voltage V	V_{RSM}, max. non-repetitive peak voltage V	I_{DRM} / I_{RRM} max. @ 125^{0}C mA
2200PK	20	200	300	100
	40	400	500	
	60	600	700	

ON-STATE CONDUCTION

	Parameter	2200PK	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	2310	A	180^0 conduction, half sine wave	
	@ heat sink temperature	55	^{0}C	double side cooled	
$I_{T(RMS)}$	Max. RMS on-state current	3626		@55^{0}C heat sink temperature (double side cooled)	
I_{TSM}	Max. peak one cycle non-repetitive surge current	42500	A	t = 10ms	Sinusodial half wave, Initial $T_J = T_J$ max.
I^2t	Maximum I^2t for fusing	9027	kA^2s	t = 10ms	
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for fusing	90270	$kA^2\sqrt{s}$	t = 0.1 to 10ms. No voltage reapplied.	
$V_{T(TO)1}$	Threshold voltage	0.83	V	$T_J = T_J$ max.	
r_{t1}	On state slope resistance	0.011	mΩ	$T_J = T_J$ max.	
V_{TM}	Max. on state voltage	1.44	V	I_{pk} = 8000A, $T_J = T_J$ max., t_p = 10ms sine pulse	
I_H	Maximum holding current	600	mA	T_J = 25^{0}C, anode supply 12V resistive load	
I_L	Latching current	1000			

SWITCHING

	Parameter	2200PK	Units	Conditions
di/dt	Max. non-repetitive rate of rise of turned-on current	100	A/µs	Gate drive 20V, 20Ω, tr $\leq$ 1 µs $T_J = T_J$ max., anode voltage $\leq$ 80% V_{DRM}
t_d	Typical delay time	1.9	µs	Gate current 1A, di_g/dt = 1A/µs V_d = 0.67% V_{DRM}, T_J = 25^{0}C
t_q	Typical turn-off time	200		I_{TM} = 550A, $T_J = T_J$ max., di/dt = 40A/µs, V_R = 50V dv/dt = 20V/µs, Gate 0V 100Ω, t_p = 500µs

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BLOCKING

	Parameter	2200PK	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

TRIGGERING

	Parameter	2200PK	Units	Conditions	
P_{GM}	Maximum peak gate power	16.0	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	
$+V_{GM}$	Max. peak positive gate voltage	20	V	$T_J = T_J$ max., $t_p \leq 5$ms	
$-V_{GM}$	Max. peak negative gate voltage	5.0			
I_{GT}	DC gate current required to trigger	250	mA	$T_J = 25^0$C	Max. required gate trigger/current / voltage are the lowest value which will trigger all units 12V anode-to-cathode applied.
V_{GT}	DC gate voltage required to trigger	3.0	V	$T_J = 25^0$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		

THERMAL AND MECHANICAL SPECIFICATION

	Parameter	2200PK	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	^{0}C	
T_{stg}	Max. storage temperature range	-40 to 150		
R_{thJ-hs}	Max. thermal resistance, junction to heat sink	0.021	K/W	DC operation double side cooled
F	Mounting force, ±10%	24500 (2500)	N (kg)	
w t	Approximate weight	425	g	
	Case style	A-24(K-PUK)		See outline

