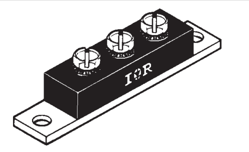
PD-20734 02/2000

International
IOR Rectifier

400CMQ... SERIES

SCHOTTKY RECTIFIER

400 Amp



TO-244AB Isolated Common Cathode

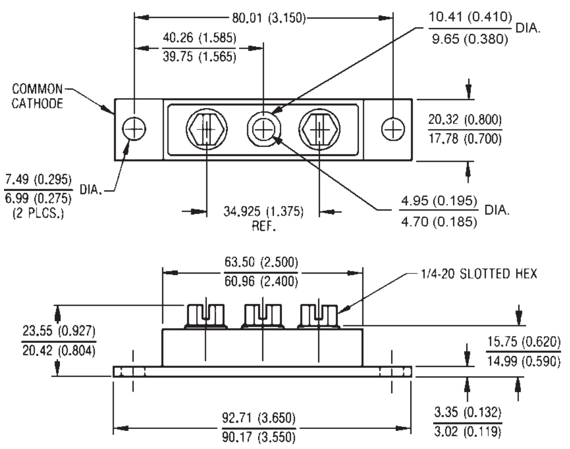
Major Ratings and Characteristics

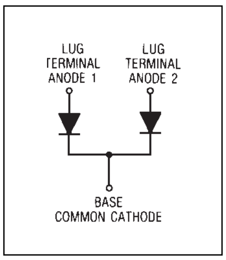
Characteristics		400CMQ...	Units
$I_{F(AV)}$	Rectangular waveform	400	A
V_{RRM}	range	35 to 45	V
I_{FSM}	@ tp = 5 μs sine	29,000	A
V_F	@200Apk, T_J=125°C (per leg)	0.52	V
T_J	range	-55 to 150	°C

Description/Features

The 400CMQ center tap, high current, 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, welding, and reverse battery protection.

- 150 °C T_J operation
- 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





Modified JEDEC
Outline TO-244AB Isolated
Dimensions in millimeters and (inches)

Voltage Ratings

	Part number	400CMQ035	400CMQ040	400CMQ045
V_R	Max. DC Reverse Voltage (V)	35	40	45
V_{RWM}	Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

	Parameters	400CMQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward (Per Leg)	200	A	50% duty cycle @ T_C = 78°C, rectangular wave form	
	Current * See Fig. 5 (Per Device)	400			
I_{FSM}	Max. Peak One Cycle Non-Repetitive	29,000	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current (Per Leg) * See Fig. 7	3400		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy (Per Leg)	180	mJ	T_J = 25 °C, I_{AS} = 40 Amps, L = 0.22 mH	
I_{AR}	Repetitive Avalanche Current (Per Leg)	40	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	400CMQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop	0.57	V	@ 200A	T_J = 25 °C
	(Per Leg) * See Fig. 1 (1)	0.73	V	@ 400A	
		0.52	V	@ 200A	T_J = 125 °C
		0.68	V	@ 400A	
I_{RM}	Max. Reverse Leakage Current	20	mA	T_J = 25 °C	V_R = rated V_R
	(Per Leg) * See Fig. 2 (1)	800	mA	T_J = 125 °C	
$V_{F(TO)}$	Threshold Voltage	0.32	V	T_J = T_J max.	
r_t	Forward Slope Resistance	0.81	mΩ		
C_T	Max. Junction Capacitance (Per Leg)	10,300	pF	V_R = 5V_{DC}, (test signal range 100Khz to 1Mhz) 25°C	
L_S	Typical Series Inductance (Per Leg)	5.0	nH	From top of terminal hole to mounting plane	
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		400CMQ	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)		0.4	°C/W	DC operation * See Fig. 4
R_{thJC}	Max. Thermal Resistance Junction to Case (Per Package)		0.2	°C/W	DC operation
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.1	°C/W	Mounting surface, smooth and greased
wt	Approximate Weight		79 (2.80)	g (oz.)	
T	Mounting Torque Base	Min.	40 (35)	Kg-cm (lbf-in)	
		Max.	58 (50)		
	Mounting Torque Center Hole	Typ.	17 (15)		
	Terminal Torque	Min.	58 (50)		
		Max.	86 (75)		
Case Style			TO-244AB isolated		Modified JEDEC

