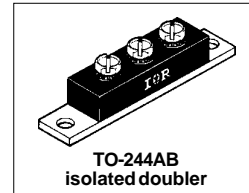


International IR Rectifier

400DMQ... SERIES

SCHOTTKY RECTIFIER

400 Amp



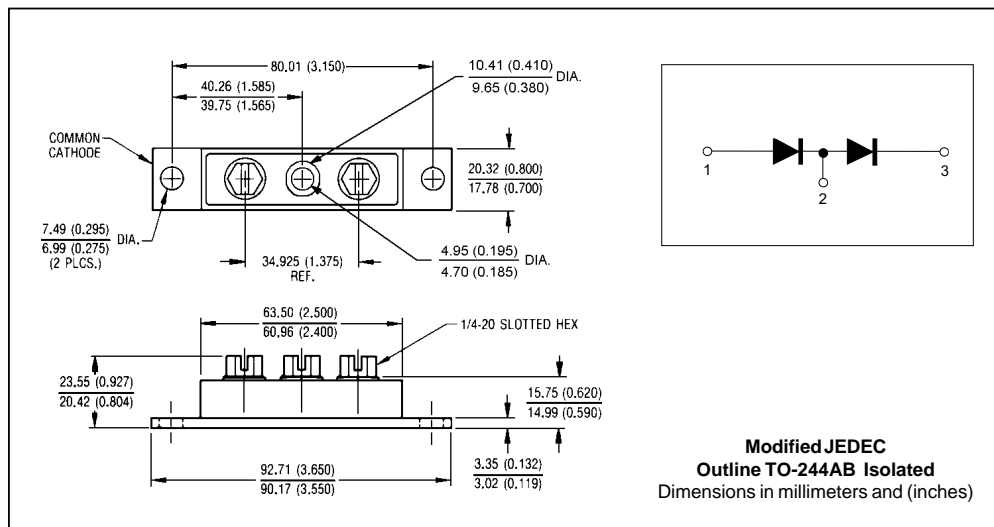
Major Ratings and Characteristics

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

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



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 @ $T_C = 70^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	29,000	A	Following any rated load condition and with rated V_{RWM} applied
	3400		
E_{AS} Non-Repetitive Avalanche Energy (Per Leg)	180	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 40$ 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. $V_A = 1.5 \times V_R$ typical

Electrical Specifications

Parameters	400DMQ	Units	Conditions
V_{FM} Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.57	V	@ 200A
	0.73	V	@ 400A
	0.52	V	@ 200A
	0.68	V	@ 400A
I_{RM} Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	20	mA	$T_J = 25^\circ\text{C}$
	1	A	$T_J = 125^\circ\text{C}$
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 < 300 μs , Duty Cycle <2%

Parameters	400DMQ	Units	Conditions	
T_J Max. Junction Temperature Range	-55 to 150	$^\circ\text{C}$		
T_{stg} Max. Storage Temperature Range	-55 to 150	$^\circ\text{C}$		
R_{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	0.4	$^\circ\text{C/W}$	DC Operation * See Fig. 4	
R_{thJC} Max. Thermal Resistance Junction to Case (Per Package)	0.2	$^\circ\text{C/W}$	DC Operation	
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.1	$^\circ\text{C/W}$	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	

