

251UL SERIES

250 Amp Fast Recovery Power Silicon Rectifiers

Major Ratings and Characteristics

	251ULRXS10	251ULRXS15	251ULRXS20	251ULRXS25	Units
$I_F(AV)$	250	250	250	250	A
θ Max. T_C	55 (1)	105 (1)	105 (1)	105 (1)	$^{\circ}C$
I_{FSM} @ 50 Hz	3,350	3,350	3,350	3,350	A
@ 60 Hz	3,500	3,500	3,500	3,500	
I^2_t @ 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

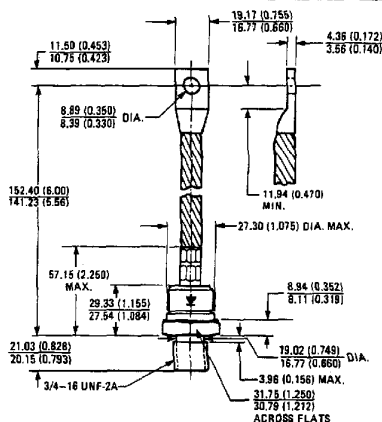
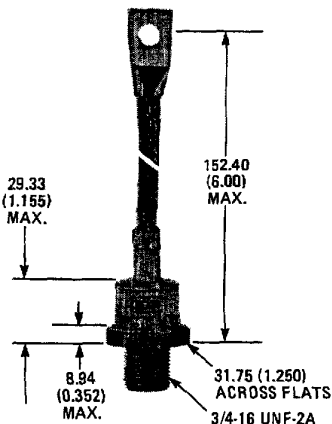
(1) Max. T_C for 251ULRXS10 is $70^{\circ}C$.

(2) Max. T_C for 251ULRXS15 to S25 is $120^{\circ}C$.

Description/Features

- $t_{rr} = 1.0 \mu s$ @ 200 to 1000V
 $= 1.5 \mu s$ @ 200 to 1000V
 $= 2.0 \mu s$ @ 600 to 1400V
 $= 2.5 \mu s$ @ 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 ≤ 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
251UL80S10	251UL80S15	251UL80S20	—	800	800	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 ①	1.0	1.5	2.0	2.5	μs	I _{FM} = 785A, t _p ≈ 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 _f	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	251ULRXS10	251ULXXS15 thru 251ULXXS25	251ULRXS15 thru 251ULRXS25	Units	Conditions
I _F (AV)	Max. average forward current	250	250	250	250	A	180° sinusoidal conduction.
Θ	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 ² s	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	Max. I ₂ √t capability for individual device fusing ①	790,000	790,000	790,000	790,000	A ² √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 251ULRXS10.② I_{2t} for time t_x = I₂√t₁ + √t_x.③ In any device, t_{rr} = t_a + t_f.

THERMAL-MECHANICAL SPECIFICATIONS

	251ULXXS10	251ULRXXS10	251ULXXS15 thru 251ULXXS25	251ULRXXS15 thru 251ULRXXS25	Units	Conditions
T_J	Max. operating junction tem- perature 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 resist- ance, junction- to-case	0.15	0.12	0.15	0.12	deg. C/W
R_{thCS}	Thermal resist- ance, case-to- sink	0.08	0.08	0.08	0.08	deg. C/W
T	Mounting torque	Min. 31.5 (275) Max. 37 (325)	31.5 (275) 37 (325)	31.5 (275) 37 (325)	31.5 (275) 37 (325)	N • m (lbf • in.)
wrt	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	