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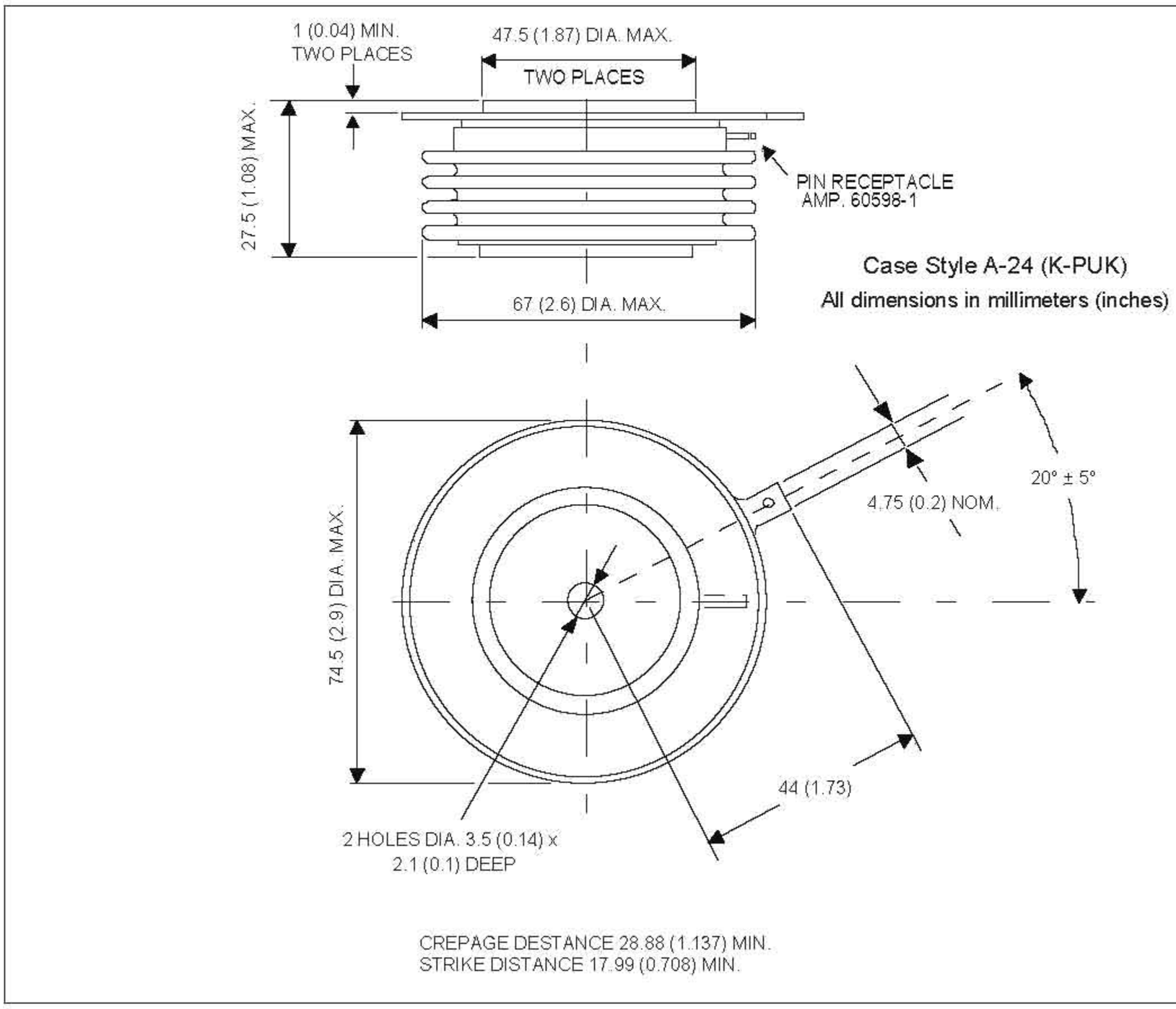
2200PK..Series

Outline Table



Case Style A-24 (K-PUK)

All dimensions in millimeters (inches)

CREPAGE DESTANCE 28.88 (1.137) MIN.
STRIKE DISTANCE 17.99 (0.708) MIN.

