Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

High Power Thyristor
Hockey Puk Version
B-PUK Series 1000PB

Types : 1000PB 40 to 1000PB 180

1000PB ...

FEATURES

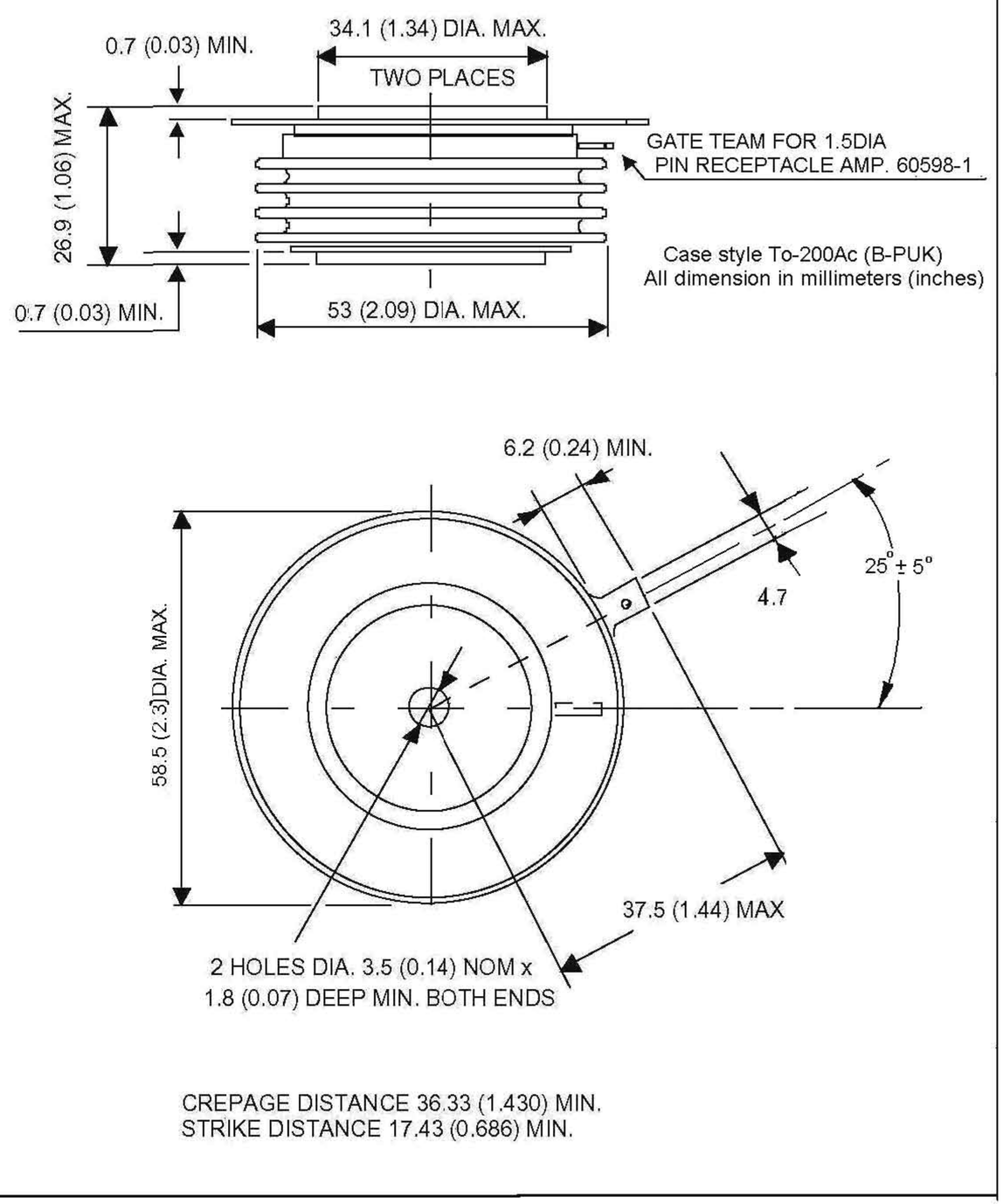
- ❖ *Center amplifying gate.*
- ❖ *International standard case TO-200AC.*

