305/355RK SERIES
Power Silicon Controlled Rectifiers
470/550 Amp RMS SCRs

Types : 305RK20 TO 305RK160, 355RK20 TO 355RK160

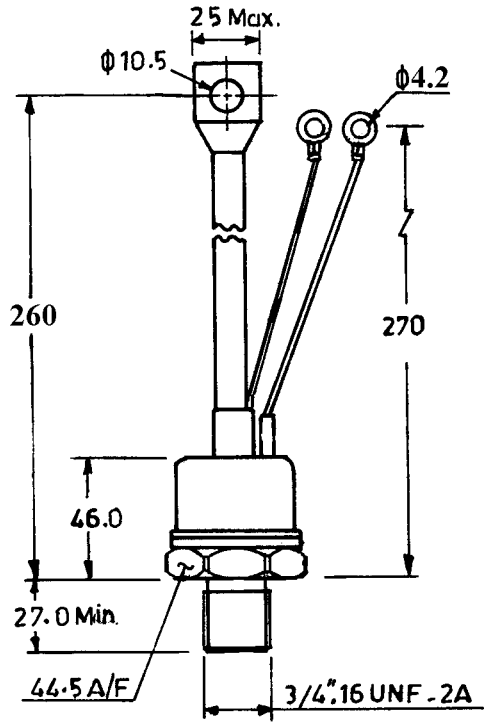
FEATURES

- *Centre amplifying gate.*
- *International standard case TO-209AE (TO-118).*
- *Threaded studs UNF 3/4 - 16UNF2A.*
- *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).*

305RK/355RK



UNIT:- M M

MAJOR RATINGS & CHARACTERISTICS

Parameters		305RK	355RK	Units
$I_{T(AV)}$		300	350	A
	@ T_C	75		^{0}C
$I_{T(RMS)}$		470	550	A
I_{TSM}	@ 50 Hz	8000	9000	A
I^2t	@ 50 Hz	320	405	KA^2s
V_{DRM} / V_{RRM}		200 to 1600		V
t_q	typical	100		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^{0}C mA
305RK/355RK	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	305RK	355RK	Units	Conditions		
$I_{T(AV)}$	Max. average on-state current	300	350	A	180^0 conduction, half sine wave		
	@ case temperature	75		^{0}C			
$I_{T(RMS)}$	Max. RMS on-state current	470	550	A			
I_{TSM}	Max. peak one cycle non-repetitive surge current	8000	9000		t = 10ms	No voltage reapplied	Sinusoidal half wave, Initial $T_J = T_J$ max.
		6730	7550		t = 10ms	100% V_{RRM} reapplied	
I^2t	Maximum I^2t for fusing	320	405	kA^{2}s	t = 10ms	No voltage reapplied	
		226	287		t = 10ms	100% V_{RRM} reapplied	
I^2t	Maximum I^2t for fusing	3200	4050	kA^{2}s	t = 0.1 to 10ms. No voltage reapplied.		
$V_{T(TO)1}$	Low level value of threshold voltage	0.97	0.91	V	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
$V_{T(TO)2}$	High level value of threshold voltage	0.98	0.92		(π x $I_{F(AV)}$ < I < 20 x π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{t1}	Low level value of on state slope resistance	0.74	0.58	mΩ	(16.7% x π x $I_{F(AV)}$ < I < π x $I_{F(AV)}$), $T_J = T_J$ max.		
r_{t2}	High level value of on state slope resistance	0.73	0.57		(π x $I_{F(AV)}$ < I < 20 x π x $I_{F(AV)}$) $T_J = T_J$ max.		
V_{TM}	Max. on state voltage	1.66	1.55	V	I_{pk} = π x $I_{T(AV)}$, T_J = 125^{0}C, 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	305RK/355RK	Units	Conditions
di/dt	Max. non-repetitive rate of rise of turned-on current	1000	A/µs	Gate drive 20V, 20Ω, tr ≤ 1 µs T_J = 125^{0}C, 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^{0}C
t_q	Typical turn-off time	100		I_{TM} = 500A, T_J = 125^{0}C, di/dt = 20A/µs, V_R = 50V dv/dt = 20V/µs, Gate 0V 100Ω, t_p = 500µs

