Data Sheet No. PD-2.047B

INTERNATIONAL RECTIFIER IOR

T-03-17

80SQ SERIES

8 Amp Schottky Power Rectifiers

Major Ratings and Characteristics

Characteristic		80SQ	Units
$I_{F(AV)}$ @ 180° Rectangular		8	A
@ 180° Half Sine Wave		7.2	A
I_{FSM}	50 Hz	380	A
	60 Hz	400	
I^2t	@ 50 Hz	730	A^2s
	@ 60 Hz	665	A^2s
$I^2\sqrt{t}$		10,330	$A^2\sqrt{s}$
C_t @ -5V		1000	pF
T_J		-65 to 175	°C
V_{RWM}		30 to 45	V

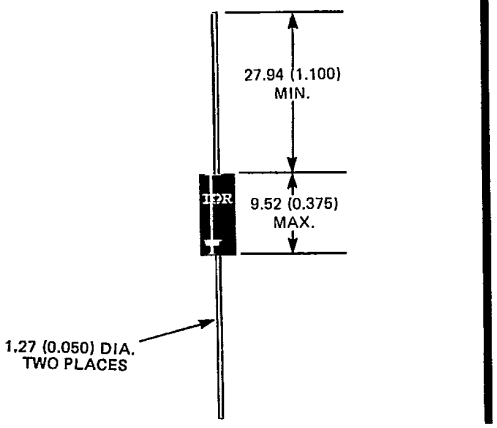
Description/Features

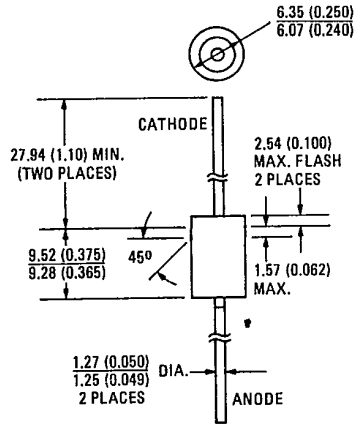
The 80SQ Schottky is designed to be operated at 175°C T_J. It employs the "830" process which results in a very low ratio of reverse leakage current to junction temperature. In addition to improvements in reliability and performance, it is a rugged device with a guaranteed repetitive peak reverse voltage capability and excellent ability to withstand reverse energy transients. It can be used in both existing and new designs.

- Economical axial lead package
- 175°C T_J operation
- Extremely low reverse leakage: 13 mA at 125°C
- No voltage derating on V_{RWM} over temperature range
- Provides extremely high power supply reliability
- No thermal runaway at rated temperature and operating parameters
- A guaranteed repetitive peak reverse voltage capability for short pulses which is 20% above V_{RWM}
- Ability to withstand reverse energy transients

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CASE STYLE AND DIMENSIONS





Case Style C-24
All Dimensions in Millimeters and (Inches)

80SQ Series

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VOLTAGE RATINGS

Part Numbers	V_{RWM} – Max. Working Peak Reverse Voltage (V)①	V_{RRM} – Max. Repetitive Peak Reverse Voltage (V)② (200 ns Max. Pulse Width)	V_R – Max. Direct Reverse Voltage (V) ③
80SQ030	30	36	30
80SQ035	35	42	35
80SQ040	40	48	40
80SQ045	45	54	45

