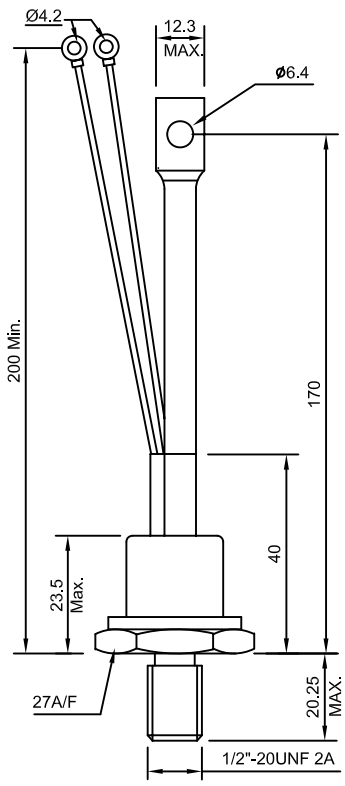
71RIA, 81RIA SERIES
Power Silicon Controlled Rectifiers
110, 125 Amp RMS SCRs

Types : 71RIA10-71RIA140, 81RIA10-81RIA140

FEATURES

- *All diffused series.*
- *High di/dt and dv/dt capabilities.*
- *Reliable blocking at elevated temperature.*
- *High I^2t capability.*
- *Excellent dynamic characteristics.*

71RIA, 81RIA



UNIT:- M.M.

THERMAL MECHANICAL SPECIFICATIONS

R_{thjc}	Maximum thermal resistance junction-to-case DC opration	71RIA	81RIA
		0.35°C/W	0.3°C/W
R_{thcs}	Contact thermal resistance case-to-sink	0.1°C/W	
T_J	Junction operating temp. range	-40°C to +125°C	
T_{stg}	Storage temperature range	-40°C to +150°C	
	Mounting torque (Non-lubricated threads)	13 Nm. Min. 16 Nm. Max.	
	Approximate weight	100gms.	

ELECTRICAL RATINGS

TYPE 71RIA / 81RIA		10	20	40	60	80	100	120	140
V_{DRM}	Max. repetitive peak off state voltage (V)	100	200	400	600	800	1000	1200	1400
V_{RRM}	Max. repetitive peak reverse voltage (V)	100	200	400	600	800	1000	1200	1400
V_{RSM}	Max. non-repetitive peak reverse voltage (V)	150	300	500	700	900	1100	1300	1500
I_{RM} & I_{DM}	Max. peak reverse & off state current @ rated V_{DRM} & V_{RRM} 125°C -mA	20	15	15	15	15	15	15	15

ELECTRICAL SPECIFICATIONS

	ON-STATE	71RIA	81RIA	Units	Conditions
$I_{T(RMS)}$	Max. RMS on-state current	110	125	A	
$I_{T(AV)}$	Max. average on-state current	70	80	A	180° half sine wave conduction.
	@ max T_C	80	85	°C	
I_{TSM}	Max. peak one cycle non-repetitive surge current	1200	1597	A	50Hz half cycle sine wave or 6ms rectangular pulse. Following any rated load condition and with rated.
		1255	1677		60Hz half cycle sine wave or 5ms rectangular pulse. V_{RRM} applied following surge. SCR turned fully on.
		1430	1900		50Hz half cycle sine wave or 6ms rectangular pulse. Same condition as above except with V_{RRM} applied.
		1490	1989		60Hz half cycle sine wave or 5ms rectangular pulse. following surge = 0.
I^2t	Max. I^2t capability for fusing	7200	12752	A^2s	t = 10ms Rated V_{RRM} applied following surge,
		6560	11718		t = 8.3ms initial T_J = 125°C
	Max. I^2t capability for individual (1) device fusing	10180	18050		t = 10ms V_{RRM} = 0 following surge,
		9300	16484		t = 8.3ms initial T_J = 125°C
I^2t	Max. I^2t capability for indivitual device fusing	101800	180500	A^2s	t = 0.1 to 10ms. V_{RRM} following surge = 0, initial T_J = 125°C
V_{TM}	Max. peak on-state voltage	1.80	--	V	T_J = 25°C, $I_{T(AV)}$ = 70A (220A peak)
		--	1.60	V	T_J = 25°C, $I_{T(AV)}$ = 80A (250A peak)
I_H	Max. holding current	200	150	mA	T_C = 25°C, anode supply = 12V, initial I_T = 3A

