

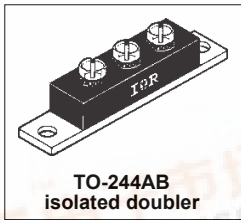
Bulletin PD-2.539 rev. C 02/04

International
IR Rectifier

403DMQ... Series

SCHOTTKY RECTIFIER

400 Amp



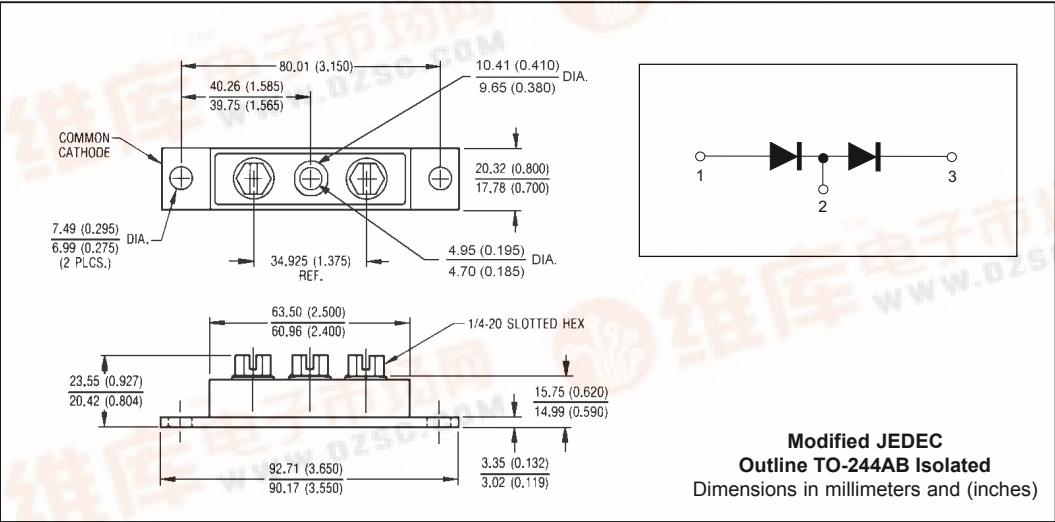
Major Ratings and Characteristics

Characteristics	403DMQ...	Units
$I_{F(AV)}$ Rectangular waveform	400	A
V_{RRM}	100	V
I_{FSM} @tp = 5 μ s sine	25,500	A
V_F @200Apk, $T_J=125^\circ\text{C}$ (per leg)	0.72	V
T_J range	-55 to 175	$^\circ\text{C}$

Description/ Features

The 403DMQ100 center tap Schottky rectifier module series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 $^\circ\text{C}$ junction temperature. Typical applications are in high current switching power supplies, plating power supplies, UPS systems, converters, free-wheeling diodes, welding, and reverse battery protection.

- 175 $^\circ\text{C}$ T_J operation
- Center tap module
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



403DMQ... Series

Bulletin PD-2.259 rev. C 02/04

International
IOR Rectifier

Voltage Ratings

Parameters	403DMQ100
V_R Max. DC Reverse Voltage (V)	100
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters		403DMQ	Units	Conditions		
I _{F(AV)}	Max. Average Forward Current (Per Leg)	400	A	50% duty cycle @ T _C = 82 °C, rectangular wave form		
I _{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg)	25,500	A	5μs Sine or 3μs Rect. pulse	Following any rated load condition and with rated V _{RRM} applied	
		3,300		10ms Sine or 6ms Rect. pulse		
E _{AS}	Non-Repetitive Avalanche Energy (Per Leg)	15	mJ	T _J = 25 °C, I _{AS} = 1 Amps, L = 30 mH		
I _{AR}	Repetitive Avalanche Current (Per Leg)	1	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		403DMQ	Units	Conditions	
V _{FM}	Max. Forward Voltage Drop (Per Leg) (1)	0.87	V	@ 200A	T _J = 25 °C
		1.06	V	@ 400A	
		0.72	V	@ 200A	T _J = 125 °C
		0.86	V	@ 400A	
I _{RM}	Max. Reverse Leakage Current (Per Leg) (1)	6	mA	T _J = 25 °C	V _R = rated V _R
		140	mA	T _J = 125 °C	
C _T	Max. Junction Capacitance (Per Leg)	5500	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		

