

International
IRF Rectifier

80RIA SERIES

PHASE CONTROL THYRISTORS

Stud Version

Features

- Hermetic glass-metal seal
- International standard case TO-209AC (TO-94)

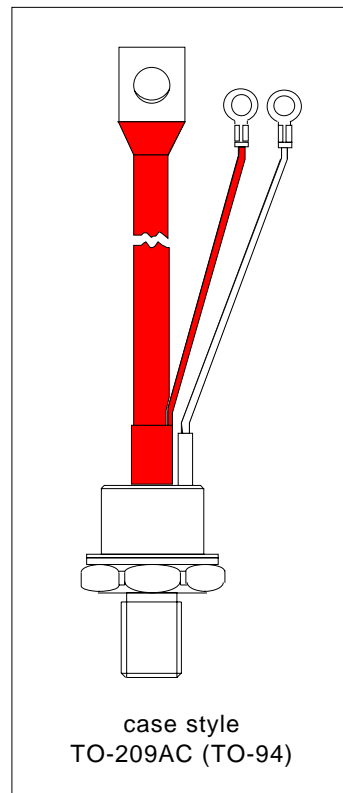
80A

Typical Applications

- DC motor controls
- Controlled DC power supplies
- AC controllers

Major Ratings and Characteristics

Parameters	80RIA	Unit
$I_{T(AV)}$	80	A
@ T_C	85	°C
$I_{T(RMS)}$	125	A
I_{TSM} @ 50Hz	1900	A
@ 60Hz	1990	A
I^2t @ 50Hz	18	KA ² s
@ 60Hz	16	KA ² s
V_{DRM}/V_{RRM}	400 to 1200	V
t_q typical	110	μs
T_J	- 40 to 125	°C



ELECTRICAL SPECIFICATIONS

Voltage Ratings

Type number	Voltage Code	V_{DRM}/V_{RRM} , max. repetitive peak and off-state voltage V	V_{RSM} , maximum non-repetitive peak voltage V	I_{DRM}/I_{RRM} max. @ $T_J = 125^\circ\text{C}$ mA
80RIA	40	400	500	15
	80	800	900	
	120	1200	1300	

On-state Conduction

Parameter	80RIA	Units	Conditions
$I_{T(AV)}$ Max. average on-state current @ Case temperature	80	A	180° conduction, half sine wave
	85	°C	
$I_{T(RMS)}$ Max. RMS on-state current	125	A	DC @ 75°C case temperature
I_{TSM} Max. peak, one-cycle non-repetitive surge current	1900	A	t = 10ms No voltage
	1990		t = 8.3ms reapplied
	1600		t = 10ms 100% V_{RRM}
	1675		t = 8.3ms reapplied
I^2t Maximum I^2t for fusing	18	KA ² s	t = 10ms No voltage
	16		t = 8.3ms reapplied
	12.7		t = 10ms 100% V_{RRM}
	11.7		t = 8.3ms reapplied
$I^2\sqrt{t}$ Maximum $I^2\sqrt{t}$ for fusing	180.5	KA ² √s	t = 0.1 to 10ms, no voltage reapplied
$V_{T(TO)1}$ Low level value of threshold voltage	0.99	V	($16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}$), $T_J = T_J \text{ max.}$
$V_{T(TO)2}$ High level value of threshold voltage	1.13		($I > \pi \times I_{T(AV)}$), $T_J = T_J \text{ max.}$
r_{t1} Low level value of on-state slope resistance	2.29	mΩ	($16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)}$), $T_J = T_J \text{ max.}$
r_{t2} High level value of on-state slope resistance	1.84		($I > \pi \times I_{T(AV)}$), $T_J = T_J \text{ max.}$
V_{TM} Max. on-state voltage	1.60	V	$I_{pk} = 250\text{A}$, $T_J = 25^\circ\text{C}$ $t_p = 10\text{ms}$ sine pulse
I_H Maximum holding current	200	mA	$T_J = 25^\circ\text{C}$, anode supply 12V resistive load
I_L Typical latching current	400		

Switching

Parameter	80RIA	Units	Conditions
di/dt Max. non-repetitive rate of rise of turned-on current	300	A/μs	T _J = 125°C, V _d = rated V _{DRM} , I _{TM} = 2xdi/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.
t _d Typical delay time	1	μs	Gate pulse: 10V, 15Ω source, t _p = 6μs, t _r = 0.1μs, V _d = rated V _{DRM} , I _{TM} = 50Adc, T _J = 25°C.
t _q Typical turn-off time	110		I _{TM} = 50A, T _J = T _J max, di/dt = -5A/μs min., V _R = 50V, dv/dt = 20V/μs, Gate bias: 0V 25Ω, t _p = 500μs