(1) I^2t for time t_x = I^2t x t_x

BLOCKING

dv/dt	Min. critical rate-of-rise of off-state voltage	200	200	V/µs	T_J = 125°C. Exponential to 100% rated V_{DRM}	Gate open circuited.
		500	500		T_J = 125°C. Exponential to 67% rated V_{DRM}	

SWITCHING

t_d	Typical delay time	1	1	µs	T_C = 25°C, V_{DM} = rated V_{DRM}, I_{TM} = 50A dc resistive circuit, Gate pulse : 10V, 25Ω source t_p = 6µs, t_r = 0.1µs
di/dt	Max non-repetitive rate of rise of turned-on current	150	300	A/µs	T_C = 125°C, V_{DM} = rated V_{DRM}, I_{TM} = 2 x di/dt; snubber 0.2µF, 15Ω, Gate pulse : 20V, 65Ω , t_p = 6µs, t_r = 0.5µs, per JEDEC Standard RS-397, 5.2, 2.6 max.
t_q	Typical turn-off time	110	350	µs	T_C = 125°C, I_{TM} = 50A, commutating di/dt = -5 A/µs, min V_R during turn-off interval = 50 V, dv/dt = 20 V/µs linear to rated V_{DRM} Gate bias : 0V, 25Ω

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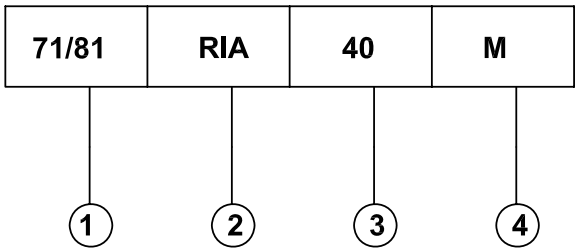
TRIGGERING

P_{GM}	Max. peak gate power	10	12	W	$t_p \leq 5ms$	
$P_{G(AV)}$	Max. average gate power	2.5	3.0	W		
$+I_{GM}$	Max. peak positive gate current	2.5	3.0	A		
$+V_{GM}$	Max. peak positive gate voltage	20	20	V		
$-V_{GM}$	Max. peak negative gate voltage	10	10	V		
I_{GT}	Max. required DC gate current to trigger	250	270	mA	$T_c = -40^oC$	Max. required gate trigger current is the lowest value which will trigger all units with 6V anode-to-cathode.
		100	120	mA	$T_C = 25^oC$	
		50	60	mA	$T_C = 125^oC$	
V_{GT}	Max. required DC gate voltage to trigger	3.5	3.5	V	$T_C = -40^oC$	Max. required gate trigger voltage is the lowest value which will trigger all units with 6V anode-to-cathode.
		2.5	2.5	V	$T_C = 25^oC$	
		1.5	1.5	V	$T_C = 125^oC$	
V_{GD}	Max. DC gate voltage not to trigger	0.2	0.25	V	$T_C = 125^oC$	Max. gate current or voltage not to trigger is the maximum value which will not trigger any unit with rated V_{DRM} anode-to-cathode.
I_{GD}	Max. DC gate current not to trigger	5.0	6.0	mA		

ORDER INFORMATION TABLE



(1) - Current Code

(2) - RIA - Essential part number

(3) - Voltage Rating (See table)

