Ruttonsha International Rectifier Ltd.

SILICON CONTROLLED RECTIFIERS

450/500RKS SERIES

Power Silicon Controlled Rectifiers

Types : 450RKS20 TO 450RKS160, 500RKS20 TO 500RKS160

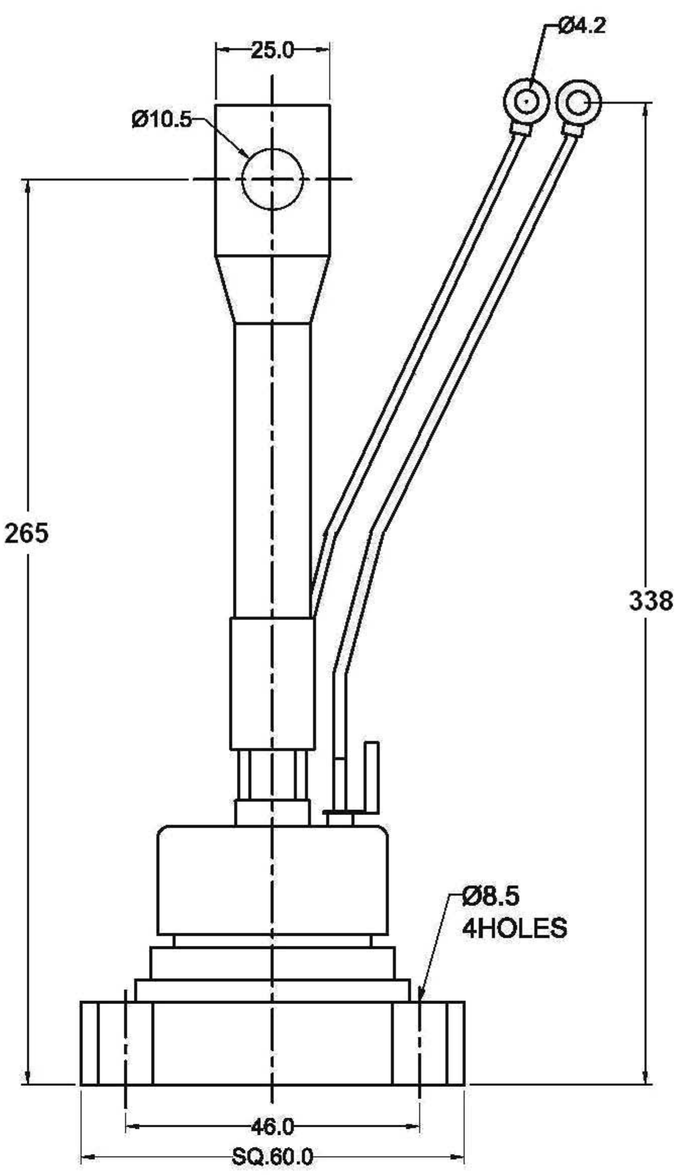
FEATURES

- *Centre amplifying gate.*
- *Compression Bonded Encapsulation for heavy duty operations such as severe thermal cycling.*

TYPICAL APPLICATIONS

- *DC motor control (e.g. for machine tools).*
- *Controlled rectifiers (e.g. for battery charging, UPS).*
- *AC controllers (e.g. temperature control, lights control).*

400 / 500 RKS



UNIT : MM

MAJOR RATINGS & CHARACTERISTICS

Parameters		450RKS	500RKS	Units
$I_{T(AV)}$		450	500	A
	@ T_C	85	85	^{0}C
$I_{T(RMS)}$		628	785	A
I_{TSM}	@ 50 Hz	11500	12000	A
I^2t	@ 50 Hz	661	781	KA^2s
V_{DRM} / V_{RRM}		200 to 1600		V
t_q	typical	250		µs
T_J		-40 to 125		^{0}C

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ELECTRICAL SPECIFICATION

VOLTAGE RATINGS

Type Number	Voltage Code	V_{RRM} / V_{DRM}, max. repetitive peak and off-state vltage V	V_{RSM}, max. non-repetitive peak voltage V	I_{DRM} / I_{RRM} max. @ 125°C mA
450/500RKS	20	200	300	50
	40	400	500	
	60	600	700	
	80	800	900	
	100	1000	1100	
	120	1200	1300	
	140	1400	1500	
	160	1600	1700	