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BLOCKING

	Parameter	305RK/355RK	Units	Conditions
dv/dt	Maximum critical rate of rise of off-state voltage	400	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	305RK/355RK		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	180 90 50	-- 200 --	mA	T_J = -40°C T_J = 25°C T_J = 125°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	2.5 1.8 1.1	-- 3.0 --	V	T_J = -40°C T_J = 25°C T_J = 125°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	305RK	355RK	Units	Conditions
T_J	Max. operating temperature range	-40 to 125		°C	
T_{stg}	Max. storage temperature range	-40 to 150			
R_{thJC}	Max. thermal resistance, junction to case	0.10	0.09	K/W	DC operation
R_{thCS}	Max. thermal resistance, case to heat sink	0.03			Mounting surface, smooth, flat and greased
T	Mounting torque, ±10%	48.5		Nm	Non lubricated threads
wt	Approximate weight	535		gm	
	Case style	To - 209AE (TO-118)			See outline

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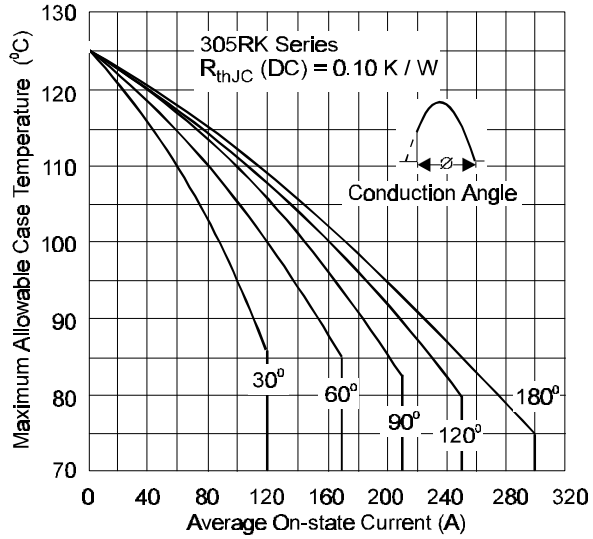


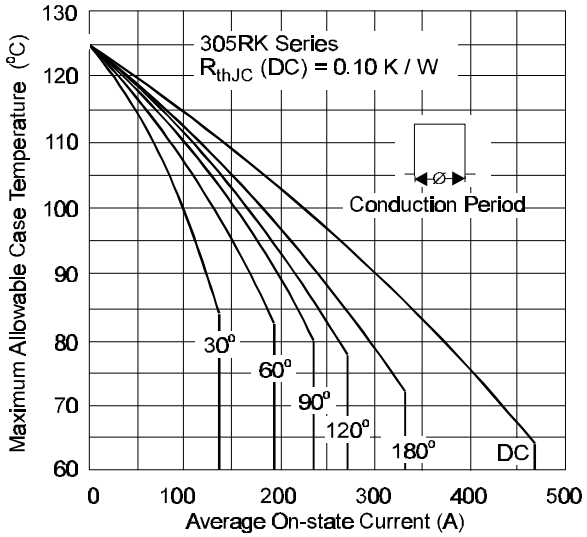
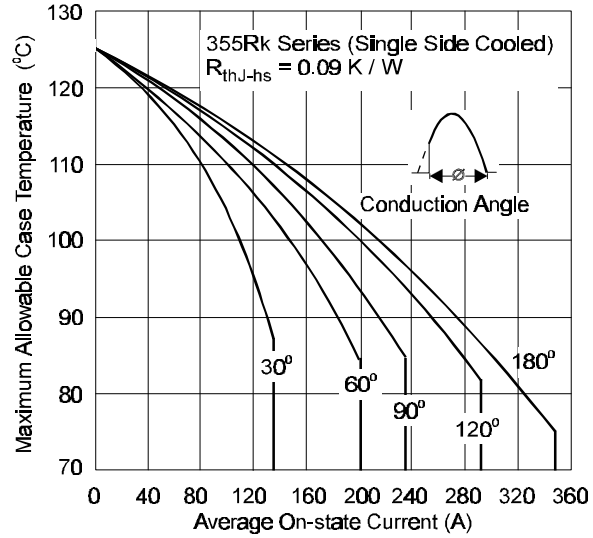