TYPICAL APPLICATIONS

- ❖ *Power supply.*
- ❖ *Controlled rectifiers (e.g. for battery charging, UPS).*
- ❖ *Electroplating equipement..*

MAJOR RATINGS & CHARACTERISTICS

Parameters		1000PB	Units
$I_{T(AV)}$		1000	A
	@ T_{hs}	55	^0C
$I_{T(RMS)}$		1570	A
	@ T_{hs}	55	^0C
I_{TSM}	@ 50 Hz	17800	A
I^2t	@ 50 Hz	1591	KA^2s
V_{DRM} / V_{RRM}		400 to 1800	V
t_q	typical	150	µs
T_J		-40 to 125	^0C



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ELECTRICAL SPECIFICATION

VOLTAGE RATINGS

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°C mA
1000PB	40	400	500	80
	60	600	700	
	80	800	900	
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	
	180	1800	1900	

ON-STATE CONDUCTION

	Parameter	1000PB	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	1000	A	180° conduction, half sine wave	
	@ heat sink temperature	55	°C	double side cooled	
$I_{T(RMS)}$	Max. RMS on-state current	1570	A	@55°C heat sink temperature (double side cooled)	
I_{TSM}	Max. peak one cycle non-repetitive surge current	17800		t = 10ms	Sinusodial half wave, Initial T_J = T_J max.
I^2t	Maximum I^2t for fusing	1591	kA^2s	t = 10ms	
$I^2\sqrt{t}$	Maximum I^2t for fusing	15910	kA^2s	t = 0.1 to 10ms. No voltage reapplied.	
$V_{T(TO)}$	Threshold voltage	0.98	V	T_J = T_J max.	
r_{t2}	On state slope resistance	0.52	mΩ	T_J = T_J max.	
V_{TM}	Max. on state voltage	1.4	V	I_{pk} = 1000A, T_J = T_J max., t_p = 10ms sine pulse	
I_H	Maximum holding current	600	mA	T_J = 25°C, anode supply 12V resistive load	
I_L	Latching current	1000			

SWITCHING

	Parameter	1000PB	Units	Conditions
di/dt	Max. non-repetitive rate of rise of turned-on current	100	A/µs	Gate drive 20V, 20Ω, tr ≤ 1 µs T_J = T_J max., anode voltage ≤ 80% V_{DRM}
t_d	Typical delay time	1.0	µs	Gate current 1A, di_g/dt = 1A/µs V_d = 0.67% V_{DRM}, T_J = 25°C
t_q	Typical turn-off time	150		I_{TM} = 750A, 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	1000PB	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	80	mA	$T_J = T_J$ max, rated V_{DRM}/V_{RRM} applied

TRIGGERING

	Parameter	1000PB		Units	Conditions	
P_{GM}	Maximum peak gate power	10.0		W	$T_J = T_J$ max., $t_p \leq 5$ms	
$P_{G(AV)}$	Maximum average gate power	2.0			$T_J = T_J$ 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				
		TYP.	MAX.			
I_{GT}	DC gate current required to trigger	100	200	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	1.8	3.0	V	$T_J = 25^0$C	
I_{GD}	DC gate current not to trigger	10		mA	$T_J = 125^0$C	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	1000PB	Units	Conditions
T_J	Max. operating temperature range	-40 to 125	^{0}C	
T_{stg}	Max. storage temperature range	-40 to 150		
$R_{thJ\text{-}hs}$	Max. thermal resistance, junction to heat sink	0.031	K/W	DC operation double side cooled
F	Mounting force, ±10%	14700 (1500)	N (kg)	
wt	Approximate weight	255	g	
	Case style	To - 200AC (B-PUK)		See outline