Blocking

Parameter	80RIA	Units	Conditions
dv/dt Maximum critical rate of rise of off-state voltage	500	V/μs	T _J = 125°C exponential to 67% rated V _{DRM}
I _{RRM} I _{DRM} Max. peak reverse and off-state leakage current	15	mA	T _J = 125°C rated V _{DRM} /V _{RRM} applied

Triggering

Parameter	80RIA	Units	Conditions
P _{GM} Maximum peak gate power	12	W	T _J = T _J max, t _p ≤ 5ms
P _{G(AV)} Maximum average gate power	3		T _J = T _J max, f = 50Hz, d% = 50
I _{GM} Max. peak positive gate current	3	A	T _J = T _J max, t _p ≤ 5ms
+V _{GM} Maximum peak positive gate voltage	20	V	T _J = T _J max, t _p ≤ 5ms
-V _{GM} Maximum peak negative gate voltage	10		
I _{GT} Max. DC gate current required to trigger	270	mA	T _J = -40°C
	120		T _J = 25°C
	60		T _J = 125°C
V _{GT} Max. DC gate voltage required to trigger	3.5	V	T _J = -40°C
	2.5		T _J = 25°C
	1.5		T _J = 125°C
I _{GD} DC gate current not to trigger	6	mA	T _J = T _J max
V _{GD} DC gate voltage not to trigger	0.25		

Max. required gate trigger/ current/ voltage are the lowest value which will trigger all units 6V anode-to-cathode applied

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

80RIA Series

Bulletin I25201 rev. B 03/03

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Thermal and Mechanical Specification

Parameter	80RIA	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	0.30	K/W	DC operation
R_{thCS} Max. thermal resistance, case to heatsink	0.1		Mounting surface, smooth, flat and greased
T Mounting torque, $\pm 10\%$	15.5 (137)	Nm	Non lubricated threads
	14 (120)	(lbf-in)	Lubricated threads
wt Approximate weight	130	g	
Case style	TO-209AC(TO-94)		See Outline Table

ΔR_{thJ-C} Conduction

(The following table shows the increment of thermal resistance R_{thJ-C} when devices operate at different conduction angles than DC)

Conduction angle	Sinusoidal conduction	Rectangular conduction	Units	Conditions
180°	0.042	0.030	K/W	$T_J = T_J \text{ max.}$
120°	0.050	0.052		
90°	0.064	0.070		
60°	0.095	0.100		
30°	0.164	0.165		

Ordering Information Table

Device Code	
1	- $I_{TAV} \times 10A$
2	- 0 = Eyelet terminals (Gate and Auxiliary Cathode Leads) 1 = Fast - on terminals (Gate and Auxiliary Cathode Leads)
3	- RIA = Essential part number
4	- Voltage code: Code $\times 10 = V_{RRM}$ (See Voltage Rating Table)
5	- None = Stud base 1/2"-20UNF- 2A threads
NOTE: For Metric Device M12 x 1.75 E6 Contact factory	

Outline Table

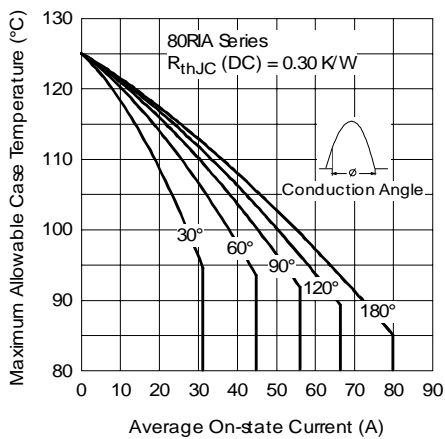
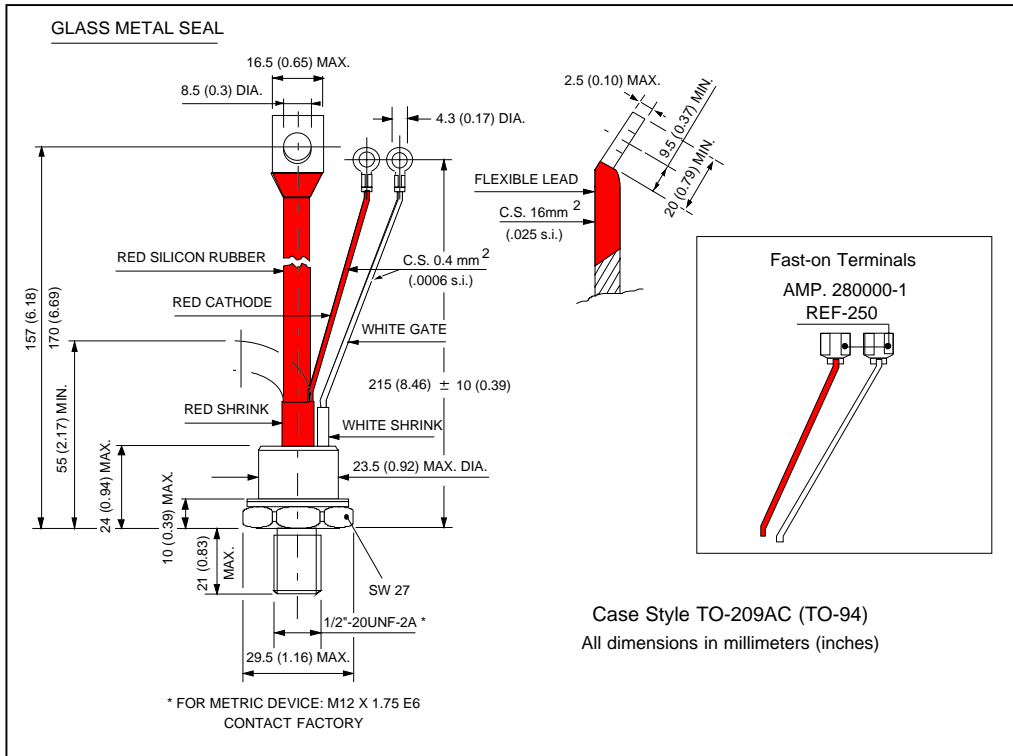


