

SILICON CONTROLLED RECTIFIERS

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

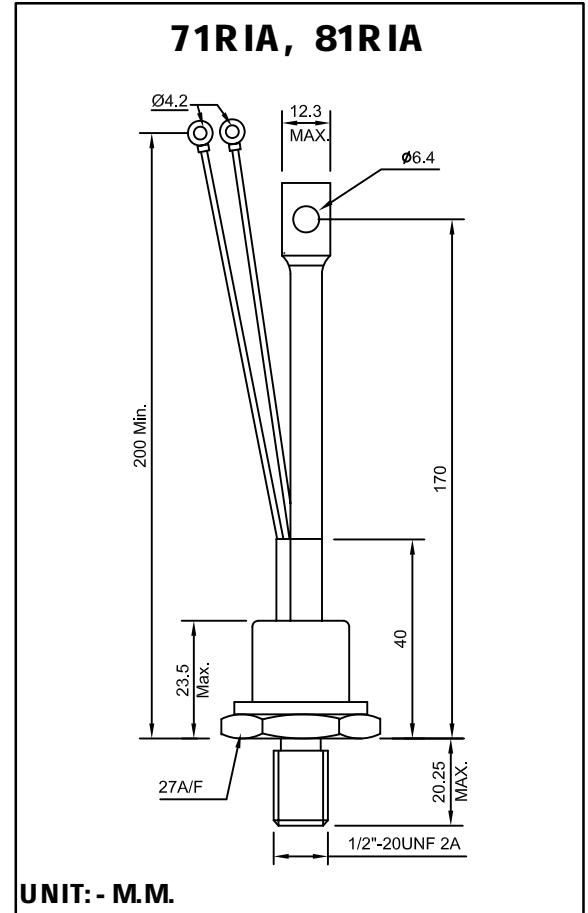
Types : 71RIA10-71RIA140, 81RIA10-81RIA140

FEATURES

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

THERMAL MECHANICAL SPECIFICATIONS

R_{thjc}	Maximum thermal resistance junction-to-case DC operation	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	
	Mbunting torque (Non-lubricated threads)	13 Nm. Mn.	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

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71 RIA, 81 RIA SERIES

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

(1) I^2t for time $t_x = I^2t \times t_x$

BLOCKING

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

SWITCHING

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

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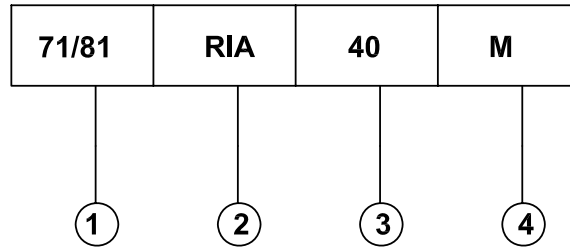
71 RIA, 81 RIA SERIES

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	$T_c = -40^\circ C$	Max. required gate trigger current is the lowest value which will trigger all units with 6V anode-to-cathode.
		100	120	mA	$T_c = 25^\circ C$	
		50	60	mA	$T_c = 125^\circ C$	
V_{GT}	Max. required DC gate voltage to trigger	3.5	3.5	V	$T_c = -40^\circ C$	Max. required gate trigger voltage is the lowest value which will trigger all units with 6V anode-to-cathode.
		2.5	2.5	V	$T_c = 25^\circ C$	
		1.5	1.5	V	$T_c = 125^\circ C$	
V_{GD}	Max. DC gate voltage not to trigger	0.2	0.25	V	$T_c = 125^\circ C$	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		

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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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71 RIA & 81 RIA SERIES