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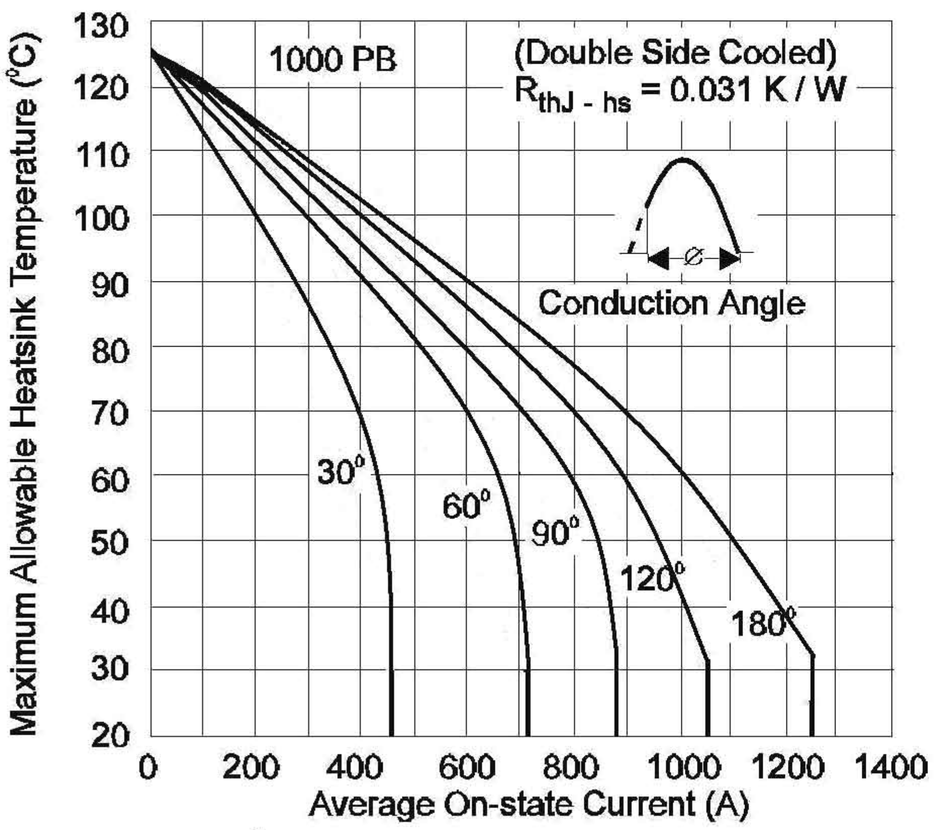

