

International  
**IR** Rectifier

100BGQ045  
 100BGQ045J

SCHOTTKY RECTIFIER

100 Amp

#### Major Ratings and Characteristics

Characteristics	100BGQ045	Units
$I_{F(AV)}$ Rectangular waveform @ $T_C$	100	A
$I_{DC}$ Maximum	141	A
$V_{RRM}$	45	V
$I_{FSM}$ @ $t_p = 5 \mu s$ sine	4400	A
$V_F$ @ 100Apk typical @ $T_J$	0.63	V
$T_J$ range	-55 to 150	°C

#### Description/Features

The NEW 100BGQ045 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

100BGQ045



100BGQ045J



100BGQ045, 100BGQ045J

PD-20709 rev. C 11/99

Voltage Ratings

Part number	100BGQ045
V <sub>R</sub> Max. DC Reverse Voltage (V)	45
V <sub>RWM</sub> Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	100BGQ	Units	Conditions
I <sub>F(AV)</sub> Max. Average Forward Current	100	A	50% duty cycle @ T <sub>C</sub> = 100°C, rectangular wave form
I <sub>F(RMS)</sub> RMS Forward Current	141	A	T <sub>C</sub> = 95°C
I <sub>FSM</sub> Max. Peak One Cycle Non-Repetitive Surge Current	4400	A	5µs Sine or 3µs Rect. pulse
	830		10ms Sine or 6ms Rect. pulse
E <sub>AS</sub> Non-Repetitive Avalanche Energy	40	mJ	T <sub>J</sub> = 25°C, I <sub>AS</sub> = 6 Amps, L = 2.0 mH
I <sub>AR</sub> Repetitive Avalanche Current	6	A	Current decaying linearly to zero in 1 µsec Frequency limited by T <sub>J</sub> max. V <sub>A</sub> = 1.5 x V <sub>R</sub> typical

Electrical Specifications

Parameters	100BGQ		Units	Conditions	
	Typ.	Max.			
V <sub>FM</sub> Forward Voltage Drop (1) (2)	0.52	0.56	V	@ 50A	T <sub>J</sub> = 25 °C
	0.67	0.73	V	@ 100A	
	0.47	0.52	V	@ 50A	T <sub>J</sub> = 150 °C
	0.63	0.68	V	@ 100A	
I <sub>RM</sub> Reverse Leakage Current (1)	0.3	1	mA	T <sub>J</sub> = 25 °C	V <sub>R</sub> = rated V <sub>R</sub>
	180	320	mA	T <sub>J</sub> = 125°C	
	600	1000	mA	T <sub>J</sub> = 150 °C	V <sub>R</sub> = 45 V
V <sub>F(TO)</sub> Threshold Voltage	0.379		V	T <sub>J</sub> = T <sub>J</sub> max.	
r <sub>t</sub> Forward Slope Resistance	2.7		mΩ		
C <sub>T</sub> Max. Junction Capacitance	2700		pF	V <sub>R</sub> = 5V <sub>DC</sub> , (test signal range 100Khz to 1Mhz)	25 °C
L <sub>S</sub> Typical Series Inductance	3.5		nH	Measured from tab to mounting plane	
dv/dt Max. Voltage Rate of Change (Rated V <sub>R</sub> )	10,000V/		µs		

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

(2) V<sub>FM</sub> = V<sub>F(TO)</sub> + r<sub>t</sub> x I<sub>F</sub>

Thermal-Mechanical Specifications

Parameters	100BGQ	Units	Conditions
T <sub>J</sub> Max. Junction Temperature Range	-55 to 150	°C	
T <sub>stg</sub> Max. Storage Temperature Range	-55 to 150	°C	
R <sub>thJC</sub> Max. Thermal Resistance Junction to Case	0.50	°C/W	DC operation
R <sub>thCS</sub> 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™		

