

Bulletin PD-2.304 rev. E 03/03

International
IOR Rectifier

31DQ03
31DQ04

SCHOTTKY RECTIFIER

3.3 Amp

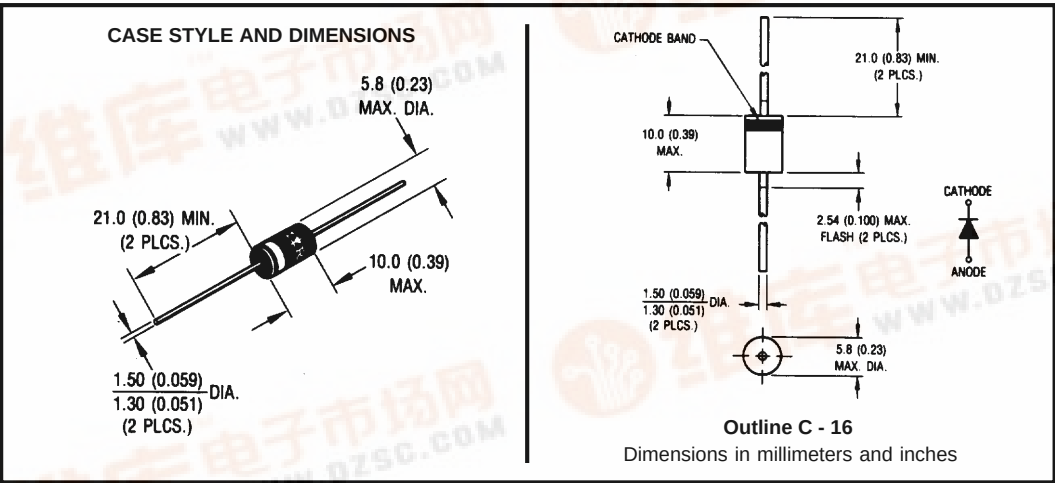
Major Ratings and Characteristics

Characteristics	31DQ..	Units
$I_{F(AV)}$ Rectangular waveform	3.3	A
V_{RRM}	30/40	V
I_{FSM} @ $t_p = 5 \mu s$ sine	450	A
V_F @ 3 Apk, $T_J = 25^\circ C$	0.57	V
T_J	-40 to 150	$^\circ C$

Description/Features

The 31DQ.. axial leaded Schottky rectifier has been optimized for very low forward voltage drop, with moderate leakage. Typical applications are in switching power supplies, converters, free-wheeling diodes, and reverse battery protection.

- Low profile, axial leaded outline
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Very low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability



Voltage Ratings

Part number	31DQ03	31DQ04
V_R Max. DC Reverse Voltage (V)	30	40
V_{RWM} Max. Working Peak Reverse Voltage (V)		

Absolute Maximum Ratings

Parameters	31DQ..	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current * See Fig. 4	3.3	A	50% duty cycle @ $T_C = 73^\circ\text{C}$, rectangular wave form
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current * See Fig. 6	450	A	5 μs Sine or 3 μs Rect. pulse
	90		10ms Sine or 6ms Rect. pulse
E_{AS} Non-Repetitive Avalanche Energy	6.0	mJ	$T_J = 25^\circ\text{C}$, $I_{AS} = 1.0$ Amps, $L = 12$ mH
I_{AR} Repetitive Avalanche Current	1.0	A	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	31DQ..	Units	Conditions
V_{FM} Max. Forward Voltage Drop * See Fig. 1 (1)	0.57	V	@ 3A
	0.71	V	@ 6A
	0.51	V	@ 3A
	0.62	V	@ 6A
I_{RM} Max. Reverse Leakage Current * See Fig. 2 (1)	1	mA	$T_J = 25^\circ\text{C}$
	20	mA	$T_J = 125^\circ\text{C}$
C_T Typical Junction Capacitance	190	pF	$V_R = 5V_{DC}$ (test signal range 100Khz to 1Mhz) 25°C
L_S Typical Series Inductance	9.0	nH	Measured lead to lead 5mm from package body
dv/dt Max. Voltage Rate of Change	10000	V/ μs	(Rated V_R)

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

Thermal-Mechanical Specifications

Parameters	31DQ..	Units	Conditions
T_J Max. Junction Temperature Range (*)	-40 to 150	$^\circ\text{C}$	
T_{stg} Max. Storage Temperature Range	-40 to 150	$^\circ\text{C}$	
R_{thJA} Max. Thermal Resistance Junction to Ambient	80	$^\circ\text{C/W}$	DC operation Without cooling fins
R_{thJL} Typical Thermal Resistance Junction to Lead	34	$^\circ\text{C/W}$	With fin 20 x 20 (0.79 x 0.79) 1.0 (0.04) thick. Dimensions in millimeters (inches)
wt Approximate Weight	1.2 (0.042)	g (oz.)	
Case Style	C - 16		

(*) $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{th(j-a)}}$ thermal runaway condition for a diode on its own heatsink