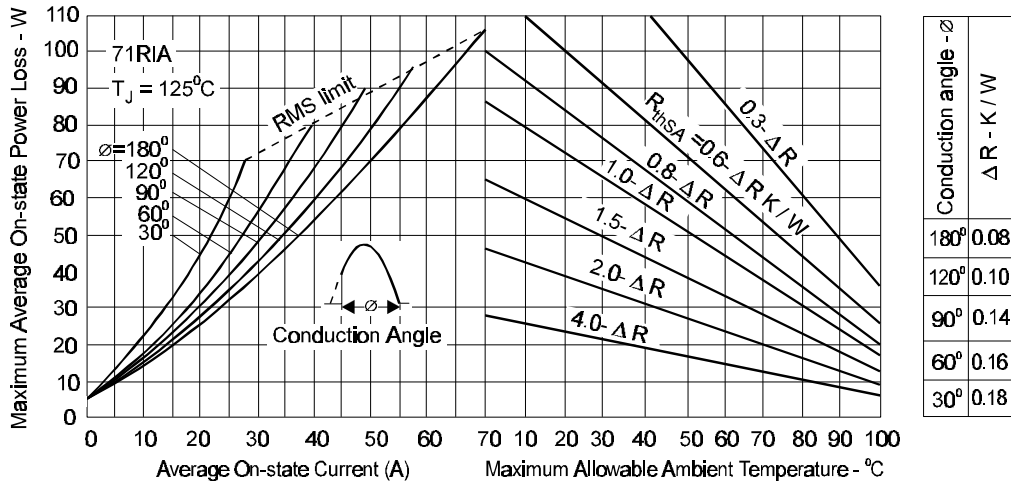


Fig. 1 - Current Rating Nomogram (Sinusoidal Waveforms, 40-400 Hz), 71RIA Series

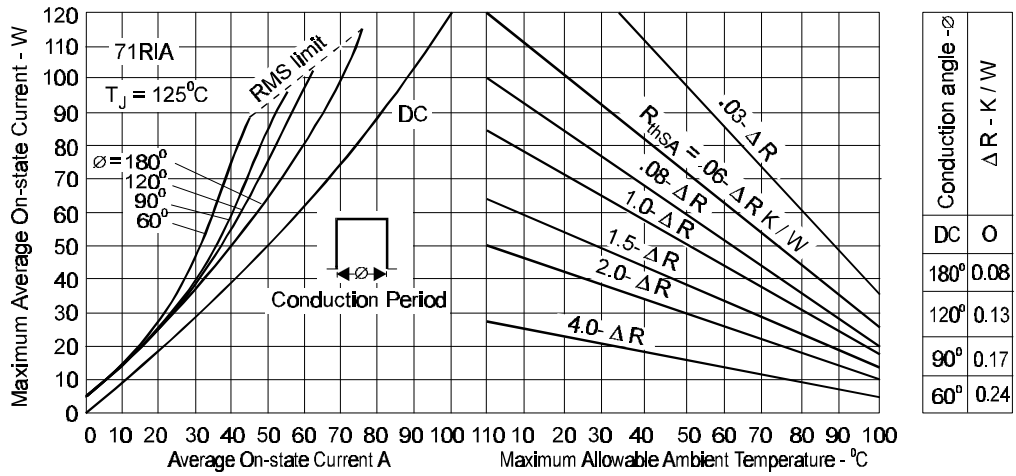


Fig. 2 - Current Rating Nomogram (Rectangular Waveforms, 40-400 Hz), 71RIA Series