Fig. 1 - Current Ratings Characteristics

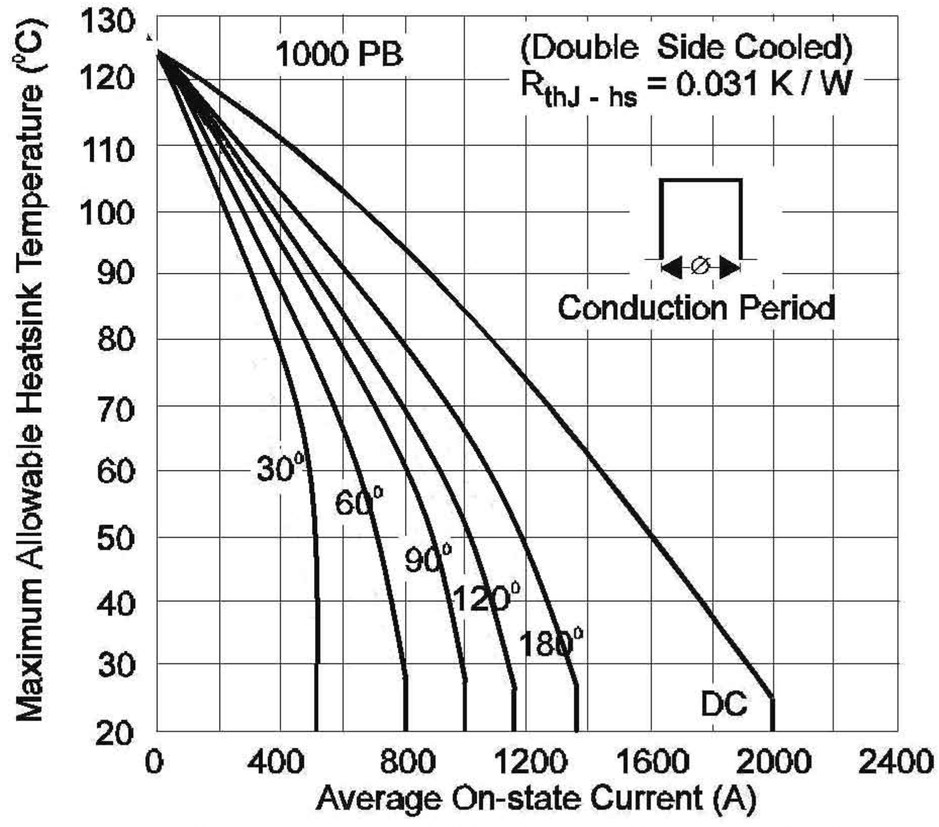

Fig. 2 - Current Ratings Characteristics

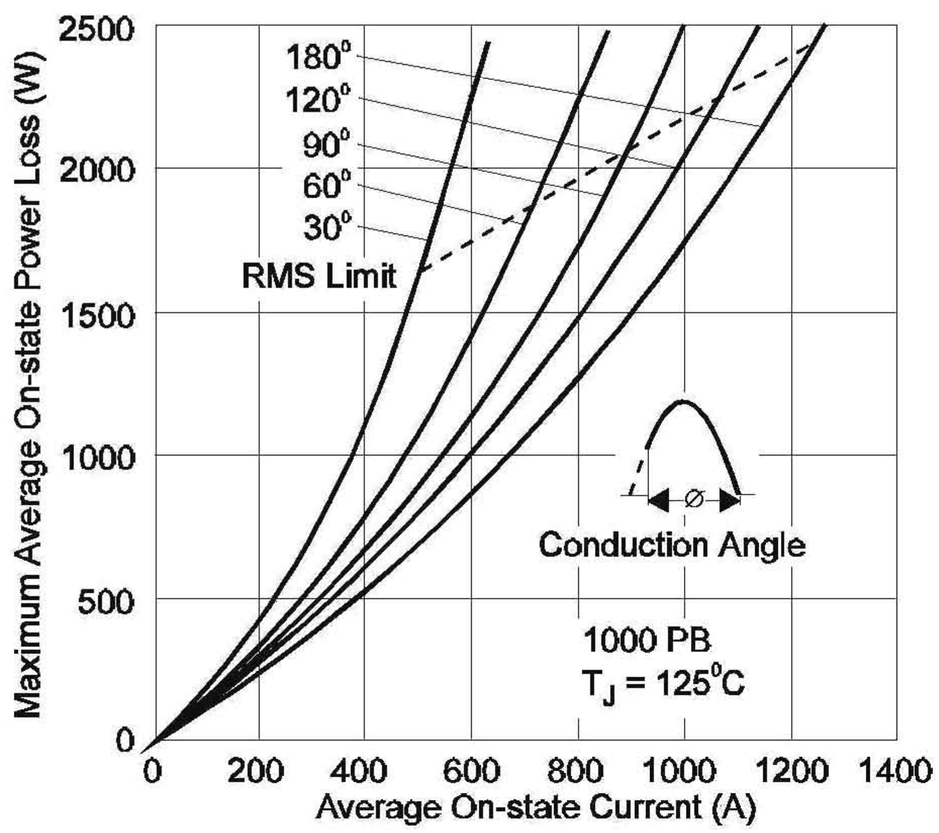