(4) - None - Stud 1/2" 20UNF 2A Threading
M - Stud M16 x 1.5P Metric Threading

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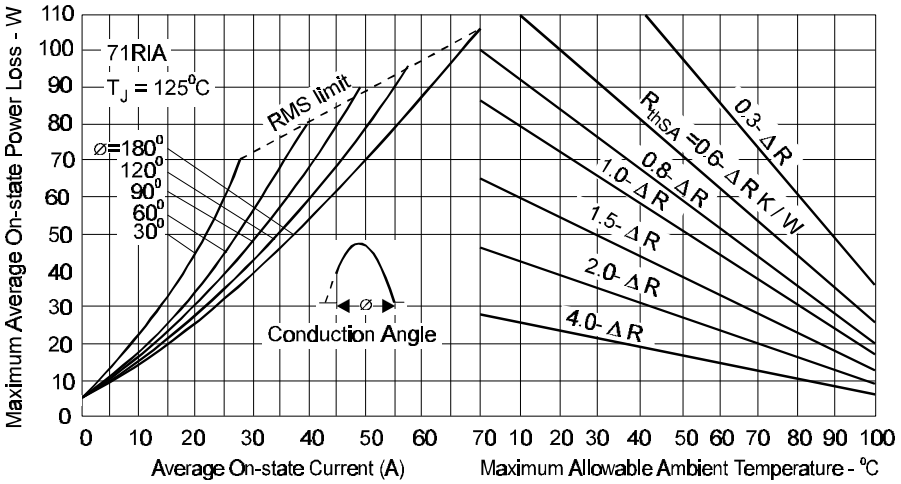
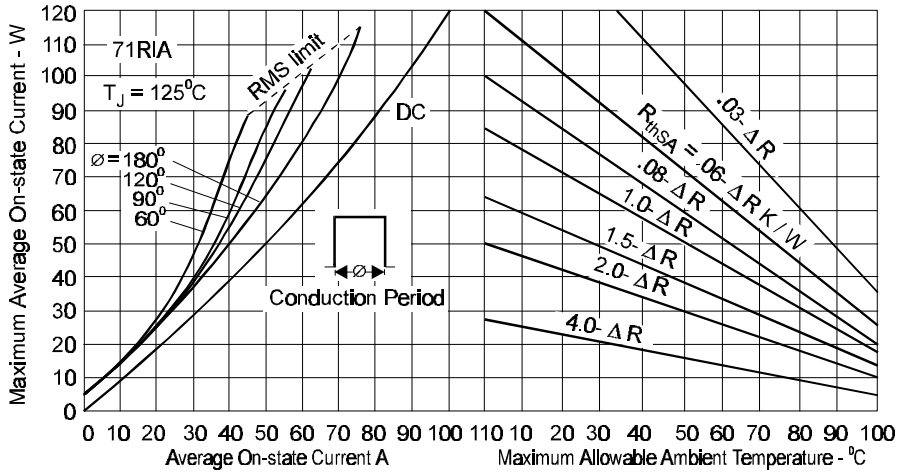


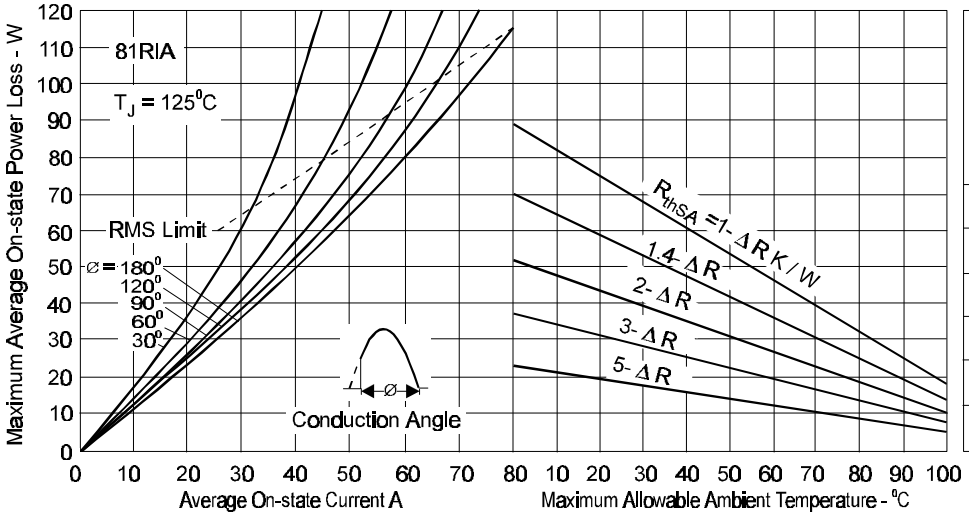
Conduction angle - ø	ΔR - K / W
180°	0.08
120°	0.10
90°	0.14
60°	0.16
30°	0.18