Fig. 1 - Current Ratings Characteristics



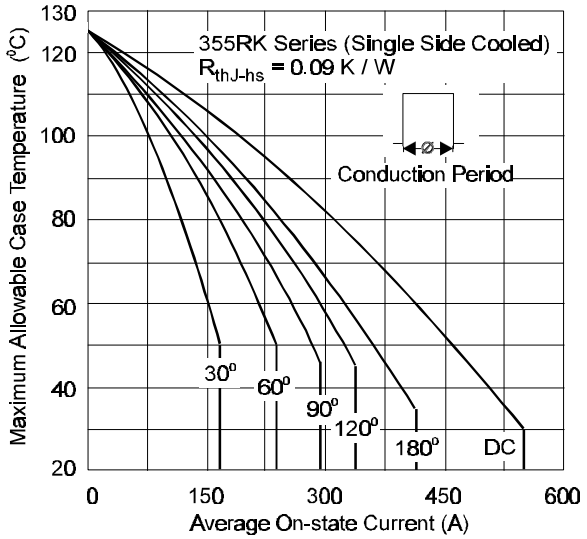


Fig. 2 - Current Ratings Characteristics

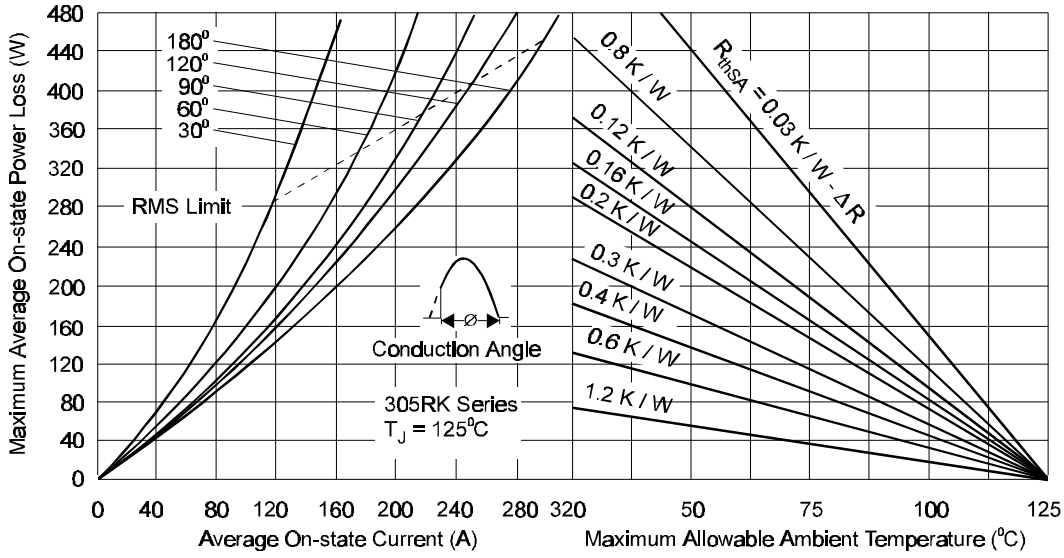


Fig. 3 - On-state Power Loss Characteristics

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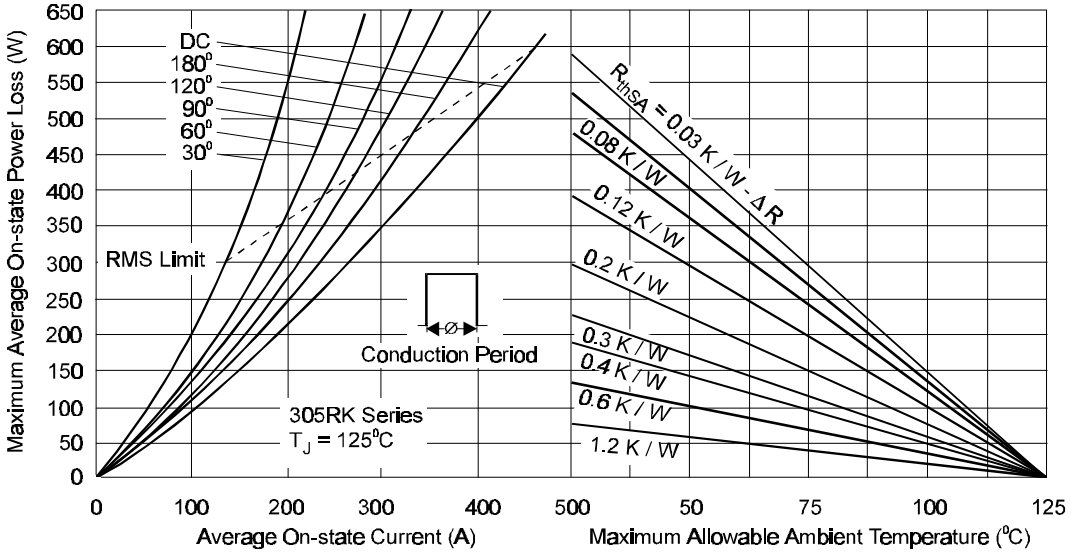