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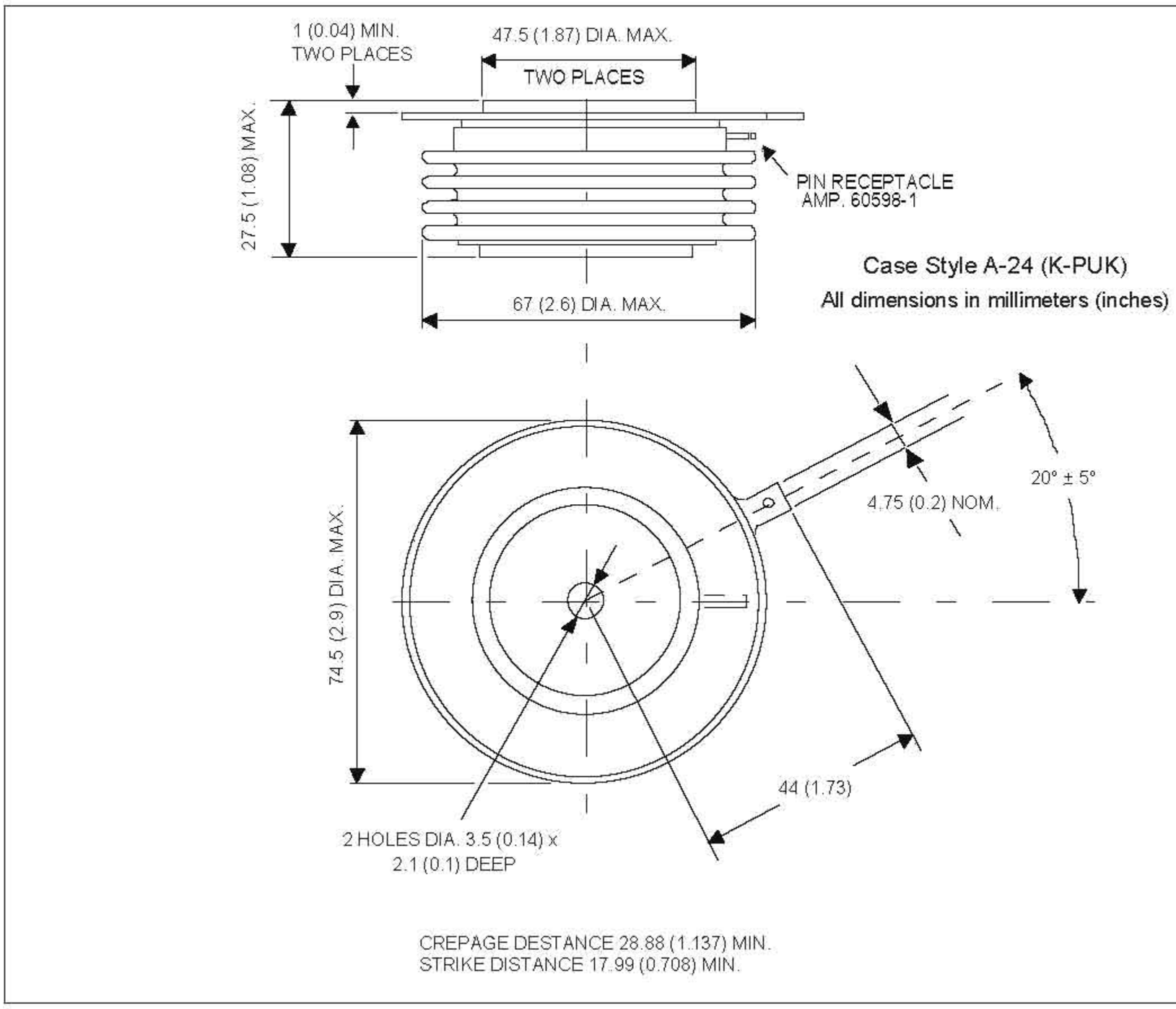

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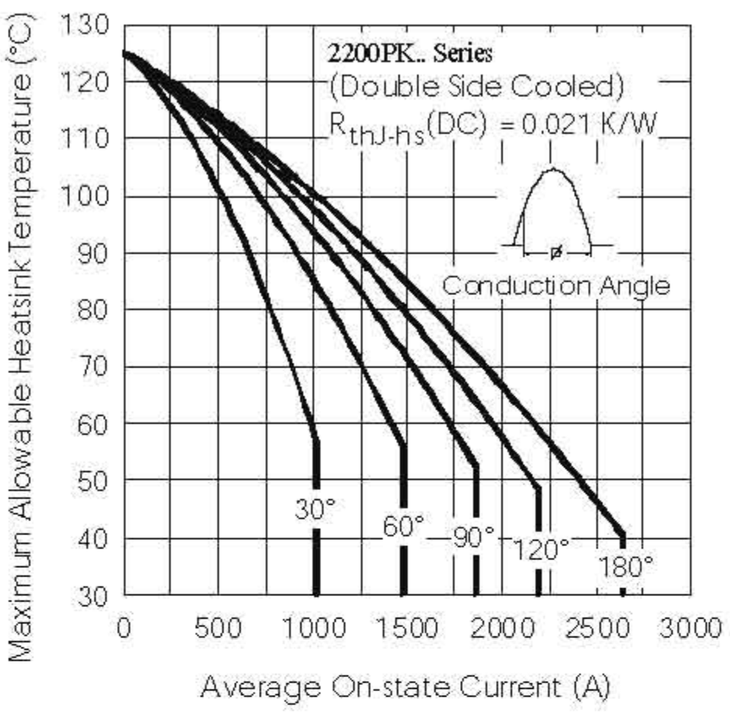