Fig. 1 - Current Rating Nomogram (Sinusoidal Waveforms, 40-400 Hz), 71RIA Series



Conduction angle - ø	ΔR - K / W
DC	O
180°	0.08
120°	0.13
90°	0.17
60°	0.24

Fig. 2 - Current Rating Nomogram (Rectangular Waveforms, 40-400 Hz), 71RIA Series



Conduction angle - ø	ΔR - K / W
DC	O
180°	0.17
120°	0.10
90°	0.07
60°	0.05
30°	0.04

Fig. 3 - Current Rating Nomogram (Sinusoidal Waveforms, 40-400 Hz), 81RIA Series

71RIA & 81RIA SERIES

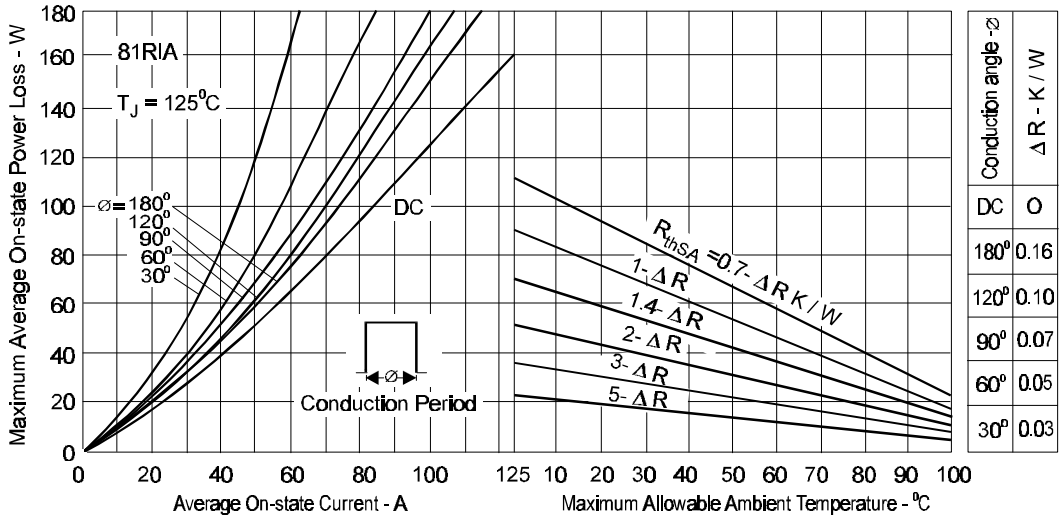


Fig. 4 - Current Rating Nomogram (Rectangular Waveforms, 40-400 Hz), 81RIA Series

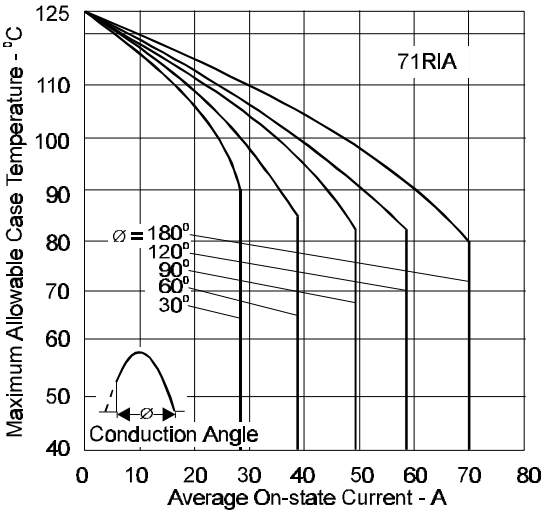


Fig. 5 - Average On-state Current Vs. Maximum Allowable Case Temperature (Sinusoidal Current Waveform), 71RIA Series