Fig. 4 - On-state Power Loss Characteristics

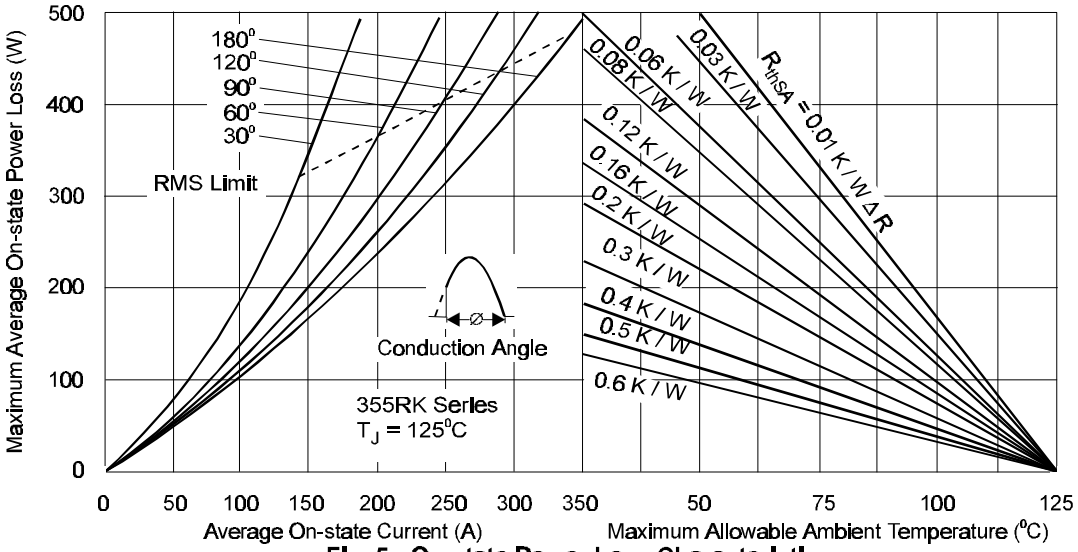

Fig. 5 - On-state Power Loss Characteristics

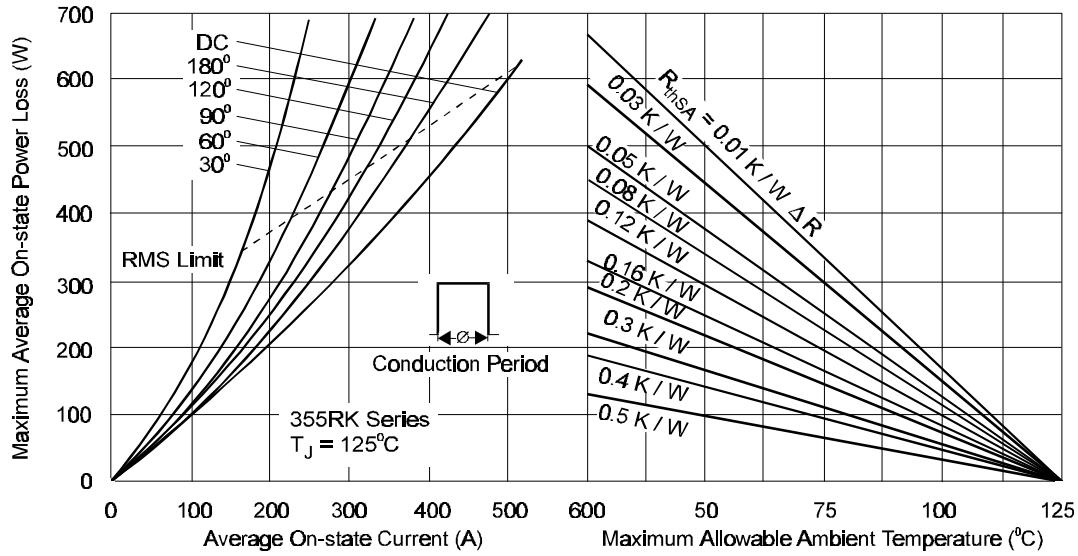

Fig. 6 - On-state Power Loss Characteristics

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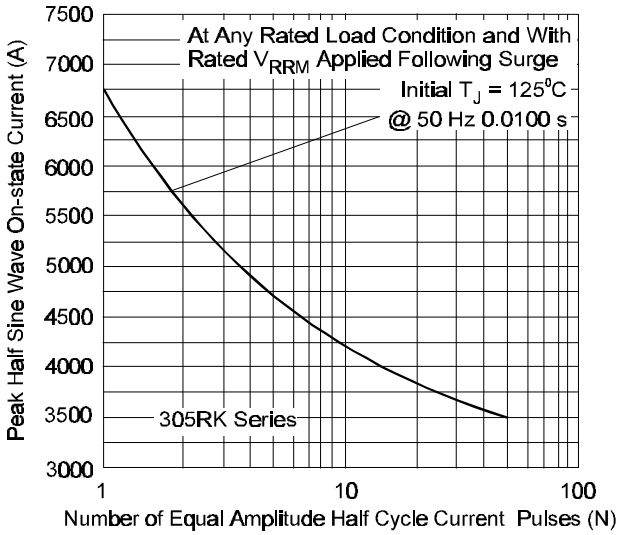