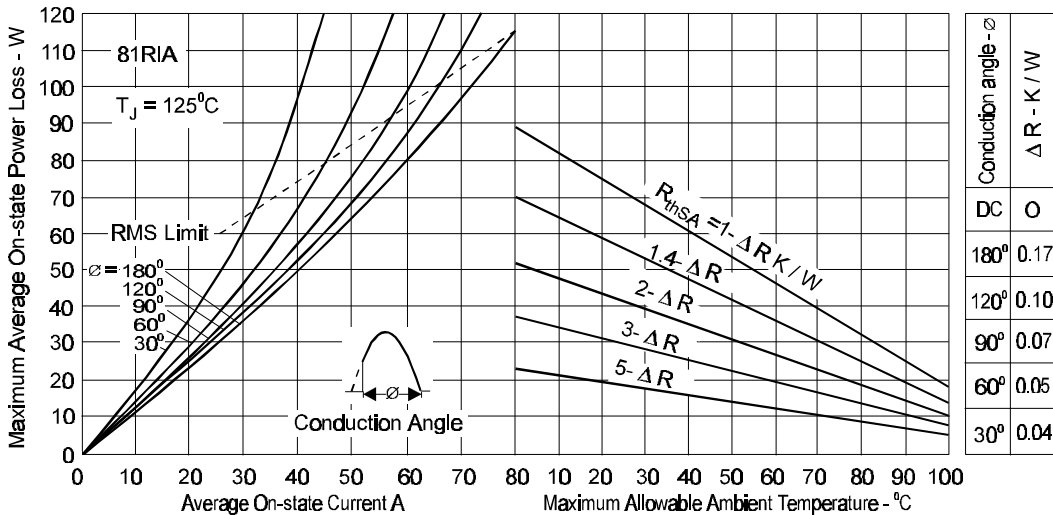


Fig. 3 - Current Rating Nomogram (Sinusoidal Waveforms, 40-400 Hz), 81RIA Series

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71RIA & 81RIA SERIES

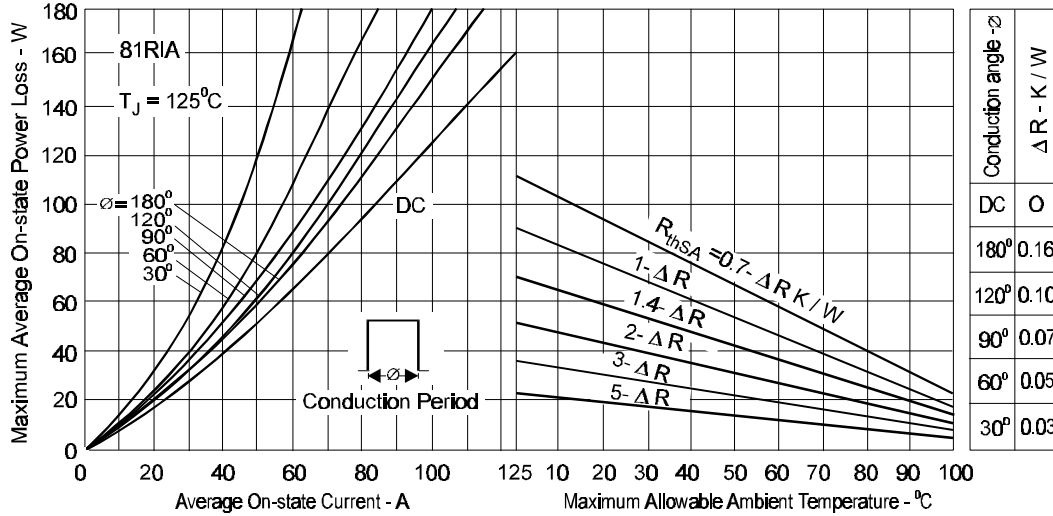


Fig. 4 - Current Rating Nomogram (Rectangular Waveforms, 40-400 Hz), 81RIA Series

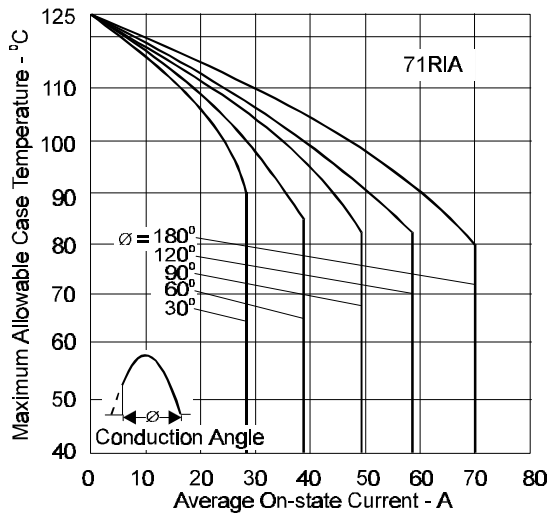


Fig. 5 - Average On-state Current Vs. Maximum Allowable Case Temperature (Sinusoidal Current Waveform), 71RIA Series

