International **IOR** Rectifier

160CMQ... SERIES

SCHOTTKY RECTIFIER

160 Amp

Major Ratings and Characteristics

Characteristics		160CMQ...	Units
$I_{F(AV)}$	Rectangular waveform	160	A
V_{RRM} range		35 to 45	V
I_{FSM}	@ tp = 5 μs sine	6400	A
V_F	@ 80 Apk, T_J = 125°C (per leg)	0.60	V
T_J	range	-55 to 150	°C

Description/Features

The 160CMQ isolated, center tap Schottky rectifier module series has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150° C junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- 150° C T_J operation
- Isolated heatsink
- Center tap module
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Low profile, high current package

CASE STYLE AND DIMENSIONS

25.65 (1.010) / 25.15 (0.990)

10.16 (0.400) / 8.38 (0.330)

61.21 (2.410) / 60.71 (2.390)

6.80 (0.260) / 6.10 (0.240) REF.

50.80 (2.000) REF.

4.95 (0.195) / 4.45 (0.175) DIA. (7 PLCS.)

12.70 (0.500) REF.

25.65 (1.010) / 25.15 (0.990)

8.05 (0.317) / 7.80 (0.307)

1.14 (0.045) / 0.76 (0.030)

8.64 (0.340) REF. (3 PLCS.)

13.21 (0.520) / 12.70 (0.500)

11.43 (0.450) REF.

22.86 (0.900) REF.

38.35 (1.510) / 37.85 (1.490)

(ISOLATED BASE)

ANODE 1   COMMON CATHODE   ANODE 2

1.14 (0.045) / 0.89 (0.035)

1.27 (0.050) REF.

10.16 (0.400) / 8.38 (0.330)

6.60 (0.260) / 6.10 (0.240)

61.21 (2.410) / 60.71 (2.390)

3.30 (0.130) / 3.05 (0.120)

Conforms to JEDEC Outline TO - 249AA
Dimensions in millimeters and inches

International IƏR Rectifier

Voltage Ratings

Part number		160CMQ035	160CMQ040	160CMQ045
V_R	Max. DC Reverse Voltage (V)	35	40	45
V_{RWM}	Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

	Parameters	160CMQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current * See Fig. 5	160	A	50% duty cycle @ T_C = 69 °C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	6400	A	5μs Sine or 3μs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		750		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	108	mJ	T_J = 25 °C, I_{AS} = 16 Amps, L = 0.84 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	16	A	Current decaying linearly to zero in 1 μsec Frequency limited by T_J max. V_A = 1.5 x V_R typical	

Electrical Specifications

	Parameters	160CMQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.64	V	@ 80A	T_J = 25 °C
		0.86	V	@ 160A	
		0.60	V	@ 80A	T_J = 125 °C
		0.76	V	@ 160A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	5	mA	T_J = 25 °C	V_R = rated V_R
		200	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance (Per Leg)	2600	pF	V_R = 5V_{DC}, (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance (Per Leg)	8.0	nH	Measured from terminal hole to terminal hole	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	10,000	V/ μs		

(1) Pulse Width < 300μs, Duty Cycle <2%

Thermal-Mechanical Specifications

	Parameters		160CMQ	Units	Conditions
T_J	Max. Junction Temperature Range		-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-55 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Leg)		1.0	°C/W	DC operation * See Fig. 4
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		0.50	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.10	°C/W	Mounting surface , smooth and greased
wt	Approximate Weight		58 (2.0)	g (oz.)	
T	Mounting Torque	Min.	40 (35)	Kg-cm (lbf-in)	
		Max.	58 (50)		
	Case Style		TO - 249AA	JEDEC	

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Instantaneous Forward Current - I_F (A)

$T_J = 150°C$

$T_J = 125°C$

$T_J = 25°C$

Forward Voltage Drop - V_{FM} (V)

Fig. 1 - Max. Forward Voltage Drop Characteristics
(Per Leg)

Reverse Current - I_R (mA)