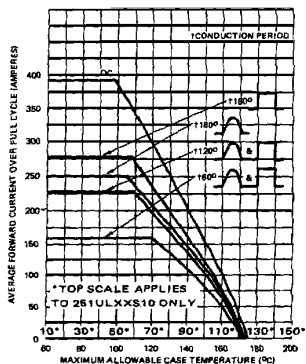


Fig. 1 — Average Forward Current Vs. Case Temperature, 251UL Series

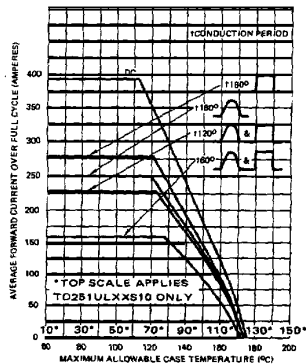


Fig. 2 — Average Forward Current Vs. Case Temperature, 251ULR Series

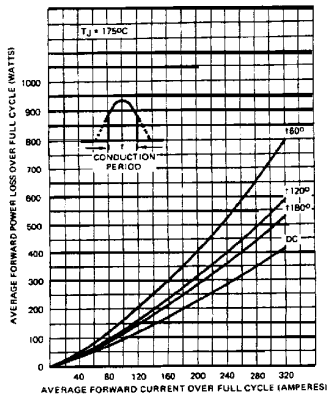


Fig. 3 — Maximum Low-Level Power Loss Vs. Forward Current (Sinusoidal Current Waveform)

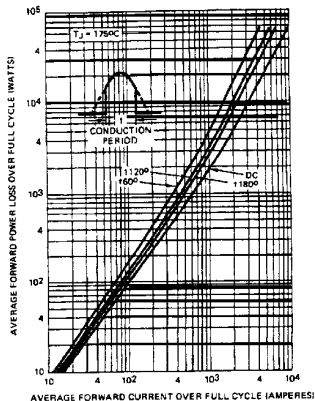


Fig. 4 — Maximum High-Level Power Loss Vs. Forward Current (Sinusoidal Current Waveform)

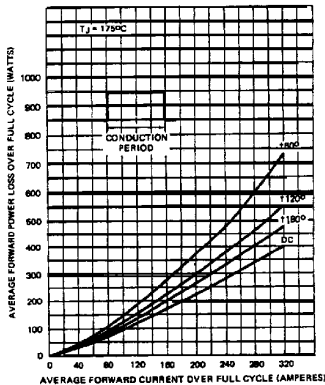


Fig. 5 — Maximum Low-Level Forward Power Loss Vs. Forward Current (Rectangular Current Waveform)

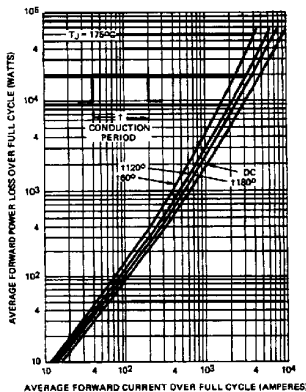


Fig. 6 — Maximum High-Level Forward Power Loss Vs. Forward Current (Rectangular Current Waveform)

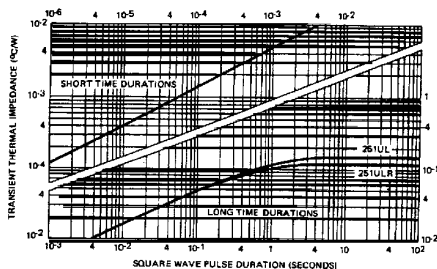


Fig. 7 — Maximum Transient Thermal Impedance, Junction-to-Case, Vs. Pulse Duration

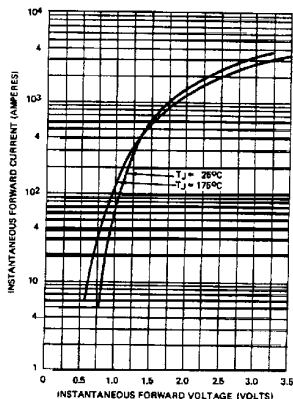


Fig. 8 — Maximum Forward Voltage Vs. Forward Current

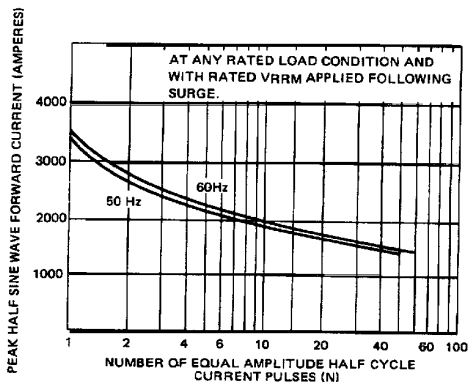


Fig. 9 — Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses