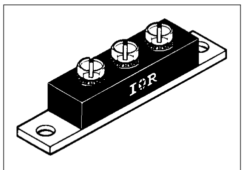
Bulletin PD-20565 rev. B 08/01

International Rectifier

# 203CMQ... SERIES

## SCHOTTKY RECTIFIER

200 Amp



TO-244AB isolated

### Major Ratings and Characteristics

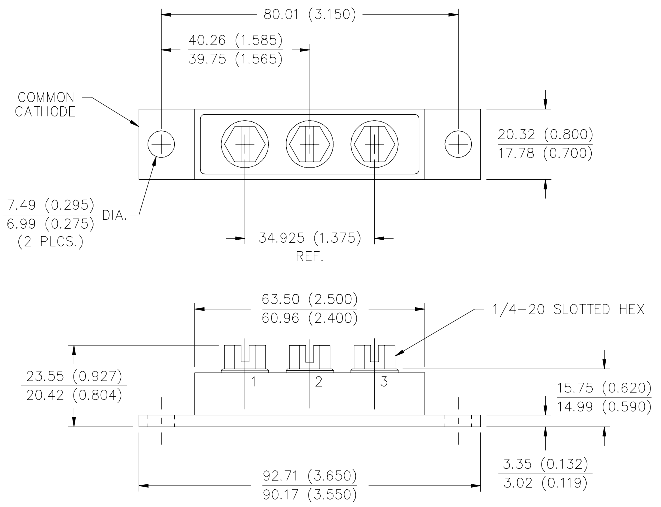
| Characteristics | | 203CMQ... | Units |
|---|---|---|---|
| $I_{F(AV)}$ | Rectangular waveform | 200 | A |
| $V_{RRM}$ | range | 80 to 100 | V |
| $I_{FSM}$ | @ tp = 5 μs sine | 16,000 | A |
| $V_F$ | @100Apk, $T_J$=125°C (per leg) | 0.70 | V |
| $T_J$ | range | - 55 to 175 | °C |

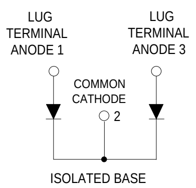
### Description/ Features

The 203CMQ high current 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 °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
- Center tap module - Isolated Base
- 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




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

## Voltage Ratings

| | Part number | 203CMQ080 | 203CMQ100 |
|---|---|---|---|
| $V_R$ | Max. DC Reverse Voltage (V) | 80 | 100 |
| $V_{RWM}$ | Max. Working Peak Reverse Voltage (V) | | |

## Absolute Maximum Ratings

| | Parameters | 203CMQ | Units | Conditions | |
|---|---|---|---|---|---|
| $I_{F(AV)}$ | Max. Average Forward (Per Leg) | 100 | A | 50% duty cycle @ $T_C$ = 110 °C, rectangular wave form | |
| | Current * See Fig. 5 (Per Device) | 200 | | | |
| $I_{FSM}$ | Max. Peak One Cycle Non-Repetitive | 16,000 | 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 | 2,100 | | 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<br>Frequency limited by $T_J$ max. $V_A$ = 1.5 x $V_R$ typical | |

## Electrical Specifications

| | Parameters | 203CMQ | Units | Conditions | |
|---|---|---|---|---|---|
| $V_{FM}$ | Max. Forward Voltage Drop | 0.86 | V | @ 100A | $T_J$ = 25 °C |
| | (Per Leg) * See Fig. 1 (1) | 1.03 | V | @ 200A | |
| | | 0.70 | V | @ 100A | $T_J$ = 125 °C |
| | | 0.84 | V | @ 200A | |
| $I_{RM}$ | Max. Reverse Leakage Current | 3 | mA | $T_J$ = 25 °C | $V_R$ = rated $V_R$ |
| | (Per Leg) * See Fig. 2 (1) | 40 | mA | $T_J$ = 125 °C | |
| $V_{F(TO)}$ | Threshold Voltage | 0.50 | V | $T_J$ = $T_J$ max. | |
| $r_t$ | Forward Slope Resistance | 1.08 | mΩ | | |
| $C_T$ | Max. Junction Capacitance (Per Leg) | 2,650 | pF | $V_R$ = 5$V_{DC}$, (test signal range 100Khz to 1Mhz) 25°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 | 10000 | V/ µs | (Rated $V_R$) | |
| $V_{RMS}$ | Insulation Voltage | 1000 | V | | |

