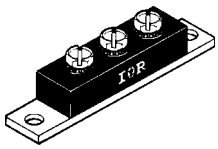
Bulletin PD-20736 rev. B 10/02

International
IOR Rectifier

400DMQ... SERIES

SCHOTTKY RECTIFIER 400 Amp



TO-244AB
isolated doubler

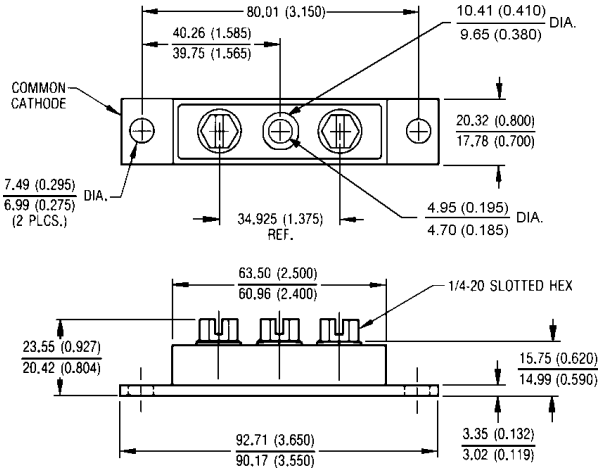
Major Ratings and Characteristics

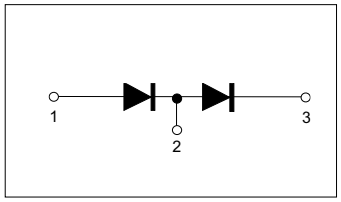
Characteristics		400DMQ...	Units
$I_{F(AV)}$	Rectangular waveform	400	A
V_{RRM}	range	35 to 45	V
I_{FSM}	@ tp = 5 µs sine	29,000	A
V_F	@200Apk, T_J=125°C (per leg)	0.52	V
T_J	range	-55 to 150	°C

Description/ Features

The 400DMQ high current, Schottky rectifier doubler 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
- 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	400DMQ035	400DMQ040	400DMQ045
V_R	Max. DC Reverse Voltage (V)	35	40	45
V_{RWM}	Max. Working Peak Reverse Voltage (V)			

Absolute Maximum Ratings

	Parameters	400DMQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current (Per Device)	400	A	50% duty cycle @ T_C = 70 °C, rectangular wave form	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	29,000	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		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	400DMQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.57	V	@ 200A	T_J = 25 °C
		0.73	V	@ 400A	
		0.52	V	@ 200A	T_J = 125 °C
		0.68	V	@ 400A	
I_{RM}	Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	20	mA	T_J = 25 °C	V_R = rated V_R
		1	A	T_J = 125 °C	
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)	10000	V/ µs		

Thermal-Mechanical Specifications

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

	Parameters		400DMQ	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.	24 (20)	Kg-cm (lbf-in)	
		Max.	35 (30)		
	Mou ue Center Hole	Typ.	13.5 (12)		
	Terminal Torque	Min.	35 (30)		
		Max.	46 (40)		
	Case Style		TO - 244AB isolated doubler		Modified JEDEC

