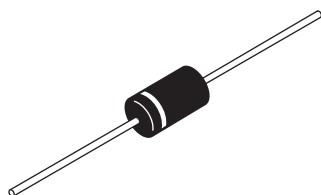




## Schottky Rectifier, 3.3 A



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
- Compliant to RoHS Directive 2002/95/EC
- Designed and qualified for commercial level
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

## PRODUCT SUMMARY

Package	DO-201AD (C-16)
$I_{F(AV)}$	3.3 A
$V_R$	30 V, 40 V
$V_F$ at $I_F$	See Electrical table
$I_{RM}$ max.	20 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	6.0 mJ

## DESCRIPTION

The VS-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	°C

## VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-31DQ03	VS-31DQ03-M3	VS-31DQ04	VS-31DQ04-M3	UNITS
Maximum DC reverse voltage	$V_R$	30	30	40	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 10 ms sine or 6 ms rect. pulse	450 90	A
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/μs

**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	$R_{thJL}$	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

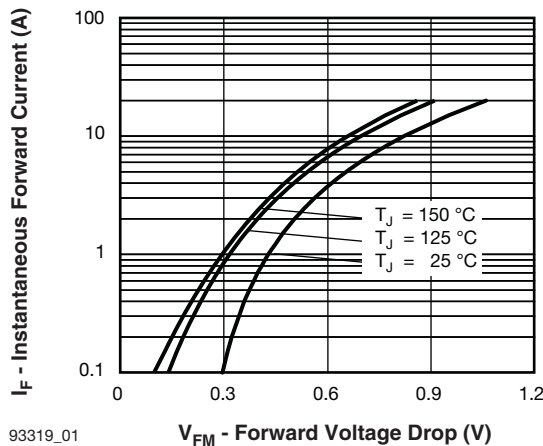


Fig. 1 - Maximum Forward Voltage Drop Characteristics

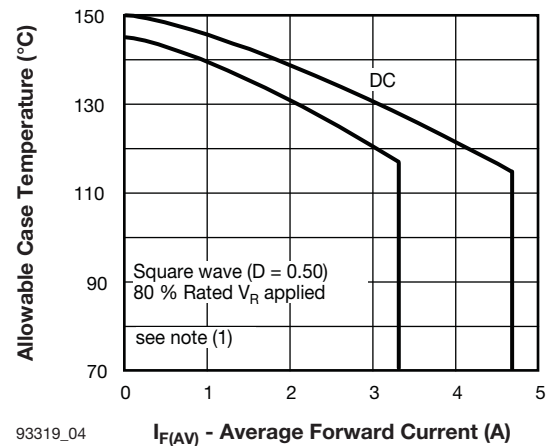


Fig. 4 - Maximum Allowable Lead Temperature vs. Average Forward Current

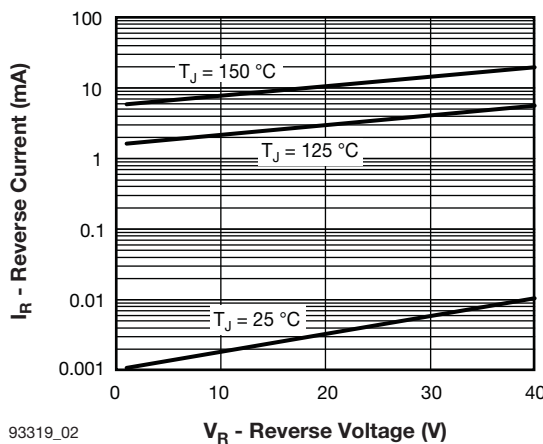


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

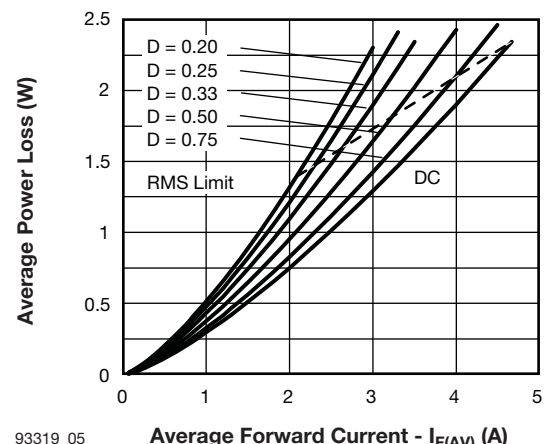


Fig. 5 - Forward Power Loss Characteristics

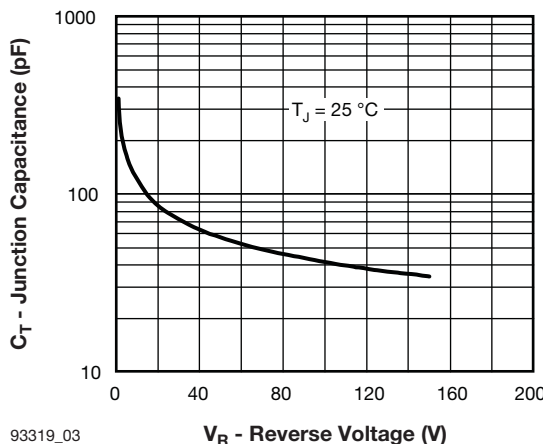


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