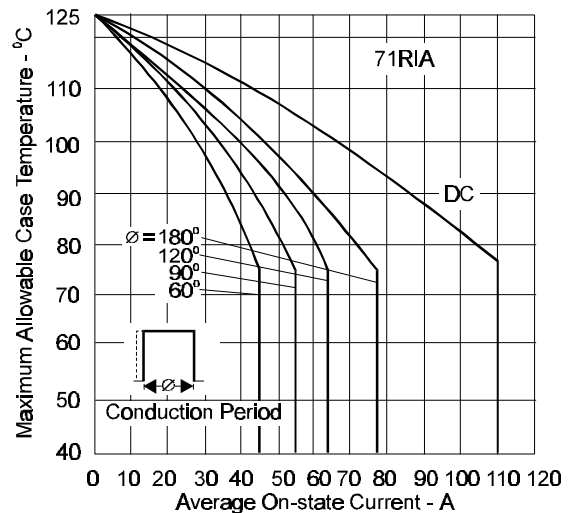


Fig. 6 - Average On-state Current Vs. Maximum Allowable Case Temperature (Rectangular Current Waveform), 71RIA Series

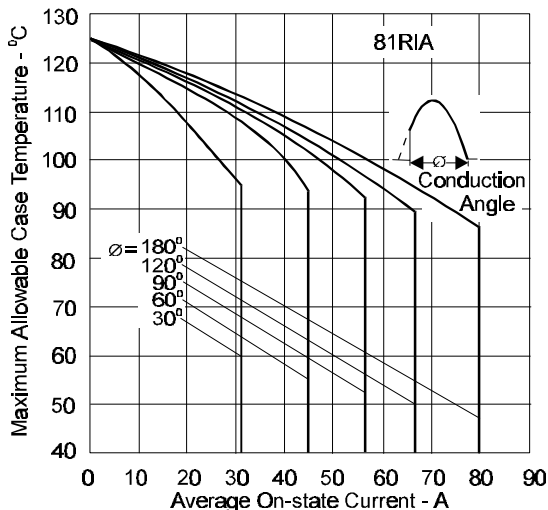


Fig. 7 - Average On-state Current Vs. Maximum Allowable Case Temperature (Sinusoidal Current Waveform), 81RIA Series

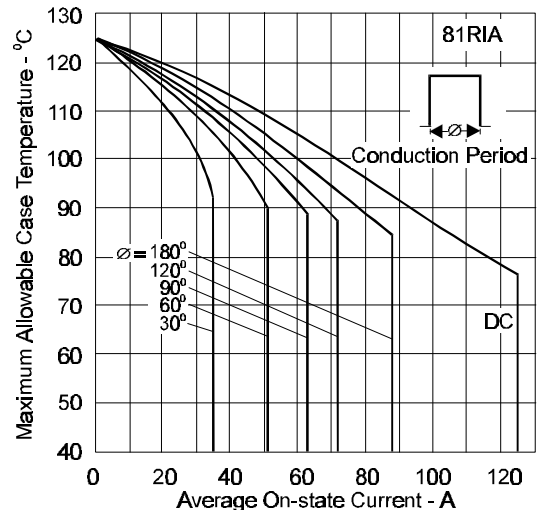


Fig. 8 - Average On-state Current Vs. Maximum Allowable Case Temperature (Rectangular Current Waveform), 81RIA Series