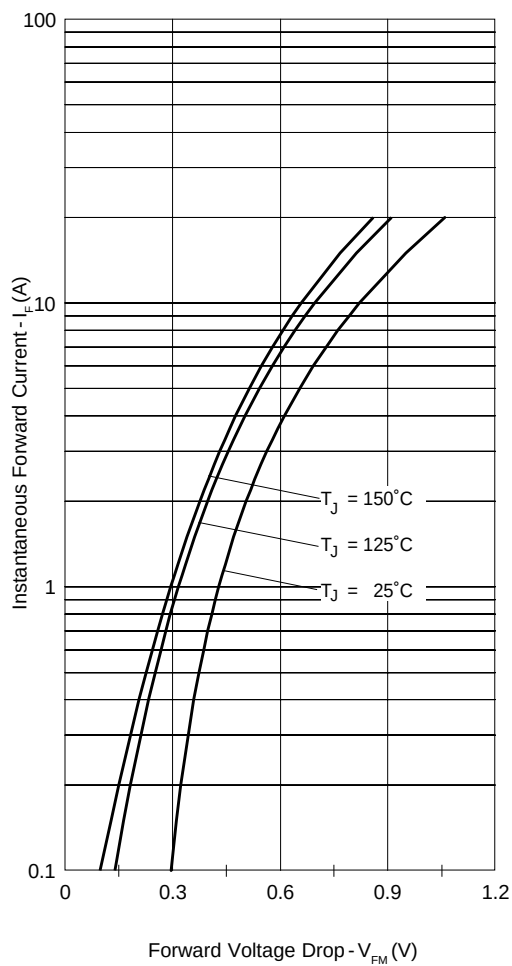


Fig. 1 - Max. Forward Voltage Drop Characteristics

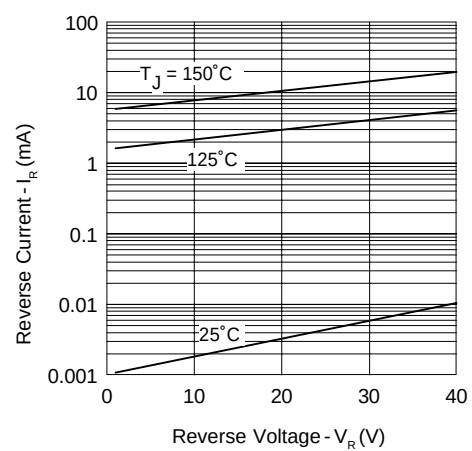


Fig. 2 - Typical Values Of Reverse Current Vs. Reverse Voltage

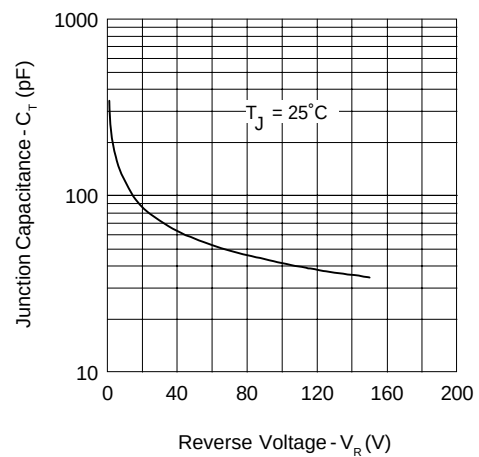


Fig. 3 - Typical Junction Capacitance Vs. Reverse Voltage

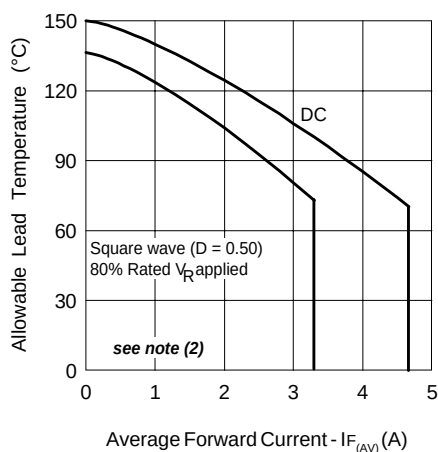


Fig. 4 - Max. Allowable Lead Temperature Vs. Average Forward Current

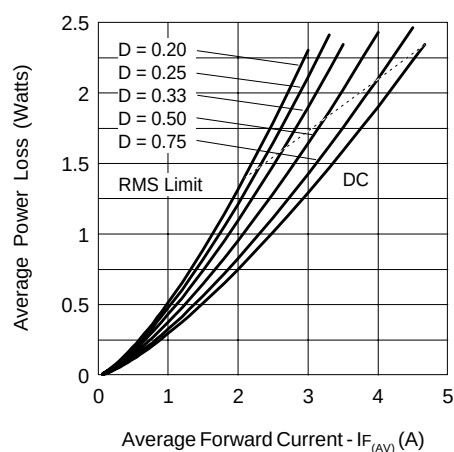


Fig. 5 - Forward Power Loss Characteristics

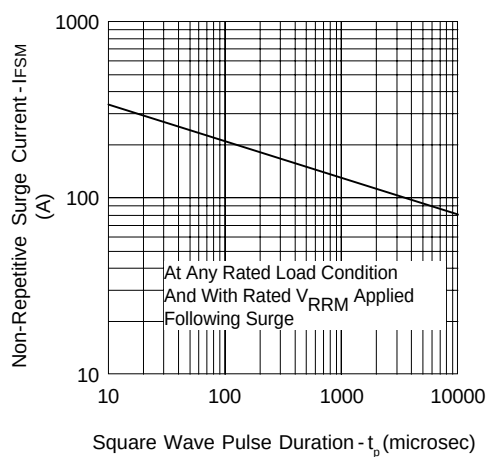


Fig. 6 - Max. Non-Repetitive Surge Current

(2) 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

Ordering Information Table

Device Code		31	D	Q	04	TR
		①	②	③	④	⑤
1	-	31 = 3.1A (Axial and small packages - Current is x10)				
2	-	D = DO-41 package				
3	-	Q = Schottky Q.. Series				
4	-	04 = Voltage Ratings				
5	-	TR = Tape & Reel package (1200 pcs)				
	-	= Box package (500 pcs)				

04 = 40V
03 = 30V

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
IR Rectifier

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