INTERNATIONAL RECTIFIER IOR

251UL SERIES

250 Amp Fast Recovery Power Silicon Rectifiers

Major Ratings and Characteristics

	251ULRXXS10 251ULXXS10	251ULRXXS15 251ULXXS15	251ULRXXS20 251ULXXS20	251ULRXXS25 251ULXXS25	Units
$I_{F(AV)}$	250	250	250	250	A
@ Max. T_C	55 (1)	105 (2)	105 (2)	105 (2)	°C
I_{FSM} @ 50 Hz	3,350	3,350	3,350	3,350	A
@ 60 Hz	3,500	3,500	3,500	3,500	
I^2t @ 50 Hz	56,000	56,000	56,000	56,000	A^2s
@ 60 Hz	51,000	51,000	51,000	51,000	
$I^2\sqrt{t}$	790,000	790,000	790,000	790,000	$A^2\sqrt{s}$
t_{rr}	1	1.5	2	2.5	μs
V_{RRM} Range	200 to 1,000	200 to 1,000	600 to 1,400	1,400 to 1,800	V

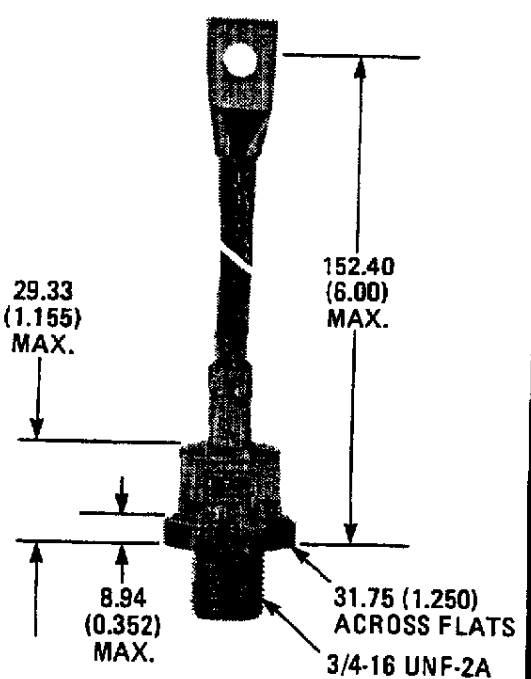
(1) Max. T_C for 251ULRXXS10 is 70°C.

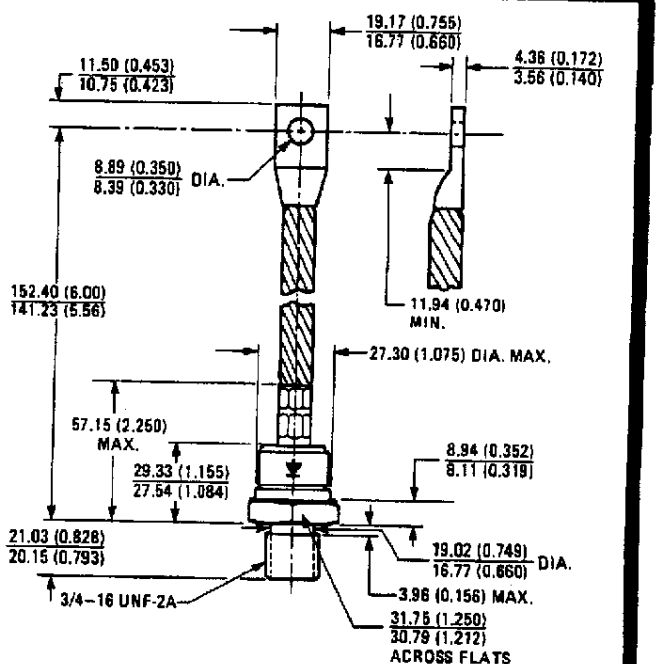
(2) Max. T_C for 251ULRXXS15 to S25 is 120°C.

Description/Features

- t_{rr} = 1.0 μs @ 200 to 1000V
  = 1.5 μs @ 200 to 1000V
  = 2.0 μs @ 600 to 1400V
  = 2.5 μs @ 1000 to 1800V
- For – by-pass diodes (free-wheeling diodes)
  – inverters and choppers
  – up to 10 kHz
- Can be supplied to meet stringent military, aerospace and other high-reliability requirements.