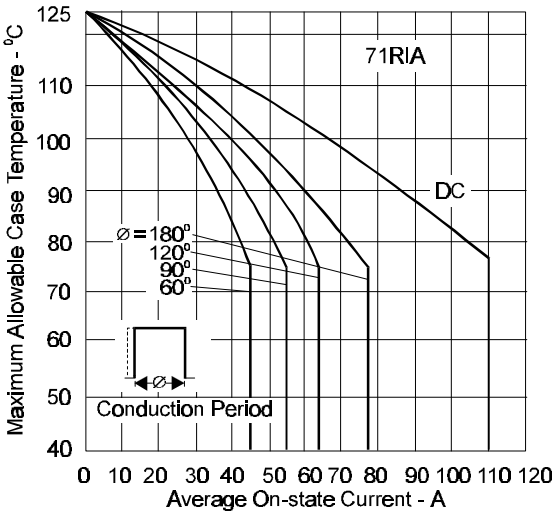


Fig. 6 - Average On-state Current Vs. Maximum Allowable Case Temperature (Rectangular Current Waveform), 71RIA Series

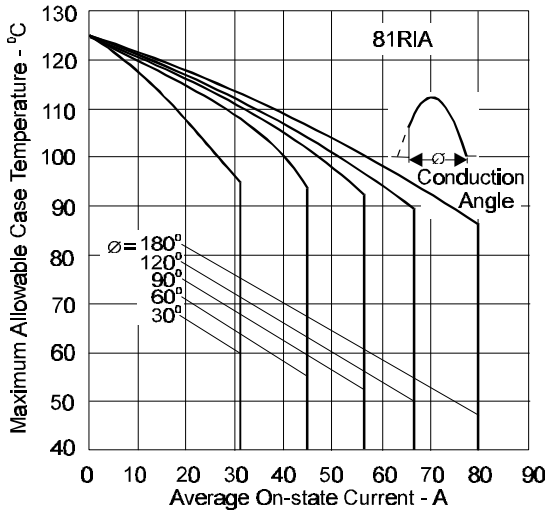


Fig. 7 - Average On-state Current Vs. Maximum Allowable Case Temperature (Sinusoidal Current Waveform), 81RIA Series

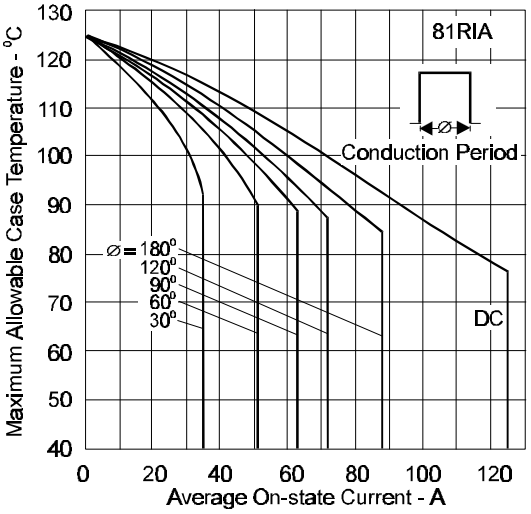


Fig. 8 - Average On-state Current Vs. Maximum Allowable Case Temperature (Rectangular Current Waveform), 81RIA Series