ELECTRICAL SPECIFICATIONS

		80SQ	Units	Conditions
$I_{F(AV)}$	Max. average forward current	8	A	180° conduction @ T_L = –65 to 92° rectangular waveform④
		7.2		180° conduction @ T_L = –65 to 97°C sinusoidal waveform④
I_{FSM}	Max. peak one cycle, non-repetitive surge current	380	A	Half cycle 50 Hz sine wave or 8 ms rectangular pulse — Following any rated load condition and with rated V_{RWM} reapplied.
		400		Half cycle 60 Hz sine wave or 5 ms rectangular pulse
		455		Half cycle 50 Hz sine wave or 8 ms rectangular pulse — Following any rated load condition and with V_{RWM} = 0 following surge.
		475		Half cycle 60 Hz sine wave or 5 ms rectangular pulse
I^2t	Maximum I^2t (for fusing)	730	A^2s	t = 10 ms — With rated V_{RWM} following surge, initial $T_J \leq 175°C$.
		665		t = 8.3 ms
	Maximum I^2t for individual device fusing	1033		t = 10 ms — With V_{RWM} = 0 following surge, initial $T_J \leq 175°C$.
		940		t = 8.3 ms
$I^2\sqrt{t}$	Maximum $I^2\sqrt{t}$ for individual device fusing ⑥	10330	$A^2\sqrt{s}$	t = 0.1 to 10 ms, initial $T_J \leq 175°C$. V_{RRM} = 0 following surge.
V_{FM}	Max. peak forward voltage	0.70	V	T_J = 25°C — Rated $I_{F(AV)}$ (16A peak)
		0.68		T_J = 150°C — 180° conduction,
		0.56		T_J = 175°C — rectangular waveform
		0.62		T_J = 25°C, I_{FM} = 8A
I_{RM}	Max. peak reverse current	5.0	mA	T_J = 25°C — V_{RWM} = rated value
		13		T_J = 125°C
I_{RRM}	Max. repetitive peak reverse current	1.0	A	T_C = 25°C, f = 1 kHz, see fig. 9 for test circuit
C_t	Max. capacitance	1000	pF	T_C = 25°C, V_R = 5 Vdc (Test signal in the range of 100 kHz to 1 MHz)
dv/dt	Max. rate of reverse voltage application	1000	V/μs	T_C = 25°C, V_{RM} = rated V_{RWM}

THERMAL-MECHANICAL SPECIFICATIONS

T_J	Max. operating junction temperature range		–65 to 175	°C	
T_{stg}	Max. storage temperature range		–65 to 175	°C	
R_{thJL}	Maximum thermal resistance, junction-to-leads, double side cooling (compositive values)			deg C/W	
	Lead length ⑤	ℓ = 3.2mm (1/8 in.)	11.0		
		ℓ = 9.5mm (3/8 in.)	14.7		
		ℓ = 19.0mm (3/4 in.)	20.0		
wt	Approximate weight		1.5 (0.053)	g (oz)	
	Case style		C-24		

① T_C = -65°C to 158°C, 180° conduction

② T_C = 0°C to 158°C, 180° conduction

③ T_L = -65 to 111°C for lead length (ℓ) = 1/8 in. (3.2 mm)
T_L = -65 to 89°C for lead lenght (ℓ) = 3/8 in. (9.5 mm)
T_L = -65 to 59°C for lead length (ℓ) = 3/4 in. (19 mm)
(see note 5).

④ ℓ = 9.5 mm (3/8 in.)

⑤ Length of leads to temperature measurement points (heat sinks).

⑥ I^2t for time $t_x = I^2\sqrt{t} \cdot \sqrt{t_x}$.

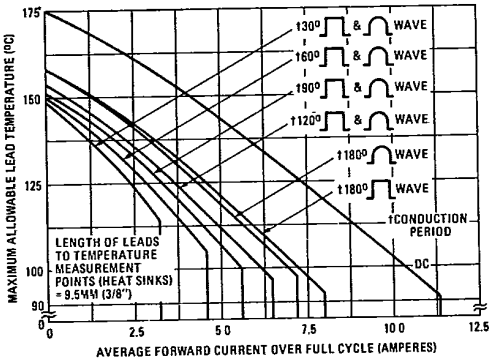


Fig. 1 – Maximum Allowable Lead Temperature Vs. Average Forward Current (50 Hz to 100 kHz)