ON-STATE CONDUCTION

	Parameter	450RKS	500RKS	Units	Conditions	
$I_{T(AV)}$	Max. average on-state current	450	500	A	180° conduction, half sine wave	
	@ case temperature	85	85	°C		
$I_{T(RMS)}$	Max. RMS on-state current	470	550		@ 85 Deg.C Case Temp	
I_{TSM}	Max. peak one cycle non-repetitive surge current	11500	12000	A	t = 10ms	Sinusoidal half wave, Initial T_J = T_J max.
I^2t	Maximum I^2t for fusing	661	781	kA^2s	t = 10ms	
$V_{T(TO)}$	High level value of threshold voltage	1.05	1.06	V	T_J = T_J max.	
r_t	High level value of on state slope resistance	0.20	0.02	mΩ	T_J = T_J max.	
V_{TM}	Max. on state voltage	1.66	1.6	V	I_{pk} = π x $I_{T(AV)}$, T_J = 125°C, 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	450RKS/500RKS	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 = 125°C, anode voltage ≤ 80% V_{DRM}
t_d	Typical delay time	2.0	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	250		I_{TM} = 500A, T_J = 125°C, di/dt = 20A/µs, V_R = 50V dv/dt = 20V/µs, Gate 0V 100Ω, t_p = 500µs

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BLOCKING

	Parameter	450/500RKS	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	500	V/µs	T_J = 125°C, linear to 80% rated V_{DRM}
I_{RRM} I_{DRM}	Max. peak reverse and off-state leakage current	50	mA	T_J = 125°C, rated V_{DRM}/V_{RRM} applied

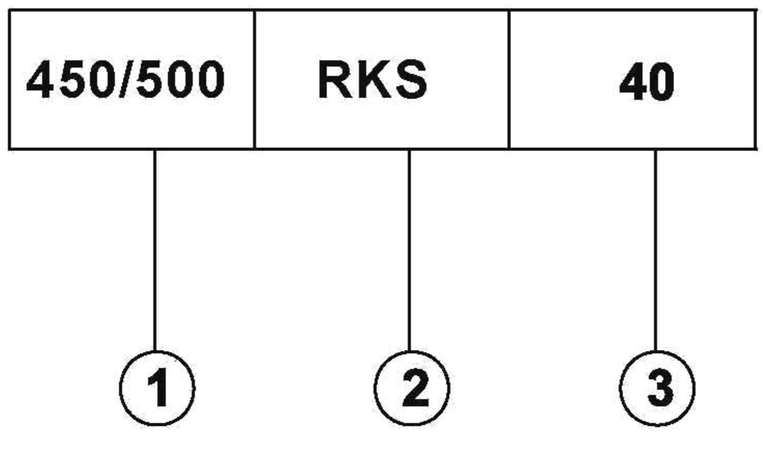
TRIGGERING

	Parameter	450/500RKS		Units	Conditions	
P_{GM}	Maximum peak gate power	10.0		W	T_J = 125°C, $t_p \leq$ 5ms	
$P_{G(AV)}$	Maximum average gate power	2.0			T_J = 125°C, f= 50Hz, d% = 50	
I_{GM}	Max. peak positive gate current	3.0		A	T_J = 125°C, $t_p \leq$ 5ms	
$+V_{GM}$	Max. peak positive gate voltage	20		V	T_J = 125°C, $t_p \leq$ 5ms	
$-V_{GM}$	Max. peak negative gate voltage	5.0				
		TYP.	MAX.			
I_{GT}	DC gate current required to trigger	90	250	mA	T_J = 25°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°C	
I_{GD}	DC gate current not to trigger	10		mA	T_J = 125°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	450RKS	500RKS	Units	Conditions
T_J	Max. operating temperature range	-40 to 125		°C	
T_{stg}	Max. storage temperature range	-40 to 140			
R_{thJC}	Max. thermal resistance, junction to case	0.073		K/W	DC operation
R_{thCS}	Max. thermal resistance, case to heat sink	0.01			Mounting surface, smooth, flat and greased
F	Mounting force ± 10%	1.66 to 2.07		KN	

ORDER INFORMATION TABLE



① - Current Code

② - **RKS** - Essential part number

③ - Voltage Rating (See table)