Fig. 1 · Current Ratings Characteristics

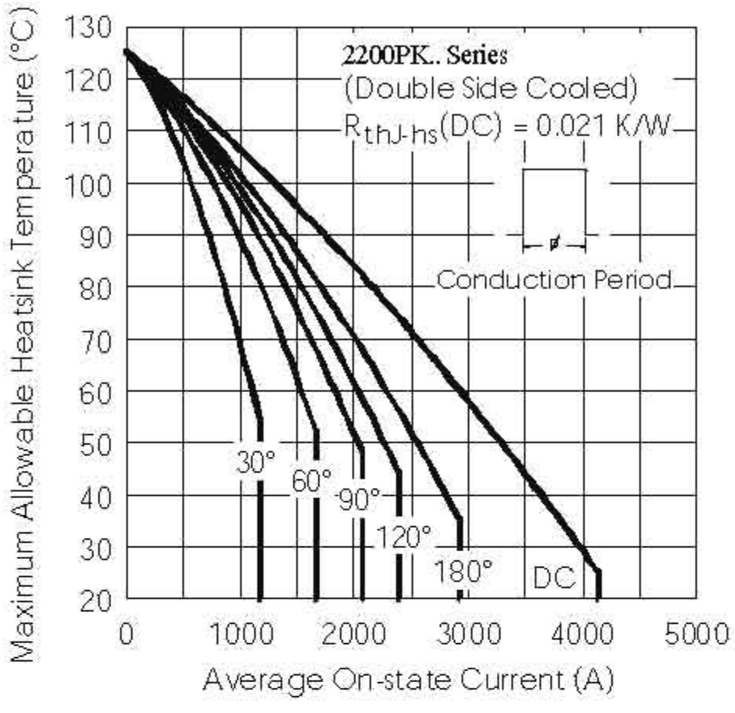

Fig. 2 - Current Ratings Characteristics

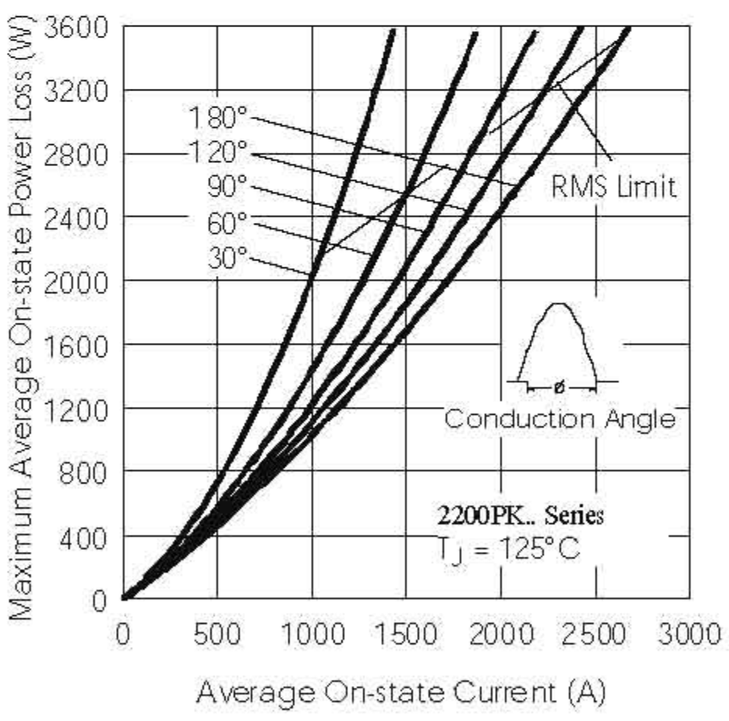

Fig.3 - On-state Power Loss Characteristics