$T_J = 150°C$

$125°C$

$100°C$

$75°C$

$50°C$

$25°C$

Reverse Voltage - V_R (V)
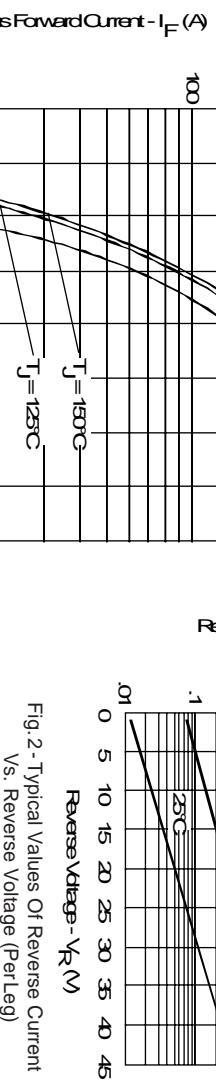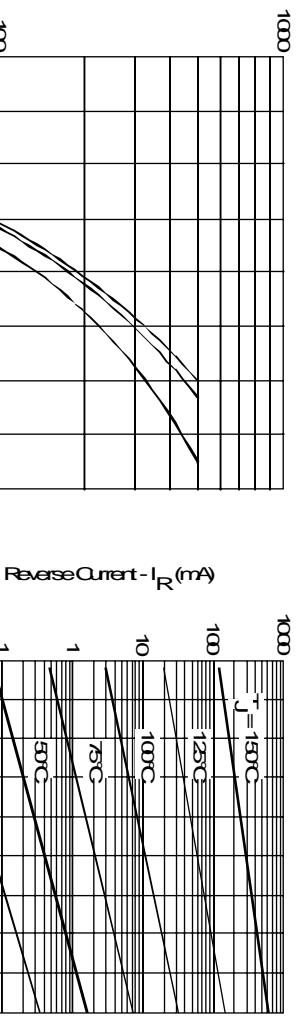
Fig. 2 - Typical Values Of Reverse Current
Vs. Reverse Voltage (Per Leg)

Junction Capacitance - C_T (pF)

$T_J = 25°C$

Reverse Voltage - V_R (V)
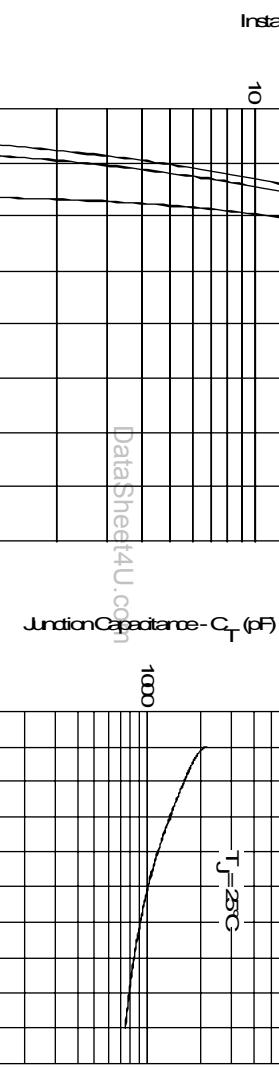
Fig. 3 - Typical Junction Capacitance
Vs. Reverse Voltage (Per Leg)

Thermal Impedance - Z_{thJC} (°C/W)

D=0.50
D=0.33
D=0.25
D=0.17
D=0.08

Single Pulse
(Thermal Resistance)