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

## Thermal-Mechanical Specifications

| | Parameters | | 203CMQ | Units | Conditions |
|---|---|---|---|---|---|
| $T_J$ | Max. Junction Temperature Range | | -55 to 175 | °C | |
| $T_{stg}$ | Max. Storage Temperature Range | | -55 to 175 | °C | |
| $R_{thJC}$ | Max. Thermal Resistance Junction to Case (Per Leg) | | 0.70 | °C/W | DC operation * See Fig. 4 |
| $R_{thJC}$ | Max. Thermal Resistance Junction to Case (Per Package) | | 0.35 | °C/W | DC operation |
| $R_{thCS}$ | Typical Thermal Resistance, Case to Heatsink | | 0.10 | °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 |

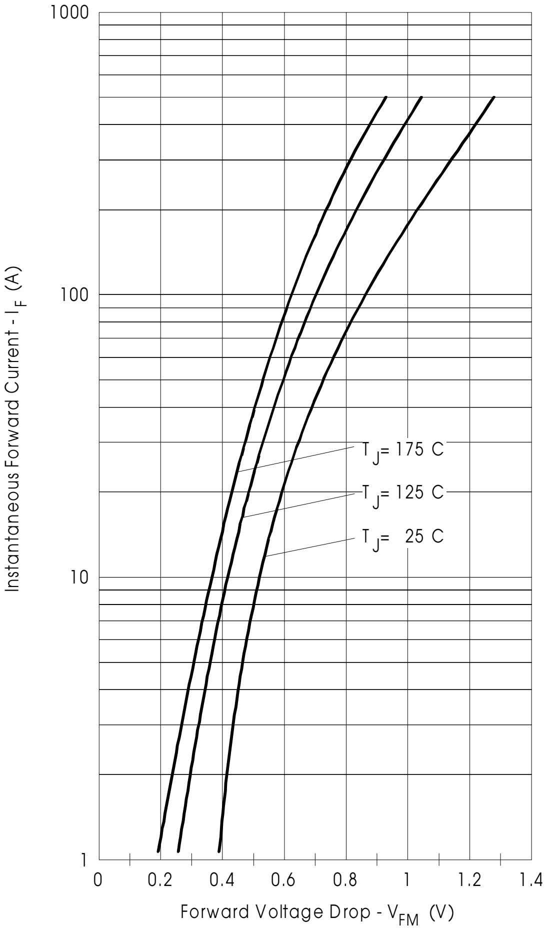



Fig. 1 - Max. Forward Voltage Drop Characteristics (Per Leg)

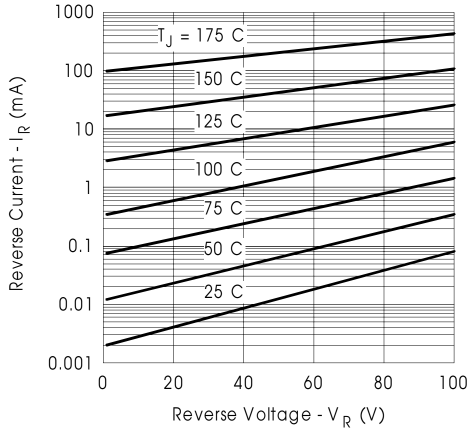



Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (Per Leg)

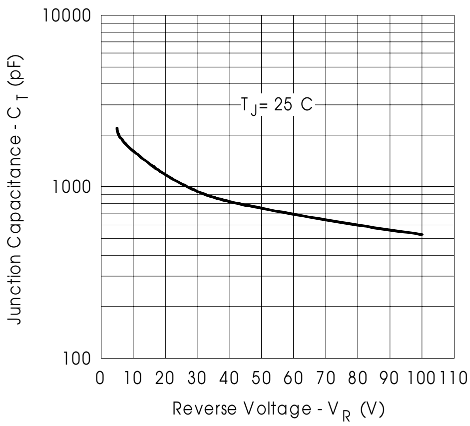



Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (Per Leg)

