

International
IOR Rectifier

175BGQ030
175BGQ030J

SCHOTTKY RECTIFIER

175 Amp

Major Ratings and Characteristics

Characteristics	175BGQ030	Units
$I_{F(AV)}$ Rectangular waveform	175	A
$@T_C$	115	°C
I_{DC} Maximum	248	A
V_{RRM}	30	V
I_{FSM} @ $t_p = 5 \mu s$ sine	8000	A
V_F @175Apk typical	0.45	V
$@T_J$	150	°C
T_J range	-55 to 150	°C

Description/ Features

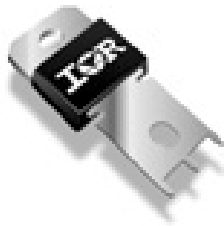
The 175BGQ030 Schottky rectifier has been optimized for ultra low forward voltage drop specifically for low voltage output in high current AC/DC power supplies.

The proprietary barrier technology allows for reliable operation up to 150°C junction temperature. Typical applications are in switching power supplies, converters, reverse battery protection, and redundant power subsystems.

- 150°C T_J operation
- High Frequency Operation
- Ultra low forward voltage drop
- Continuous High Current operation
- Guard ring for enhanced ruggedness and long term reliability
- **PowIRtab™ package**

Case Styles

175BGQ030



175BGQ030J



175BGQ030, 175BGQ030J

Bulletin PD-20997 rev. E 12/02

International
IR Rectifier

Voltage Ratings

Part number	175BGQ030
V_R Max. DC Reverse Voltage (V)	30
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	175BGQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	175	A	50% duty cycle @ $T_C = 115^\circ\text{C}$, rectangular wave form
$I_{F(RMS)}$ RMS Forward Current	248	A	$T_C = 114^\circ\text{C}$
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current	8000	A	5 μs Sine or 3 μs Rect. pulse
	1500		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy	80	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 12\text{ Amps}$, $L = 1.12\text{ mH}$
I_{AR} Repetitive Avalanche Current	12	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	175BGQ		Units	Conditions	
	Typ.	Max.			
V_{FM} Forward Voltage Drop (1) (2)	0.46	0.48	V	@ 100A	$T_J = 25^\circ\text{C}$
	0.53	0.56	V	@ 175A	
	0.35	0.38	V	@ 100A	$T_J = 150^\circ\text{C}$
	0.45	0.49	V	@ 175A	
I_{RM} Reverse Leakage Current (1)	1.3	4.5	mA	$T_J = 25^\circ\text{C}$	$V_R = \text{rated } V_R$
	450	650	mA	$T_J = 125^\circ\text{C}$	
	160	220	mA	$T_J = 125^\circ\text{C}$	$V_R = 15\text{V}$
	1400	2000	mA	$T_J = 150^\circ\text{C}$	$V_R = 30\text{V}$
$V_{F(TO)}$ Threshold Voltage	0.242		V	$T_J = T_J \text{ max.}$	
r_t Forward Slope Resistance	1.4		m Ω		
C_T Max. Junction Capacitance	8500		pF	$V_R = 5V_{DC}$, (test signal range 100Khz to 1Mhz) 25°C	
L_S Typical Series Inductance	3.5		nH	Measured from tab to mounting plane	
dv/dt Max. Voltage Rate of Change (Rated V_R)	10000		V/ μs		

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

(2) $V_{FM} = V_{F(TO)} + r_t \times I_F$

Thermal-Mechanical Specifications

Parameters	175BGQ	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	0.25	$^\circ\text{C/W}$	DC operation
R_{thCS} Typical Thermal Resistance, Case to Heatsink	0.20	$^\circ\text{C/W}$	Mounting surface, smooth and greased
wt Approximate Weight	5(0.18)	g(oz.)	
T Mounting Torque	Min.	1.2(10)	N*m (lbf-in)
	Max.	2.4(20)	
Case Style	PowIRtab™		

