

PD-20710 rev. C 11/99

International
IR Rectifier

175BGQ045
175BGQ045J

SCHOTTKY RECTIFIER

175 Amp

Major Ratings and Characteristics

Characteristics	175BGQ045	Units
$I_{F(AV)}$ Rectangular waveform @ T_C	175	A
	107	°C
I_{DC} Maximum	248	A
V_{RRM}	45	V
I_{FSM} @ $t_p = 5 \mu s$ sine	8700	A
V_F @175Apk typical @ T_J	0.61	V
	150	°C
T_J range	-55 to 150	°C

Description/Features

The NEW 175BGQ045 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

175BGQ045	175BGQ045J
	



175BGQ045, 175BGQ045J

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International
IRF Rectifier

Voltage Ratings

Part number	175BGQ045
V _R Max. DC Reverse Voltage (V)	45
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 = 107°C, rectangular waveform
I _{F(RMS)} RMS Forward Current	248	A	T _C = 104°C
I _{FSM} Max. Peak One Cycle Non-Repetitive Surge Current	8700 1550	A	5μs Sine or 3μs Rect. pulse 10ms Sine or 6ms Rect. pulse
E _{AS} Non-Repetitive Avalanche Energy	40	mJ	T _J = 25 °C, I _{AS} = 6 Amps, L = 2.0 mH
I _{AR} Repetitive Avalanche Current	6	A	Current decaying linearly to zero in 1μsec Frequency limited by T _J max. V _A = 1.5 × V _R typical

Electrical Specifications

Parameters	175BGQ		Units	Conditions	
	Typ.	Max.			
V _{FM} Forward Voltage Drop (1) (2)	0.53	0.56	V	@ 100A	T _J = 25 °C
	0.64	0.69	V	@ 175A	
	0.48	0.52	V	@ 100A	T _J = 150 °C
	0.61	0.64	V	@ 175A	
I _{RM} Reverse Leakage Current (1)	0.6	2	mA	T _J = 25 °C	V _R = rated V _R
	360	640	mA	T _J = 125°C	
	1200	2000	mA	T _J = 150 °C	V _R = 45V
V _{F(TO)} Threshold Voltage	0.352		V	T _J = T _J max.	
r _t Forward Slope Resistance	1.5		mΩ		
C _T Max. Junction Capacitance	5600		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)	10,000		V/μs		

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

(2) V_{FM} = V_{F(TO)} + r_t × I_F

Thermal-Mechanical Specifications

Parameters	175BGQ	Units	Conditions
T _J Max. Junction Temperature Range	-55 to 150	°C	
T _{stg} Max. Storage Temperature Range	-55 to 150	°C	
R _{thJC} Max. Thermal Resistance Junction to Case	0.25	°C/W	DC operation
R _{thCS} Typical Thermal Resistance, Case to Heatsink	0.20	°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™		

