4855452 INTERNATIONAL RECTIFIER 55C 05115 D

Data Sheet No. PD-2.081

INTERNATIONAL RECTIFIER IOR

T-03-21

55HQ SERIES

60 Amp Schottky Power Rectifiers

Major Ratings and Characteristics

Characteristic	55HQ	Units
$I_{F(AV)}$		
@ 180° Rectangular	60	A
@ 180° Half Sine Wave	54	A
I_{FSM}		
@ 50 Hz	955	A
@ 60 Hz	1000	A
I^2t		
@ 50 Hz	4550	A^2s
@ 60 Hz	4150	A^2s
$I^2\sqrt{t}$	64,500	$A^2\sqrt{s}$
V_{RWM}	15 to 30	V
C_t @ -5V	2900	pF
T_J	-65 to 150	°C

Description/Features

The 55HQ Schottky rectifier series is designed to operate at maximum rated junction temperature with no voltage derating. In addition to improved performance characteristics, these rugged devices feature guard ring construction to protect against reverse energy transients. Additionally, the 55HQ series offers a 20% safety margin for a pulse over the working peak reverse voltage rating to protect against voltage transients.

Applications for the 55HQ Schottky rectifiers include both existing and new switching power supply designs.

- Ultra fast switching.
- Extremely low V_F.
- Excellent parameter stability over temperature range.
- No derating on reverse voltage up to maximum operating temperature.
- A guaranteed non-repetitive peak reverse voltage capability which is 20% above V_{RWM} to protect against voltage transients.
- Industry-preferred DO-203AB (DO-5) package.

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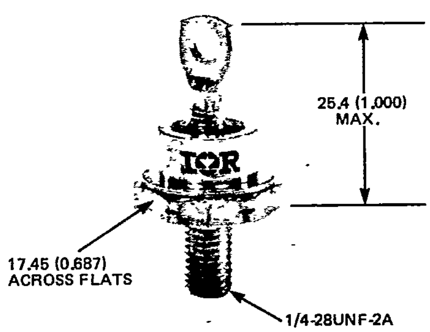
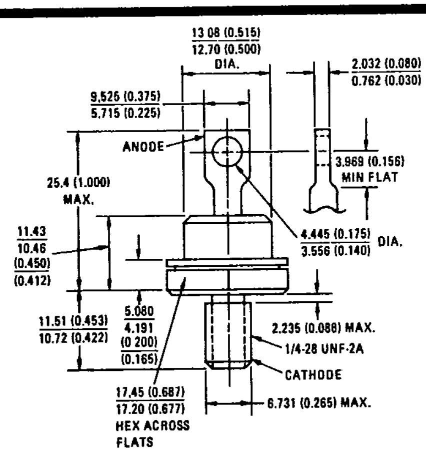
CASE STYLE AND DIMENSIONS





Conforms to JEDEC Outline DO-203AB (DO-5)
Dimensions in Millimeters and (Inches)

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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) t_p = 200 ns Max. (2)	V_R – Max. DC Reverse Voltage (V) (3)
55HQ015	15	18	15
55HQ020	20	24	20
55HQ025	25	30	25
55HQ030	30	36	30

ELECTRICAL SPECIFICATIONS

		55HQ	Units	Conditions	
$I_{F(AV)}$	Max. average forward current	60	A	180° conduction @ T_C = -65 to 110°C rectangular waveform.	
		54		180° conduction @ T_C = -65 to 108°C sinusoidal waveform.	
I_{FSM}	Max. peak one cycle, non-repetitive surge current	955	A	50 Hz half sine wave or 6 ms rectangular pulse	Following any rated load condition and with rated V_{RWM} applied following surge.
		1000		60 Hz half sine wave or 5 ms rectangular pulse	
		1150		50 Hz half sine wave or 6 ms rectangular pulse	Following any rated load condition and with rated V_{RWM} applied following surge = 0.
		1200		60 Hz half sine wave or 5 ms rectangular pulse	
I^2t	Max. I^2t capability for fusing	4550	A^2s	t = 10 ms	Rated V_{RWM} applied following surge, initial T_J = 150°C.
		4150		t = 8.3 ms	
	Max. I^2t capability for individual device fusing	6450		t = 10 ms	V_{RWM} following surge = 0, initial T_J = 150°C.
		5850		t = 8.3 ms	
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ for individual device fusing (4)	64,500	$A^2\sqrt{s}$	t = 0.1 to 10 ms, V_{RWM} following surge = 0. initial T_J = 150°C	
V_{FM}	Max. peak forward voltage	0.57	V	T_J = 25°C	Rated $I_{F(AV)}$, (120A peak),
		0.49		T_J = 150°C	180° rectangular waveform.
		0.48		T_J = 25°C	I_{FM} = 60A
		0.42		T_J = 25°C	I_{FM} = 30A
I_{RM}	Max. peak reverse current	50	mA	T_J = 25°C	Max. rated V_{RWM}
		280		T_J = 125°C	
I_{RRM}	Max. repetitive peak reverse current	2	A	T_C = 25°C, f = 1 kHz, see Fig. 8 for test circuit	
C_t	Max. capacitance	2900	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 150	°C	
T_{stg}	Max. storage temperature range		-65 to 150	°C	
R_{thJC}	Max. thermal resistance, junction-to-case		1.0	deg. C/W	DC Operation
R_{thCS}	Max. thermal resistance, case-to-sink		0.25	deg. C/W	Mounting surface flat, smooth, and greased.
T	Mounting torque	Min.	2.26 (20)	N • m	Non-lubricated threads
		Max.	3.39 (30)	(lbf • in.)	
wt	Approximate weight		15.6 (0.55)	g (oz.)	
	Case Style		DO-203AB (DO-5)		