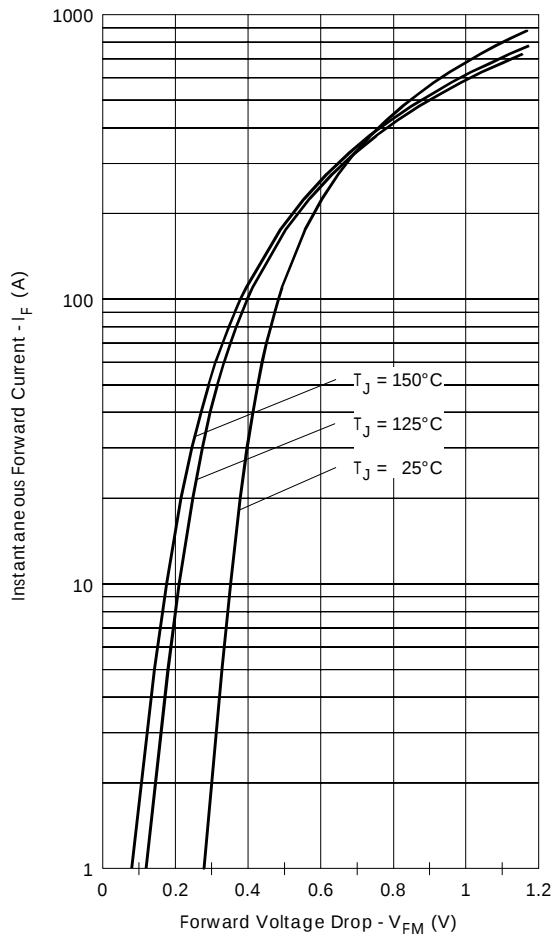


Fig. 1 - Maximum Forward Voltage Drop Characteristics

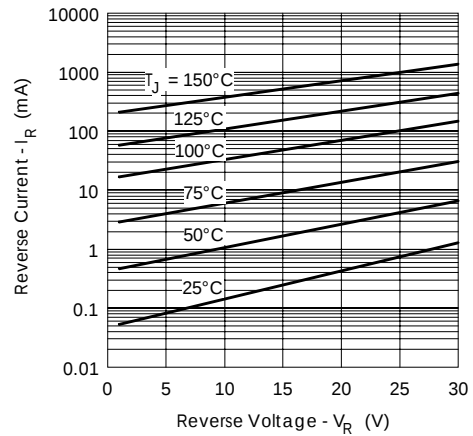


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

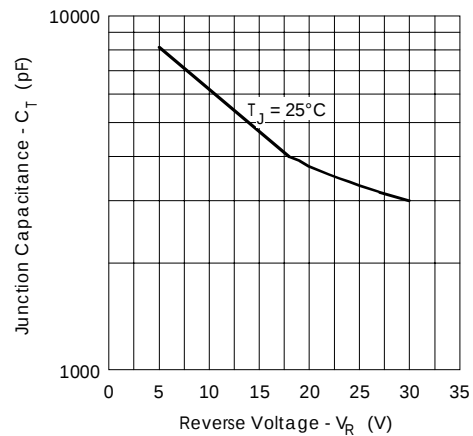


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

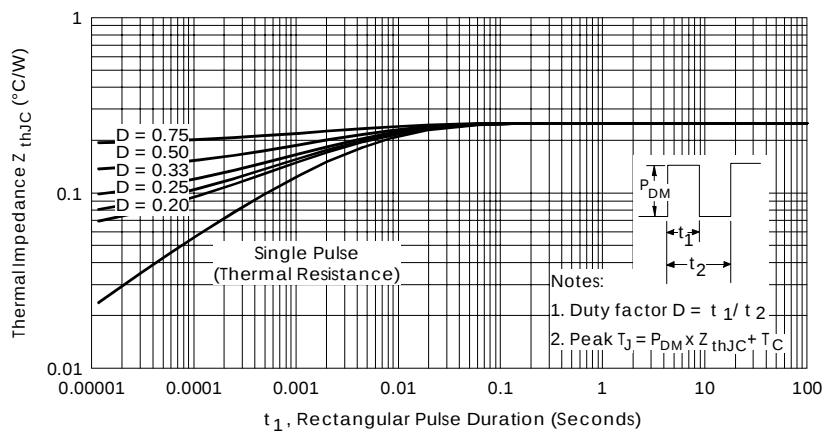


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

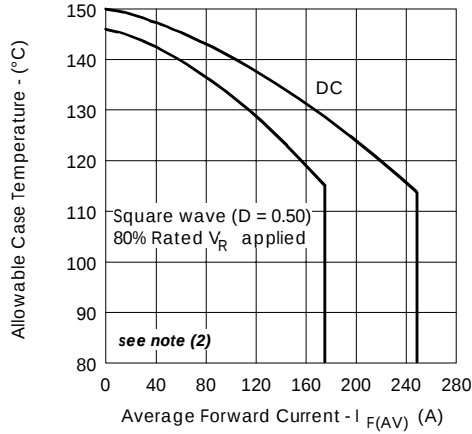


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

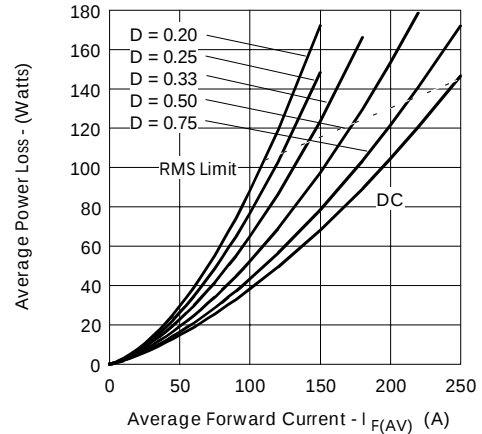


Fig. 6 - Forward Power Loss Characteristics

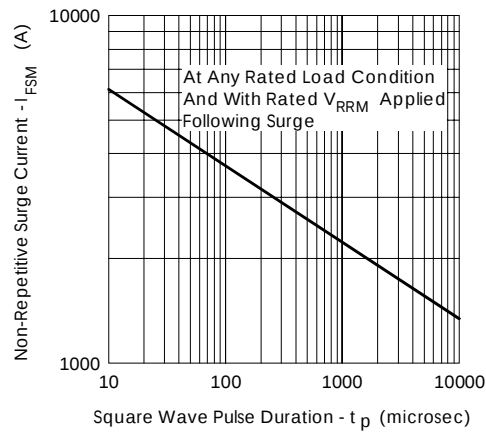


Fig. 7 - Maximum Non-Repetitive Surge Current

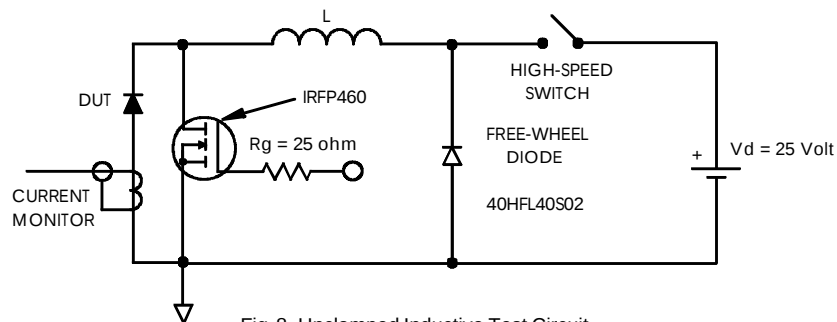


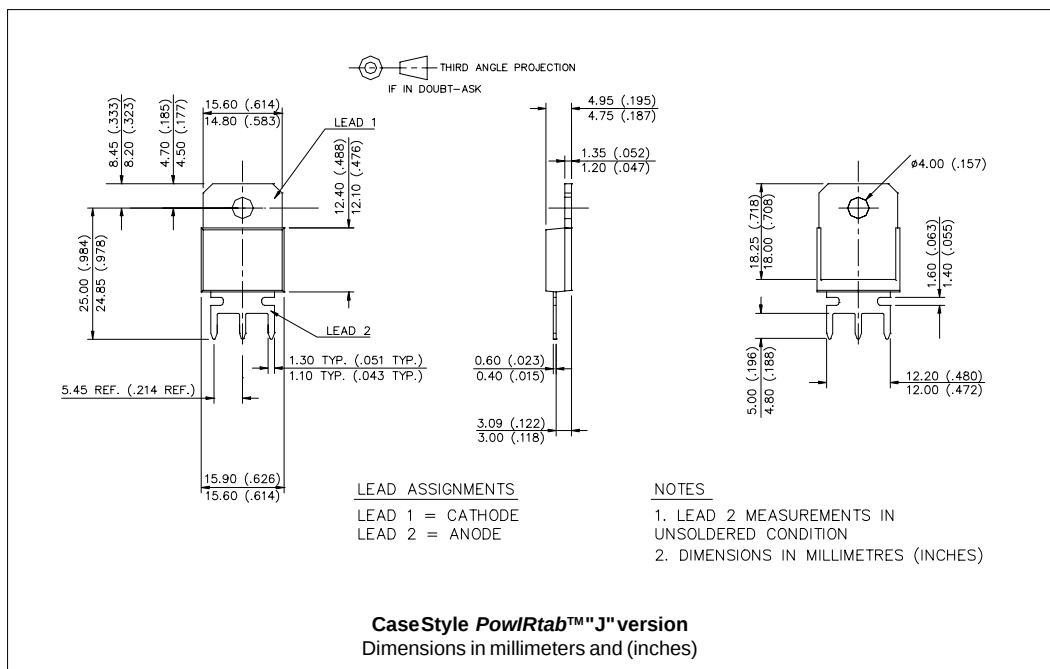
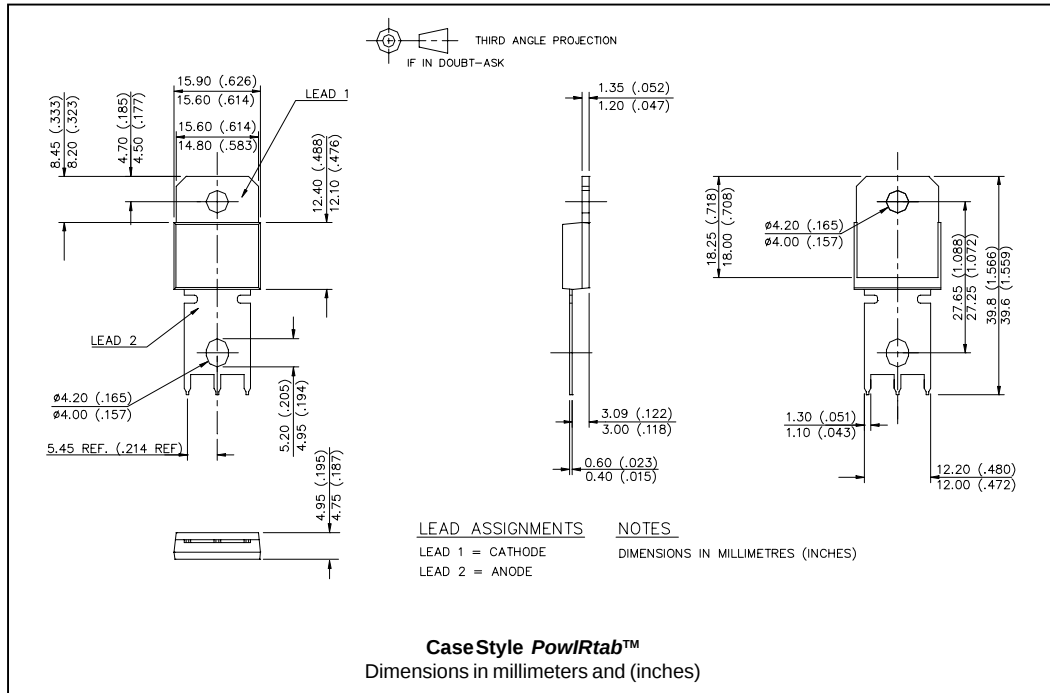
