



# 31DQ05, 31DQ06

Vishay High Power Products

## Schottky Rectifier, 3.3 A



### 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
$V_R$	50/60 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
$V_{RRM}$		50/60	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	340	A
$V_F$	3 Apk, $T_J = 25^\circ C$	0.62	V
$T_J$		- 40 to 150	$^\circ C$

### VOLTAGE RATINGS

PARAMETER	SYMBOL	31DQ05	31DQ06	UNITS
Maximum DC reverse voltage	$V_R$	50	60	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 $T_L = 105^\circ C$ , 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	340	
		10 ms sine or 6 ms rect. pulse	55	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 1 A$ , $L = 10 mH$	5.0	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



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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	3 A	$T_J = 25\text{ }^\circ\text{C}$	0.62	V
		6 A		0.78	
		3 A	$T_J = 125\text{ }^\circ\text{C}$	0.54	
		6 A		0.65	
Maximum reverse leakage current See fig. 4	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	2	mA
		$T_J = 125\text{ }^\circ\text{C}$		15	
Typical junction capacitance	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		160	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/ $\mu$ s

**Note**

(1) Pulse width < 300  $\mu$ 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	$^\circ\text{C/W}$
Typical thermal resistance, junction to lead	$R_{thJL}$	DC operation		15	
Approximate weight				1.2	g
				0.042	oz.
Marking device		Case style C-16		31DQ05	
				31DQ06	

**Note**

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

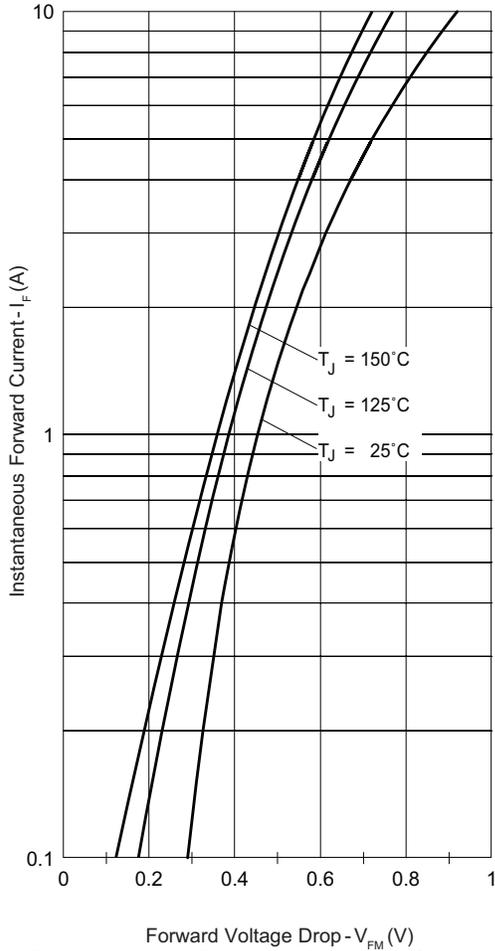


Fig. 1 - Maximum Forward Voltage Drop Characteristics

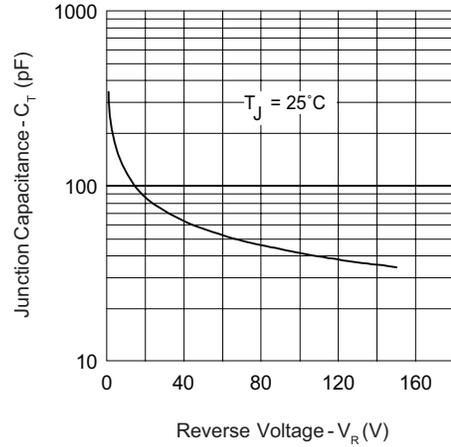


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

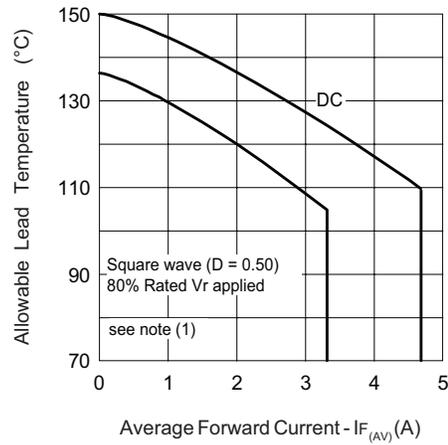


Fig. 4 - Maximum Allowable Lead Temperature vs. Average Forward Current

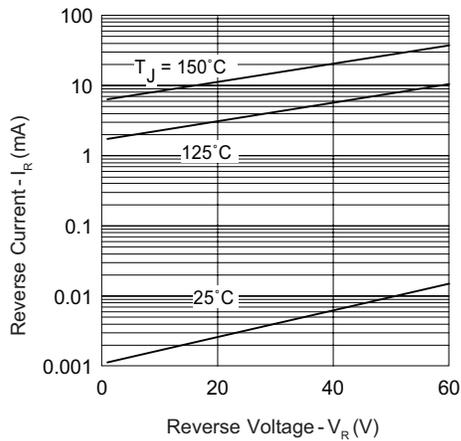


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

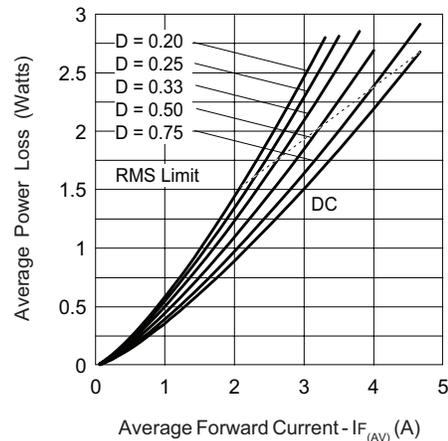


Fig. 5 - Forward Power Loss Characteristics

**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 =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1} = 80\%$  rated  $V_R$

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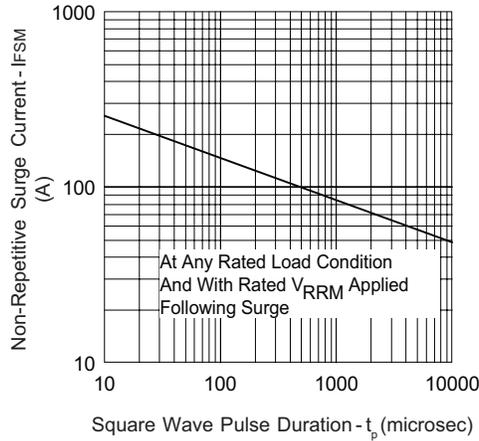


Fig. 6 - Maximum Non-Repetitive Surge Current

## ORDERING INFORMATION TABLE

Device code	<b>31</b>	<b>D</b>	<b>Q</b>	<b>06</b>	<b>TR</b>
	①	②	③	④	⑤
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	-	-	-	-	-
	31 = 3.1 A (axial and small packages - current is x 10)	D = DO-201 package	Q = Schottky Q.. series	06 = Voltage ratings	TR = Tape and reel package (1200 pcs)
				05 = 50 V	None = Box package (500 pcs)
				06 = 60 V	

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>



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