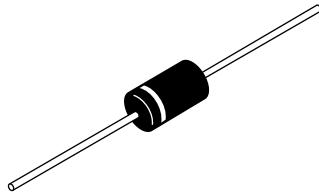


## Schottky Rectifier, 3.3 A


**C-16**


### FEATURES

- Low profile, axial leaded outline
- High frequency operation
- Very low forward voltage drop
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Lead (Pb)-free plating
- Designed and qualified for industrial level


**RoHS**  
COMPLIANT

### PRODUCT SUMMARY

$I_{F(AV)}$	3.3 A
$V_R$	30/40 V

### DESCRIPTION

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, freewheeling diodes, and reverse battery protection

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	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	$^\circ C$

### VOLTAGE RATINGS

PARAMETER	SYMBOL	31DQ03	31DQ04	UNITS
Maximum DC reverse voltage	$V_R$	30	40	V
Maximum working peak reverse voltage	$V_{RWM}$			

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 4	$I_{F(AV)}$	50 % duty cycle at $T_L = 117^\circ C$ , rectangular waveform	3.3	A
Maximum peak one cycle non-repetitive surge current See fig. 6	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	450	
		10 ms sine or 6 ms rect. pulse	90	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 1.0$ A, $L = 12$ mH	6.0	mJ
Repetitive avalanche current	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical	1.0	A

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	3 A	$T_J = 25\text{ }^\circ\text{C}$	0.57	V
		6 A		0.71	
		3 A	$T_J = 125\text{ }^\circ\text{C}$	0.51	
		6 A		0.62	
Maximum reverse leakage current See fig. 4	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	1	mA
		$T_J = 125\text{ }^\circ\text{C}$		20	
Typical junction capacitance	$C_T$	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		190	pF
Typical series inductance	$L_S$	Measured lead to lead 5 mm from package body		9.0	nH
Maximum voltage rate of charge	dV/dt	Rated $V_R$		10 000	V/ $\mu\text{s}$

**Note**(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J^{(1)}, T_{Stg}$		- 40 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$	DC operation Without cooling fin	80	$^\circ\text{C}/\text{W}$
Typical thermal resistance, junction to lead	$R_{thJL}$	With fin 20 mm x 20 mm (0.79" x 0.79") 1.0 mm (0.04") thickness	15	
Approximate weight			1.2	g
			0.042	oz.
Marking device		Case style C-16	31DQ03	
			31DQ04	