(1) T_C = -65°C to 142°C, 180° conduction.
(2) T_C = 0°C to 142°C, 180° conduction.
(3) T_C = -65°C to 123°C.
(4) I^2t for time $t_x = I^2\sqrt{t} \cdot \sqrt{t_x}$

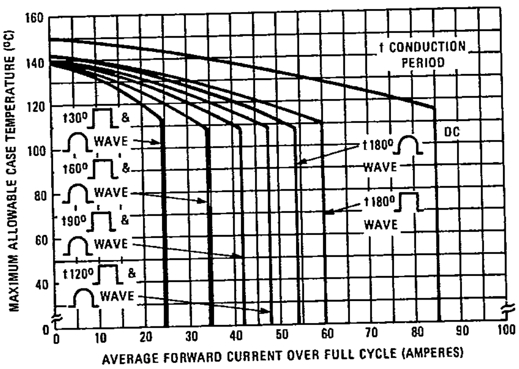

Fig. 1 – Average Forward Current Vs. Case Temperature

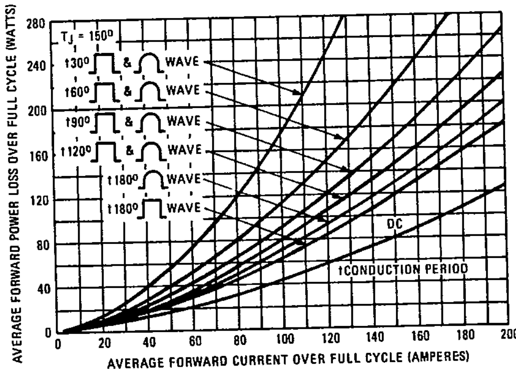

Fig. 2 – Maximum Average Forward Power Loss Vs. Average Forward Current

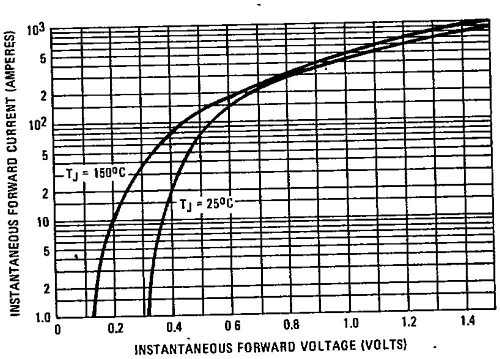

Fig. 3 – Maximum Forward Voltage Vs. Forward Current

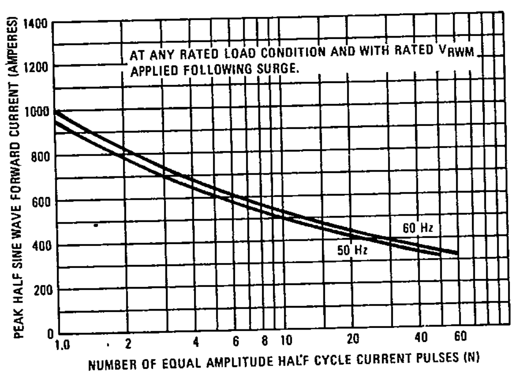

Fig. 4 – Maximum Non-Repetitive Surge Current Vs. Number of Cycles

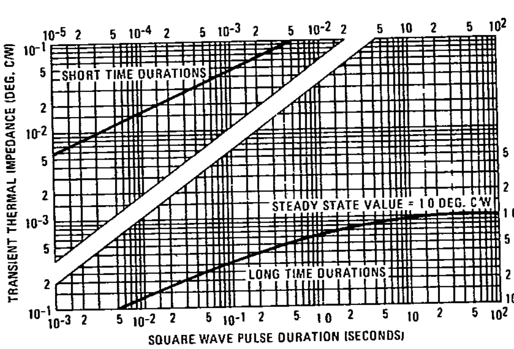

Fig. 5 – Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration

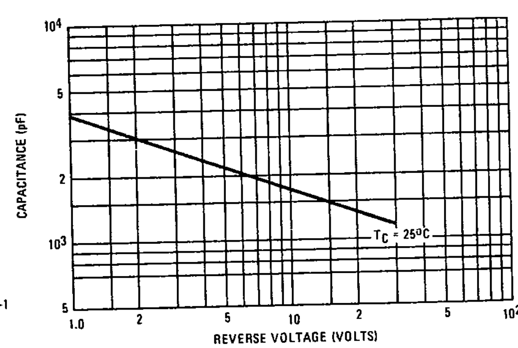

Fig. 6 – Typical Capacitance Vs. Recerse Voltage