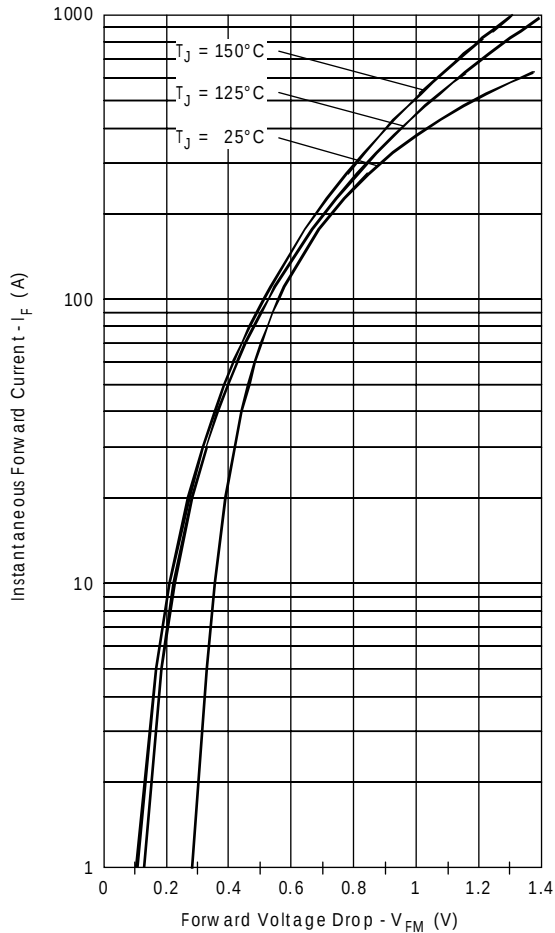


Fig. 1 - Maximum Forward Voltage Drop Characteristics

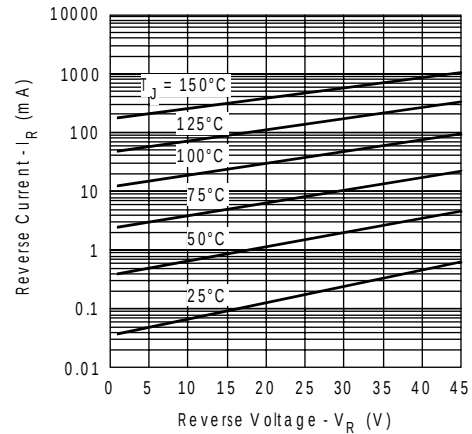


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

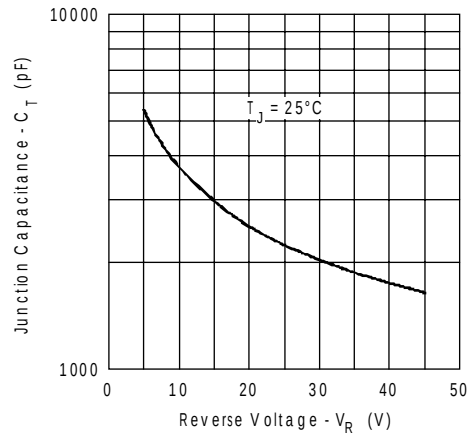


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

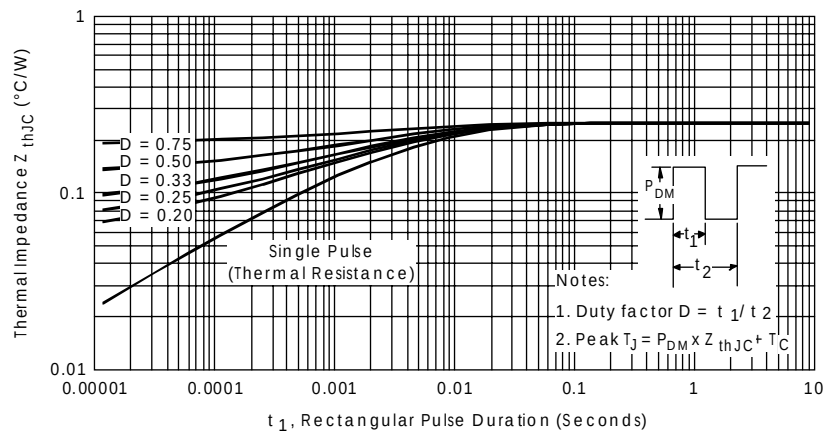


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

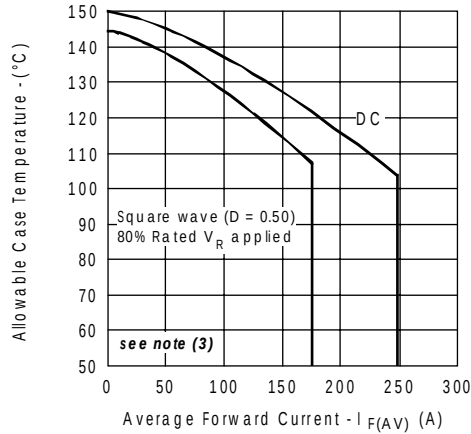