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

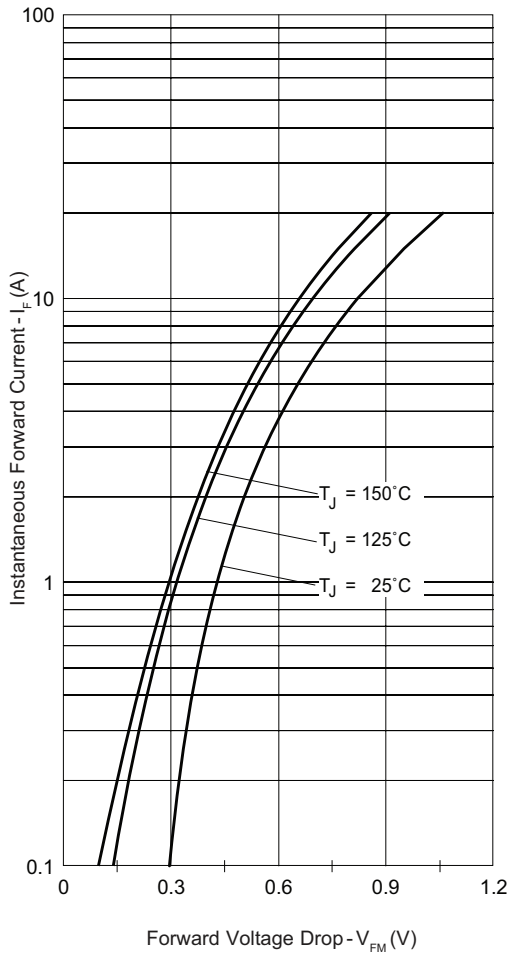


Fig. 1 - Maximum Forward Voltage Drop Characteristics

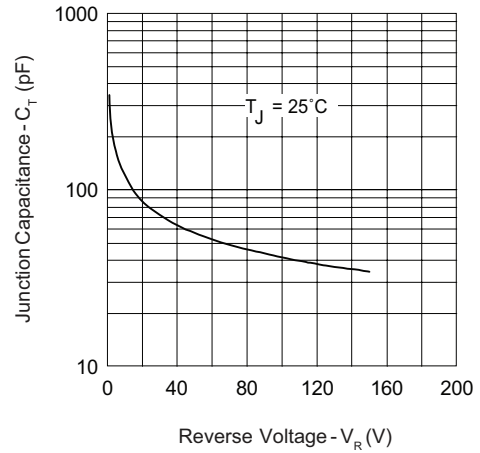


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

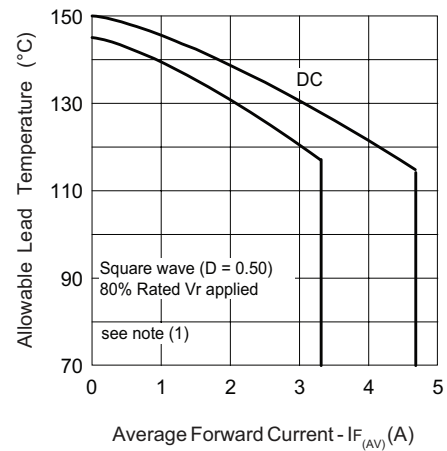


Fig. 4 - Maximum Allowable Lead Temperature vs. Average Forward Current

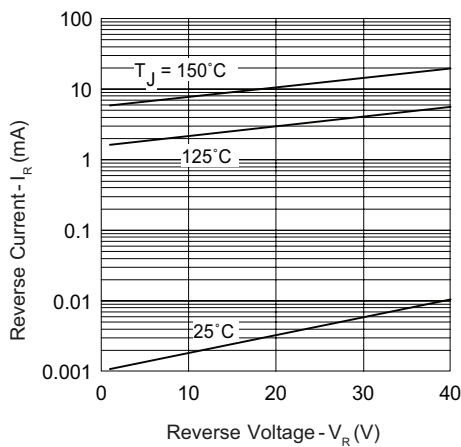


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

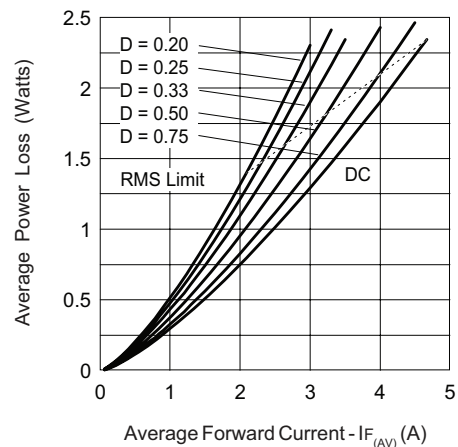


Fig. 5 - Forward Power Loss Characteristics

**Note**

(1) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;

$Pd$  = Forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 6);  $Pd_{REV}$  = Inverse power loss =  $V_{R1} \times I_{R1} (1 - D)$ ;  $I_{R1}$  at  $V_{R1} = 80\%$  rated  $V_R$

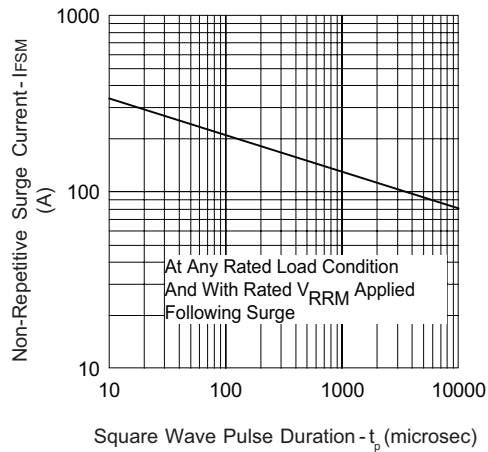


Fig. 6 - Maximum Non-Repetitive Surge Current

## ORDERING INFORMATION TABLE

Device code	<b>31</b>	<b>D</b>	<b>Q</b>	<b>04</b>	<b>TR</b>		
	①	②	③	④	⑤		
	<b>1</b>	-	<b>31</b> = 3.1 A (axial and small packages - current is x 10)				
	<b>2</b>	-	<b>D</b> = DO-201 package				
	<b>3</b>	-	<b>Q</b> = Schottky Q.. series				
	<b>4</b>	-	<b>04</b> = Voltage ratings		<table border="1"> <tr> <td>03 = 30 V</td> </tr> <tr> <td>04 = 40 V</td> </tr> </table>	03 = 30 V	04 = 40 V
03 = 30 V							
04 = 40 V							
	<b>5</b>	-	• <b>TR</b> = Tape and reel package ( 1200 pcs) • None = Box package (500 pcs)				

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95242">http://www.vishay.com/doc?95242</a>
Part marking information	<a href="http://www.vishay.com/doc?95304">http://www.vishay.com/doc?95304</a>
Packaging information	<a href="http://www.vishay.com/doc?95309">http://www.vishay.com/doc?95309</a>



## Disclaimer

All product specifications and data are subject to change without notice.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.