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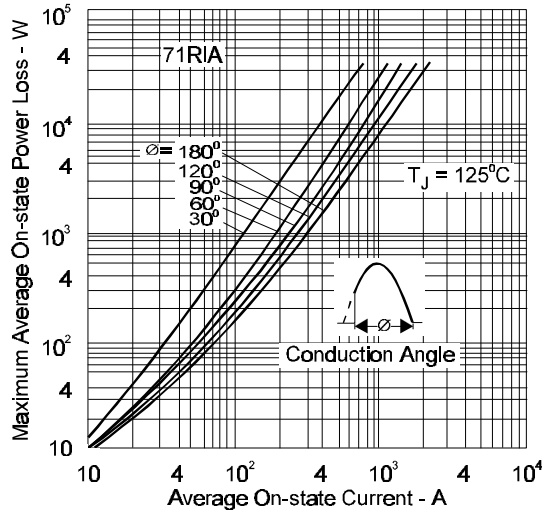


Fig. 9 - Maximum On-state Power Loss Vs. Average On-state Current (Sinusoidal Current Waveform), 71RIA Series

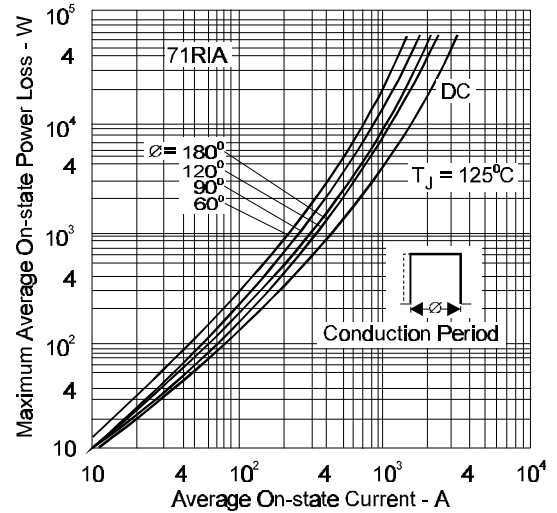


Fig. 10 - Maximum On-state Power Loss Vs. Average On-state Current (Rectangular Current Waveform), 71RIA Series

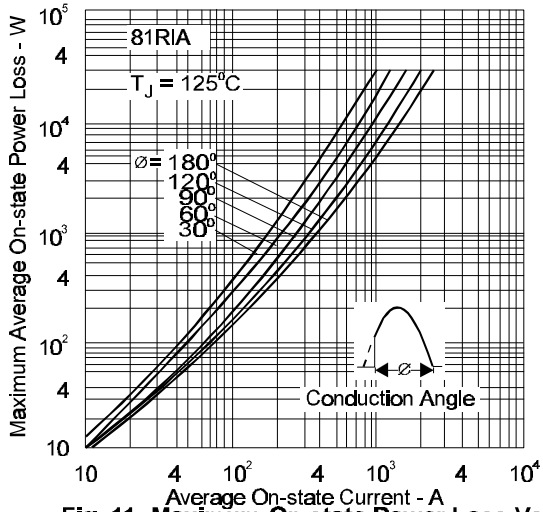


Fig. 11 - Maximum On-state Power Loss Vs. Average On-state Current (Sinusoidal Current Waveform), 81RIA Series

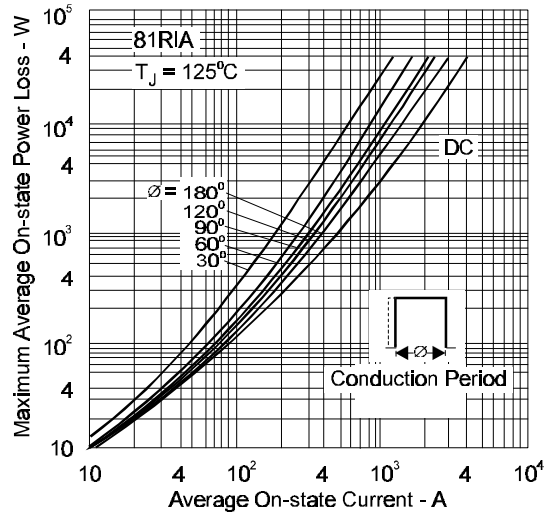


Fig. 12 - Maximum On-state Power Loss Vs. Average On-state Current (Rectangular Current Waveform), 81RIA Series

