

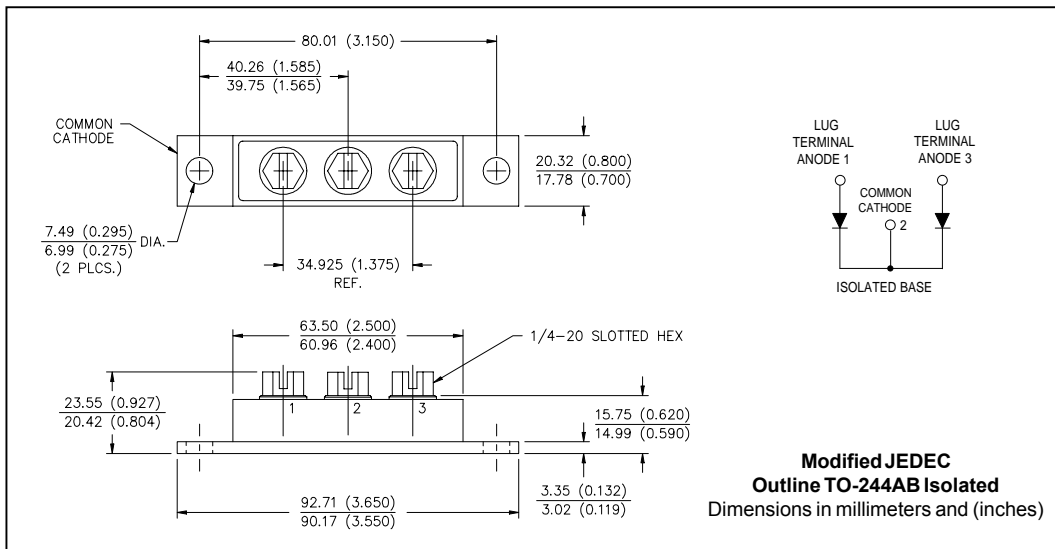
**Major Ratings and Characteristics**

Characteristics	220CMQ030	Units
$I_{F(AV)}$ Rectangular waveform	220	A
$V_{RRM}$	30	V
$I_{FSM}$ @tp = 5 $\mu$ s sine	22,500	A
$V_F$ @110Apk, $T_J = 125^\circ\text{C}$ (per leg)	0.40	V
$T_J$ range	-55 to 150	$^\circ\text{C}$

**Description/Features**

The 220CMQ030 high current Schottky rectifier module has been optimized for very low forward voltage drop, with moderate leakage. The proprietary barrier technology allows for reliable operation up to 150  $^\circ\text{C}$  junction temperature. Typical applications are in switching power supplies, converters, free-wheeling diodes, welding and reverse battery protection.

- 150  $^\circ\text{C}$   $T_J$  operation
- Center tap module - Isolated Base
- 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



# 220CMQ030

Bulletin PD-2.555 rev. B 08/01

International  
**IR** Rectifier

## Voltage Ratings

Part number	220CMQ030
$V_R$ Max. DC Reverse Voltage (V)	30
$V_{RWM}$ Max. Working Peak Reverse Voltage (V)	

## Absolute Maximum Ratings

Parameters	220CMQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current (Per Leg) * See Fig. 5 (Per Device)	110 220	A	50% duty cycle @ $T_C = 100^\circ\text{C}$ , rectangular waveform
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current (Per Leg) * See Fig. 7	22,500 2,400	A	5 $\mu\text{s}$ Sine or 3 $\mu\text{s}$ Rect. pulse 10ms Sine or 6ms Rect. pulse Following any rated load condition and with rated $V_{RWM}$ applied
$E_{AS}$ Non-Repetitive Avalanche Energy (Per Leg)	99	mJ	$T_J = 25^\circ\text{C}$ , $I_{AS} = 22$ Amps, $L = 0.41$ mH
$I_{AR}$ Repetitive Avalanche Current (Per Leg)	22	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	220CMQ	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop (Per Leg) * See Fig. 1 (1)	0.48	V	@ 110A $T_J = 25^\circ\text{C}$
	0.57	V	@ 220A
	0.40	V	@ 110A $T_J = 125^\circ\text{C}$
	0.52	V	@ 220A
$I_{RM}$ Max. Reverse Leakage Current (Per Leg) * See Fig. 2 (1)	10	mA	$T_J = 25^\circ\text{C}$
	560	mA	$T_J = 125^\circ\text{C}$ $V_R = \text{rated } V_R$
$V_{F(TO)}$ Threshold Voltage	0.23	V	$T_J = T_J \text{ max.}$
$r_t$ Forward Slope Resistance	1.16	m $\Omega$	
$C_T$ Max. Junction Capacitance (Per Leg)	7,400	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	10000	V/ $\mu\text{s}$	(Rated $V_R$ )
$V_{RMS}$ Insulation Voltage	1000	V	

