

PD-20709 rev. C 11/99

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
	100	°C
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
	150	°C
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 
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100BGQ045, 100BGQ045J

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Voltage Ratings

Part number	100BGQ045
V_R Max. DC Reverse Voltage (V)	45
V_{RWM} Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

Parameters	100BGQ	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	100	A	50% duty cycle @ $T_C = 100^\circ\text{C}$, rectangular wave form
$I_{F(RMS)}$ RMS Forward Current	141	A	$T_C = 95^\circ\text{C}$
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current	4400	A	5 μs Sine or 3 μs Rect. pulse
	830		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy	40	mJ	Following any rated load condition and with rated V_{RWM} applied
I_{AR} Repetitive Avalanche Current	6	A	$T_J = 25^\circ\text{C}$, $I_{AS} = 6\text{ Amps}$, $L = 2.0\text{ mH}$ 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			100BGQ		Units	Conditions	
			Typ.	Max.			
V _{FM} Forward Voltage Drop (1) (2)		0.52	0.56	V	@ 50A	T _J = 25 °C	
		0.67	0.73	V	@ 100A		
		0.47	0.52	V	@ 50A	T _J = 150 °C	
		0.63	0.68	V	@ 100A		
I _{RM} Reverse Leakage Current (1)		0.3	1	mA	T _J = 25 °C	V _R = rated V _R	
		180	320	mA	T _J = 125°C		
		600	1000	mA	T _J = 150 °C		V _R = 45 V
V _{F(TO)} Threshold Voltage		0.379	VT _J = T _J max.				
r _L Forward Slope Resistance		2.7	mΩ				
C _T Max. Junction Capacitance		2700	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)		10,000V/	μs				

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

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

Thermal-Mechanical Specifications

Parameters		100BGQ	Units	Conditions
T _J	Max. Junction Temperature Range	-55to150	°C	
T _{stg}	Max. Storage Temperature Range	-55to150	°C	
R _{thJC}	Max. Thermal Resistance Junction to Case	0.50	°C/W	DCoperation
R _{thCS}	Typical Thermal Resistance, Case to Heatsink	0.20	°C/W	Mountingsurface, smoothandgreased
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™		