CASE STYLE AND DIMENSIONS





Conforms to JEDEC
Outline DO-205AB (DO-9) (B-6)
All Dimensions in Millimeters and (Inches)

VOLTAGE RATINGS

Part Number				V_{RRM} – Max. Repetitive Peak Reverse Voltage (V) ①	V_{RRM} – Max. Repetitive Peak Reverse Voltage (V) ①	V_{RSM} – Max. Non-Repetitive Peak Reverse Voltage $t_p \leq 5$ ms (V) ①	V_R – Max. Direct Reverse Voltage (V) ①
1.0 μs	1.5 μs	2.0 μs	2.5 μs	T_J = -40°C to 175°C	T_J = 0°C to 175°C	T_J = 25°C to 175°C	T_J = -40°C to 175°C
251UL20S10	251UL20S15	–	–	200	200	300	200
251UL40S10	251UL40S15	–	–	400	400	500	400
251UL60S10	251UL60S15	251UL60S20	–	600	600	720	600
251UL80S10	251UL80S15	251UL80S20	–	800	800	960	800
251UL100S10	251UL100S15	251UL100S20	251UL100S25	1000	1000	1200	1000
–	–	251UL120S20	251UL120S25	1200	1200	1400	1200
–	–	251UL140S20	251UL140S25	1400	1500	1600	1400
–	–	–	251UL160S25	1600	1700	1800	1600
–	–	–	251UL180S25	1800	1900	2000	1800

REVERSE RECOVERY CHARACTERISTICS

		251UL/251ULR					Conditions for Reverse Recovery
		S10	S15	S20	S25	Units	
t_{rr}	Max. reverse recovery time ②	1.0	1.5	2.0	2.5	μs	I_{FM} = 785A, $t_p \approx$ 100 μs, di/dt = -25 A/μs, T_C = 25°C
t_a	Max. reverse recovery rise time	0.75	1.13	1.50	1.88	μs	
t_b	Min. reverse recovery fall time	0.25	0.37	0.50	0.62	μs	
$I_{RM(REC)}$	Max. reverse recovery current	20	30	38	44	A	
Q_{RR}	Max. recovered charge	10	20.5	38	55	μC	
Voltage Range		200 to 1,000	200 to 1,000	600 to 1,400	1,000 to 1,800	V	

ELECTRICAL SPECIFICATIONS

		251ULXXS10	251ULRXXS10	251ULXXS15 thru 251ULXXS25	251ULRXXS15 thru 251ULRXXS25	Units	Conditions
$I_{F(AV)}$	Max. average forward current	250	250	250	250	A	180° sinusoidal conduction.
	@ Max. T_C =	55	70	105	120	°C	
I_{FSM}	Max. peak one cycle, non-repetitive surge current	3,350	3,350	3,350	3,350	A	50 Hz half cycle sine wave or 6 ms rectangular pulse — Following any rated load condition, and with rated V_{RRM} applied following surge.
		3,500	3,500	3,500	3,500		60 Hz half cycle sine wave or 5 ms rectangular pulse
		4,000	4,000	4,000	4,000		50 Hz half cycle sine wave or 6 ms rectangular pulse — Same conditions as above except with V_{RRM} applied following surge = 0.
		4,150	4,150	4,150	4,150		60 Hz half cycle sine wave or 5 ms rectangular pulse
I^2t	Max. I^2t capability for fusing	56,000	56,000	56,000	56,000	A^2s	t = 10 ms — Rated V_{RRM} applied following surge, initial T_J = Max. rated
		51,000	51,000	51,000	51,000		t = 8.3 ms
	Max. I^2t capability for individual device fusing	79,000	79,000	79,000	79,000		t = 10 ms — V_{RRM} = 0 following surge, initial T_J = Max. rated
		72,000	72,000	72,000	72,000		t = 8.3 ms
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ capability for individual device fusing ③	790,000	790,000	790,000	790,000	$A^2\sqrt{s}$	V_{RRM} following surge = 0.
V_{FM}	Max. peak forward voltage	1.65	1.65	1.65	1.65	V	$I_{F(AV)}$ = 250A (785A peak), T_C = Max. rated
$I_{R(AV)}$	Max. average reverse current	20	20	20	20	mA	Max. rated $I_{F(AV)}$, V_{RRM} and T_C

① Max. T_J limited to 125°C on 251ULXXS10 and 251ULRXXS10. ③ I^2t for time $t_x = I^2\sqrt{t} \cdot \sqrt{t_x}$.