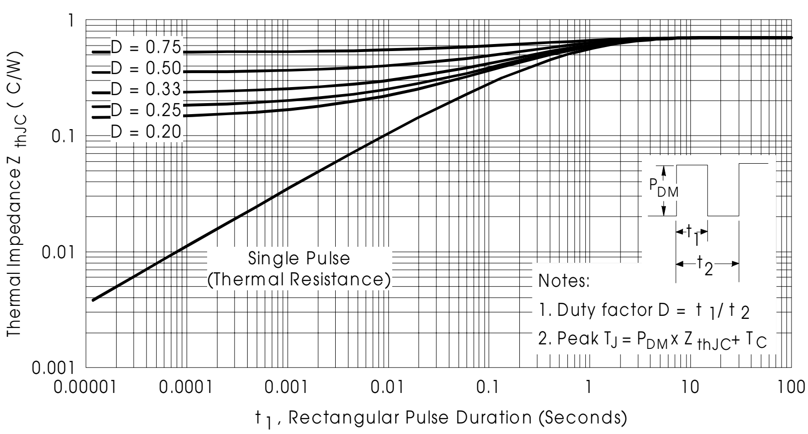



Fig. 4 - Max. Thermal Impedance $Z_{thJC}$ Characteristics (Per Leg)

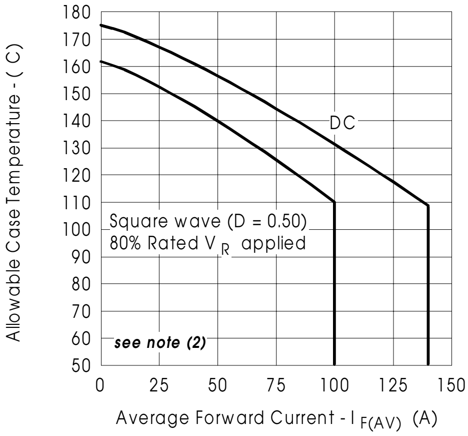



Fig. 5 - Max. Allowable Case Temperature Vs. Average Forward Current (Per Leg)

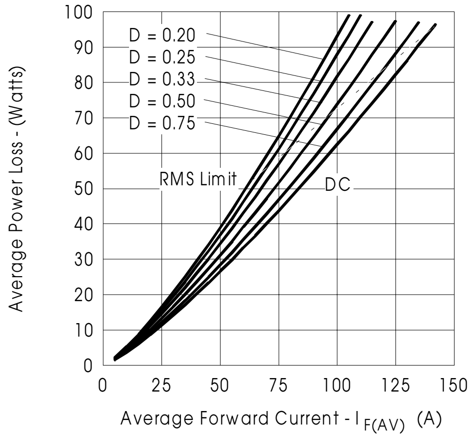



Fig. 6 - Forward Power Loss Characteristics (Per Leg)

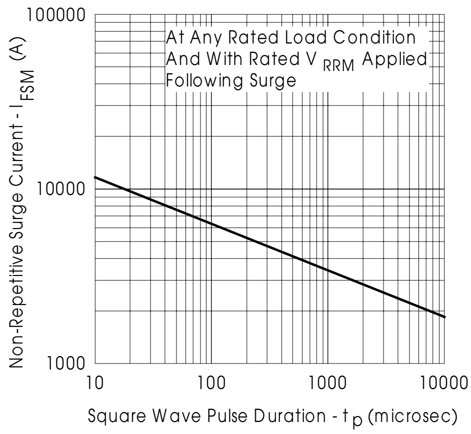



Fig. 7 - Max. Non-Repetitive Surge Current (Per Leg)

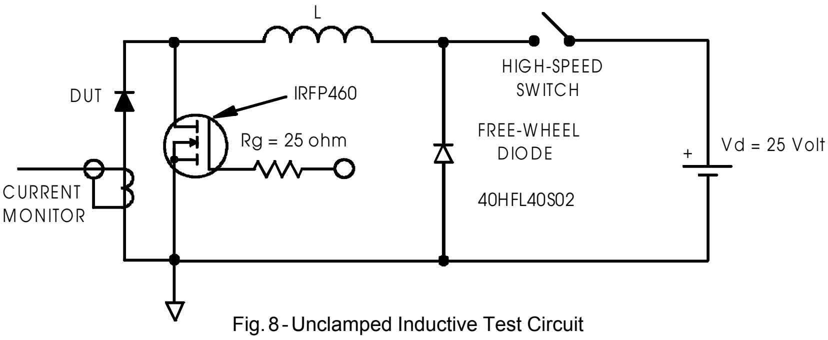



Fig. 8 - Unclamped Inductive Test Circuit

**(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 $V_R$

## Ordering Information Table

**Device Code**

| 203 | C | M | Q | 100 |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

1 - Current Rating: 200A
2 - Common Cathode
3 - Module
4 - Schottky Q Series
5 - Voltage Rating:
- 080 = 80V
- 100 = 100V



International
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