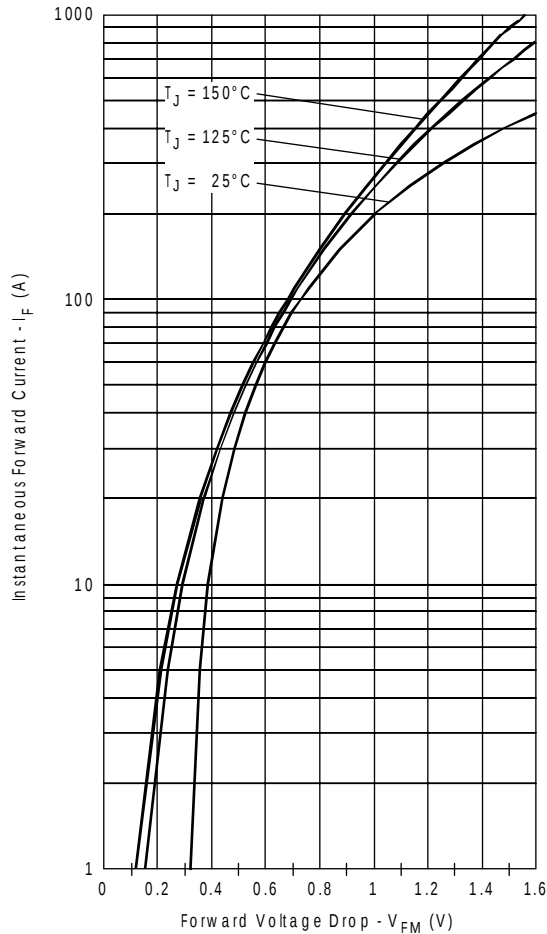


Fig. 1 - Maximum Forward Voltage Drop Characteristics

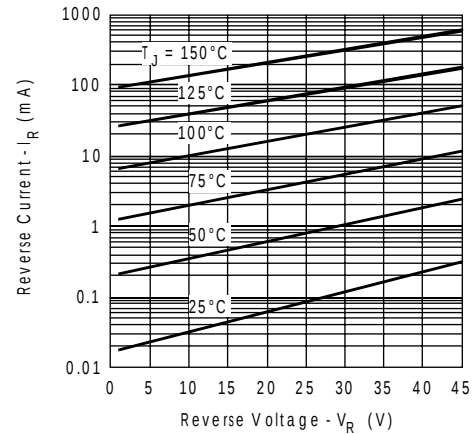


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

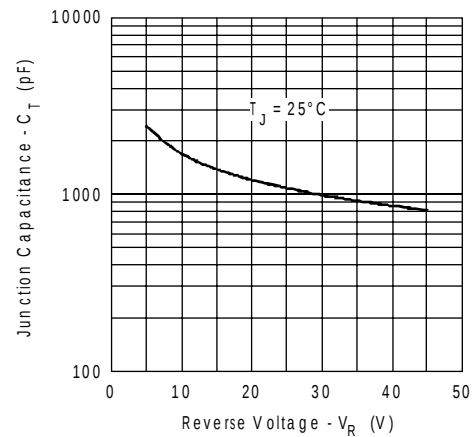


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

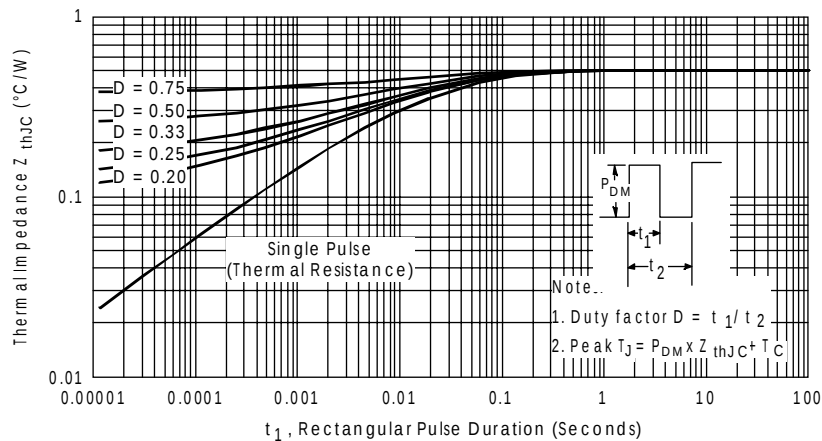


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

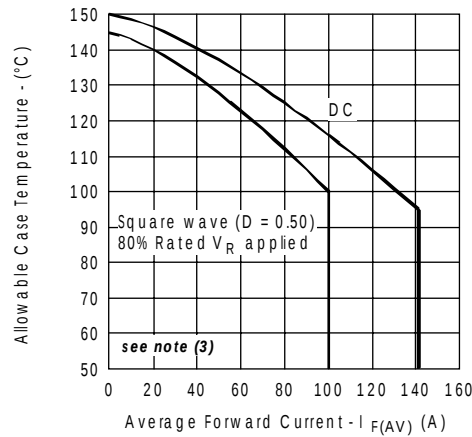


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

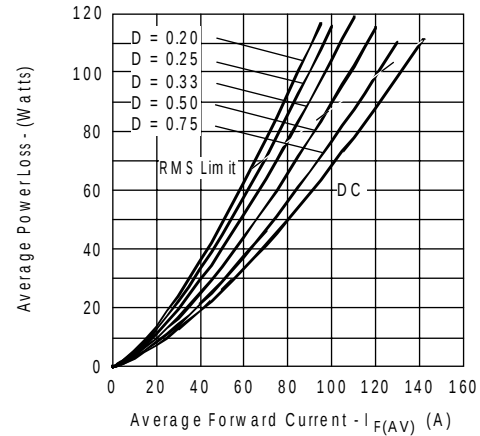


Fig. 6 - Forward Power Loss Characteristics

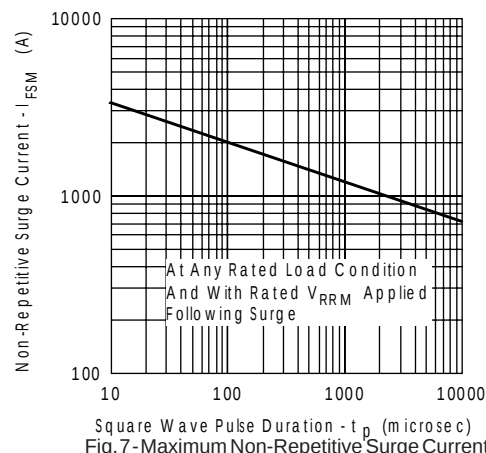


Fig. 7 - Maximum Non-Repetitive Surge Current

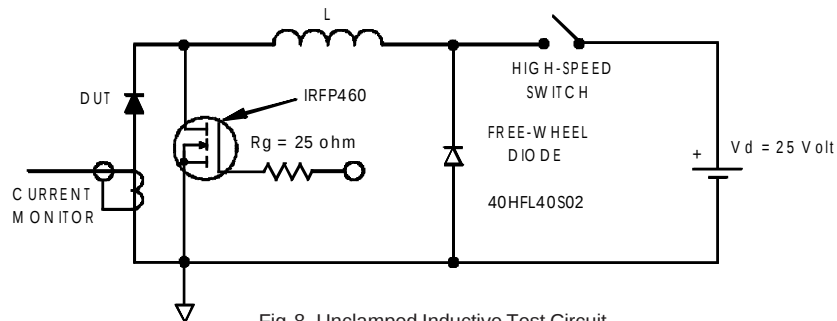


Fig. 8 - Unclamped Inductive Test Circuit