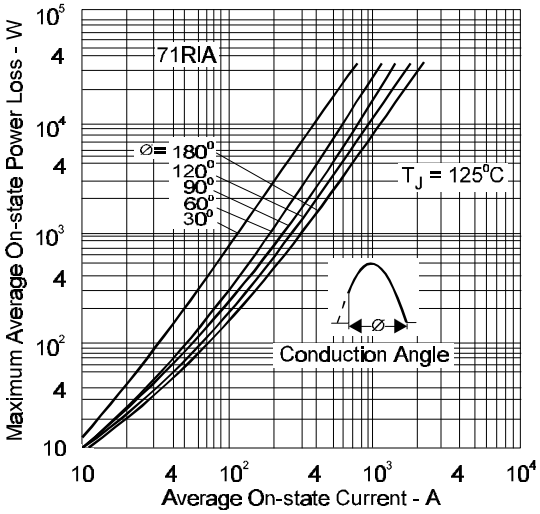


Fig. 9 - Maximum On-state Power Loss Vs. Average On-state Current (Sinusoidal Current Waveform), 71RIA Series

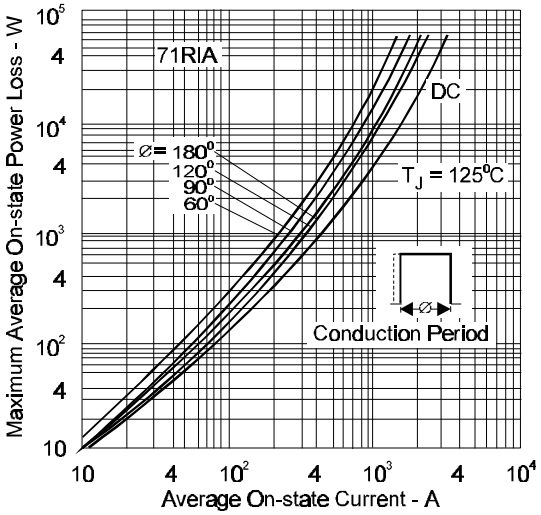


Fig. 10 - Maximum On-state Power Loss Vs. Average On-state Current (Rectangular Current Waveform), 71RIA Series

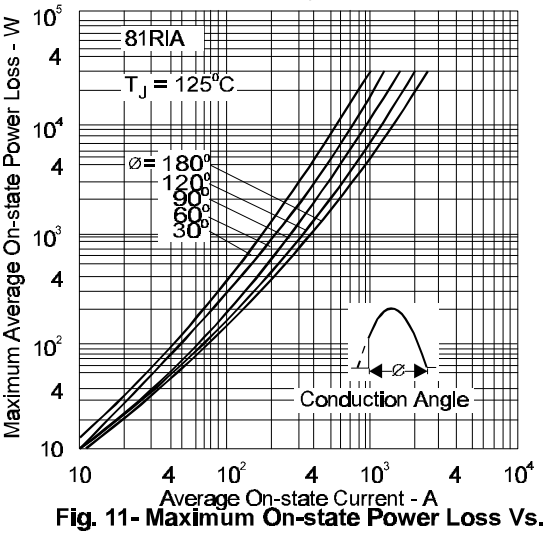


Fig. 11- Maximum On-state Power Loss Vs. Average On-state Current (Sinusoidal Current Waveform), 81RIA Series

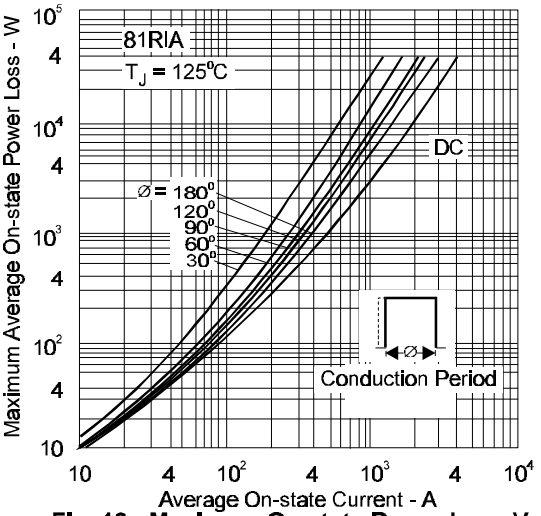


Fig. 12 - Maximum On-state Power Loss Vs. Average On-state Current (Rectangular Current Waveform), 81RIA Series