(1) Pulse Width < 300 $\mu\text{s}$ , Duty Cycle < 2%

## Thermal-Mechanical Specifications

Parameters	220CMQ	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)	0.70	$^\circ\text{C/W}$	DC operation * See Fig. 4	
$R_{thJC}$ Max. Thermal Resistance Junction to Case (Per Package)	0.35	$^\circ\text{C/W}$	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	

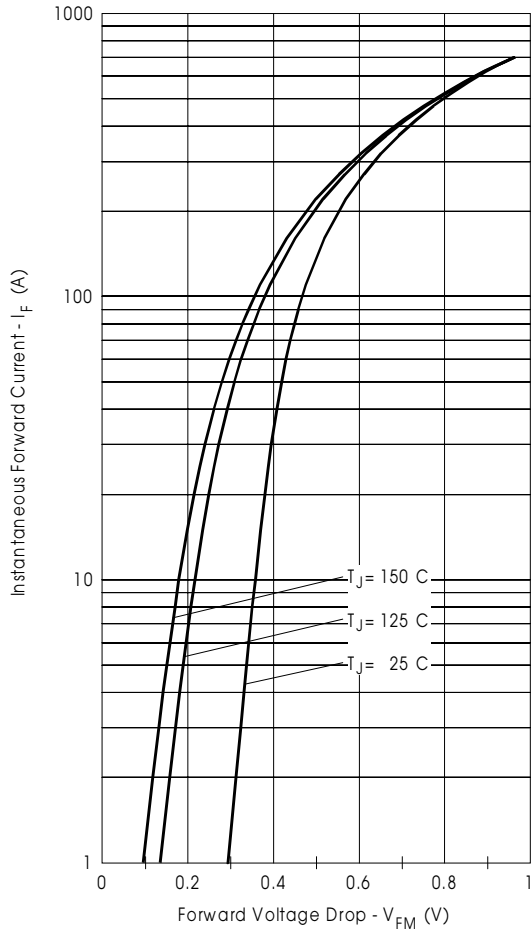


Fig. 1 - Max. Forward Voltage Drop Characteristics (PerLeg)

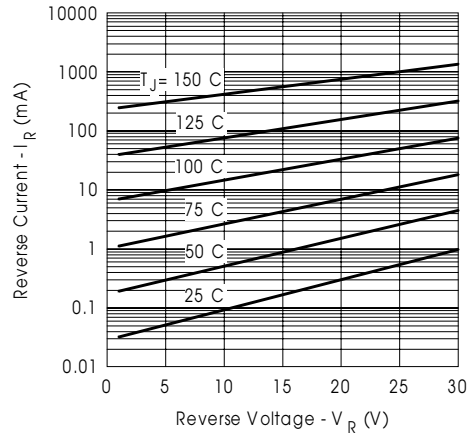


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage (PerLeg)

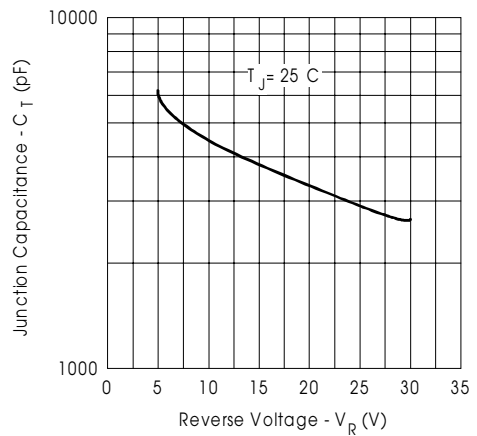


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage (PerLeg)

