Bulletin PD-20710 rev. D 12/02

International
IOR Rectifier

175BGQ045
175BGQ045J

SCHOTTKY RECTIFIER

175 Amp

Major Ratings and Characteristics

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

Description/ Features

The 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
	

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 wave form	
$I_{F(RMS)}$	RMS Forward Current	248	A	T_C = 104°C	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current	8700	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		1550		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 1 µsec Frequency limited by T_J max. V_A = 1.5 x V_R typical	

Electrical Specifications

	Parameters	175BGQ Typ.	175BGQ Max.	Units	Conditions	
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)	10000		V/ µs		

(1) Pulse Width < 300µs, 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	°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*™		

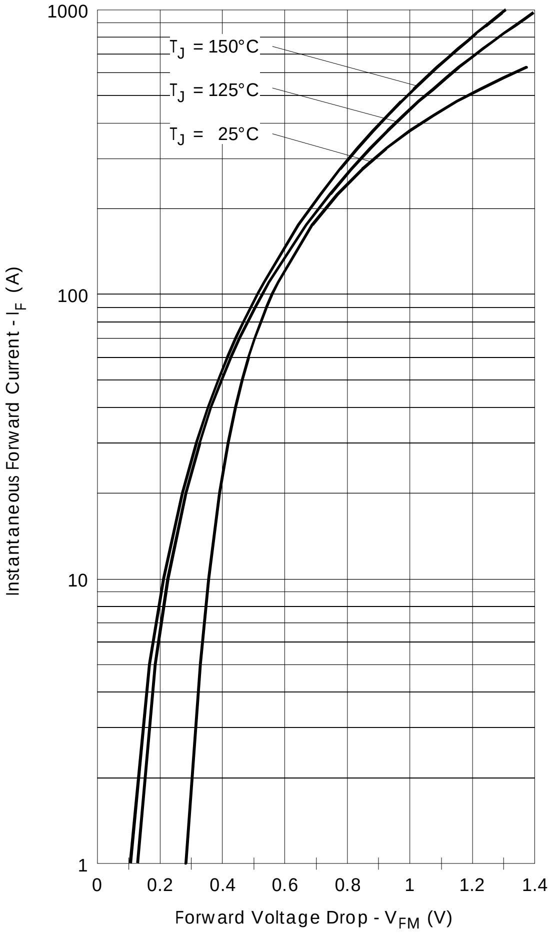


Fig. 1 - Maximum Forward Voltage Drop Characteristics

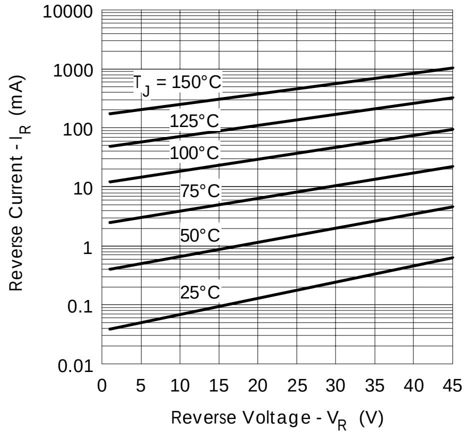


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

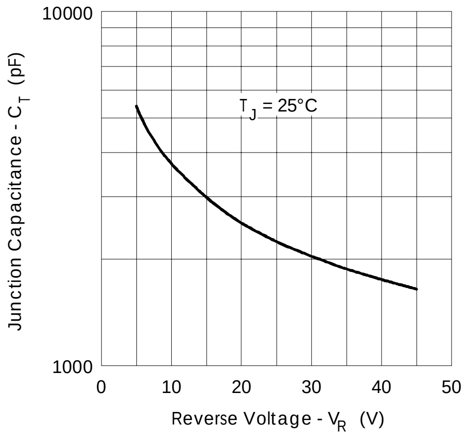


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

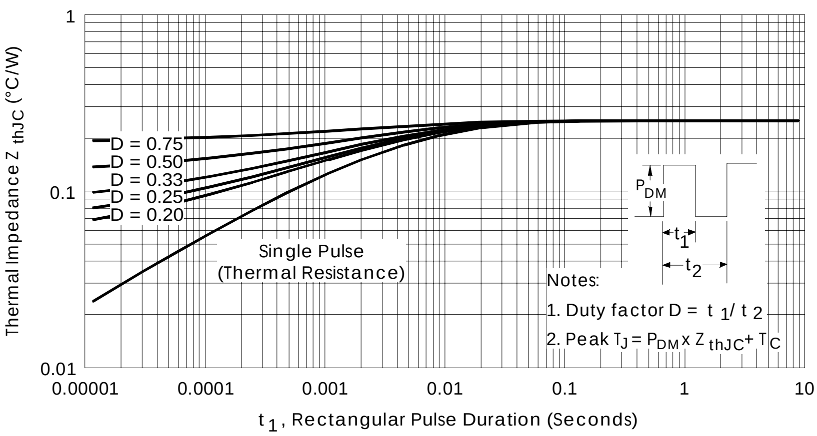


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

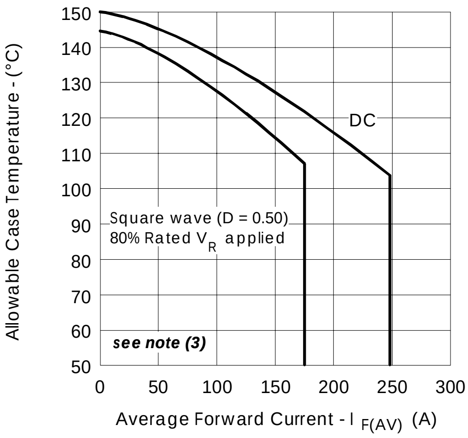


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

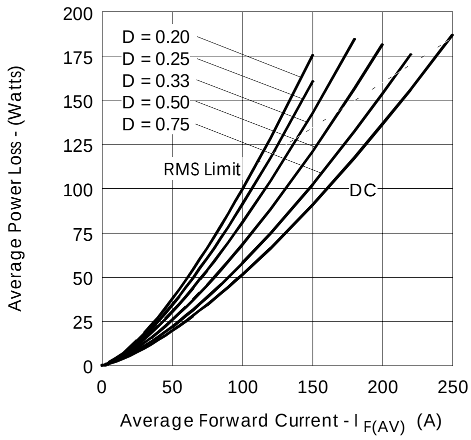


Fig. 6 - Forward Power Loss Characteristics

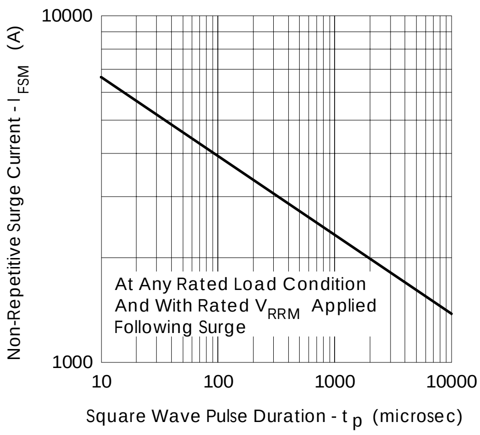


Fig. 7 - Maximum Non-Repetitive Surge Current

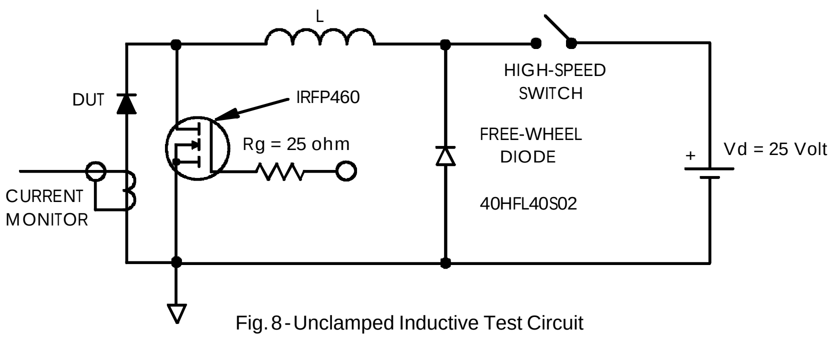
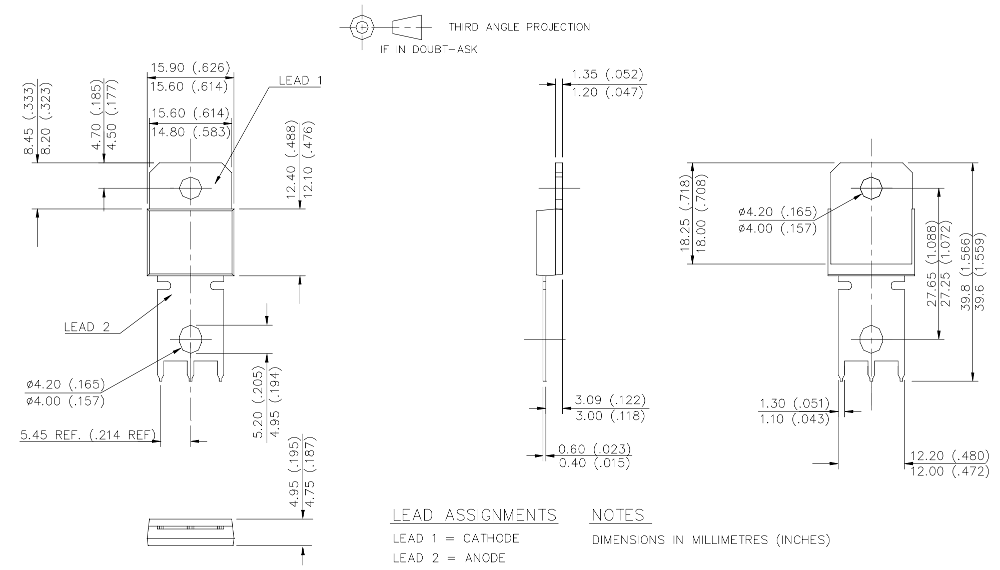


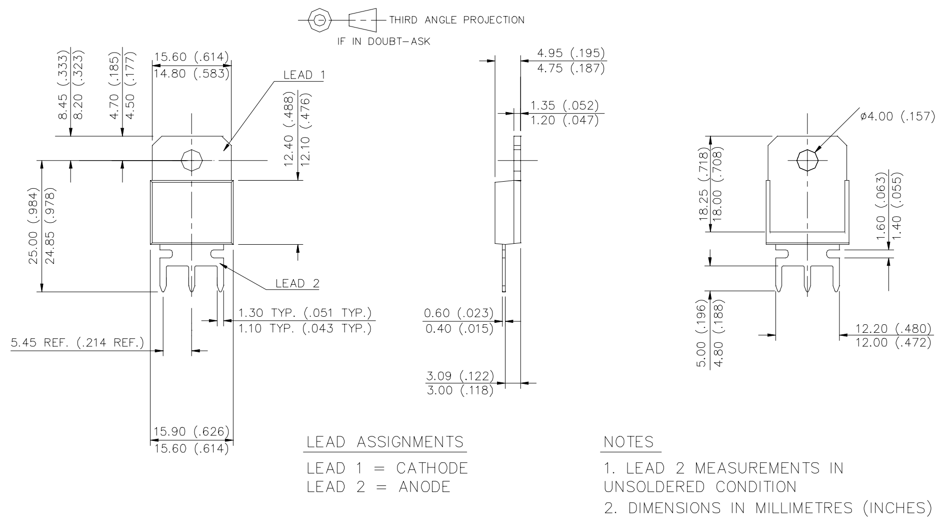
Fig. 8 - Unclamped Inductive Test Circuit

(3) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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

Outline Table



Case Style *PowIRtab*™
Dimensions in millimeters and (inches)



Case Style *PowIRtab*™ "J" version
Dimensions in millimeters and (inches)

Ordering Information Table

Device Code

175	BGQ	045	J
1	2	3	4

- **1** - Current Rating
- **2** - Essential Part Number
- **3** - Voltage code: Code = V_{RRM}
- **4** - none = PowIRtab™ standard
  - J = Short Lead Version

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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 paralled VCG2T
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.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)}

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.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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International
IR Rectifier

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