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55HQ Series

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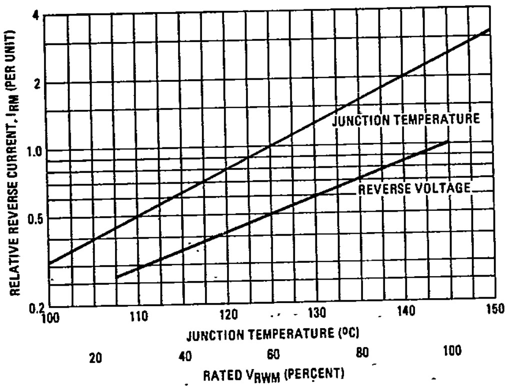


Fig. 7 – Typical Variation of Reverse Current Vs. Junction Temperature and Reverse Voltage

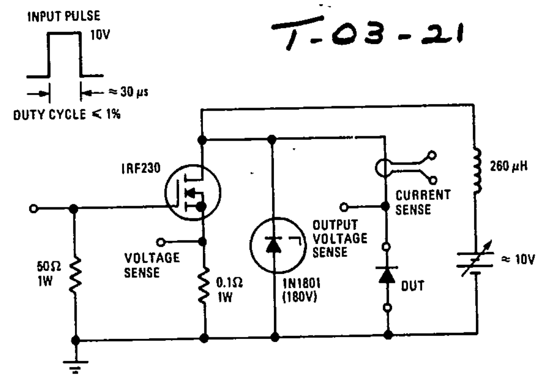
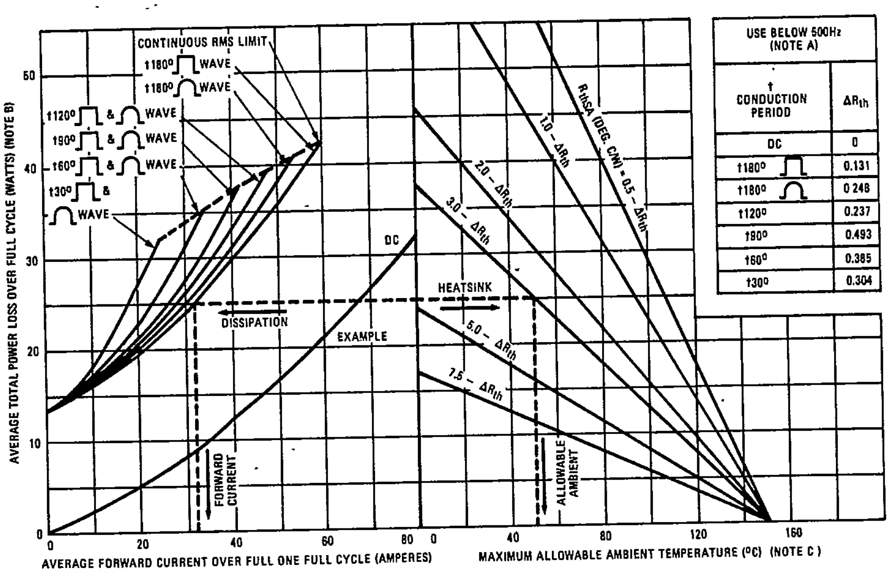


Fig. 8 – I_{RRM} Test Circuit



USE BELOW 500Hz (NOTE A)	
† CONDUCTION PERIOD	ΔR_{th}
DC	0
†180° ⎍	0.131
†180° ⌒	0 248
†120°	0.237
†90°	0.493
†60°	0.385
†30°	0.304

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

B. The total power dissipation curves assume the worst case reverse conditions of halfwave (180°) rectangular reverse voltage, full rated V_R and V_R 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 thermally conductive grease to achieve R_{thCS} = 0 25 deg C/W.

Fig. 9 – Thermal Nomogram