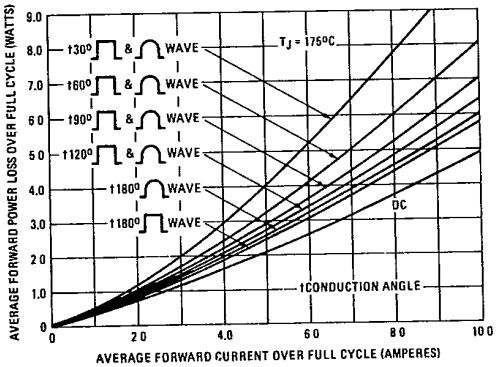


Fig. 2 – Maximum Forward Power Loss Vs. Forward Current (50 Hz to 100 kHz)

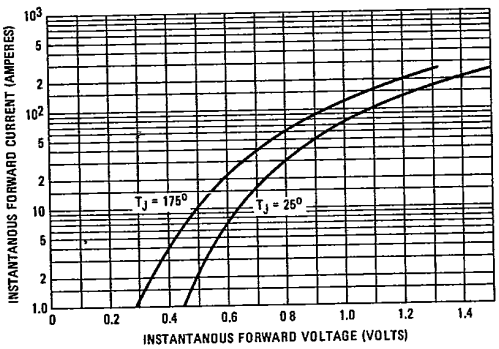


Fig. 3 – Maximum Forward Voltage Vs. Forward Current

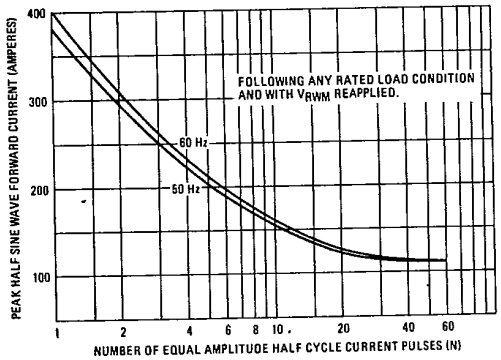


Fig. 4 – Maximum Non-Repetitive Surge Current Vs. Number of Cycles

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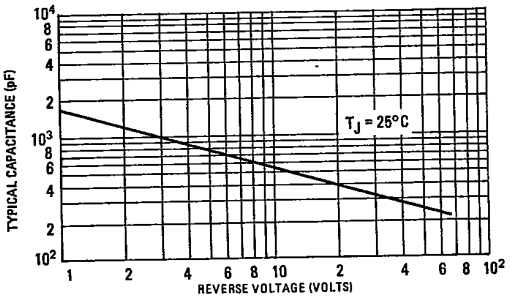


Fig. 5 – Typical Capacitance Vs. Reverse Voltage

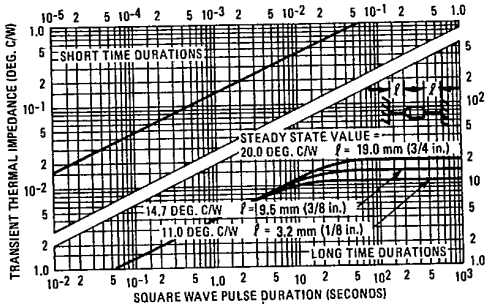
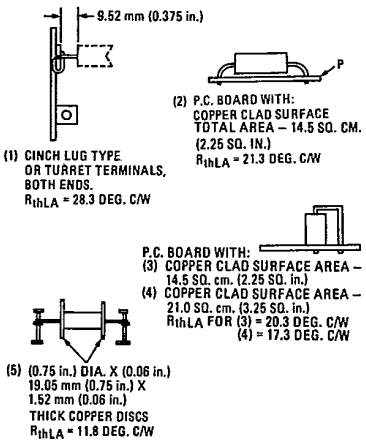


Fig. 6 – Maximum Transient Thermal Impedance, Junction-to-Lead Vs. Pulse Duration