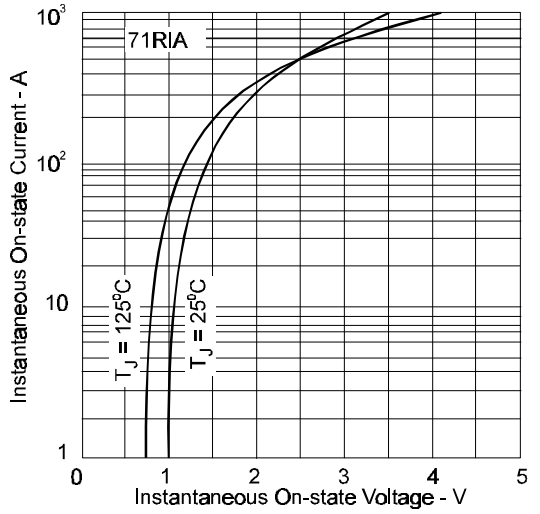


Fig. 13- Maximum Instantaneous On-state Voltage Vs. Instantaneous On-state Current, 71RIA Series

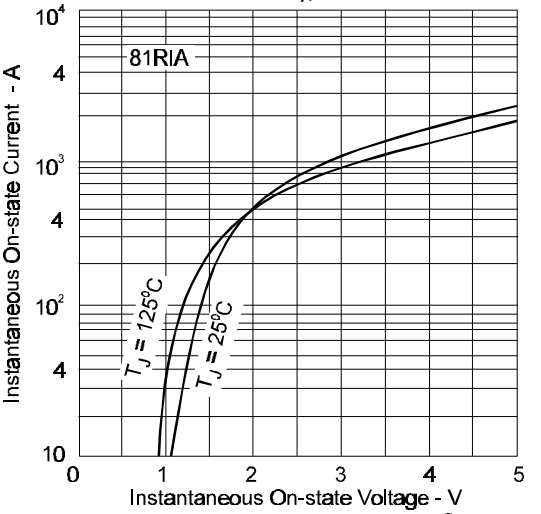


FIg. 14- MaxImum Instantaneous On-state Voltage Vs. Instantaneous On-state Current, 81RIA Series