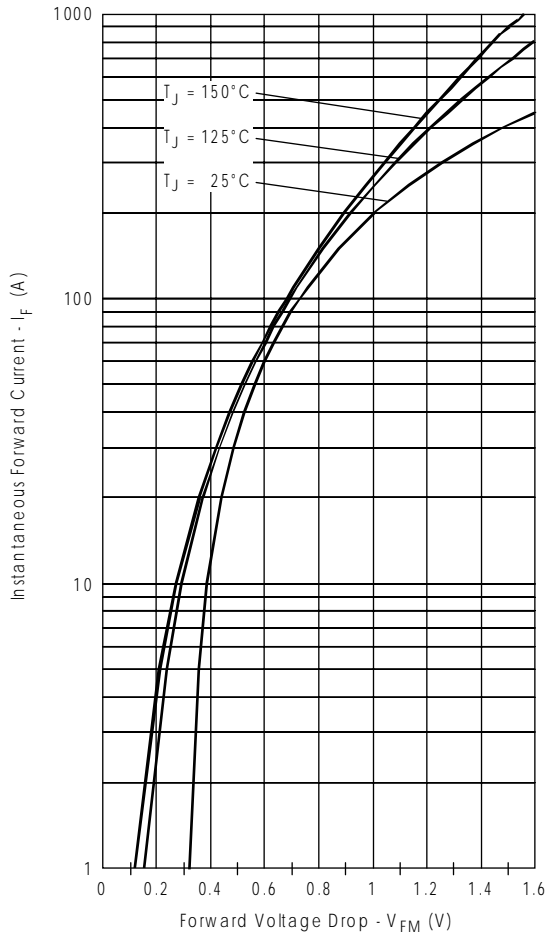


Fig. 1 - Maximum Forward Voltage Drop Characteristics

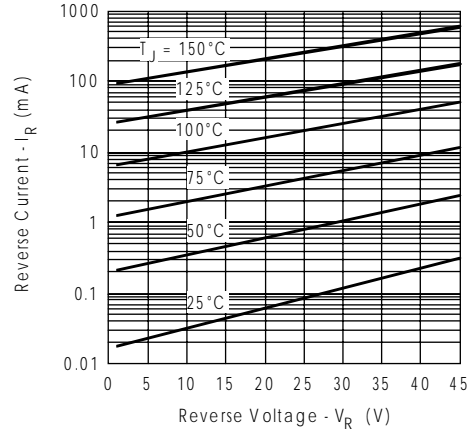


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

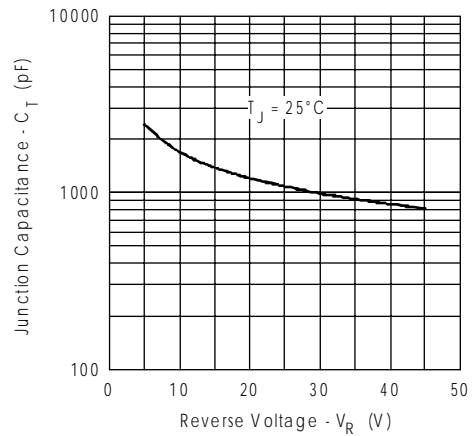


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

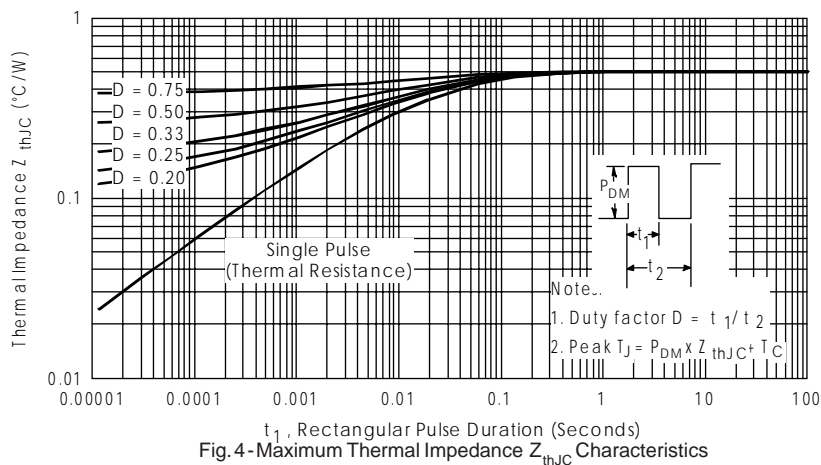


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

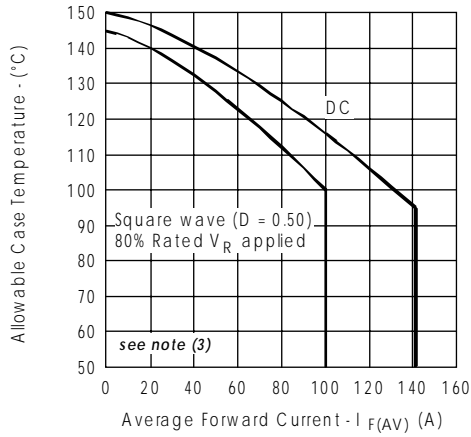


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

