Bulletin PD-20787 rev. A 09/05

International
IOR Rectifier

20BQ030PbF

SCHOTTKY RECTIFIER 2 Amp

$I_{F(AV)}$ = 2.0Amp
V_R = 30V

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Rectangular waveform	2.0	A
V_{RRM}	30	V
I_{FSM} @tp = 5 µs sine	350	A
V_F @2.0 Apk, T_J=125°C	0.37	V
T_J range	- 55 to 150	°C

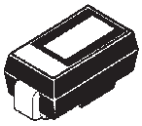
Description/ Features

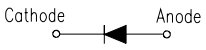
The 20BQ030PbF surface-mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC boards. Typical applications are in disk drives, switching power supplies, converters, free-wheeling diodes, battery charging, and reverse battery protection.

- Small foot print, surface mountable
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Lead-Free ("PbF" suffix)

Case Styles

20BQ030PbF





SMB

Voltage Ratings

	Part number	20BQ030PbF
V_R	Max. DC Reverse Voltage (V)	30
V_{RWM}	Max. Working Peak Reverse Voltage (V)	

Absolute Maximum Ratings

	Parameters	20BQ	Units	Conditions	
$I_{F(AV)}$	Max. Average Forward Current	2.0	A	50% duty cycle @ T_L = 119 °C, rectangular wave form.	
I_{FSM}	Max. Peak One Cycle Non-Repetitive	350		5µs Sine or 3µs Rect. pulse	Following any rated load condition and with rated V_{RRM} applied
	Surge Current	80		10ms Sine or 6ms Rect. pulse	
E_{AS}	Non-Repetitive Avalanche Energy	3.0	mJ	T_J = 25 °C, I_{AS} = 1A, L = 6mH	
I_{AR}	Repetitive Avalanche Current	1.0	A	Current decaying linearly to zero in 1 µsec Frequency limited by T_J max. Va = 1.5 x Vr typical	

Electrical Specifications

	Parameters	20BQ	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop (1)	0.470	V	@ 2A	T_J = 25 °C
		0.550	V	@ 4A	
V_{FM}	Max. Forward Voltage Drop (1)	0.370	V	@ 2A	T_J = 125 °C
		0.470	V	@ 4A	
I_{RM}	Max. Reverse Leakage Current (1)	0.5	mA	T_J = 25 °C	V_R = rated V_R
		15	mA	T_J = 125 °C	
C_T	Max. Junction Capacitance	200	pF	V_R = 5V_{DC}, (test signal range 100KHz to 1Mhz) 25°C	
L_S	Typical Series Inductance	2.0	nH	Measured lead to lead 5mm from package body	
dv/dt	Max. Voltage Rate of Change (Rated V_R)	10000	V/µs		

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

Thermal-Mechanical Specifications

	Parameters	20BQ	Units	Conditions
T_J	Max. Junction Temperature Range (*)	-55 to 150	°C	
T_{stg}	Max. Storage Temperature Range	-55 to 150	°C	
R_{thJL}	Max. Thermal Resistance Junction to Lead (**)	25	°C/W	DC operation
R_{thJA}	Max. Thermal Resistance Junction to Ambient	80	°C/W	
wt	Approximate Weight	0.10 (0.003)	g (oz.)	
	Case Style	SMB		Similar DO-214AA
	Device Marking	IR2E		

(*) $\frac{dPtot}{dTj} < \frac{1}{Rth(j\text{-}a)}$ thermal runaway condition for a diode on its own heatsink