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

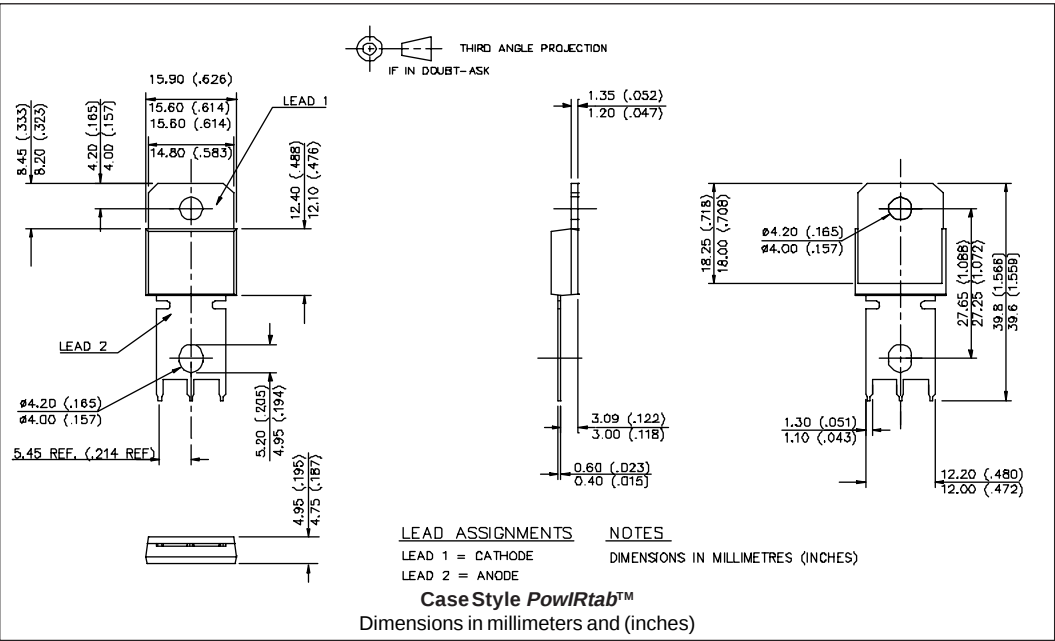
P_d = Forward Power Loss = $I_{F(AV)} \times V_{FM} @ (I_{F(AV)} / D)$ (see Fig. 6);

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

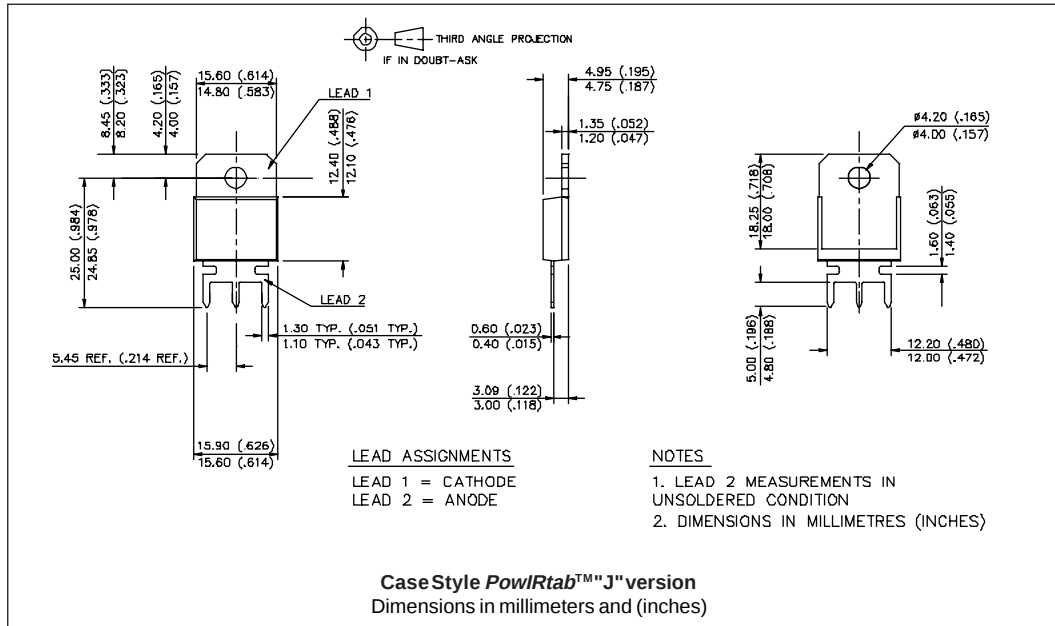
Ordering Information Table

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)}

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.ENDS 100bgq45

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

RTHERM1 5 4 3.42E-2
RTHERM2 4 3 2.55E-1
RTHERM3 3 2 8.41E-2
RTHERM4 2 1 1.81E-4

.ENDS 100bgq45T

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IR FAR EAST: K&H Bldg., 2F, 30-4 Nishi-Ikebukuro 3-Chome, Toshima-Ku, Tokyo, Japan 171. Tel: 81 3 3983 0086.
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