Fig. 5- Maximum Allowable Case Temperature Vs. Average Forward Current

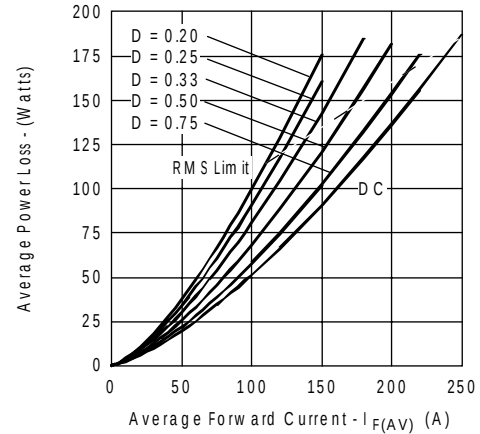


Fig. 6- Forward Power Loss Characteristics

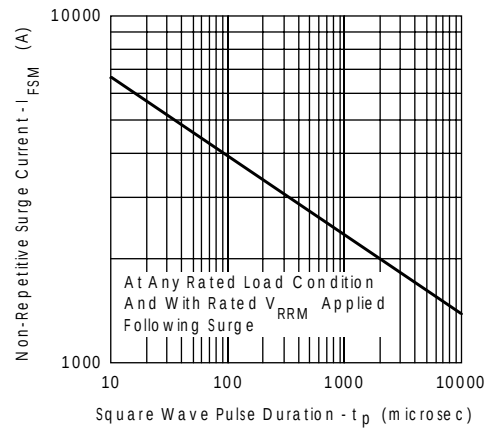


Fig. 7- Maximum Non-Repetitive Surge Current

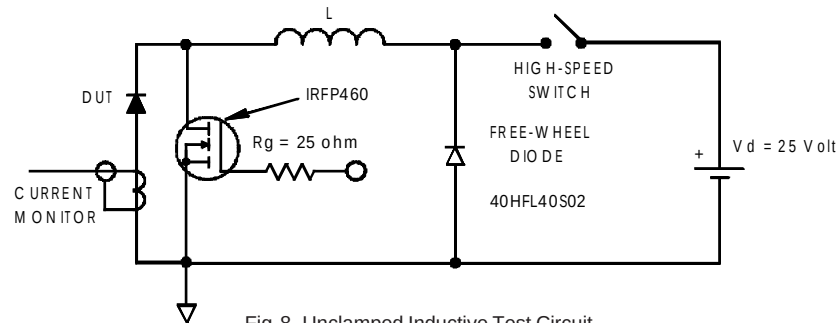


Fig. 8- Unclamped Inductive Test Circuit

(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 @ $V_{R1} = 80\%$ rated V_R