Fig. 3 - On-state Power Loss Characteristics

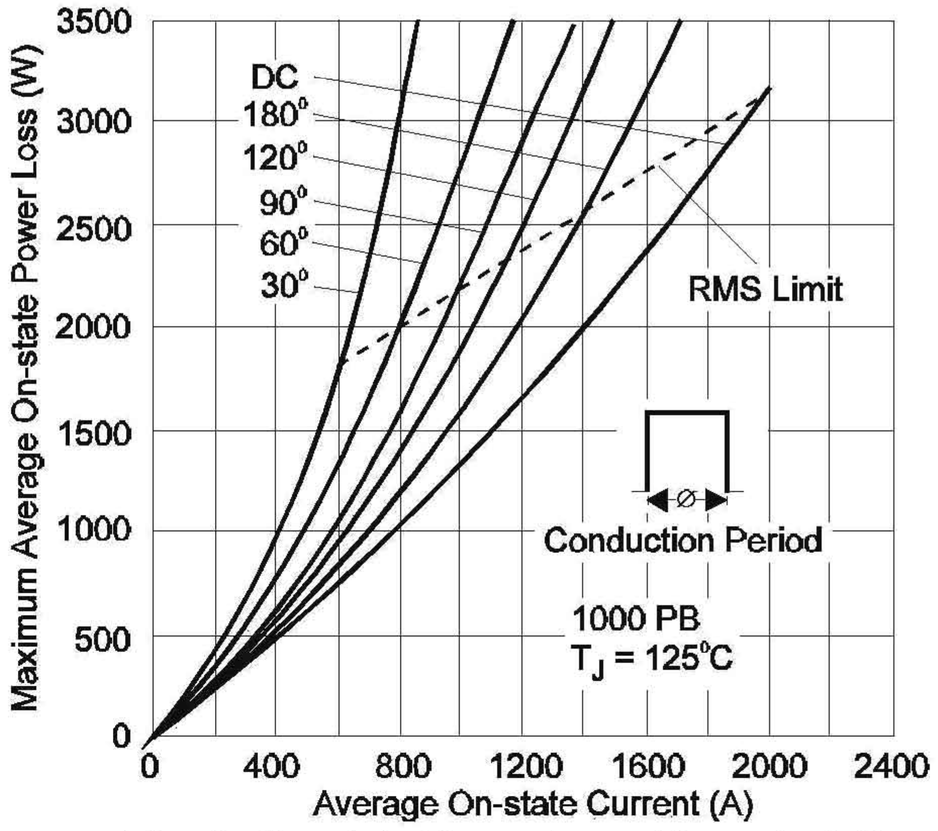

Fig. 4 - On-state Power Loss Characteristics

1000 PB