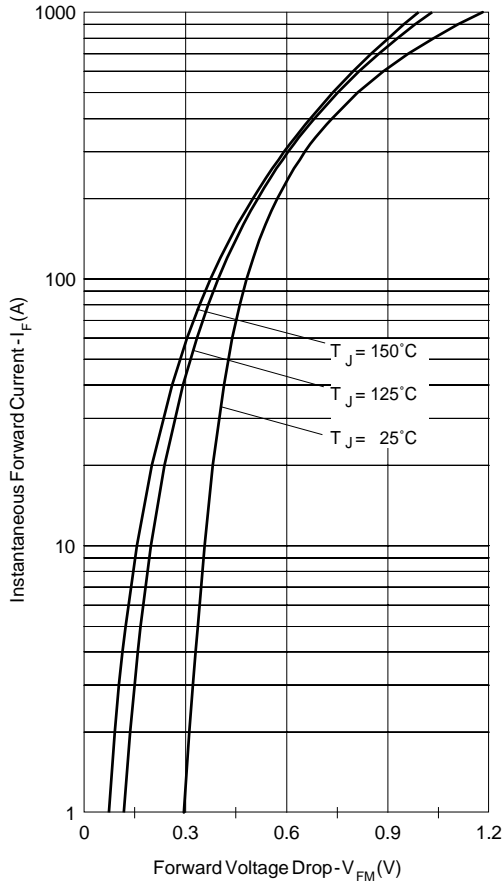


Fig. 1 - Max. Forward Voltage Drop Characteristics

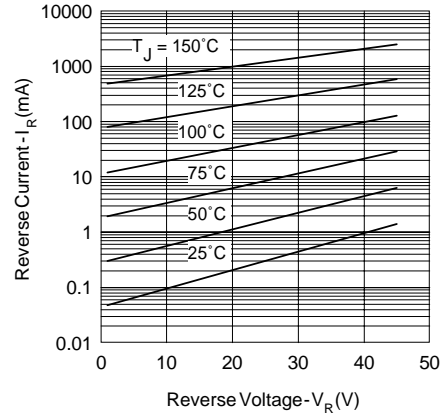


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

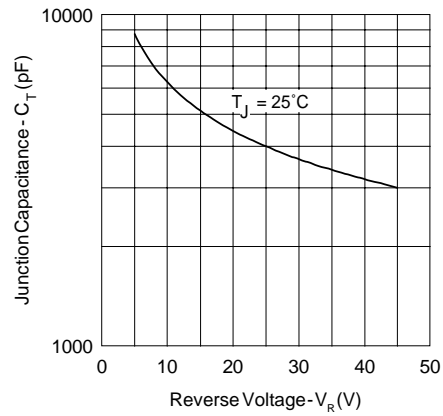


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

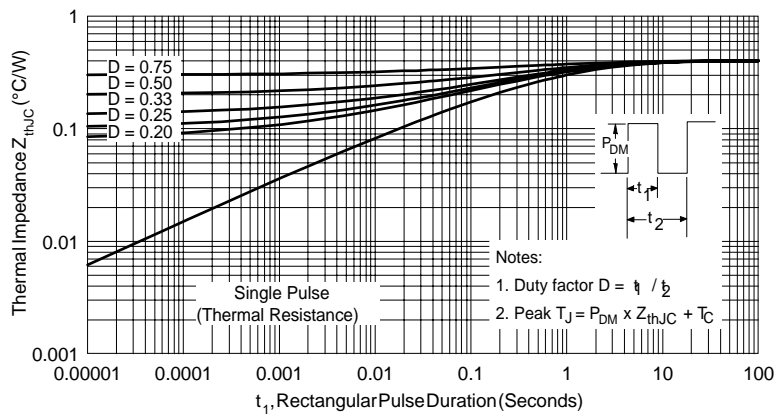


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

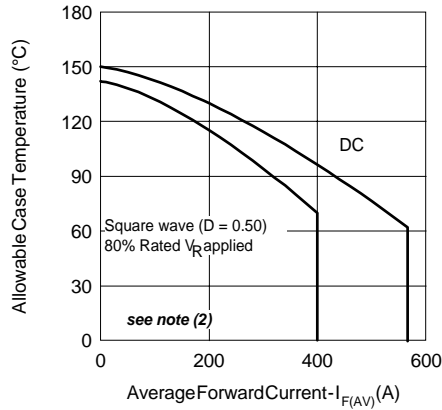


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

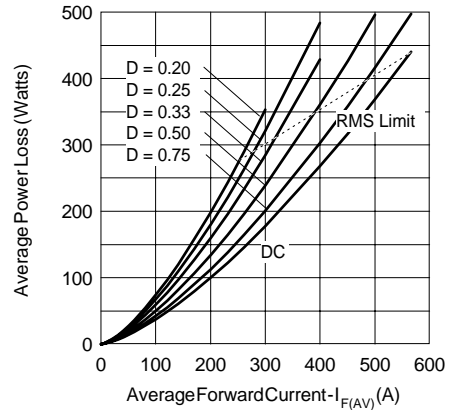


Fig. 6 - Forward Power Loss Characteristics

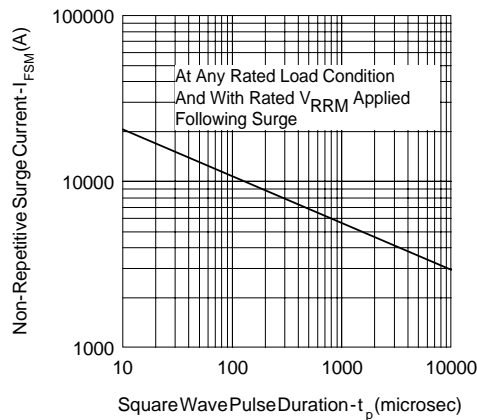


Fig. 7 - Max. Non-Repetitive Surge Current

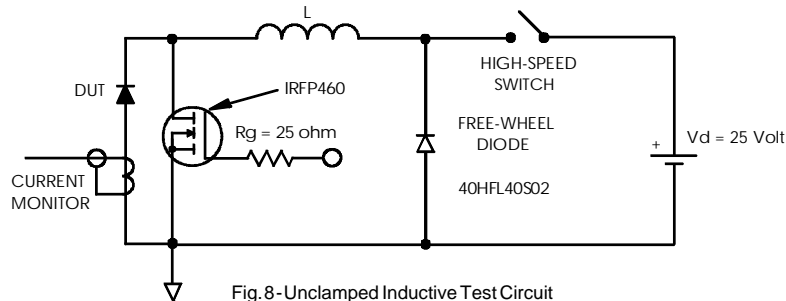


Fig. 8 - Unclamped Inductive Test Circuit

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

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.

International
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