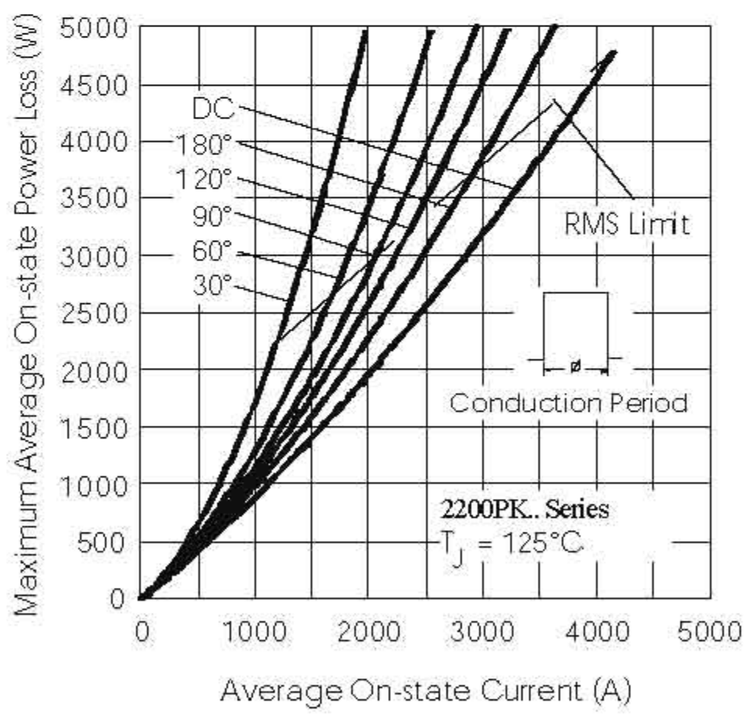

Fig. 4 - On-state Power Loss Characteristics

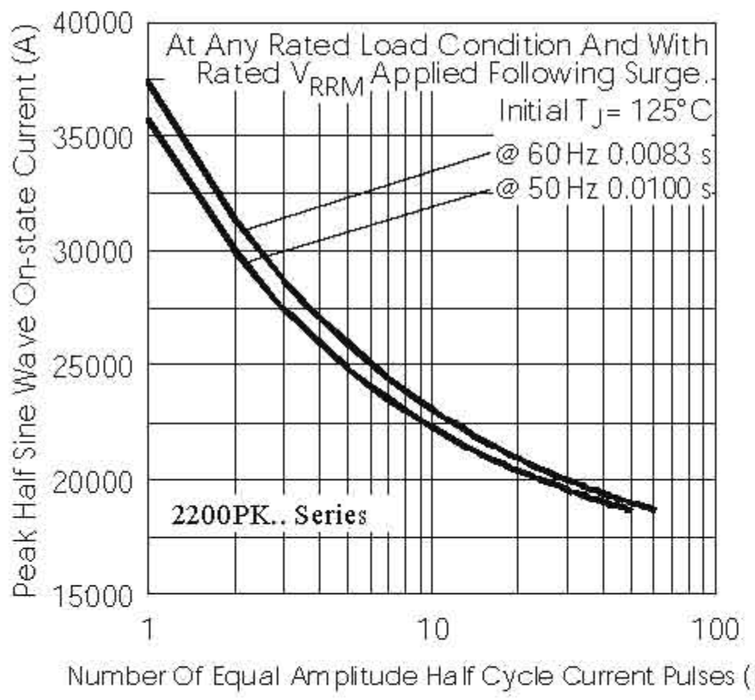

Fig. 5 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