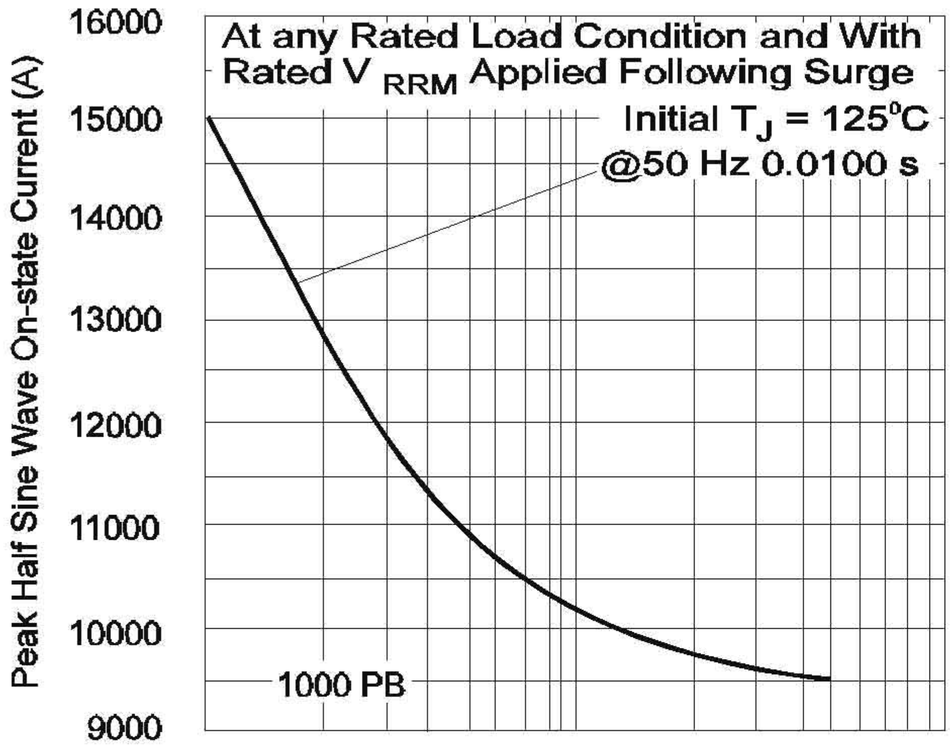

Fig. 5 - Maximum Non-Repetitive Surge Current

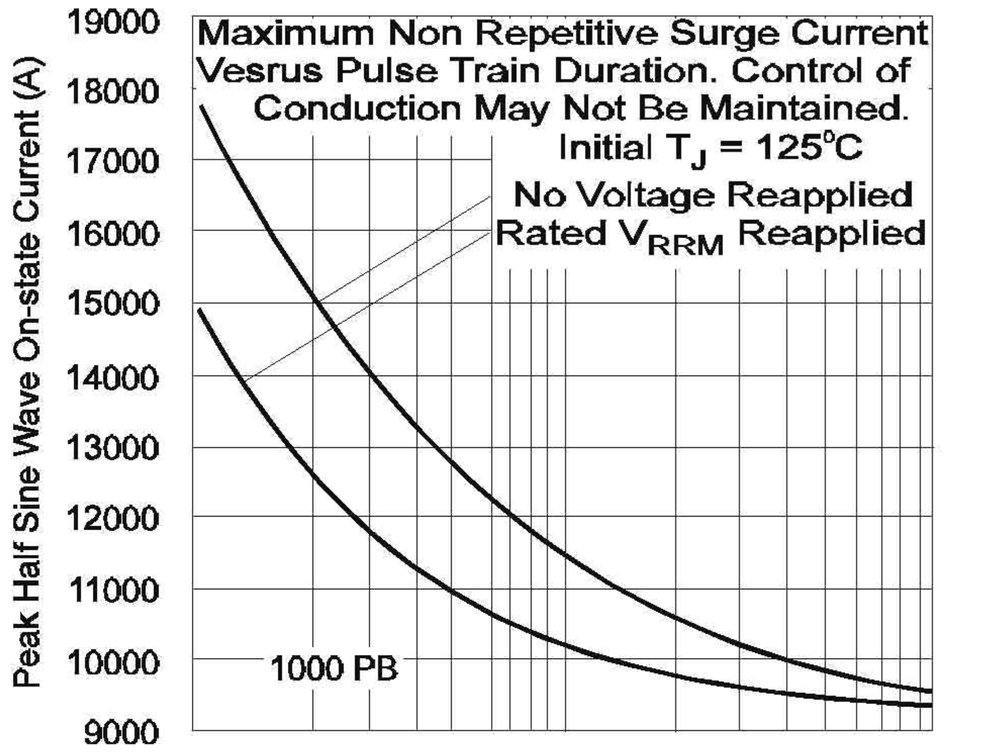

Fig. 6 - Maximum Non-Repetitive Surge Current