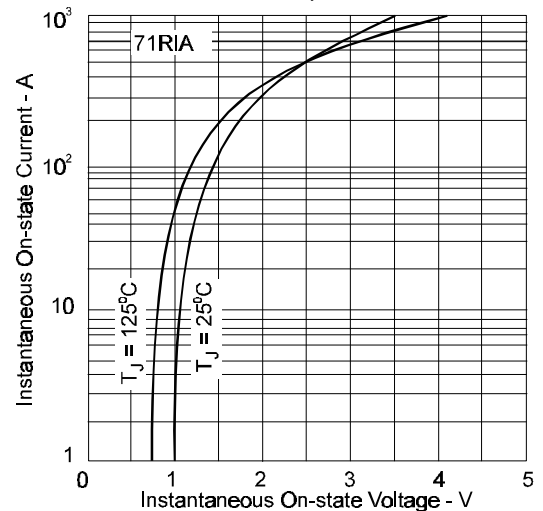


Fig. 13 - Maximum Instantaneous On-state Voltage Vs. Instantaneous On-state Current, 71RIA Series

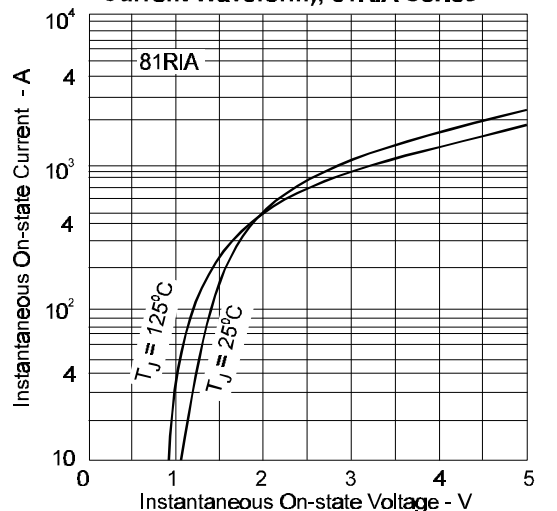


Fig. 14 - Maximum Instantaneous On-state Voltage Vs. Instantaneous On-state Current, 81RIA Series

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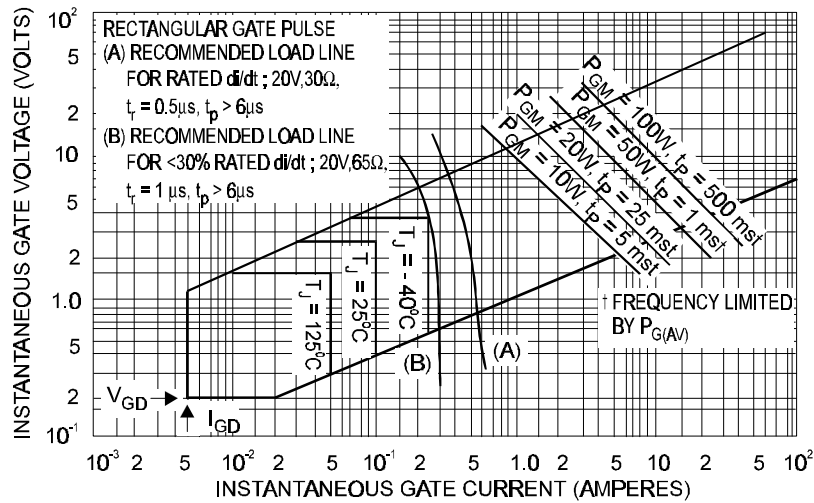