Fig. 7 - Maximum Non-Repetitive Surge Current

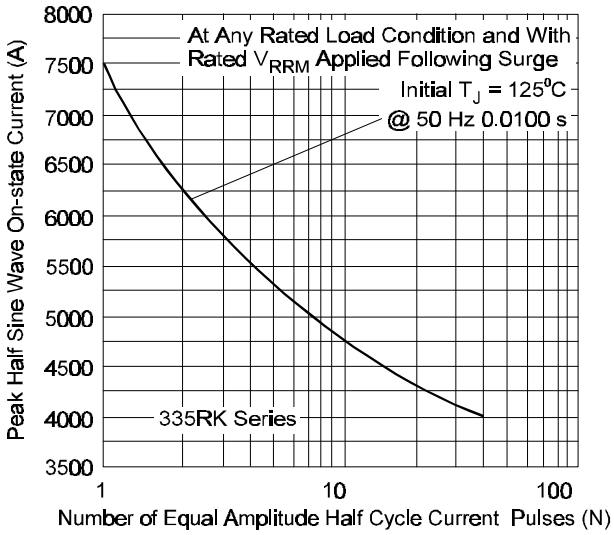

Fig. 8 - Maximum Non-Repetitive Surge Current

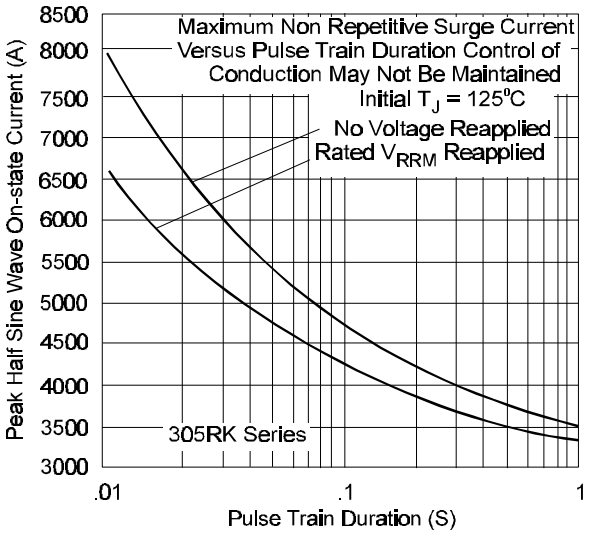

Fig. 9 - Maximum Non-Repetitive Surge Current

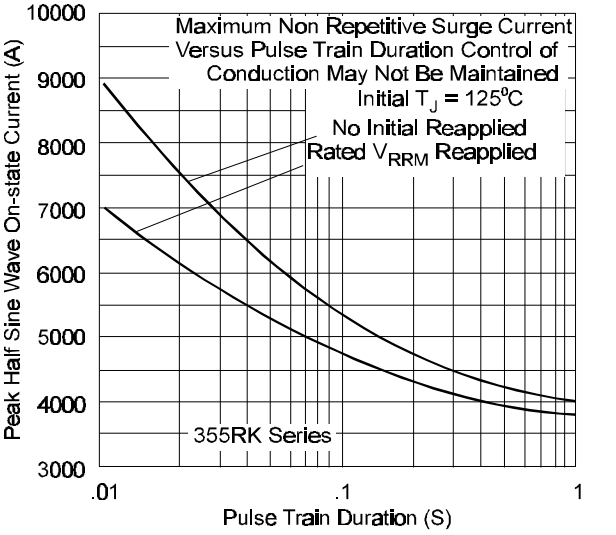