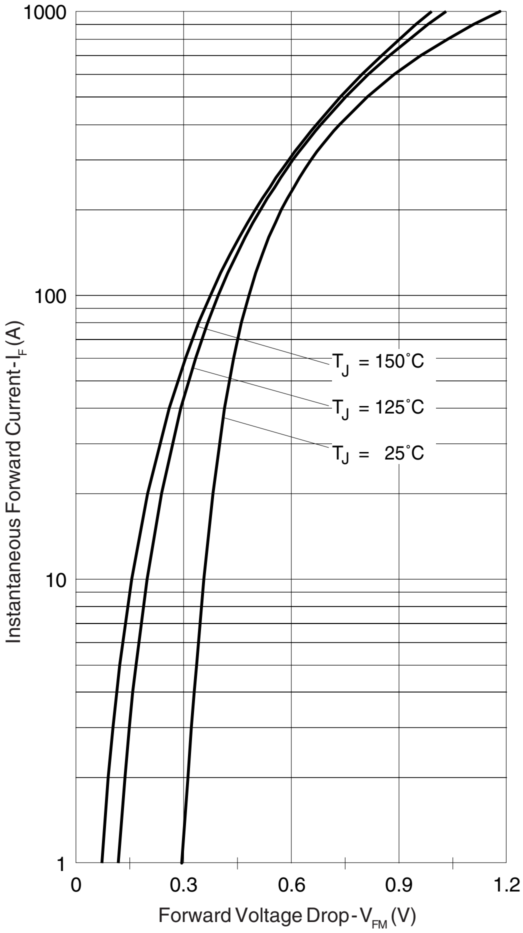


Fig. 1 - Max. Forward Voltage Drop Characteristics

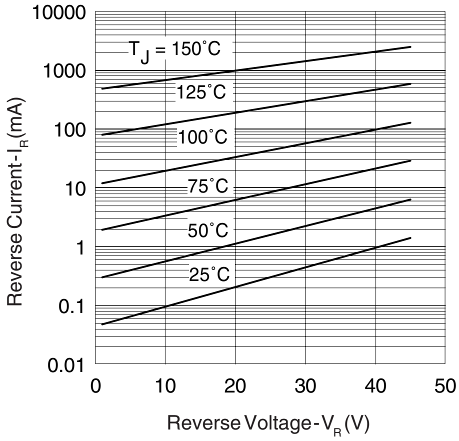


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

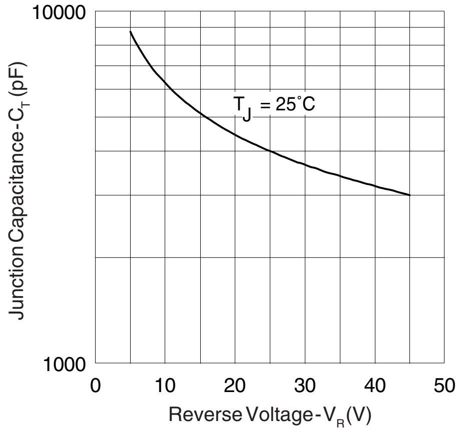


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

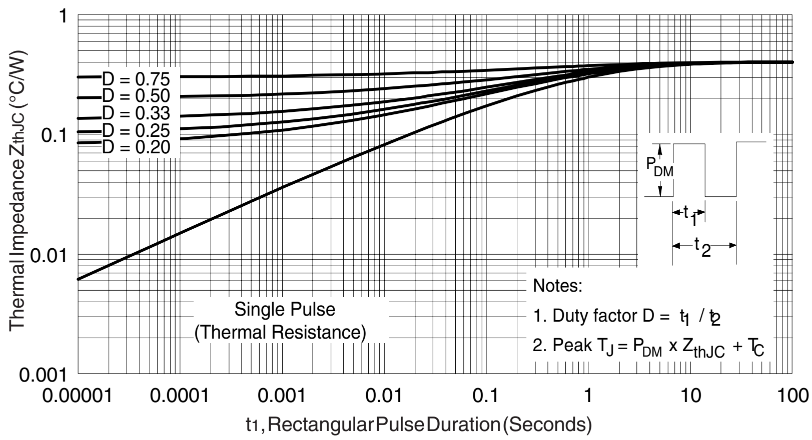


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics (Per Leg)