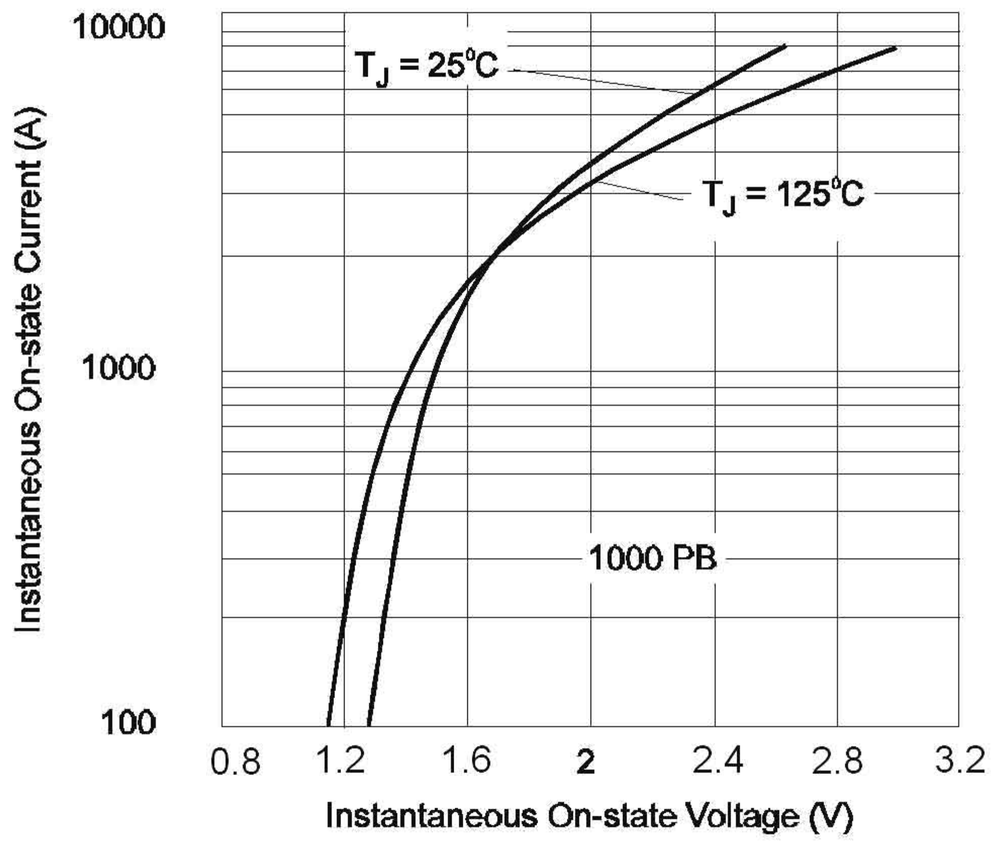

Fig. 7 - On-state Voltage Drop Characteristics

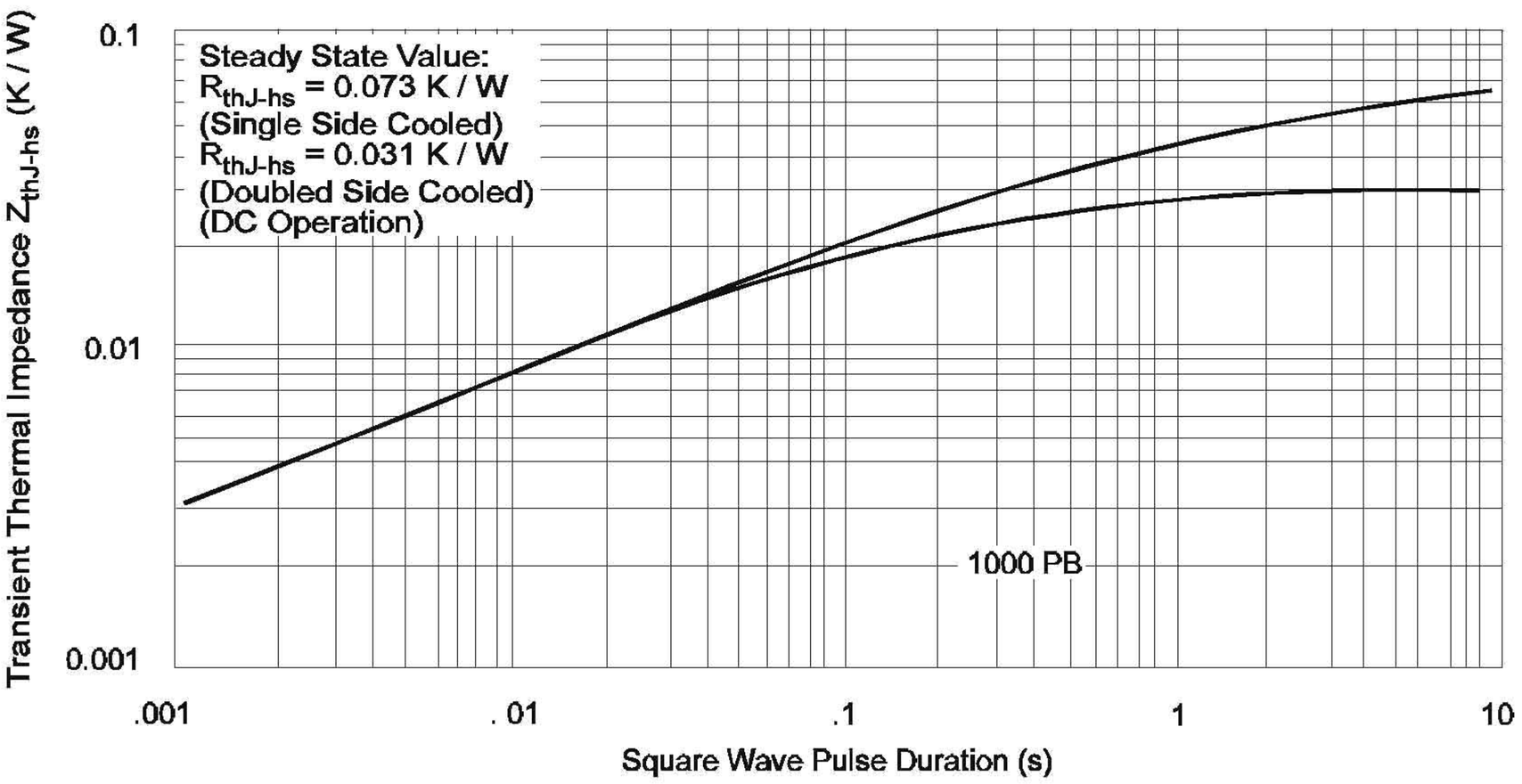

Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

