

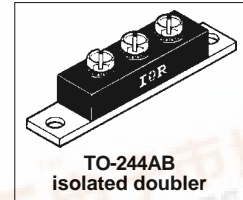
Bulletin PD-20580 rev. B 10/02

# International IR Rectifier

## 203DNQ... SERIES

SCHOTTKY RECTIFIER

200 Amp



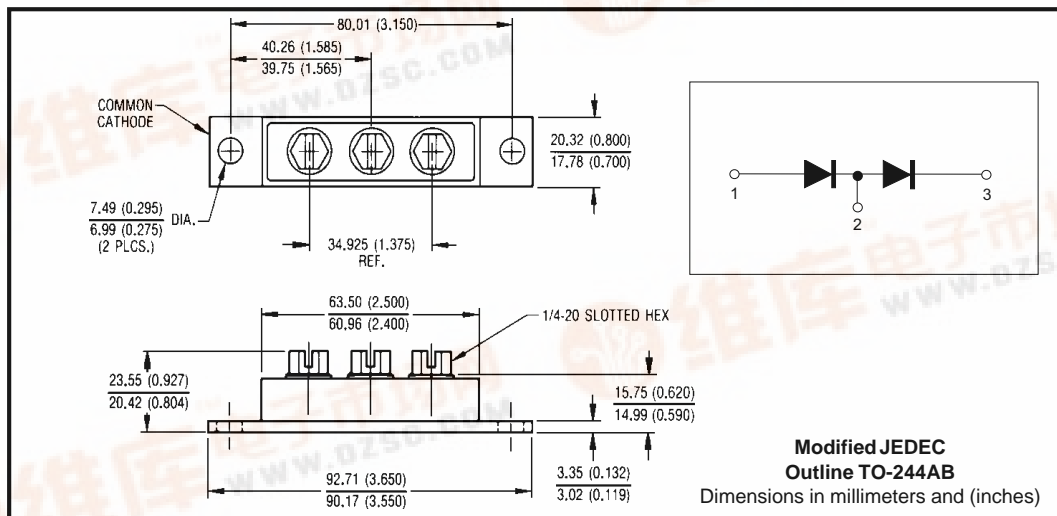
### Major Ratings and Characteristics

Characteristics	203DNQ...	Units
$I_{F(AV)}$ Rectangular waveform	200	A
$V_{RRM}$ range	80 to 100	V
$I_{FSM}$ @ $t_p=5\mu s$ sine	16,000	A
$V_F$ @ 100Apk, $T_J=125^\circ C$ (per leg)	0.70	V
$T_J$ range	-55 to 175	$^\circ C$

### Description/Features

The 203DNQ Schottky rectifier doubler module series has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 175 °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 °C  $T_J$  operation
- 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



**Voltage Ratings**

Part number	203DNQ080	203DNQ100
$V_R$ Max. DC Reverse Voltage (V)	80	100
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)		

**Absolute Maximum Ratings**

Parameters	203DNQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 5 (Per Device)	200	A	50% duty cycle @ $T_C = 136^\circ\text{C}$ , rectangular wave form
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	16,000	A	Following any rated load condition and with rated $V_{RWM}$ applied
	2,100		
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	15	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 1$ Amps, $L = 30$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	1	A	Current decaying linearly to zero in 1 $\mu\text{sec}$ Frequency limited by $T_J$ max. $V_A = 1.5 \times V_R$ typical

**Electrical Specifications**

Parameters	203DNQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.86	V	@ 100A
	1.03	V	@ 200A
	0.70	V	@ 100A
	0.84	V	@ 200A
$I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	3	mA	$T_J = 25^\circ\text{C}$
	40	mA	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold Voltage	0.50	V	$T_J = T_J$ max.
$r_t$ Forward Slope Resistance	1.08	m $\Omega$	
$C_T$ Max. Junction Capacitance (Per Leg)	2,650	pF	$V_R = 5V_{DC}$ (test signal range 100KHz to 1MHz) $25^\circ\text{C}$
$L_S$ Typical Series Inductance (Per Leg)	7.0	nH	From top of terminal hole to mounting plane
dv/dt Max. Voltage Rate of Change (Rated $V_R$ )	10000	V/ $\mu\text{s}$	