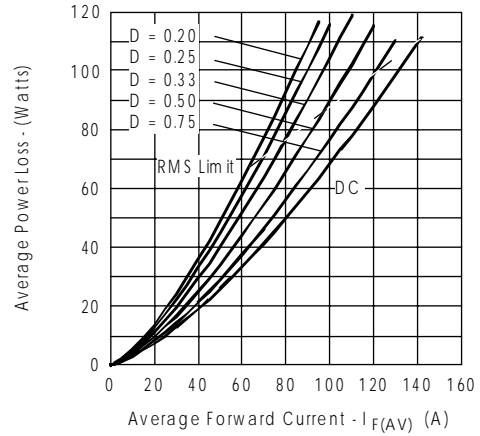


Fig. 6 - Forward Power Loss Characteristics

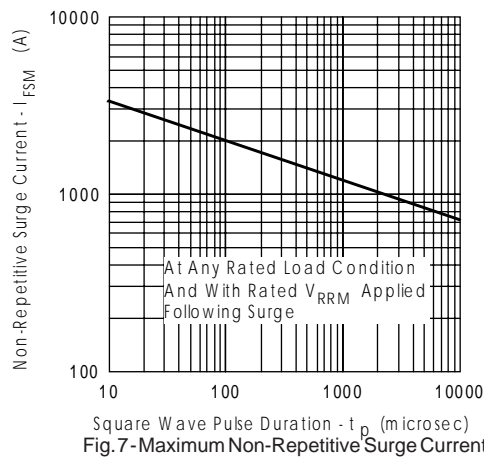


Fig. 7 - Maximum Non-Repetitive Surge Current

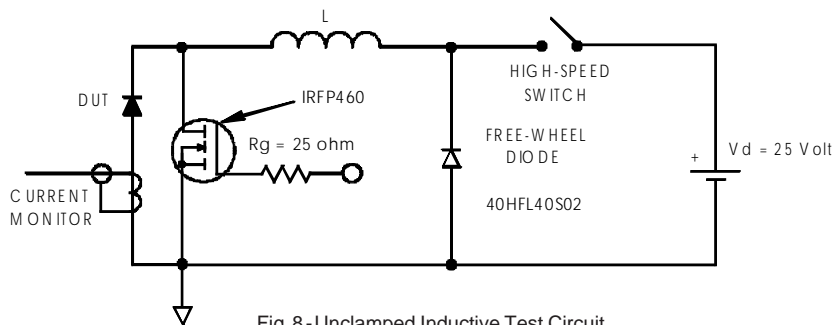


Fig. 8 - Unclamped Inductive Test Circuit

(3) Formula used:  $T_c = T_j - (P_d + P_{d_{REV}}) \times R_{thJC}$ ;

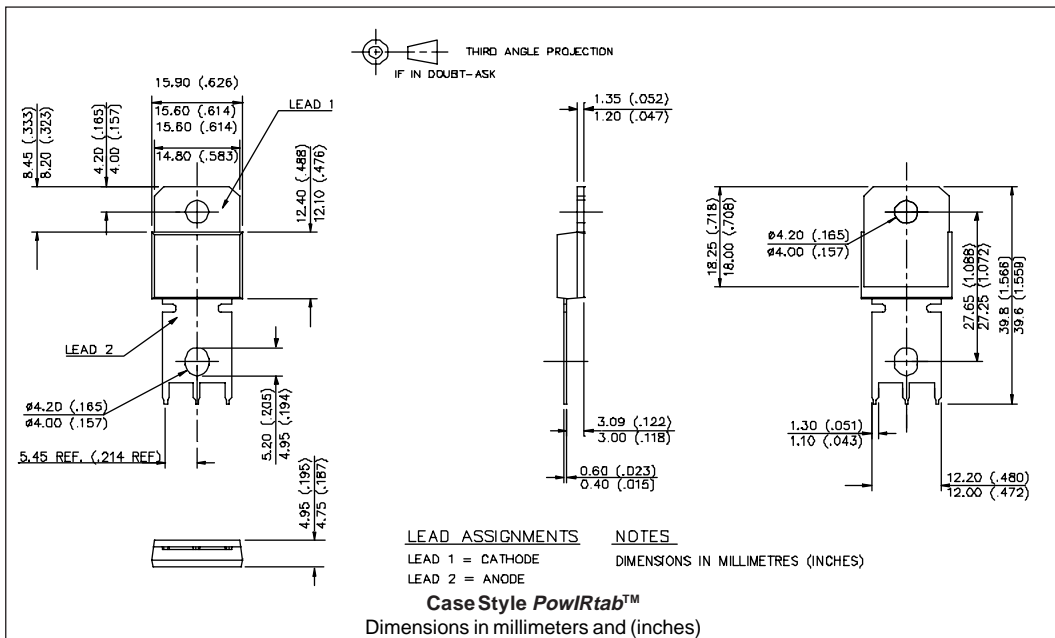
$P_d$  = Forward Power Loss =  $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$  (see Fig. 6);