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

Thermal-Mechanical Specifications

Parameters	403DMQ	Units	Conditions
T_J Max. Junction Temperature Range	-55 to 175	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-55 to 175	$^\circ\text{C}$	
R_{thJC} Max. Thermal Resistance Junction to Case (Per Leg)	0.4	$^\circ\text{C/W}$	DC operation
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)	
	Mounting Torque Center Hole Typ.	13.5 (12)	
	Terminal Torque	Min. 35 (30)	
	Max.	46 (40)	
Case Style	TO-244AB isolated doubler		Modified JEDEC

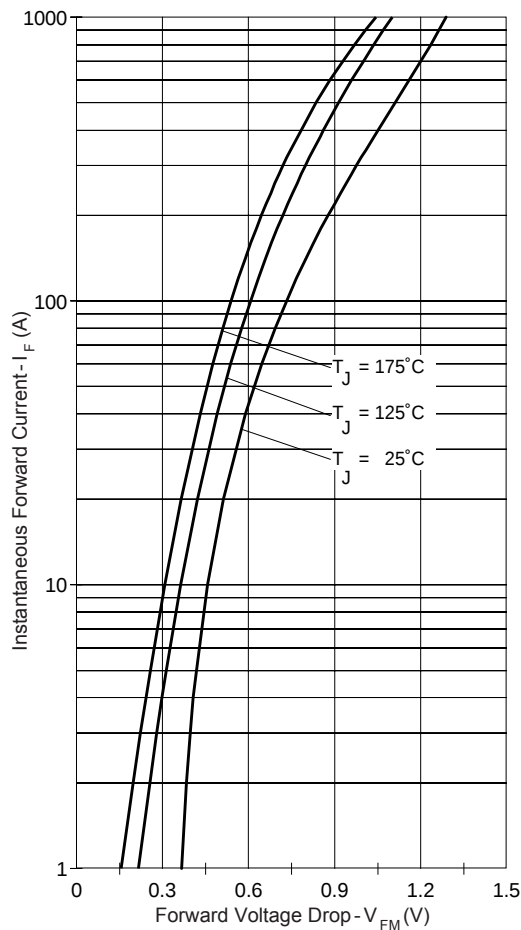


Fig. 1 - Max. Forward Voltage Drop Characteristics

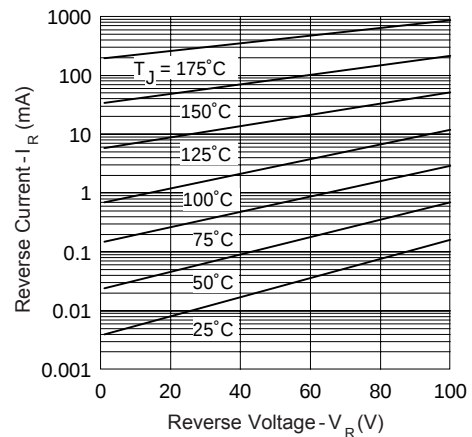


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

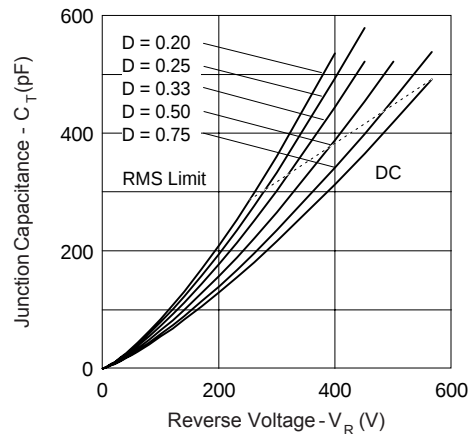


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