Fig. 1 - Current Ratings Characteristics

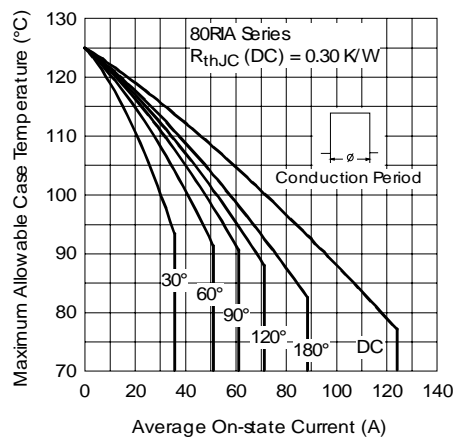


Fig. 2 - Current Ratings Characteristics

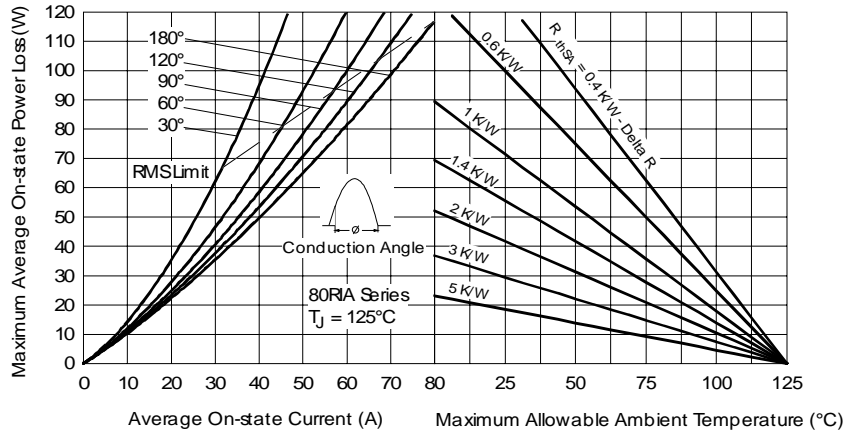


Fig. 3 - On-state Power Loss Characteristics

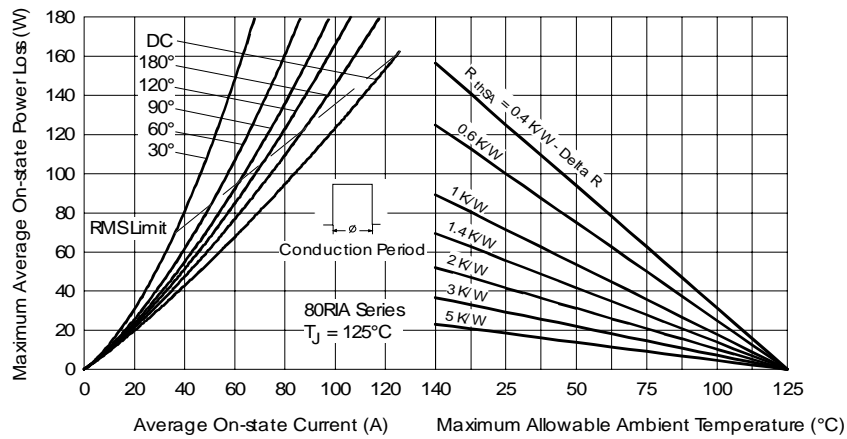


Fig. 4 - On-state Power Loss Characteristics

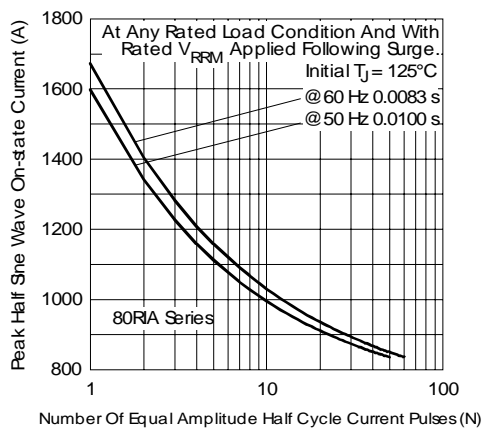


Fig. 5 - Maximum Non-Repetitive Surge Current

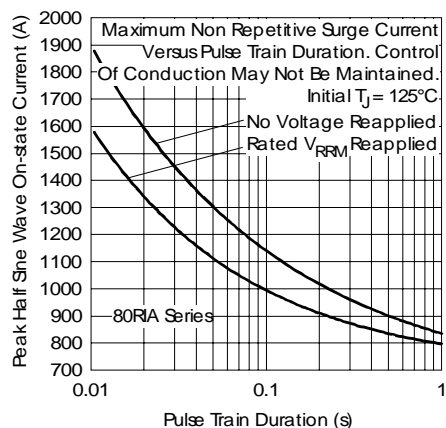


Fig. 6 - Maximum Non-Repetitive Surge Current