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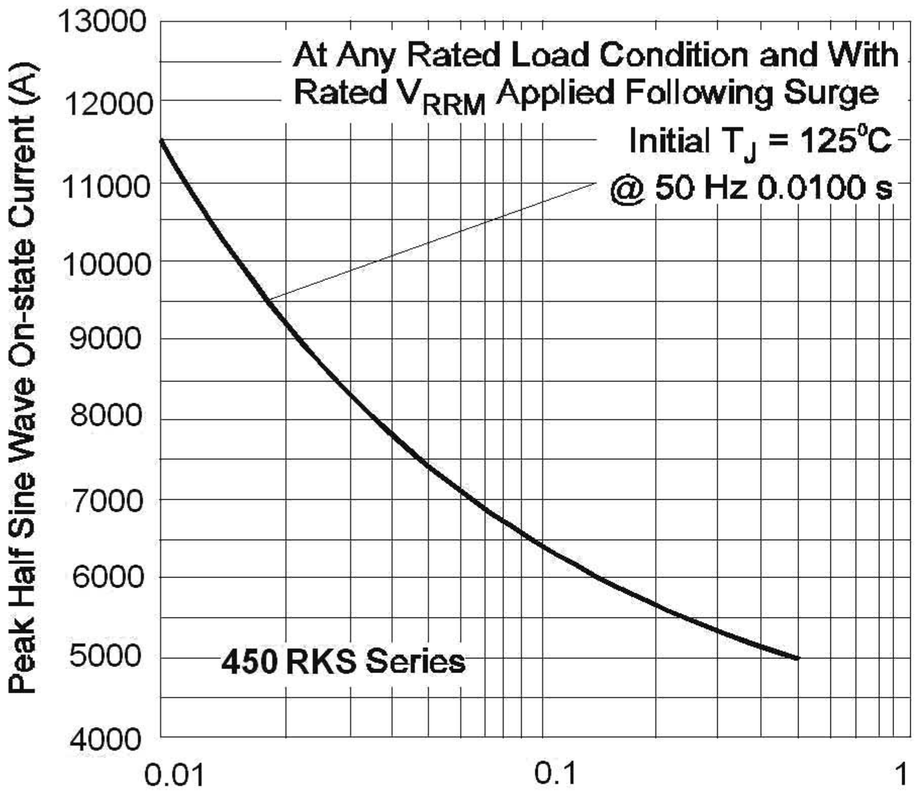
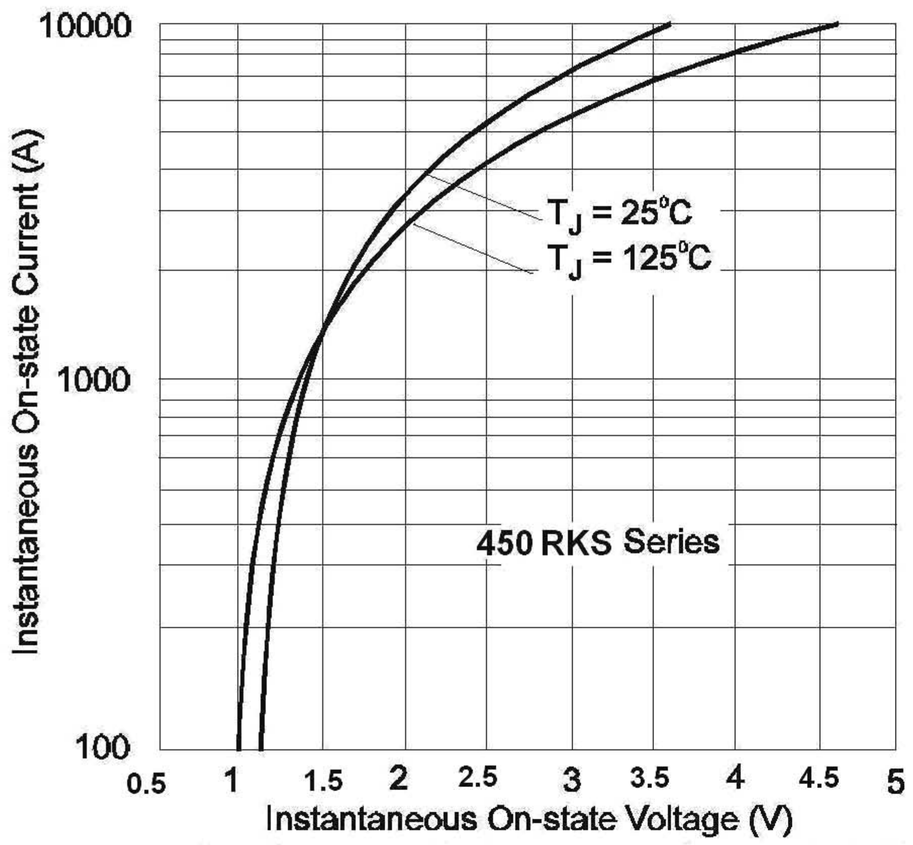
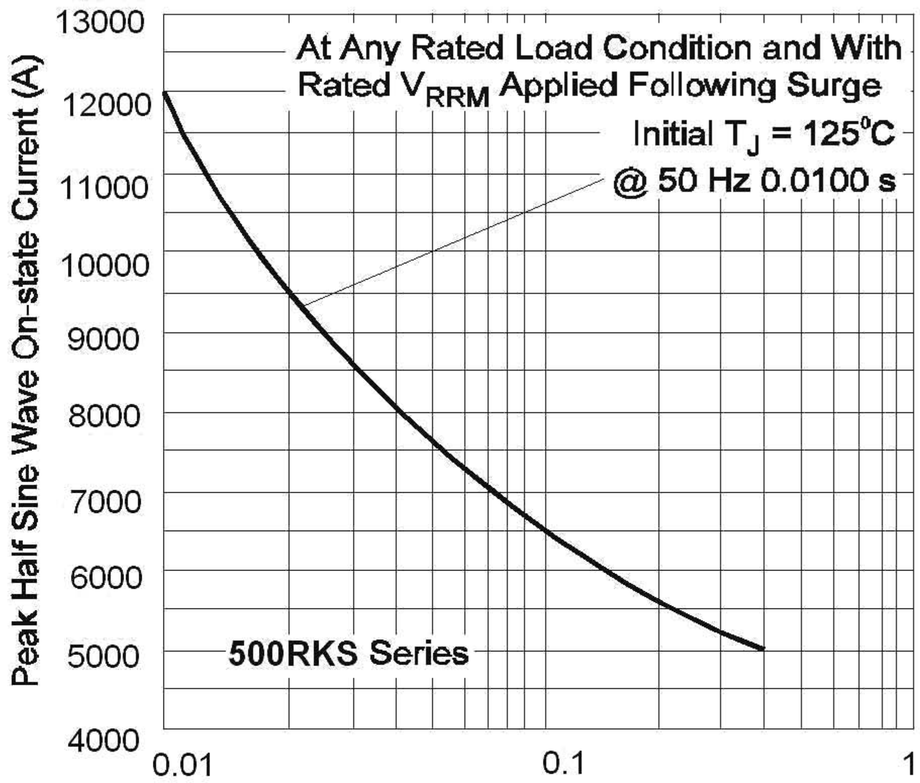