Notes

1. Duty factor D= t_1 / t_2

2. Peak $T_J = P_{DM} \times Z_{thJC} + T_C$

P_{DM}

t_1

t_2

t_1, Rectangular Pulse Duration (Seconds)
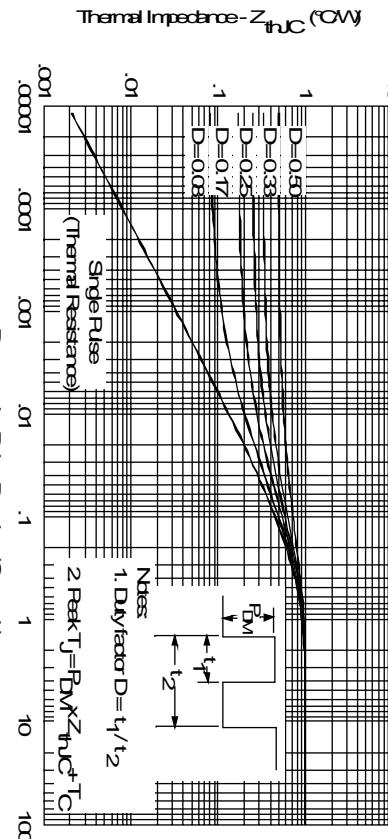
Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

International IOR Rectifier

Allowable Case Temperature - (°C)

160CMQ
R thJC (DC) = 1.0°C/W

DC
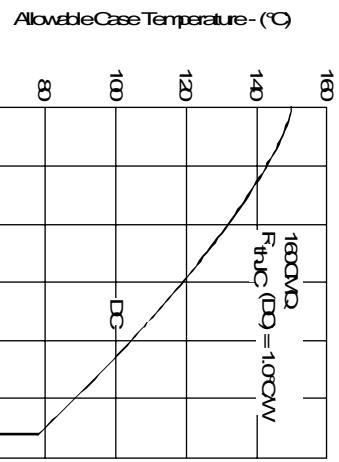
Fig. 5 - Max. Allowable Case Temperature
Vs. Average Forward Current (Per Leg)

Average Forward Current - I$_{F(AV)}$ (A)

Non-Repetitive Surge Current - I$_{FSM}$ (A)

At Any Rated Load Condition
And With Rated V$_{RRM}$ Applied
Following Surge

Square Wave Pulse Duration - t$_p$ (microsec)

Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

Average Power Loss - (Watts)

D=0.08
D=0.17
D=0.25
D=0.33
D=0.50

RMS Limit

DC
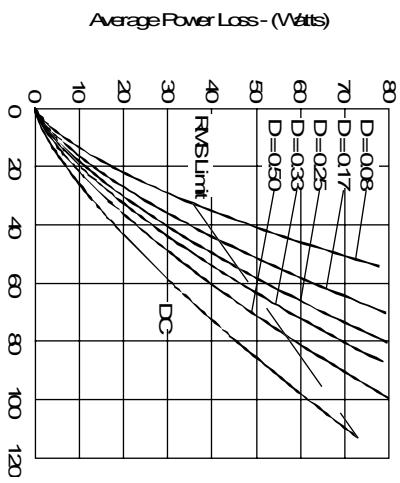
Fig. 6 - Forward Power Loss Characteristics
(Per Leg)

Average Forward Current - I$_{F(AV)}$ (A)

CURRENT
MONITOR

DUT

IRFP460

Rg = 25 ohm

L

HIGH-SPEED
SWITCH

FREE-WHEEL
DIODE

40HFL40S02

Vd = 25 Volt
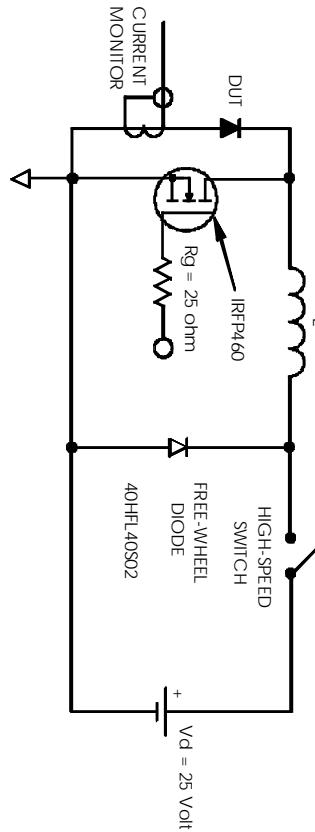
Fig. 8 - Unclamped Inductive Test Circuit