$P_{d_{REV}}$  = Inverse Power Loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R @ V_{R1} = 80\%$  rated  $V_R$

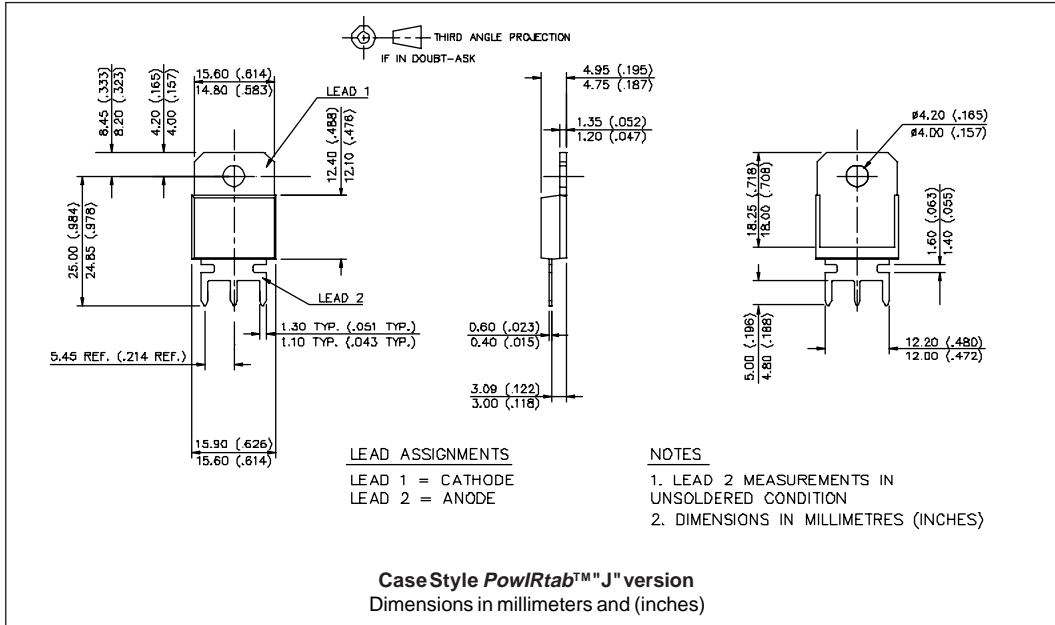
Ordering Information Table

Device Code			
100	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		

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 paralalled VCG2T
*****

.SUBCKT 100bgq45 ANO CAT
D1 ANO 1 DMOD (0.24359)
*Define diode model
.MODEL DMOD D(IS=6.61799286342482E-05A,N=1.0212796726385,BV=45V,
+IBV=0.115140026620575A,RS=0.0005748724,CJO=3.31930927290723E-08,
+VJ=0.456112448442971,XTI=2,EG=0.721992455742664)
*****
*Implementation of VCG2T
VX 1 2 DC 0V
R1 2 CAT TRES 1E-6
.MODEL TRES RES(R=1,TC1=9.83346387011944)
GP1 ANO CAT VALUE={-ABS(I(VX))*(EXP((( -2.949174E-03/
9.833464)*((V(2,CAT)*1E6)/(I(VX)+1E-6)-1))+1)*6.600191E-2*ABS(V(ANO,CAT)))-1}

*****

.ENDS100bgq45

Thermal Model Subcircuit
.SUBCKT 100bgq45T 5 1

CTHERM1 5 4 1.66E+3
CTHERM2 4 3 2.22E+2
CTHERM3 3 2 1.48E+5
CTHERM4 2 1 3.12E+5

R THERM1 5 4 3.42E-2
R THERM2 4 3 2.55E-1
R THERM3 3 2 8.41E-2
R THERM4 2 1 1.81E-4

.ENDS 100bgq45T
    
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Data and specifications subject to change without notice.