Fig. 10 - Maximum Non-Repetitive Surge Current

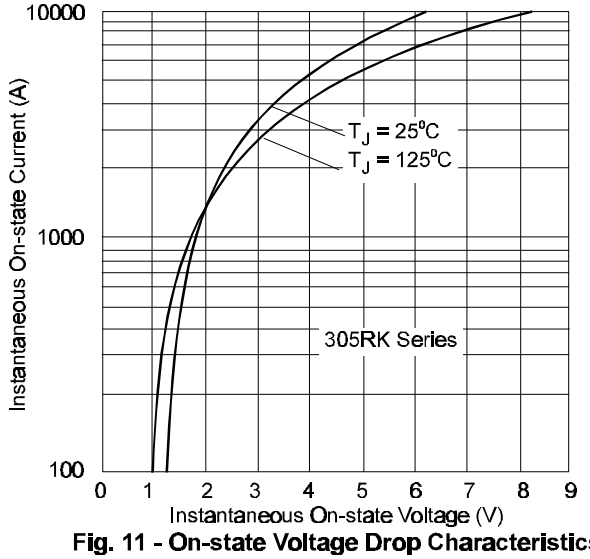

Fig. 11 - On-state Voltage Drop Characteristics

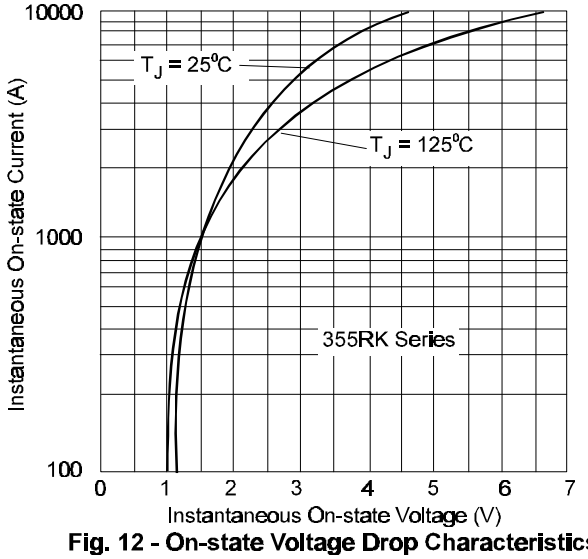

Fig. 12 - On-state Voltage Drop Characteristics