Fig. 8 - Unclamped Inductive Test Circuit

(3) 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 = $V_{R1} \times I_R (1 - D)$; $I_R @ V_{R1} = 80\% \text{ rated } V_R$

Outline Table



Ordering Information Table

Device Code

175

BGQ

030

J

1

2

3

4

1

2

3

4

-

Current Rating

-

Essential Part Number

-

Voltage code: Code = V_{RRM}

-

none = PowIRtab™ standard

J

= Short Lead Version

This model has been developed by
Wizard SPICE MODEL GENERATOR(1999)
(International Rectifier Corporation)
contains Proprietary Information

SPICE Model Diode is composed by a
simple diode plus paralld VCG2T

```
.SUBCKT 175bgq30 ANO CAT
D1 ANO 1 DMOD (0.24359)
*Define diode model
.MODEL DMOD D(IS=1.3875007809205E-04A,N=1.00125798542747,BV=30V,
+IBV=0.160931851779476A,RS=0.0001656412,CJO=5.05942026644635E-08,
+VJ=1.99501834690192,XTI=2,EG=0.711439066978857)
*****
```

*Implementation of VCG2T

```
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=4.01799427965033)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP(((((-3.827089E-03/
4.017994)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-1))+1)*0.122401*ABS(V(ANO,CAT)))-1}}
```

```
.ENDS 175bgq30
```

Thermal Model Subcircuit

```
.SUBCKT 175bgq30T 5 1
```

```
CTHERM1 5 4 1.30E+3
CTHERM2 4 3 2.87E+2
CTHERM3 3 2 1.56E+4
CTHERM4 2 1 2.37E+5
```

```
R THERM1 5 4 3.13E-2
R THERM2 4 3 1.42E-1
R THERM3 3 2 6.70E-2
R THERM4 2 1 1.72E-4
```

```
.ENDS 175bgq30T
```

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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