Fig. 15 - Gate Characteristics 71RIA & 81RIA Series

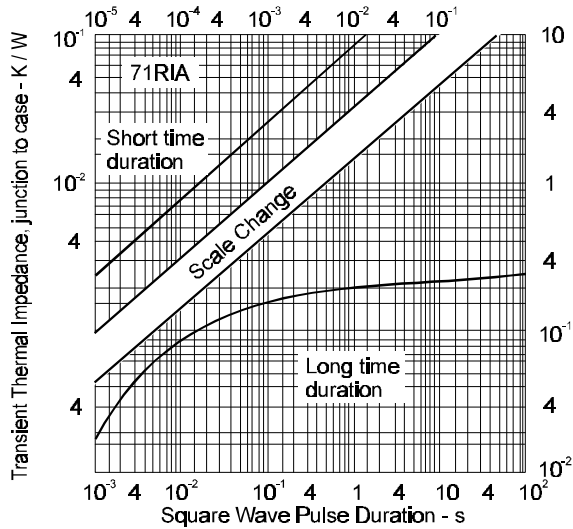


Fig. 16 - Maximum Transient Thermal Impedance Vs. Square Wave Pulse Duration, 71RIA Series

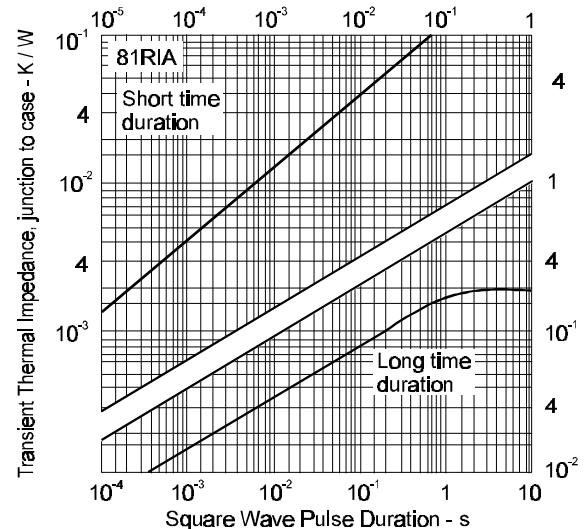


Fig. 17 - Maximum Transient Thermal Impedance Vs. Square Wave Pulse Duration, 81RIA Series

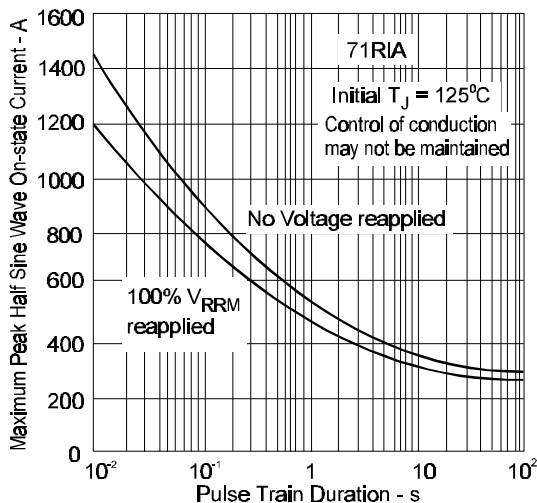


Fig. 18 - Maximum Non-Repetitive Surge Current Vs. Pulse Train Duration, 71RIA Series

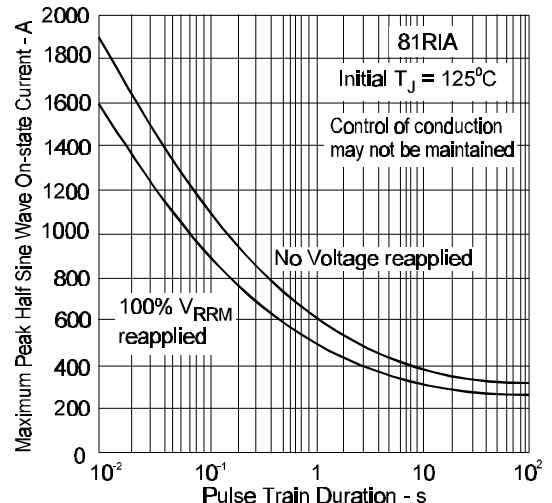


Fig. 19 - Maximum Non-Repetitive Surge Current Vs. Pulse Train Duration, 81RIA Series