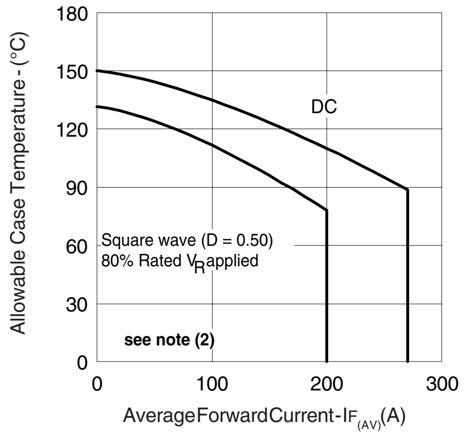


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

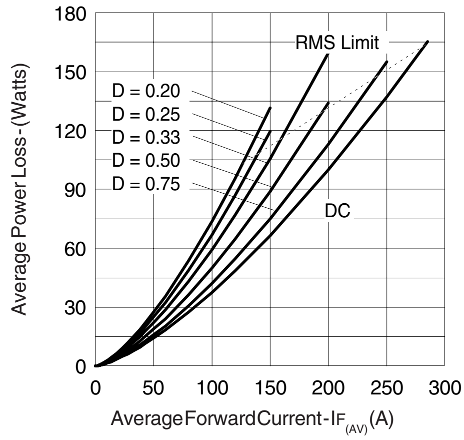


Fig. 6 - Forward Power Loss Characteristics

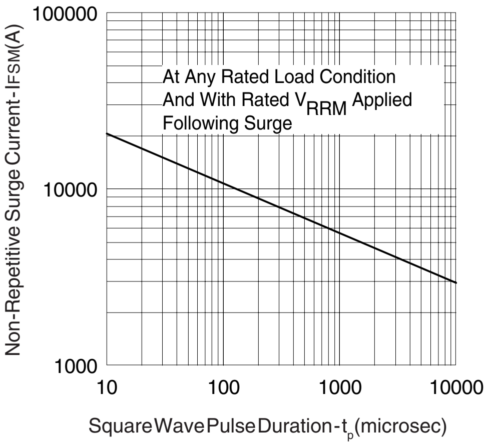


Fig. 7 - Max. Non-Repetitive Surge Current

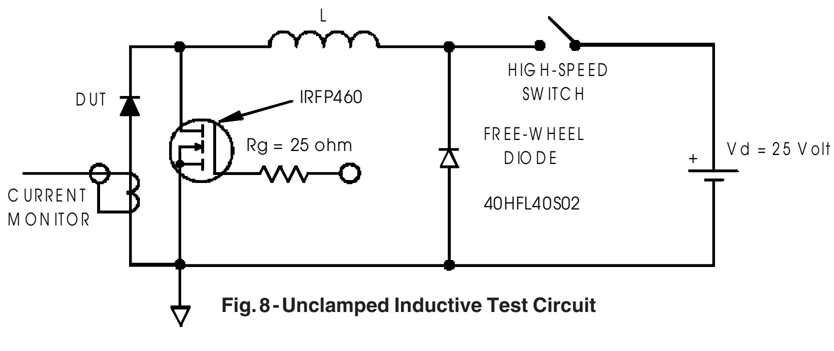


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward Power Loss = $I_{F(AV)} \times V_{FM}$ @ $(I_{F(AV)} / D)$ (see Fig. 6);
Pd_{REV} = Inverse Power Loss = $V_{R1} \times I_R (1 - D)$; I_R @ V_{R1} = 80% rated V_R

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