Bulletin PD-20709 rev. D 12/02

International
IOR Rectifier

100BGQ045
100BGQ045J

SCHOTTKY RECTIFIER

100 Amp

Major Ratings and Characteristics

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

Description/ Features

The 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
	

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°C, rectangular wave form	
$I_{F(RMS)}$	RMS Forward Current	141	A	T_C = 95°C	
I_{FSM}	Max. Peak One Cycle Non-Repetitive Surge Current	4400	A	5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
		830		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	100BGQ Typ.	100BGQ Max.	Units	Conditions	
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		V	T_J = T_J max.	
r_t	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	10000		V/ µs	(Rated V_R)	

(1) Pulse Width < 300µs, Duty Cycle < 2%
(2) V_{FM} = $V_{F(TO)}$ + r_t x I_F

Thermal-Mechanical Specifications

	Parameters		100BGQ	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		0.50	°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*™		

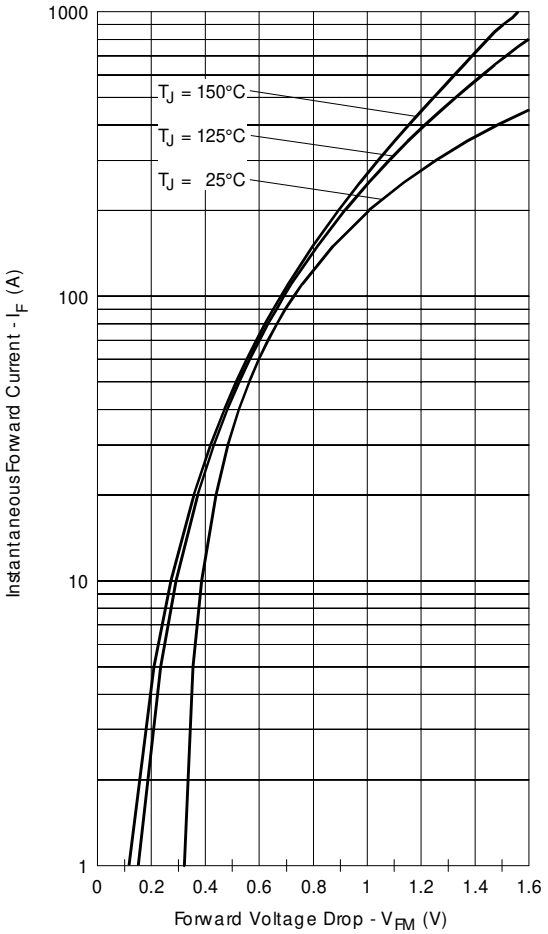


Fig. 1 - Maximum Forward Voltage Drop Characteristics

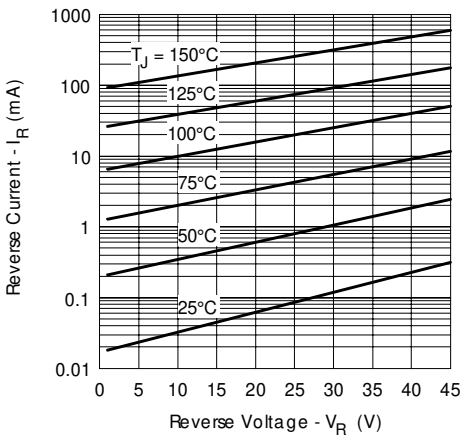


Fig. 2 - Typical Values of Reverse Current Vs. Reverse Voltage

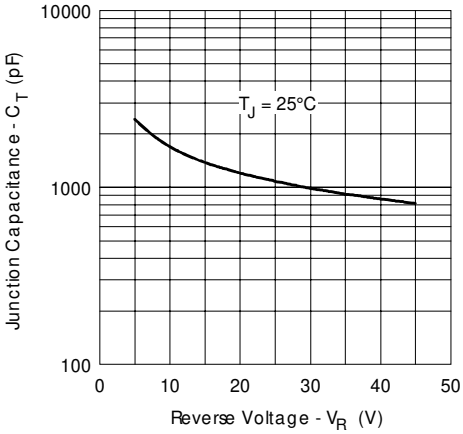


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

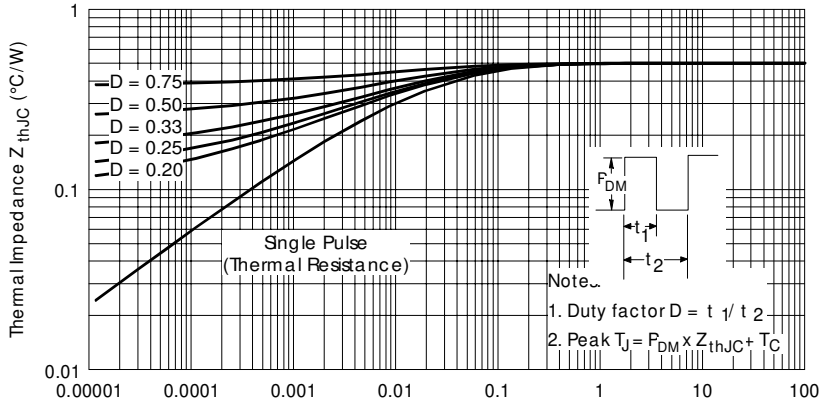


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

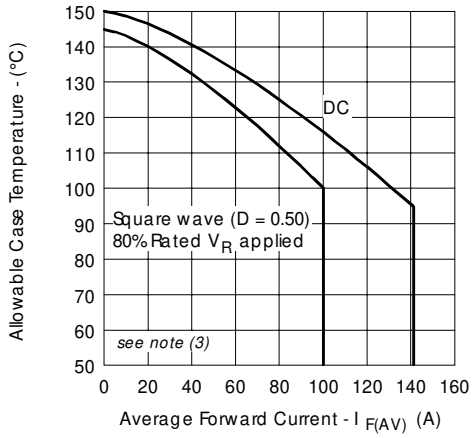


Fig. 5 - Maximum Allowable Case Temperature Vs. Average Forward Current

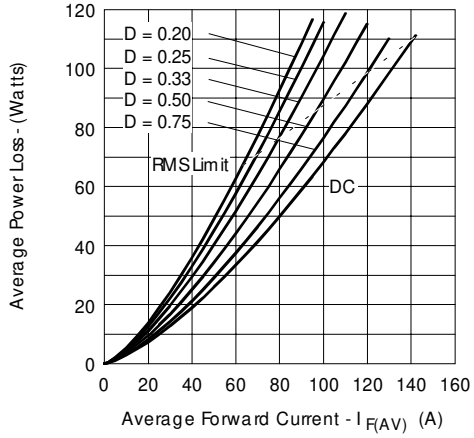


Fig. 6 - Forward Power Loss Characteristics

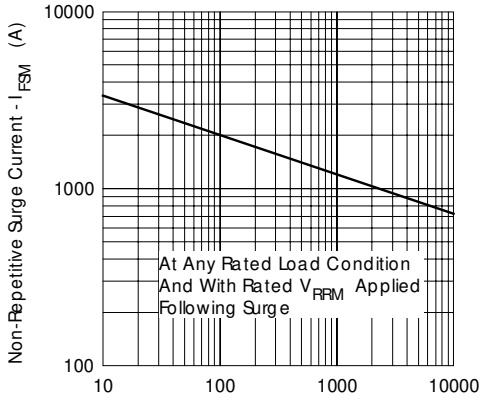