71RIA & 81RIA SERIES

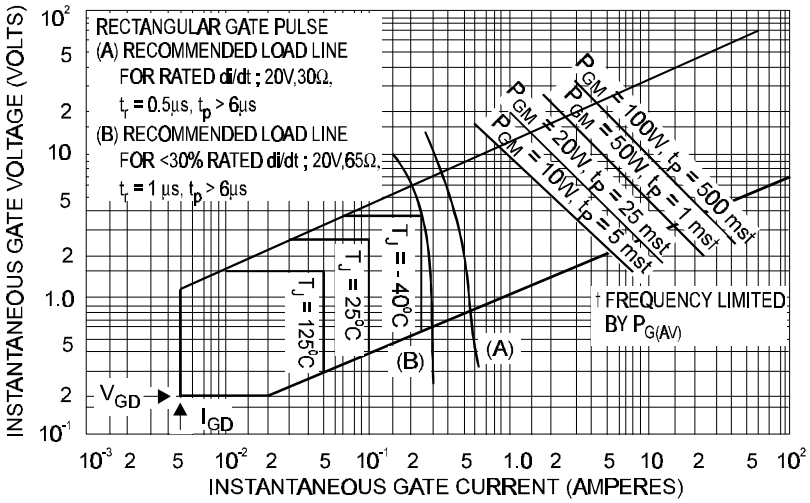


Fig. 15 - Gate Characteristics 71RIA & 81RIA Series

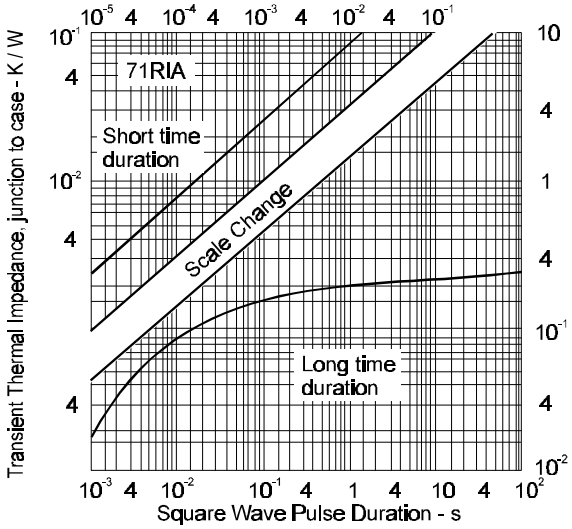


Fig. 16 - Maximum Transient Thermal Impedance Vs. Square Wave Pulse Duration, 71RIA Series

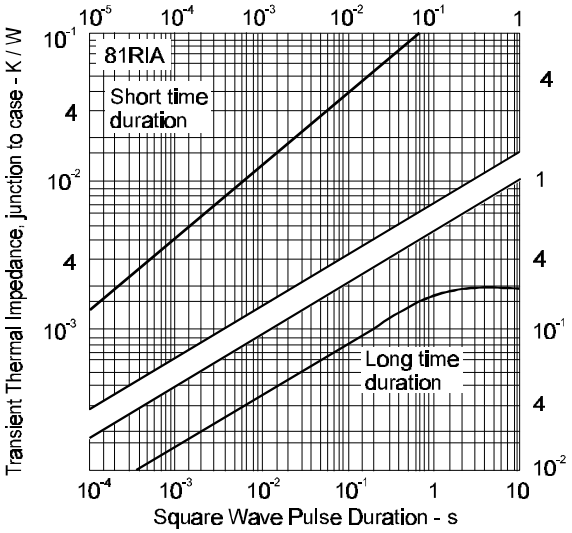


Fig. 17 - Maximum Transient Thermal Impedance Vs. Square Wave Pulse Duration, 81RIA Series

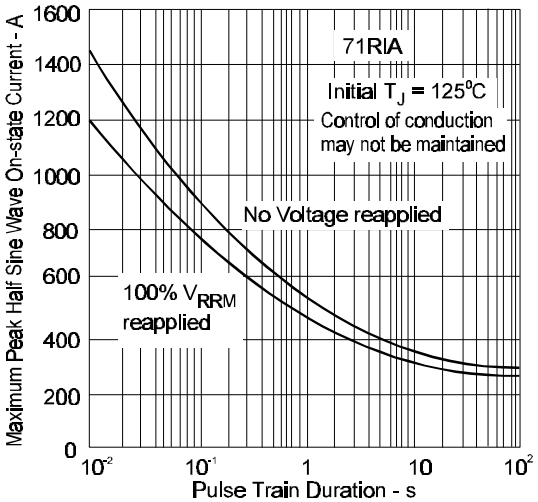


Fig. 18 - Maximum Non-Repetitive Surge Current Vs. Pulse Train Duration, 71RIA Series

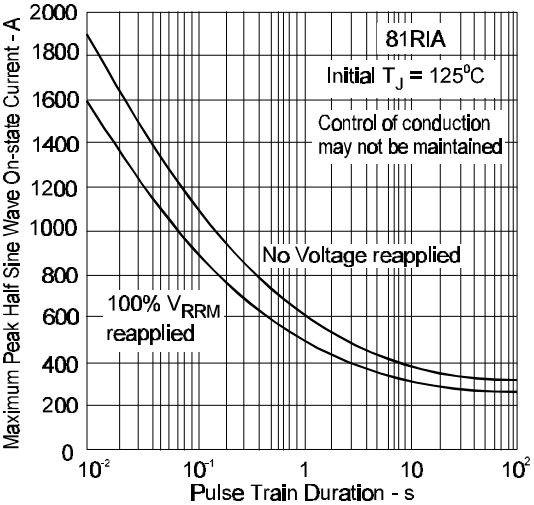


Fig. 19 - Maximum Non-Repetitive Surge Current Vs. Pulse Train Duration, 81RIA Series

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