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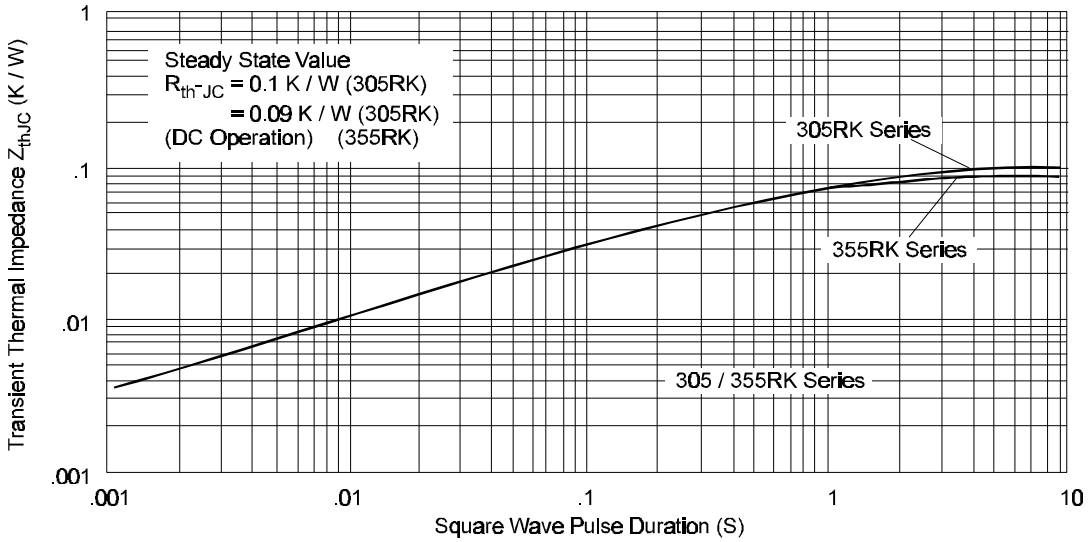

Fig. 13 - Thermal Impedance Z_{thJC} Characteristics

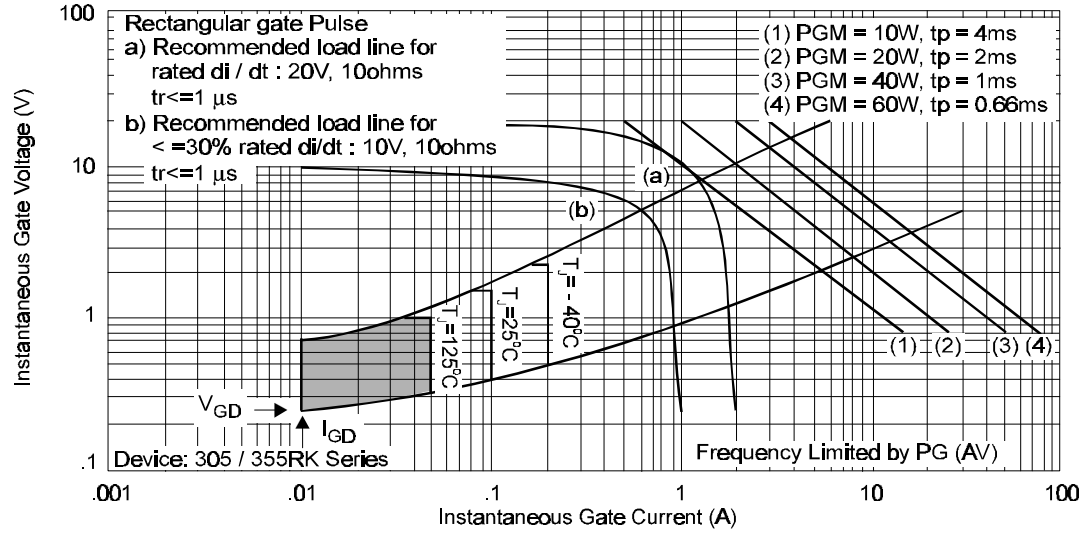

Fig. 14 - Gate Characteristics

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