Fig. 7 - Maximum Non-Repetitive Surge Current

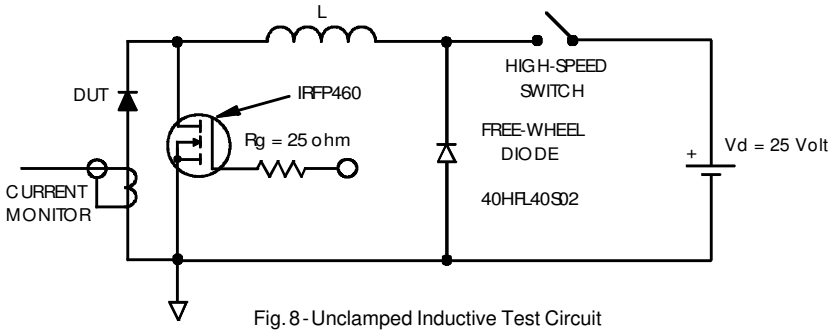
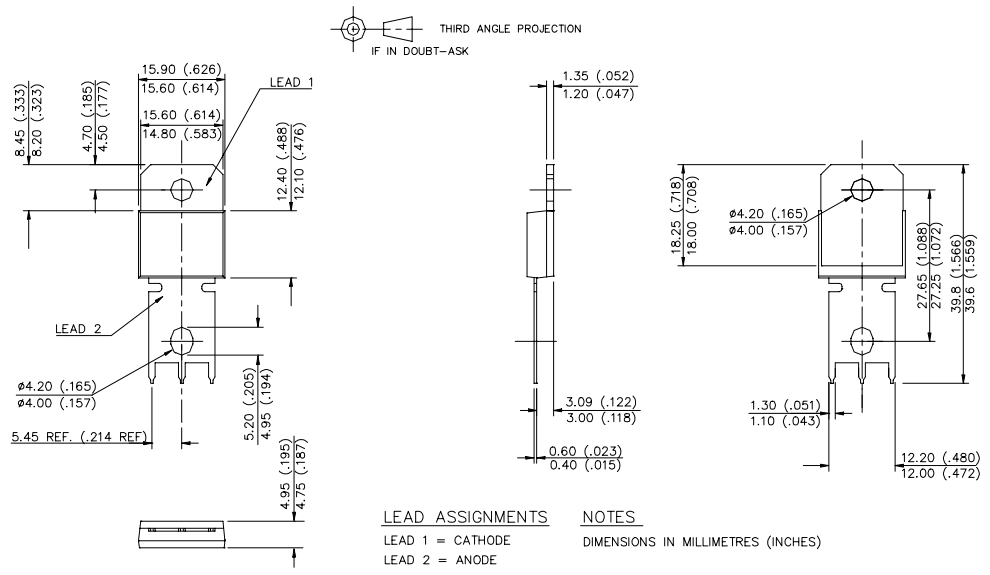


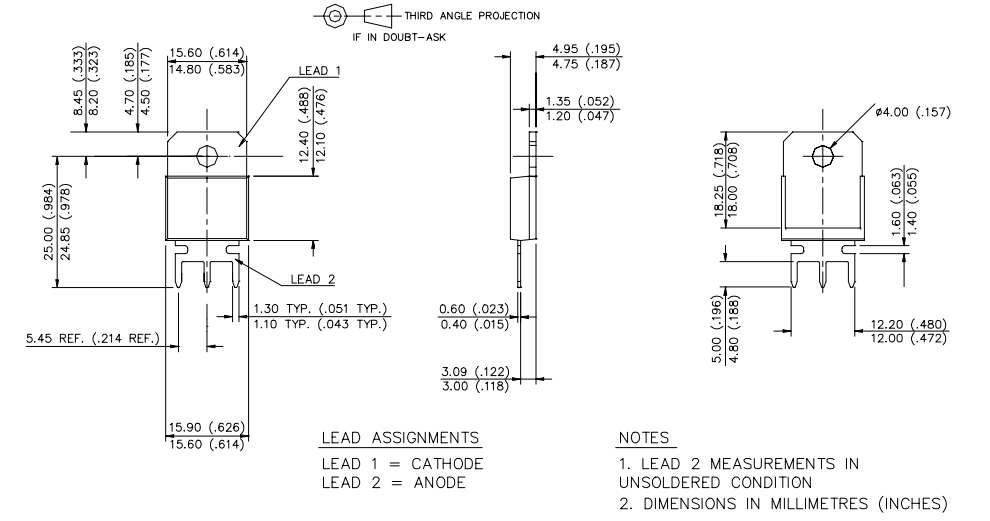
Fig. 8 - Unclamped Inductive Test Circuit

(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

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

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

**************************************************
SPICE Model Diode is composed by a
simple diode plus paralled 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)}

**************************************************
.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
```

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

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
Visit us at www.irf.com for sales contact information. 12/02