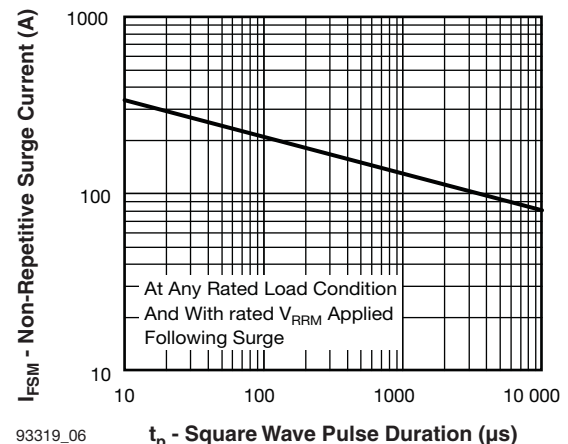


Fig. 6 - Maximum Non-Repetitive Surge Current

## Note

(2) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$

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



## ORDERING INFORMATION TABLE

Device code	VS-	31	D	Q	04	TR	-M3
	①	②	③	④	⑤	⑥	⑦

- ①** - Vishay Semiconductors product
- ②** - 31 = Current Rating 3.3 A
- ③** - D = DO-201 package
- ④** - Q = Schottky Q.. series
- ⑤** - 04 = Voltage ratings 

03 = 30 V  
04 = 40 V
- ⑥** -
  - TR = Tape and reel package
  - None = Bulk package
- ⑦** - Environmental digit
  - None = Lead (Pb)-free and RoHS compliant
  - -M3 = Halogen-free, RoHS compliant, and terminations lead (Pb)-free

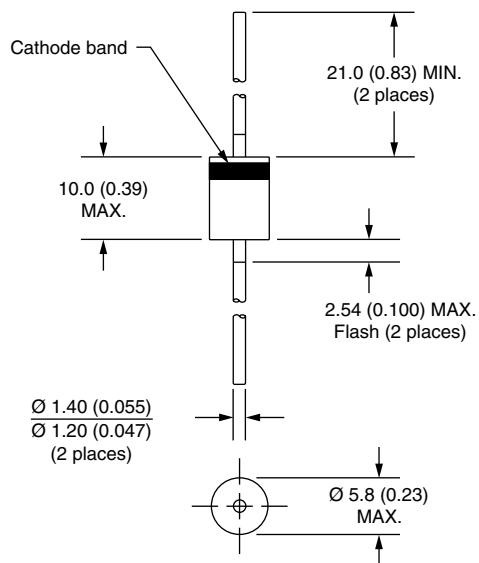
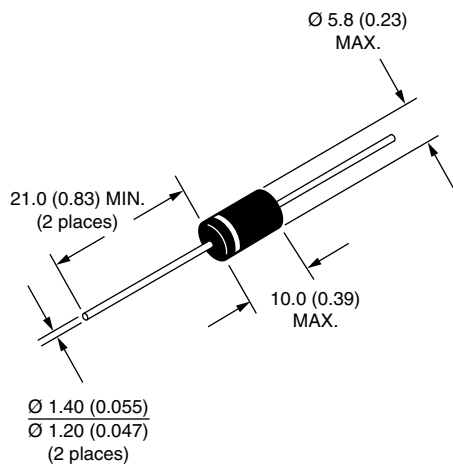
ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-31DQ03	500	500	Bulk
VS-31DQ03TR	1200	1200	Tape and reel
VS-31DQ03-M3	500	500	Bulk
VS-31DQ03TR-M3	1200	1200	Tape and reel
VS-31DQ04	500	500	Bulk
VS-31DQ04TR	1200	1200	Tape and reel
VS-31DQ04-M3	500	500	Bulk
VS-31DQ04TR-M3	1200	1200	Tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95242">www.vishay.com/doc?95242</a>
Part marking information	<a href="http://www.vishay.com/doc?95304">www.vishay.com/doc?95304</a>
Packaging information	<a href="http://www.vishay.com/doc?95338">www.vishay.com/doc?95338</a>



## Axial DO-201AD (C-16)

**DIMENSIONS** in millimeters (inches)





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