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Mounting Details



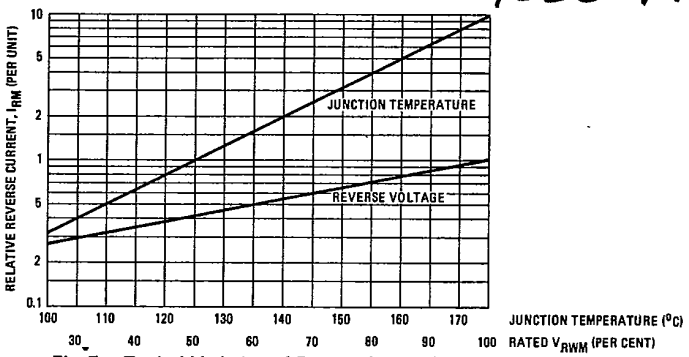


Fig. 7 – Typical Variation of Reverse Current Vs. Junction Temperature and Reverse Voltage

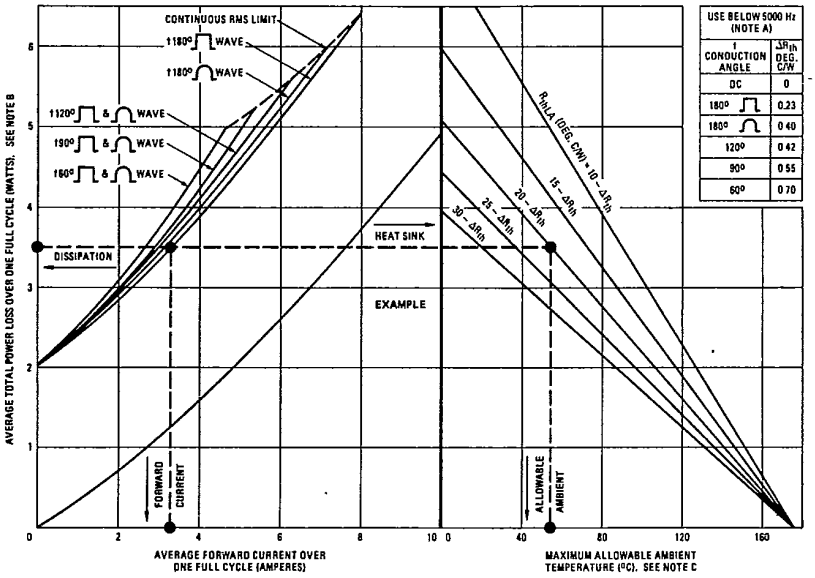


Fig. 8 – Thermal Nomogram

Notes: A. Maximum allowable heatsink thermal resistance, R_{thLA}, equals the graph value minus the ΔR_{th} factor which allows for instantaneous T_J excursion. At frequencies above 5000 Hz, ΔR_{th} becomes essentially zero and can be ignored.

B. The total power dissipation curves assume the worst case reverse conditions of half wave (180°) rectangular reverse voltage, full rated V_{RWM}, and T_J = 150°C. Lower reverse power losses allow higher operating ambient, smaller heatsinks or larger operating safety margin.

C. Caution: Data assumes that the rectifier is mounted with heatsinks attached to the leads at a maximum of 3/8 of an inch (9.5 mm) from the ends of the body of the rectifier.

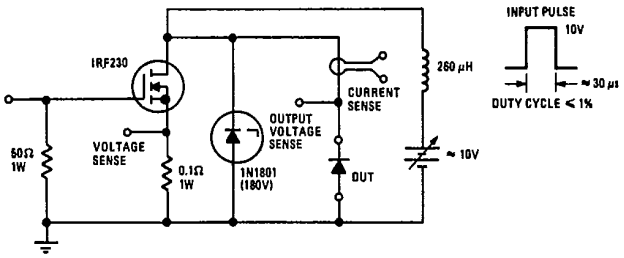


Fig. 9 – I_{RRM} Test Circuit