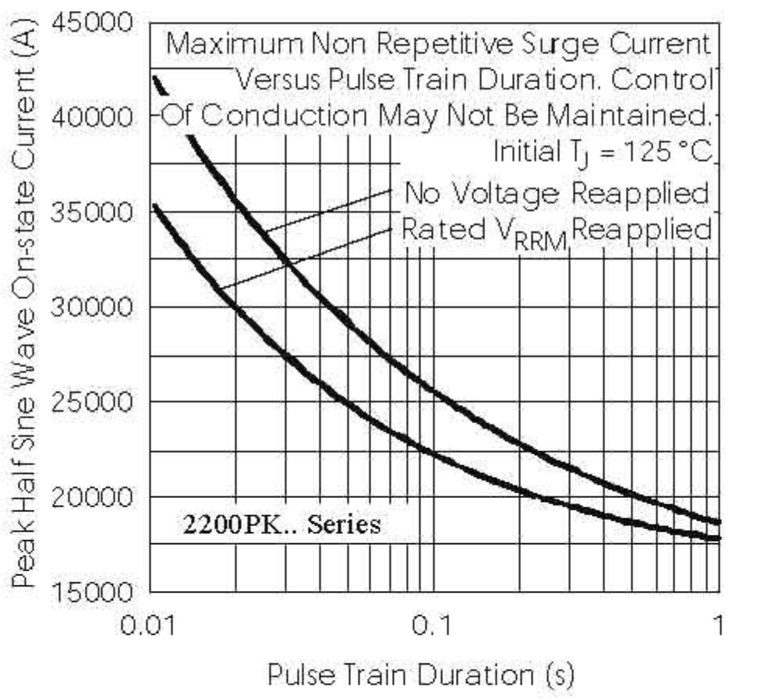

Fig. 6 - Maximum Non-Repetitive Surge Current
Single and Double Side Cooled

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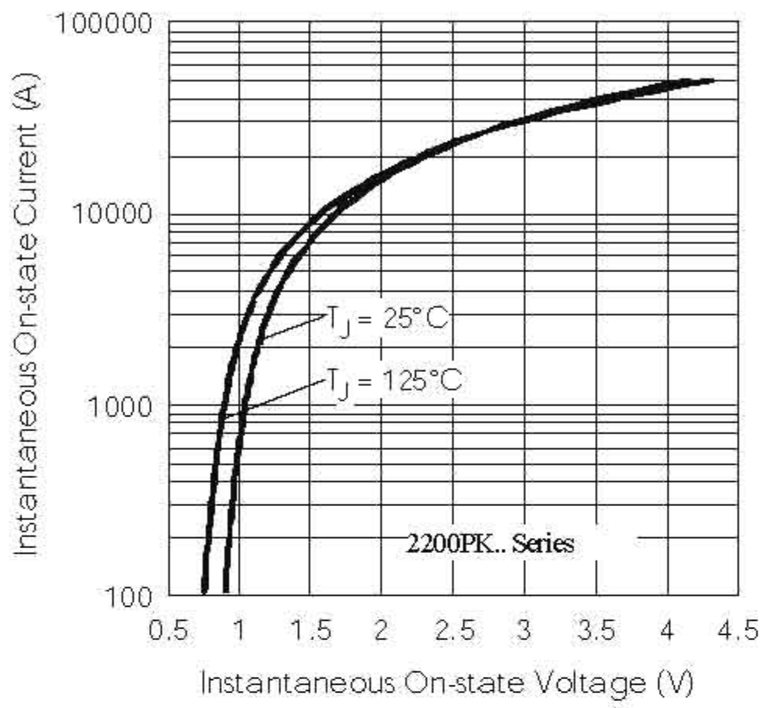

Fig. 7 - On-state Voltage Drop Characteristics

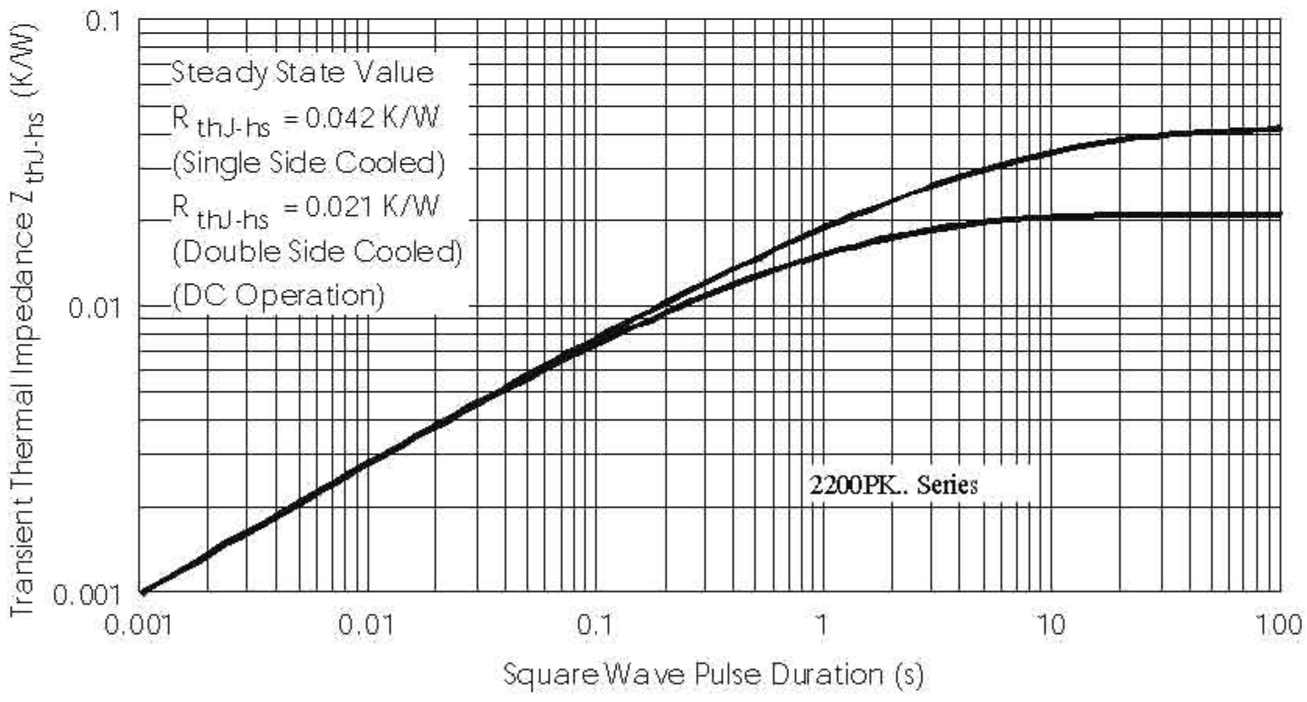

Fig. 8 - Thermal Impedance Z_{thJ-hs} Characteristics

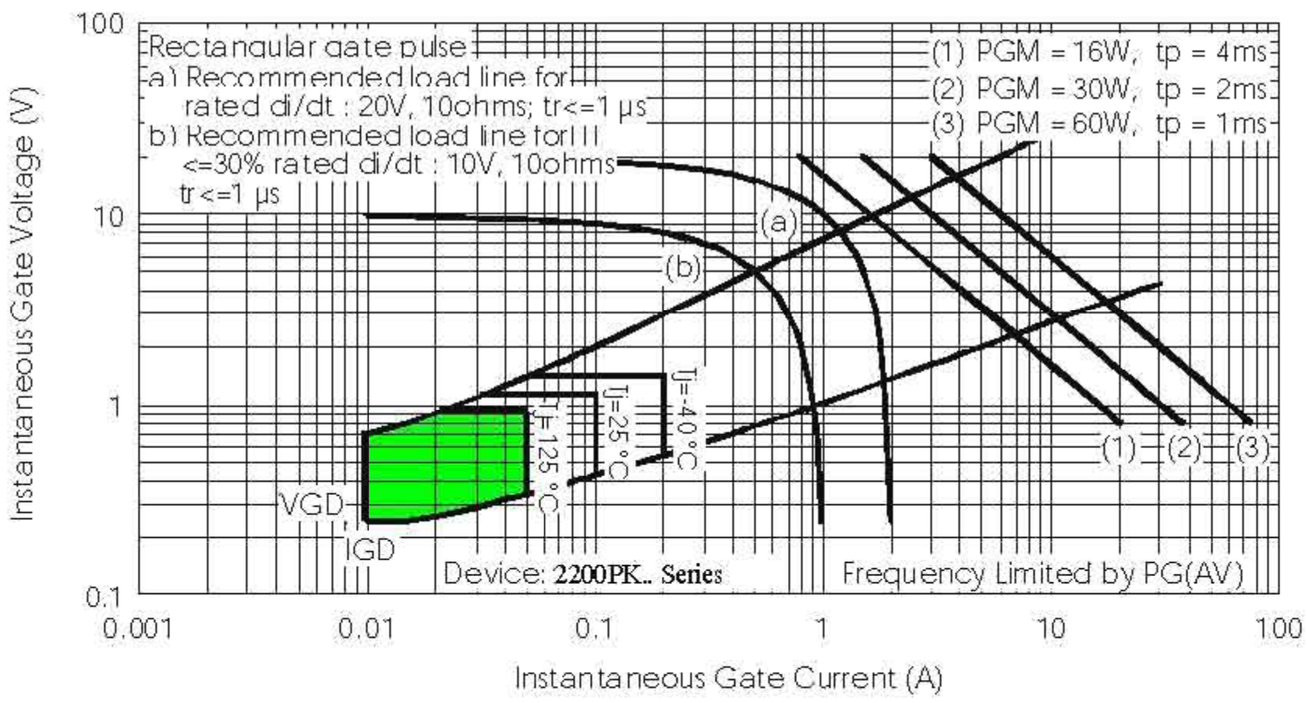

Fig. 9 - Gate Characteristics