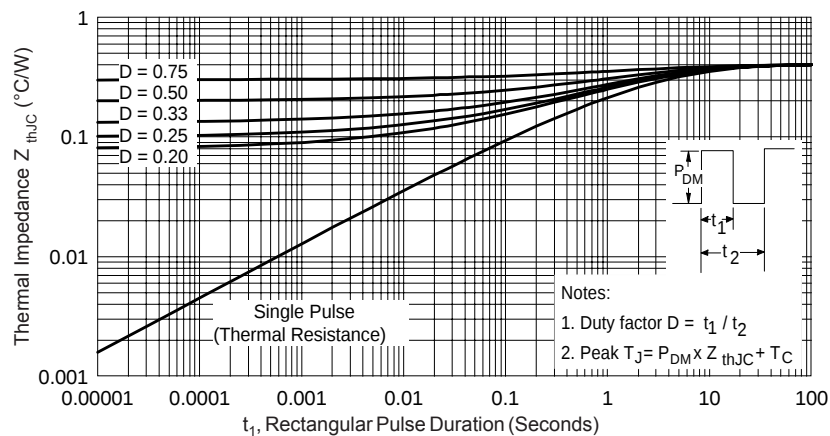


Fig. 4 - Max. Thermal Impedance Z_{thJC} Characteristics

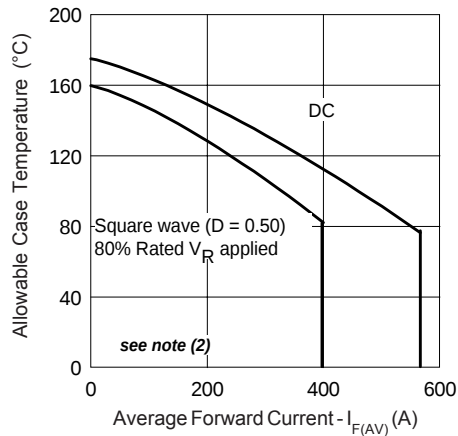


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current

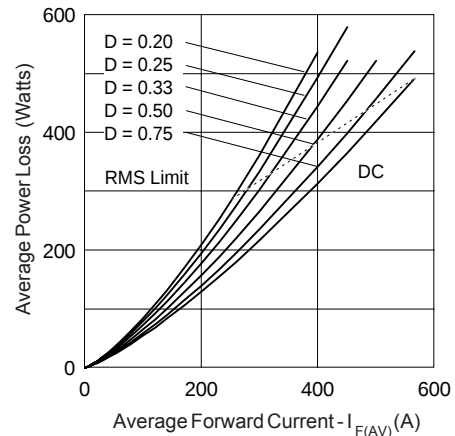


Fig. 6 - Forward Power Loss Characteristics

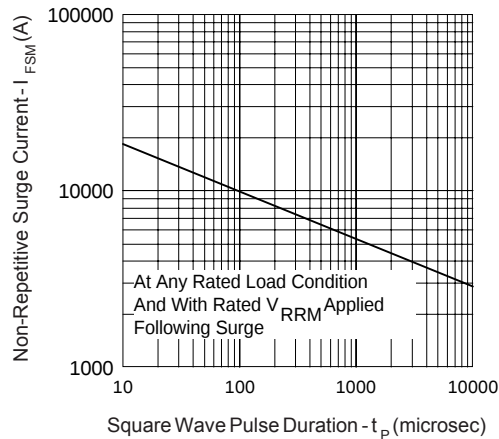


Fig. 7 - Max. Non-Repetitive Surge Current

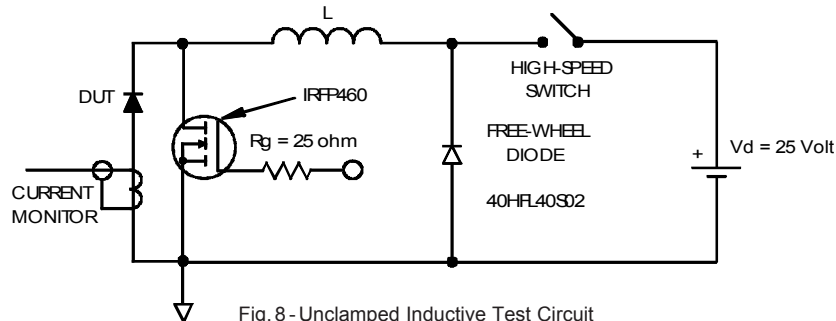


Fig. 8 - Unclamped Inductive Test Circuit

(2) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;

P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

$P_{d_{REV}}$ = Inverse Power Loss = $V_{R1} \times I_{R1} (1 - D)$; $I_{R1} @ V_{R1} = 80\%$ 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.

International
IOR Rectifier

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 02/04