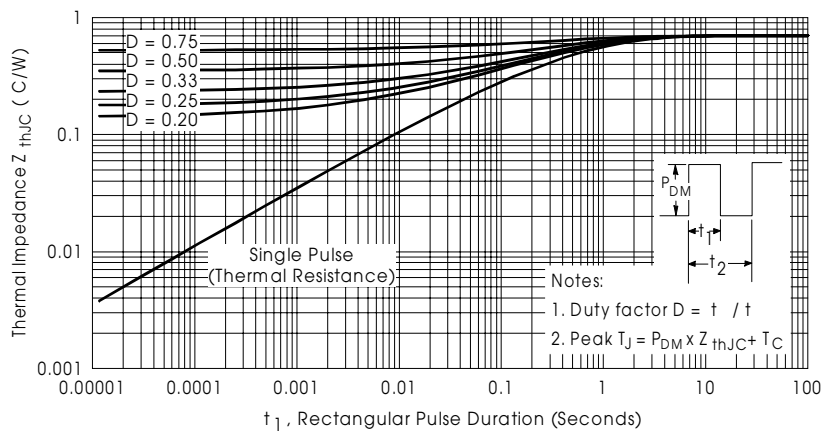


Fig. 4 - Max. Thermal Impedance  $Z_{thJC}$  Characteristics (PerLeg)

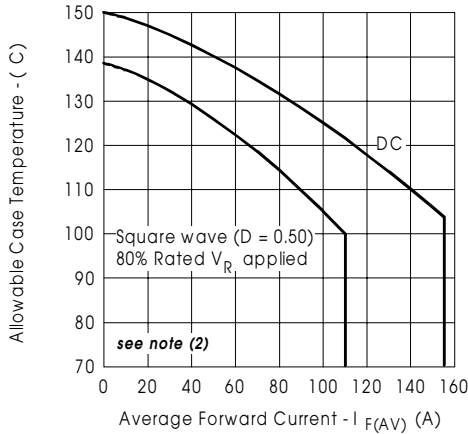


Fig. 5- Max. Allowable Case Temperature Vs. Average Forward Current (PerLeg)

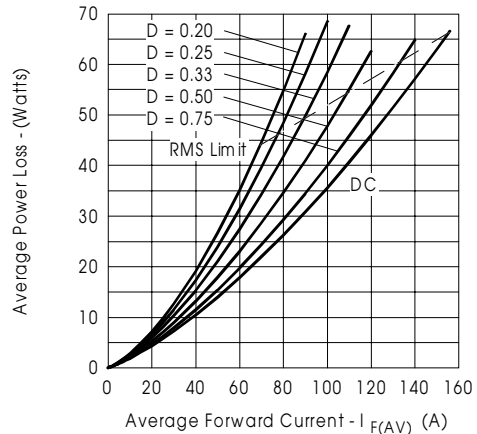


Fig. 6- Forward Power Loss Characteristics (PerLeg)

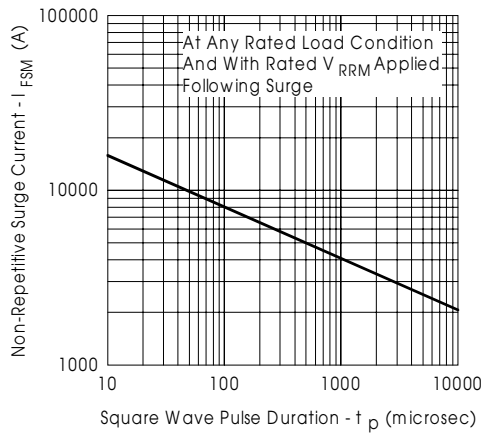


Fig. 7- Max. Non-Repetitive Surge Current (PerLeg)

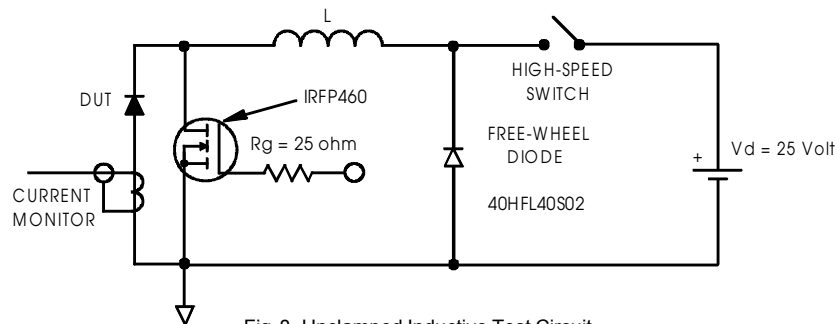


Fig. 8- Unclamped Inductive Test Circuit

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

Ordering Information Table

Device Code				
220	C	M	Q	030
①	②	③	④	⑤
<b>1</b>	-	Current Rating: 220A		
<b>2</b>	-	Common Cathode		
<b>3</b>	-	Module		
<b>4</b>	-	Schottky Q Series		
<b>5</b>	-	Voltage Rating: 30V		

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.