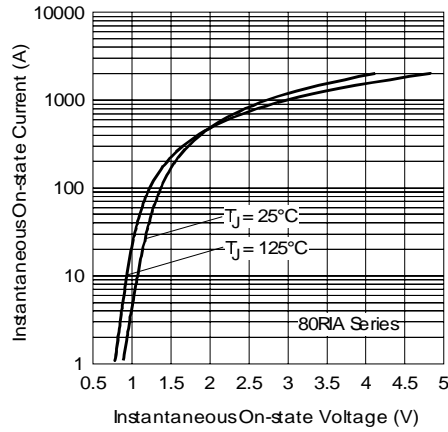


Fig. 7 - On-state Voltage Drop Characteristics

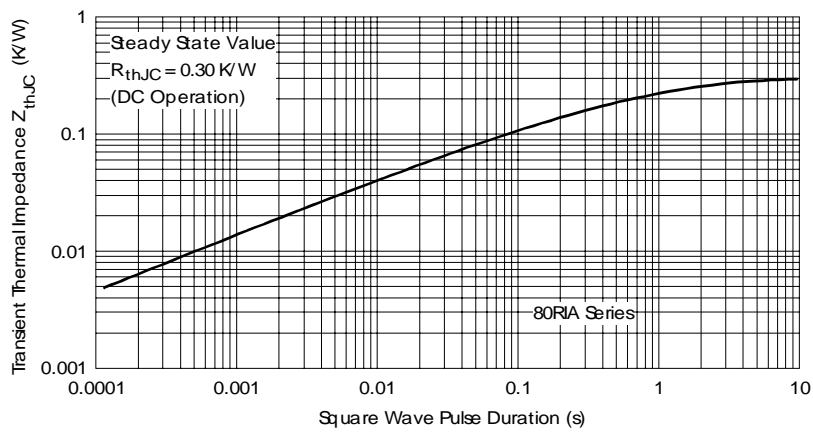


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

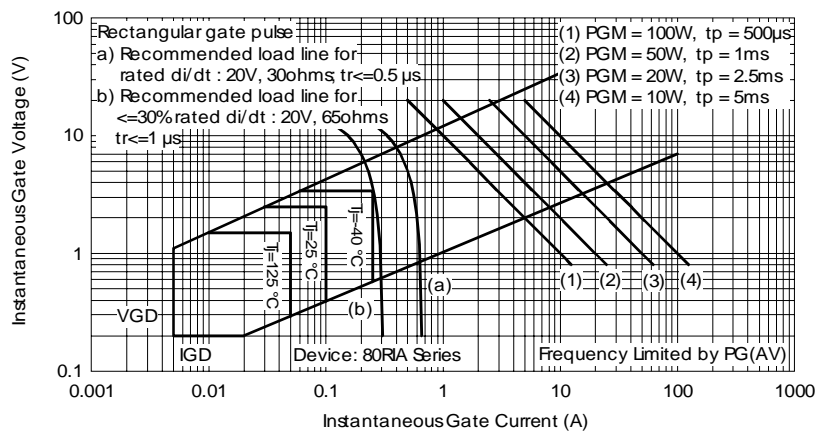


Fig. 9 - Gate Characteristics

80RIA Series

Bulletin I25201 rev. B 03/03

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Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

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