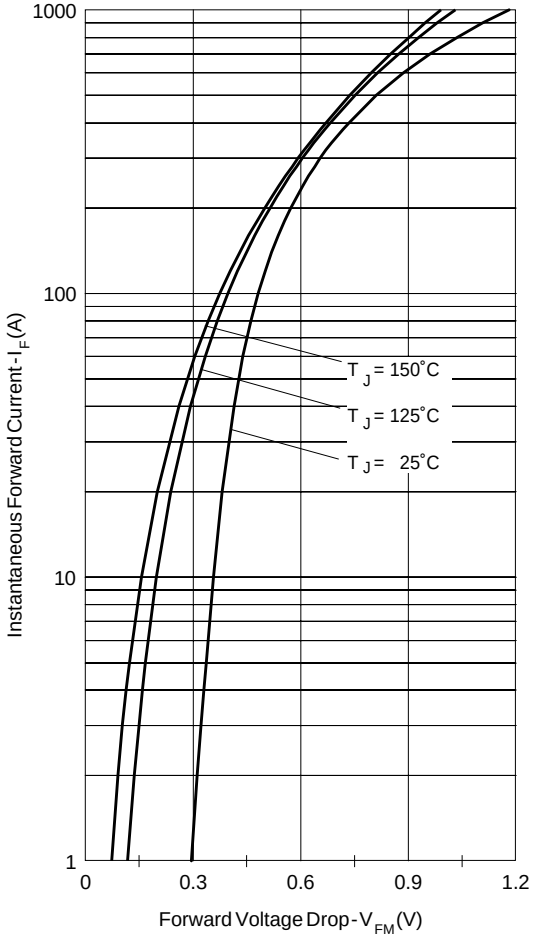


Fig. 1 - Max. Forward Voltage Drop Characteristics

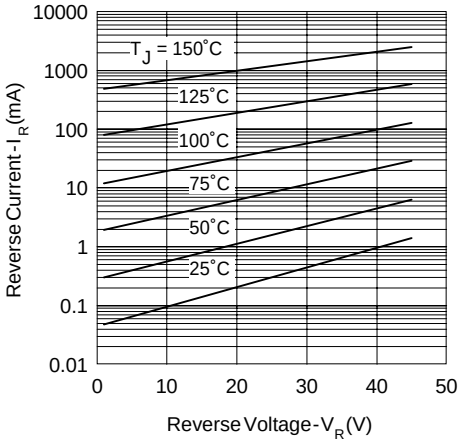


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

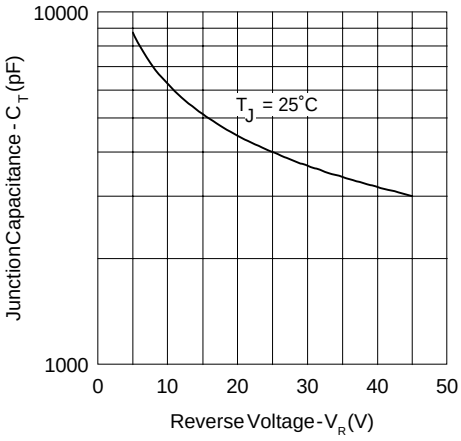


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

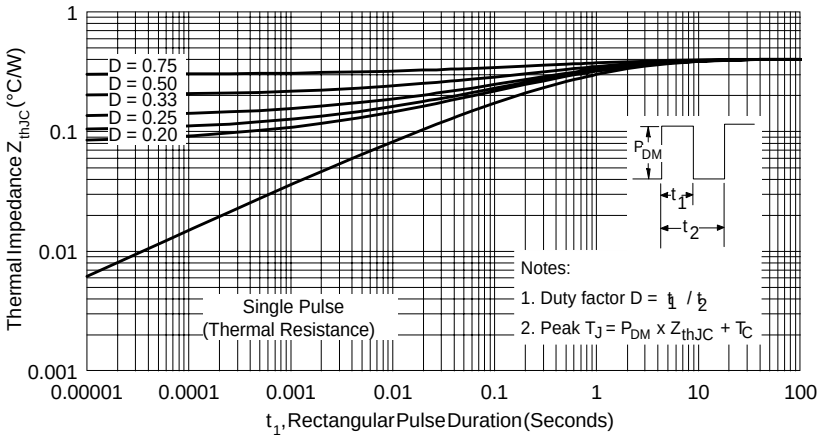


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

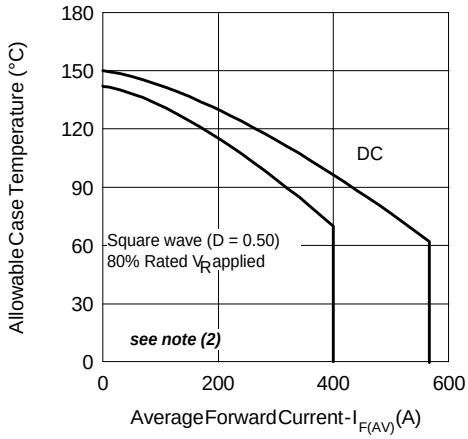


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

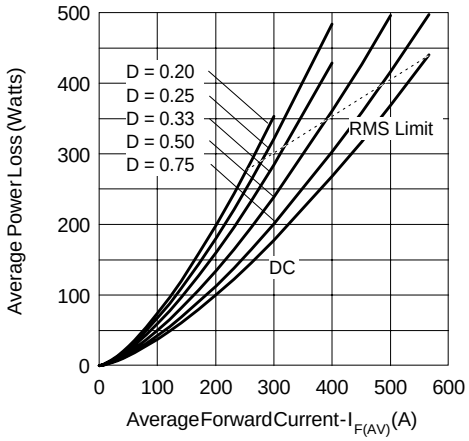


Fig. 6 - Forward Power Loss Characteristics

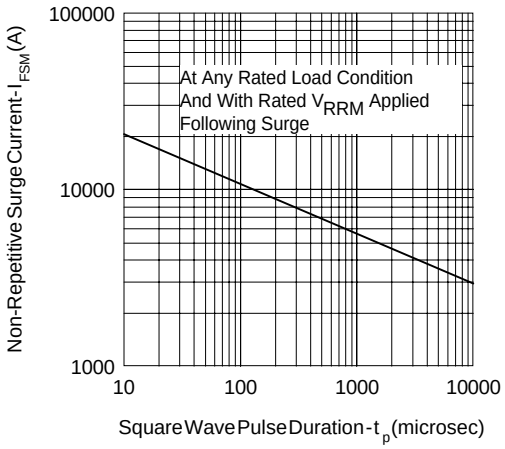


Fig. 7 - Max. Non-Repetitive Surge Current

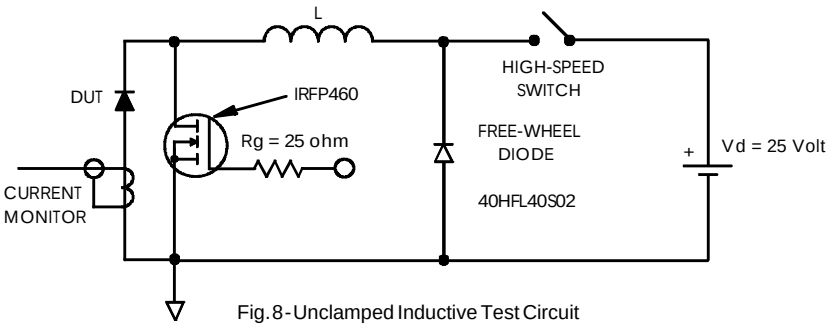


Fig. 8 - Unclamped Inductive Test Circuit

(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

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level.
Qualification Standards can be found on IR's Web site.

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