(**) Mounted 1 inch square PCB

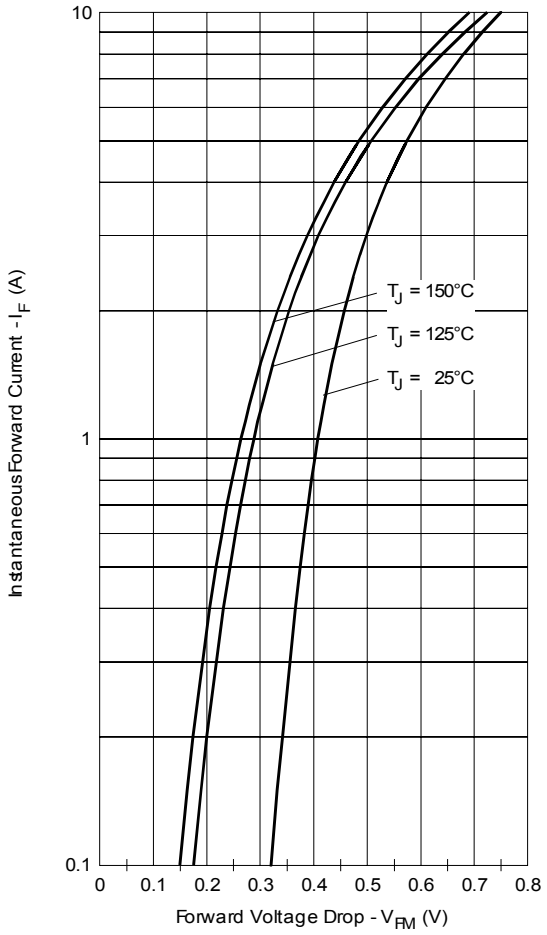


Fig. 1 - Maximum Forward Voltage Drop Characteristics

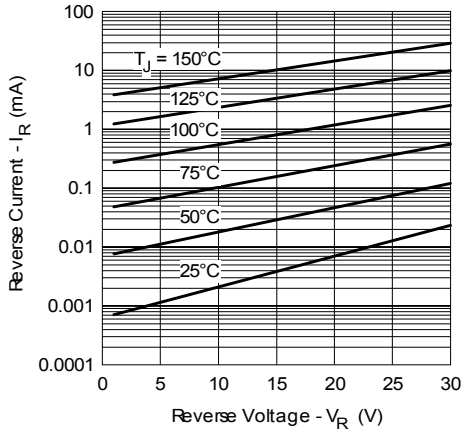


Fig. 2 - Typical Peak Reverse Current Vs. Reverse Voltage

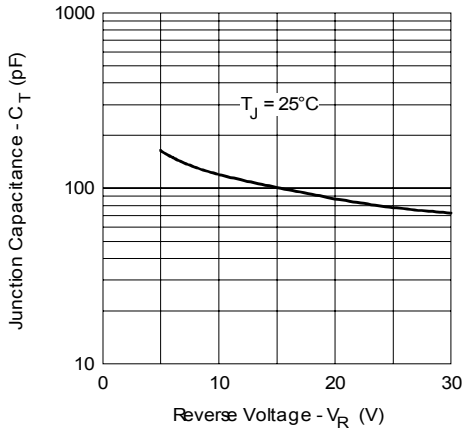


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

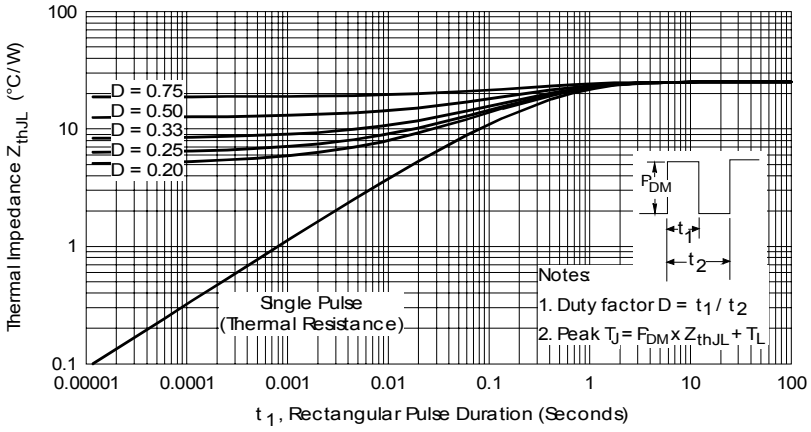


Fig. 4 - Maximum Thermal Impedance Z_{thJL} Characteristics

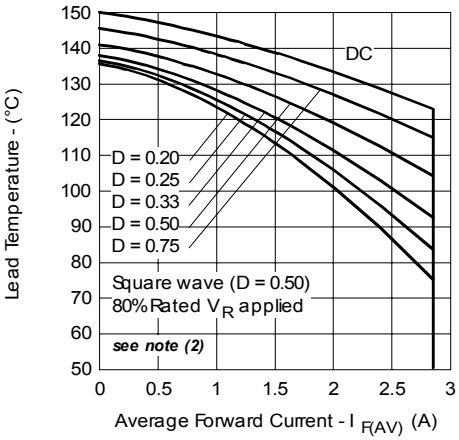


Fig. 5 - Maximum Average Forward Current Vs. Allowable Lead Temperature

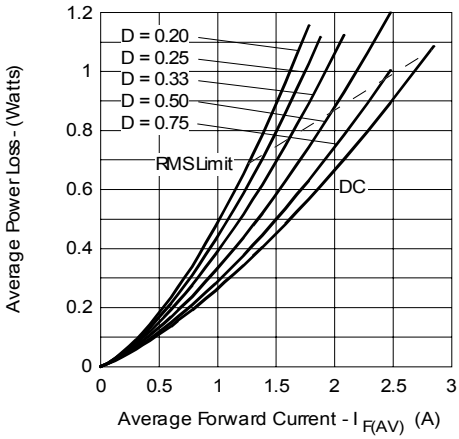


Fig. 6 - Maximum Average Forward Dissipation Vs. Average Forward Current

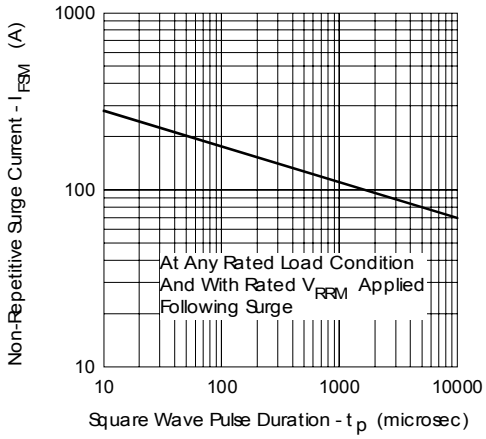
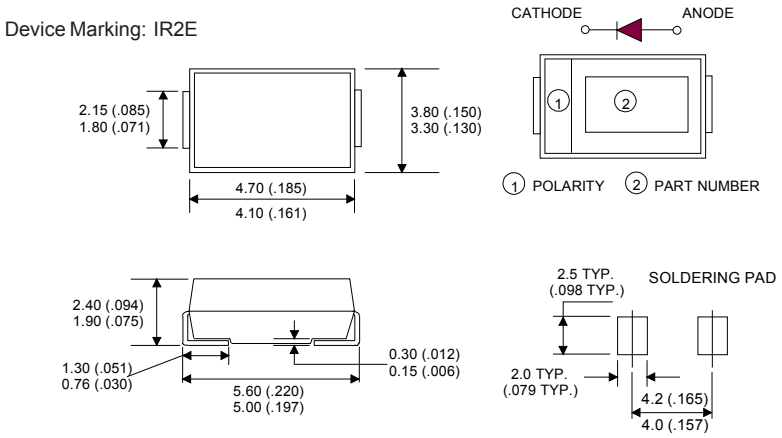


Fig. 7 - Maximum Peak Surge Forward Current Vs. Pulse Duration

(2) Formula used: $T_L = T_J - (Pd + Pd_{REV}) \times R_{thJL}$;
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



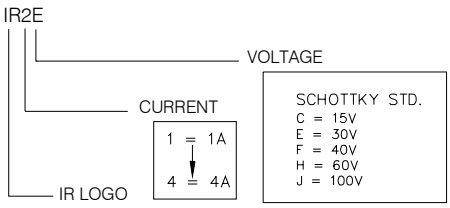
Outline SMB

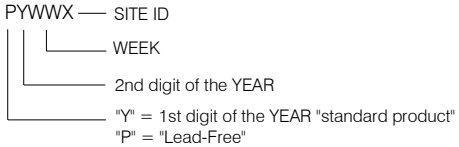
Dimensions in millimeters and (inches)

For recommended footprint and soldering techniques refer to application note #AN-994

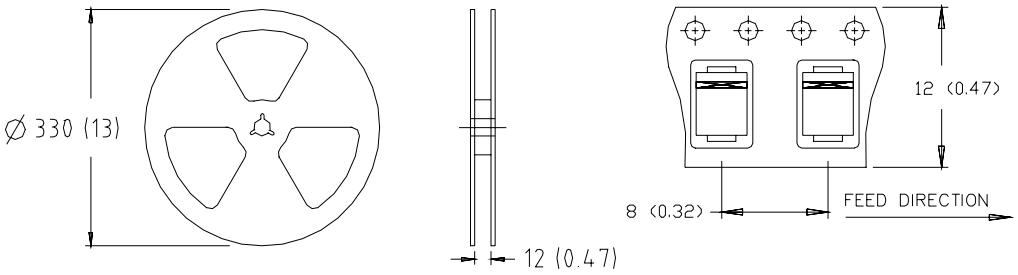
Marking & Identification

Each device has 2 rows for identification. The first row designates the device as manufactured by International Rectifier, indicated by the letters "IR", and the Part Number (indicates the current, the voltage rating and Schottky Generation). The second row indicates the year, the week of manufacturing and the Site ID.