1000 PB

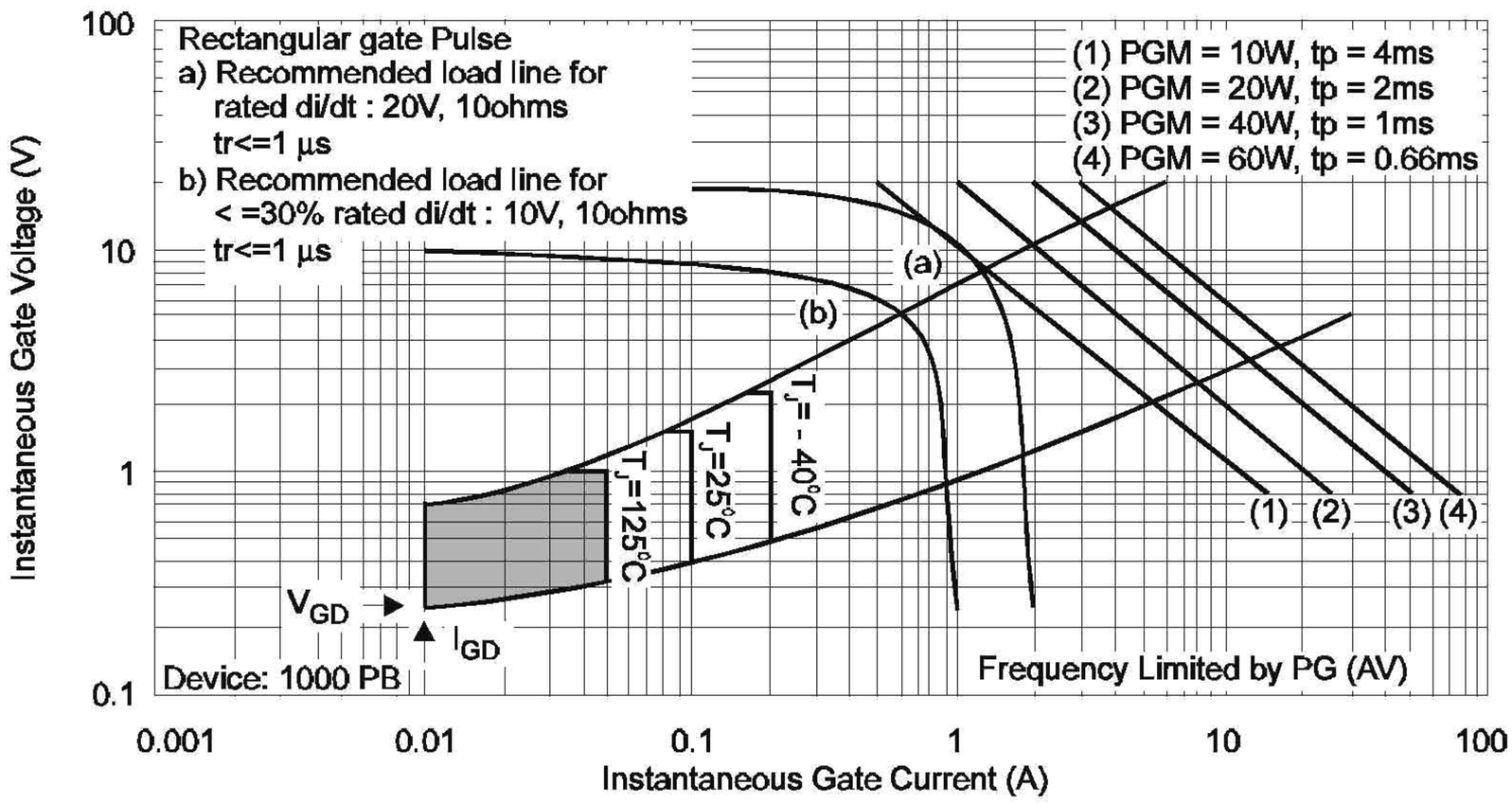

Fig. 9 - Gate Characteristics

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