Ordering Information Table

Device Code

175

BGQ

045

J

1

2

3

4

1

2

3

4

-

-

-

-

Current Rating

Essential Part Number

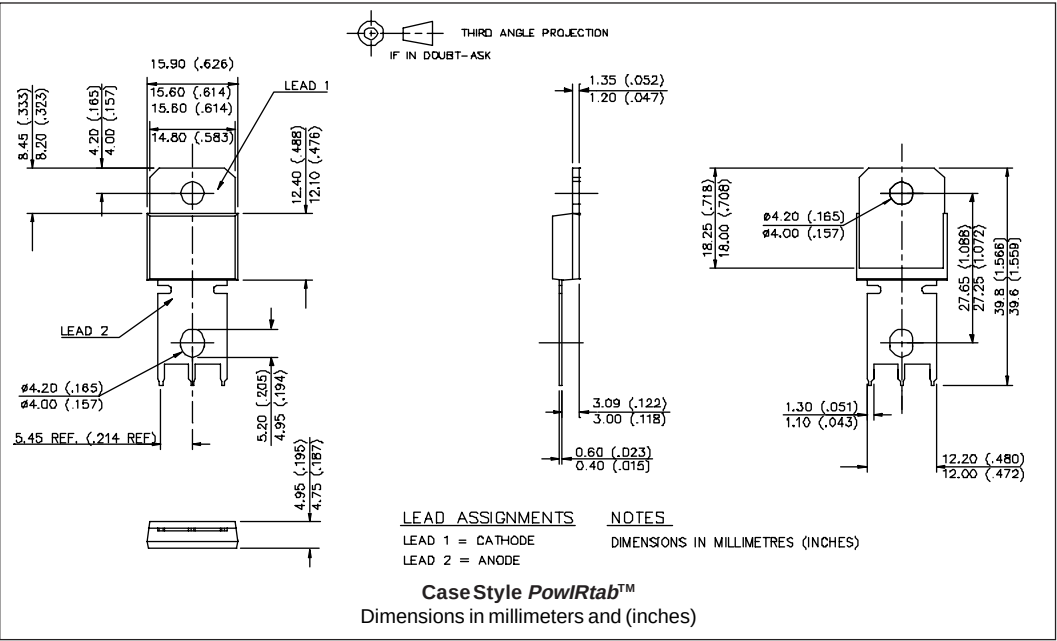
Voltage code: Code = V_{RRM}

none = PowIRtab™standard

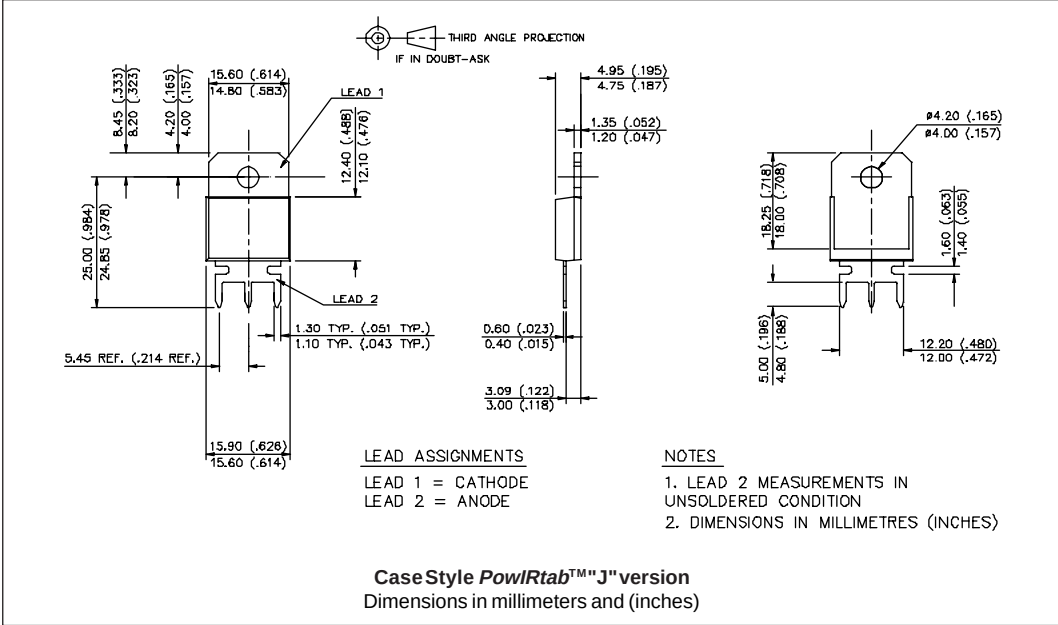
J

= Short Lead Version

Outline Table



Outline Table



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*****
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 175bgq45 ANO CAT
D1 ANO 1 DMOD (0.24359)
*Define diode model
.MODEL DMOD D(IS=1.83192228095708E-04A,N=1.05013272757567,BV=45V,
+IBV=0.318718355472911A,RS=0.0003020516,CJO=5.36650017916966E-08,
+VJ=0.773797902206145,XTI=2,EG=0.707245556720411)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=5.6216088199529)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP(((((-2.339145E-03/
5.621609)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-1))+1)*5.687601E-02*ABS(V(ANO,CAT))))-1)}

*****
.ENDS175bgq45

Thermal Model Subcircuit
.SUBCKT 175bgq45T 5 1

CTHERM1 5 4 1.71E+3
CTHERM2 4 3 3.63E+2
CTHERM3 3 2 3.23E+4
CTHERM4 2 1 3.12E+5

RTHERM1 5 4 3.24E-2
RTHERM2 4 3 1.52E-1
RTHERM3 3 2 4.08E-2
RTHERM4 2 1 1.81E-4

.ENDS 175bgq45T

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Data and specifications subject to change without notice.