- Maximum Non-Repetitive Surge Current



On-state Voltage Drop Characteristics



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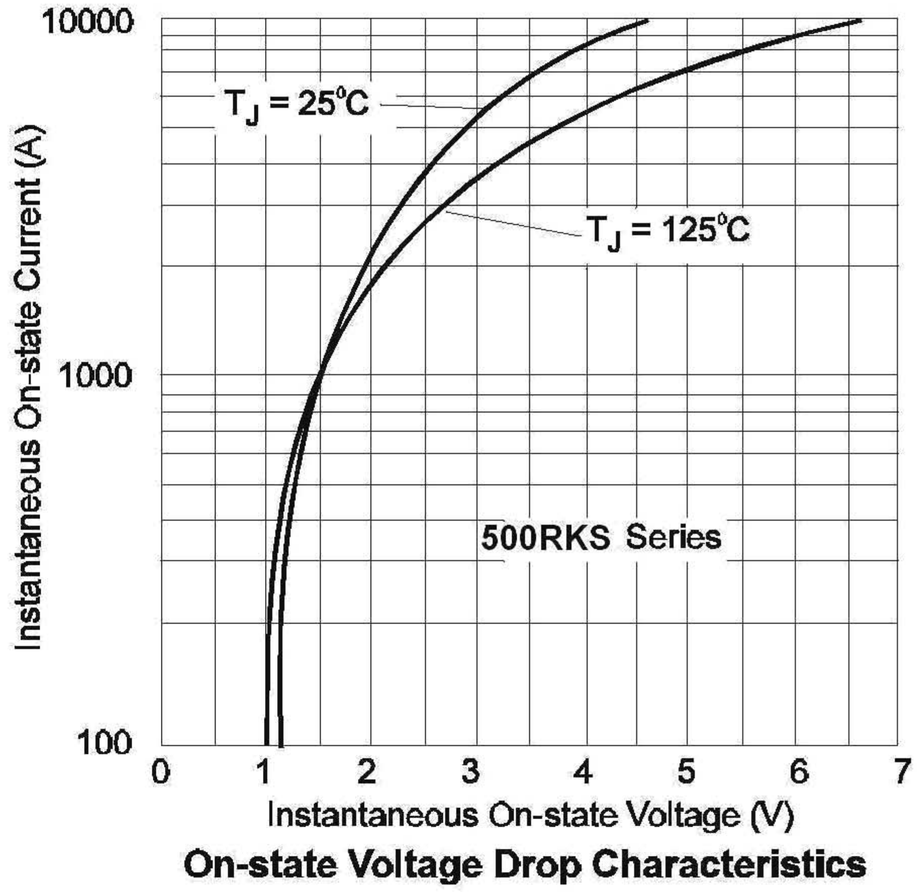