**Thermal-Mechanical Specifications**(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

Parameters	203DNQ	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)	0.40	$^\circ\text{C/W}$	DC operation * See Fig. 4	
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)	0.20	$^\circ\text{C/W}$	DC operation	
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink	0.10	$^\circ\text{C/W}$	Mounting surface, smooth and greased	
wt Approximate Weight	79 (2.80)	g (oz.)		
T Mounting Torque	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		Modified JEDEC	

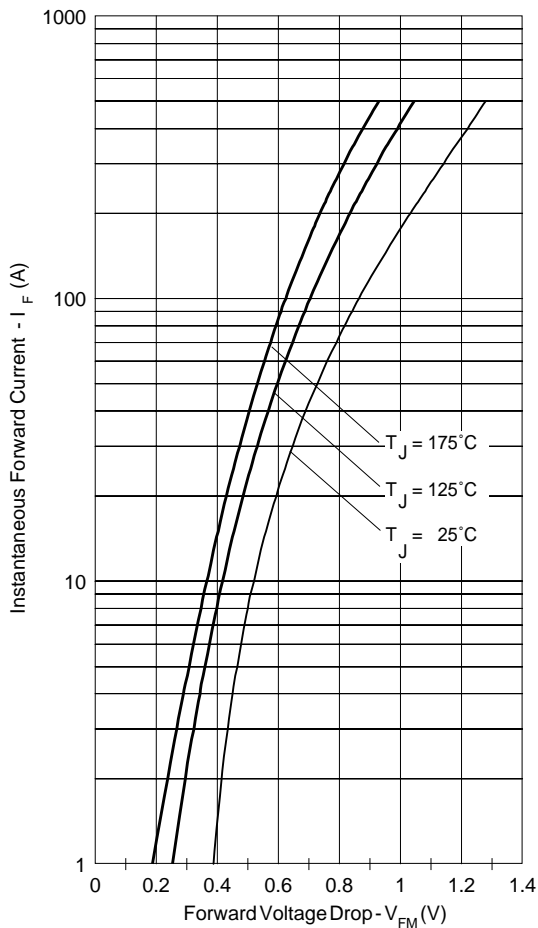


Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

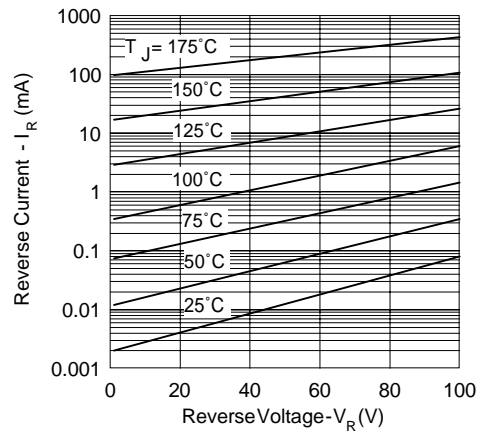


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