② In any device, $t_{rr} = t_a + t_b$.

THERMAL-MECHANICAL SPECIFICATIONS

		251ULXXS10	251ULRXXS10	251ULXXS15 thru 251ULXXS25	251ULRXXS15 thru 251ULRXXS25	Units	Conditions
T_J	Max. operating junction temperature range	-40 to 125	-40 to 125	-40 to 175	-40 to 175	°C	
T_{stg}	Max. storage temperature range	-40 to 200	-40 to 200	-40 to 200	-40 to 200	°C	
R_{thJC}	Max. internal thermal resistance, junction-to-case	0.15	0.12	0.15	0.12	deg. C/W	DC operation
R_{thCS}	Thermal resistance, case-to-sink	0.08	0.08	0.08	0.08	deg. C/W	Mounting surface flat, smooth and greased.
T	Mounting torque Min.	31.5 (275)	31.5 (275)	31.5 (275)	31.5 (275)	N • m (lbf-in.)	
	Max.	37 (325)	37 (325)	37 (325)	37 (325)		
wt	Approximate weight	215 (7.5)	215 (7.5)	215 (7.5)	215 (7.5)	g (oz.)	
	Case style	DO-205AB (DO-9) (B-13)					JEDEC

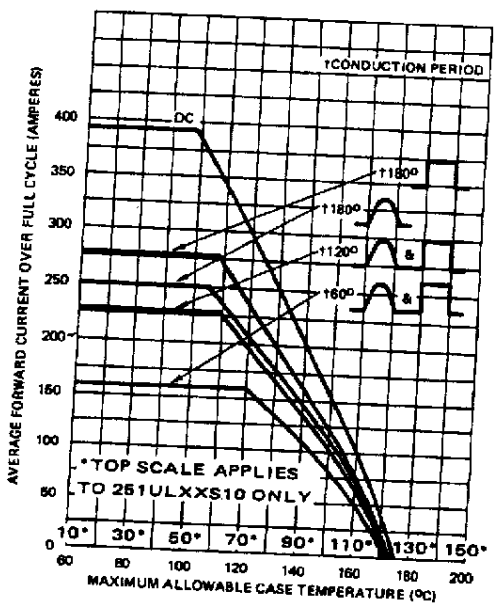


Fig. 1 – Average Forward Current Vs. Case Temperature, 251UL Series

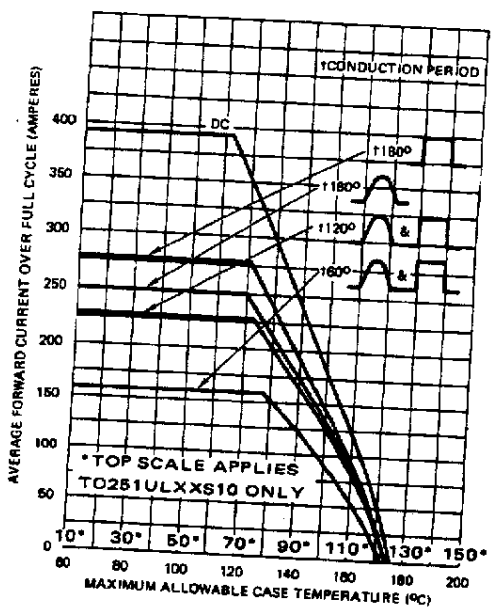


Fig. 2 – Average Forward Current Vs. Case Temperature, 251ULR Series

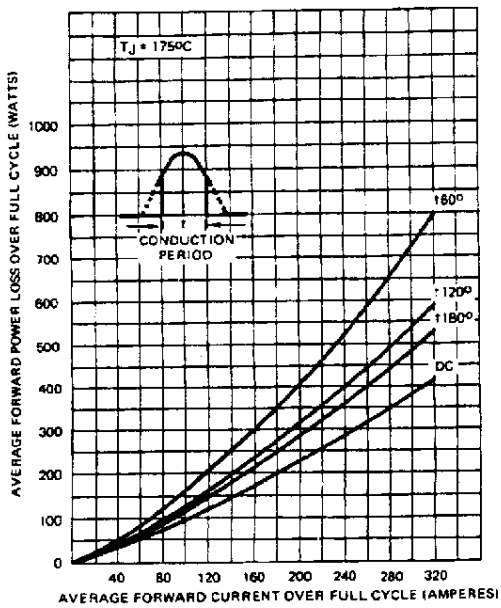


Fig. 3 – Maximum Low-Level Power Loss Vs. Forward Current (Sinusoidal Current Waveform)

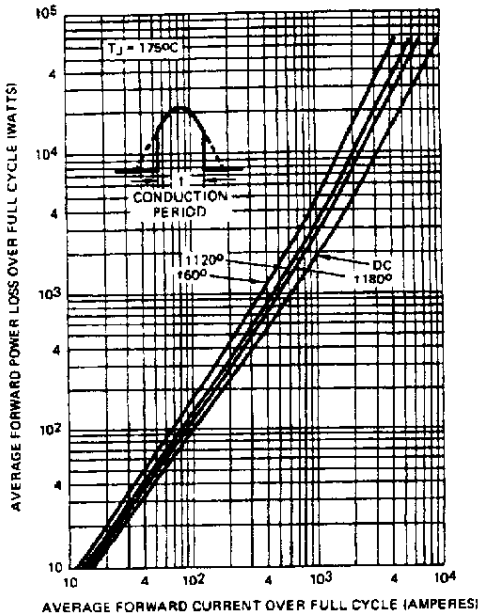


Fig. 4 – Maximum High-Level Power Loss Vs. Forward Current (Sinusoidal Current Waveform)

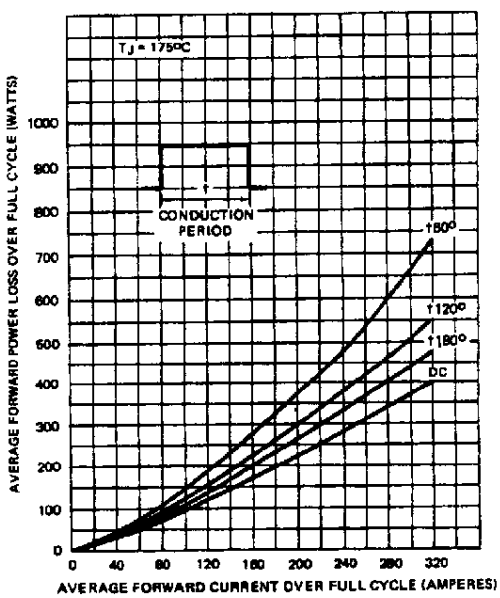


Fig. 5 – Maximum Low-Level Forward Power Loss Vs. Forward Current (Rectangular Current Waveform)

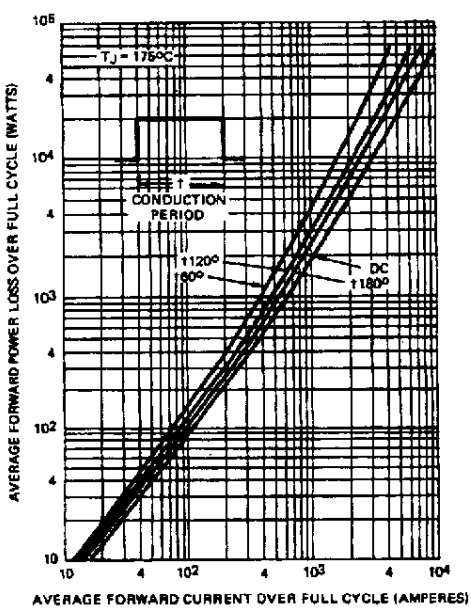


Fig. 6 – Maximum High-Level Forward Power Loss Vs. Forward Current (Rectangular Current Waveform)

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