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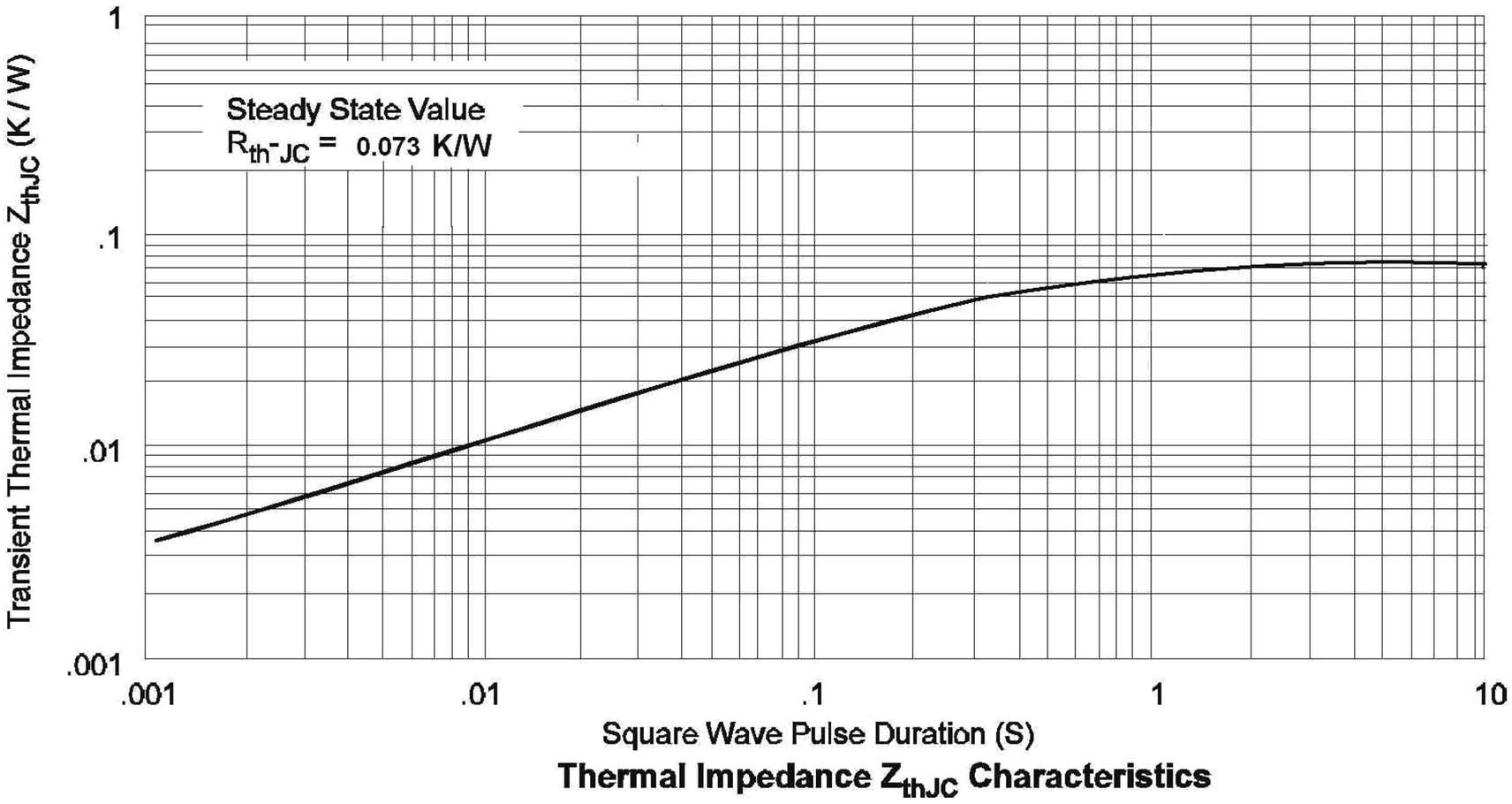
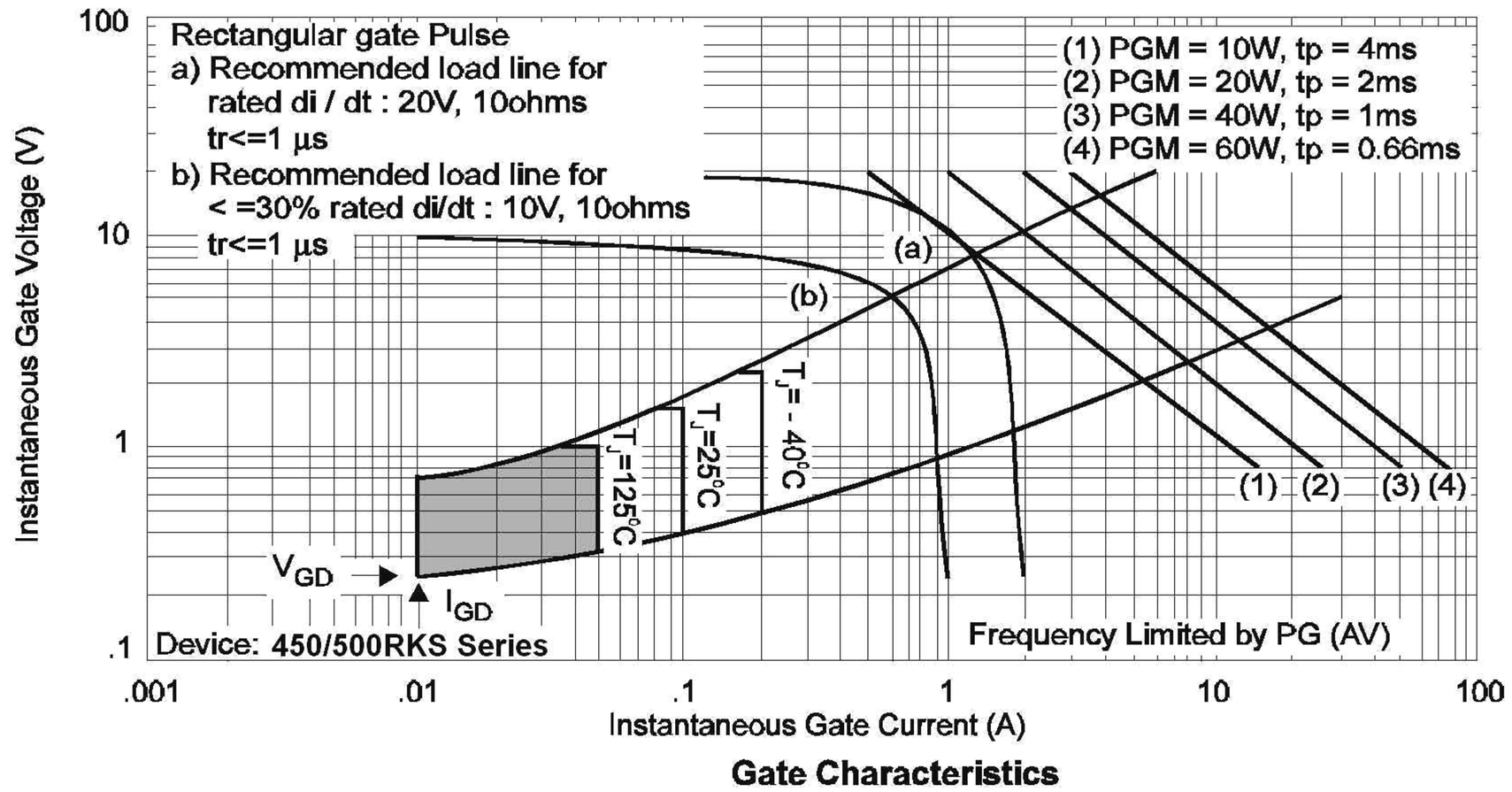


Thermal Impedance Z_{thJC} Characteristics



Gate Characteristics

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