Tape & Reel Information



Dimensions in millimetres and (inches)

Ordering Information Table

Device Code

20	B	Q	030	TR	PbF
1	2	3	4	5	6

1	-	Current Rating
2	-	B = Single Lead Diode
3	-	Q = Schottky Q Series
4	-	Voltage Rating (030 = 30V)
5	-	• none = Box (1000 pieces) • TR = Tape & Reel (3000 pieces)
6	-	• none = Standard Production • PbF = Lead-Free

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20BQ030
****************************************
* SPICE Model Diode                    *
****************************************
.SUBCKT 20BQ030 ANO CAT
D1 ANO 1 CAT
*Define diode model
.MODEL part0 D (IS=19.5547N N=812.929M BV=37 IBV=100P RS=33.136M
+ CJO=453.263P VJ=720.525M M=491.184M EG=1.11 XTI=2 RL=1.94758MEG)

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.ENDS 20BQ030


Thermal Model Subcircuit
.SUBCKT 20BQ030  5 1

CTHERM1     5    4     8.74E-04
CTHERM2     4    3     2.26E+01
CTHERM3     3    2     1.96E+02
CTHERM4     2    1     4.20E+03

RTHERM1     5    4     1.00E-07
RTHERM2     4    3     1.45E+01
RTHERM1     3    2     9.17E+00
RTHERM1     2    1     1.26E+00


.ENDS 20BQ030
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Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
Qualification Standards can be found on IR's Web site.

International
IOR Rectifier

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09/05

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