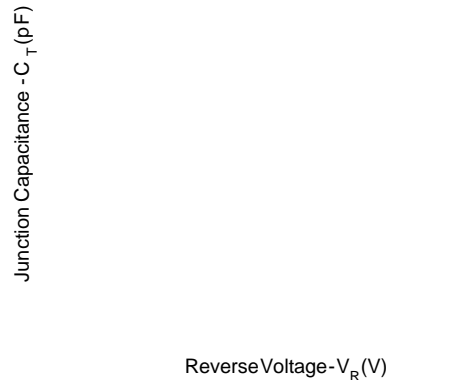


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

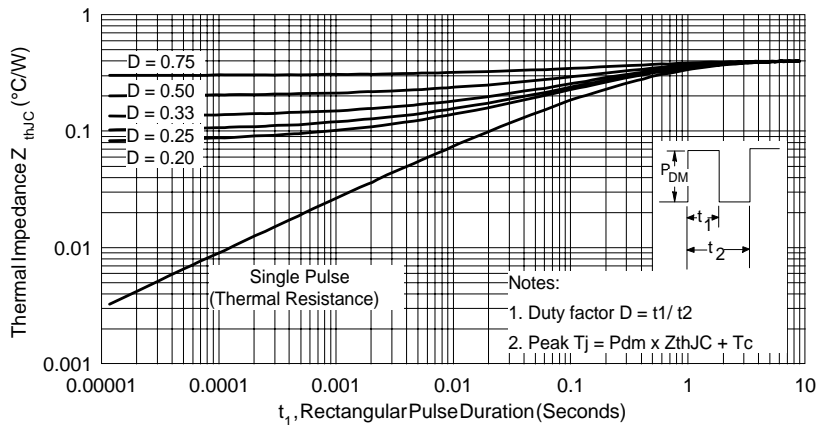


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

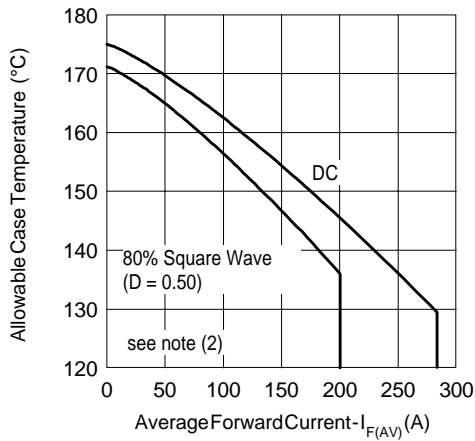


Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

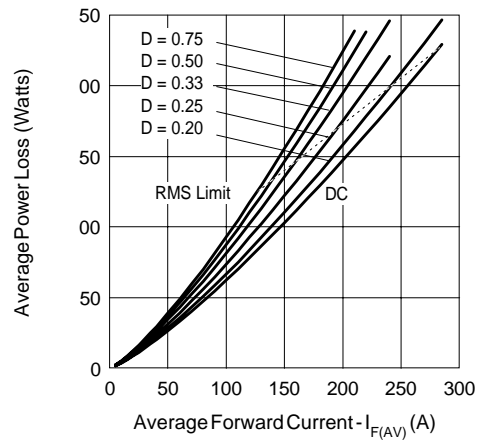


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

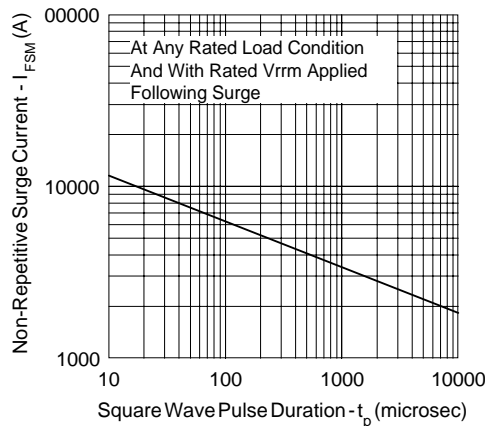


Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

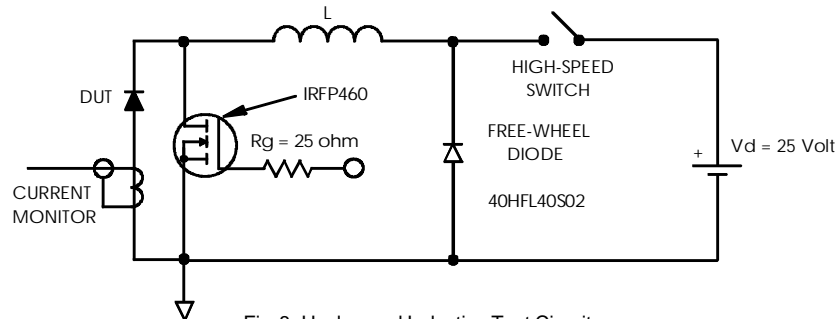


Fig. 8 - Unclamped Inductive Test Circuit

(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.

International  
**IOR** Rectifier

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