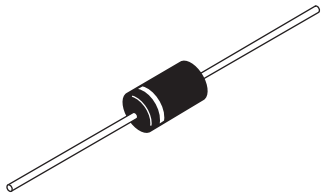
Schottky Rectifier, 3.3 A



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

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

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

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 µs sine	450	A
V_F	3 Apk, T_J = 25 °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 °C, rectangular waveform		3.3	A
Maximum peak one cycle non-repetitive surge current See fig. 6	I_{FSM}	5 µs sine or 3 µs rect. pulse	Following any rated load condition and with rated V_{RRM} applied	450	
		10 ms sine or 6 ms rect. pulse		90	
Non-repetitive avalanche energy	E_{AS}	T_J = 25 °C, I_{AS} = 1.0 A, L = 12 mH		6.0	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x 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 °C	0.57	V
		6 A		0.71	
		3 A	T_J = 125 °C	0.51	
		6 A		0.62	
Maximum reverse leakage current See fig. 4	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	1	mA
		T_J = 125 °C		20	
Typical junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °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 µs, 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	°C
Maximum thermal resistance, junction to ambient	R_{thJA}	DC operation Without cooling fin	80	°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

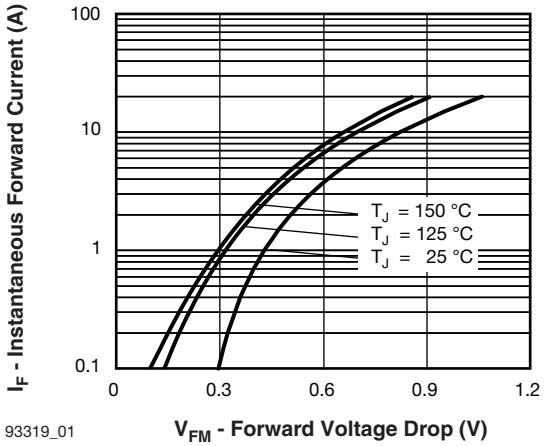


Fig. 1 - Maximum Forward Voltage Drop Characteristics

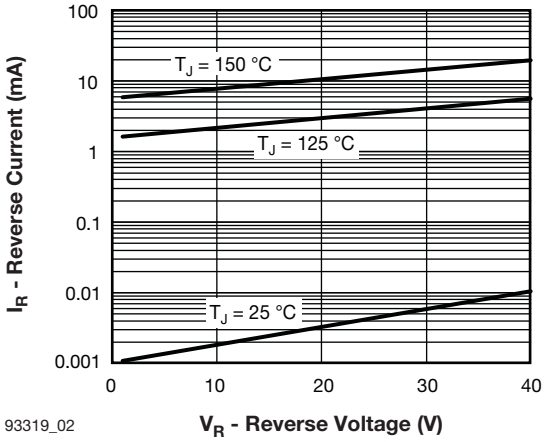


Fig. 2 - - Typical Values of Reverse Current vs. Reverse Voltage

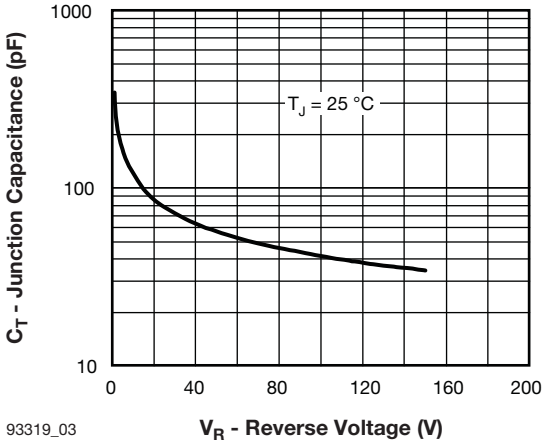


Fig. 3 - - Typical Junction Capacitance vs. Reverse Voltage

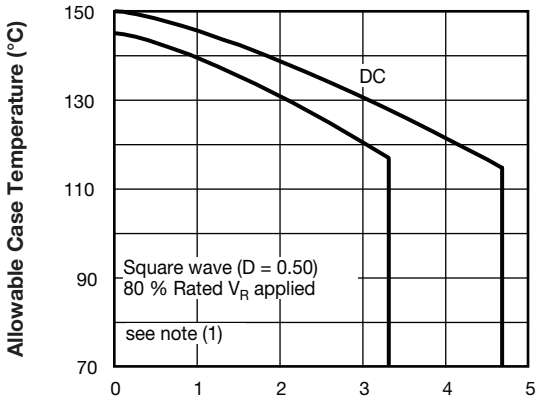


Fig. 4 - Maximum Allowable Lead Temperature vs. Average Forward Current

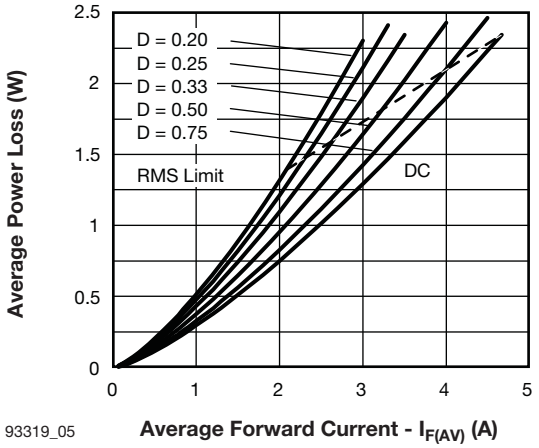


Fig. 5 - Forward Power Loss Characteristics

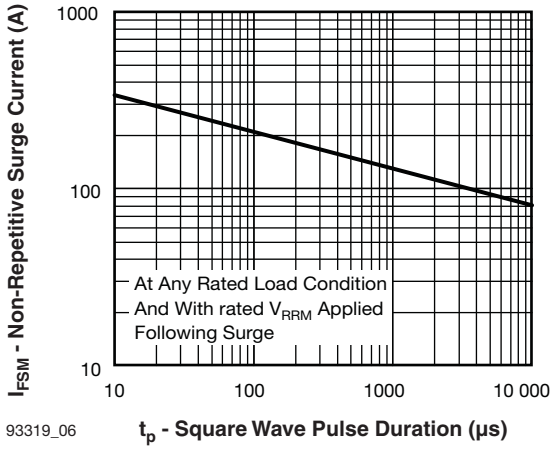


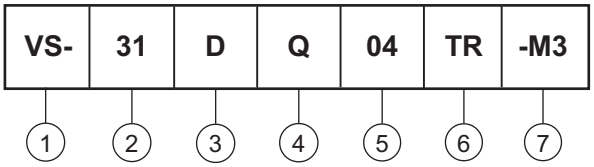
Fig. 6 - Maximum Non-Repetitive Surge Current

Note

(2) 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

ORDERING INFORMATION TABLE

Device code



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

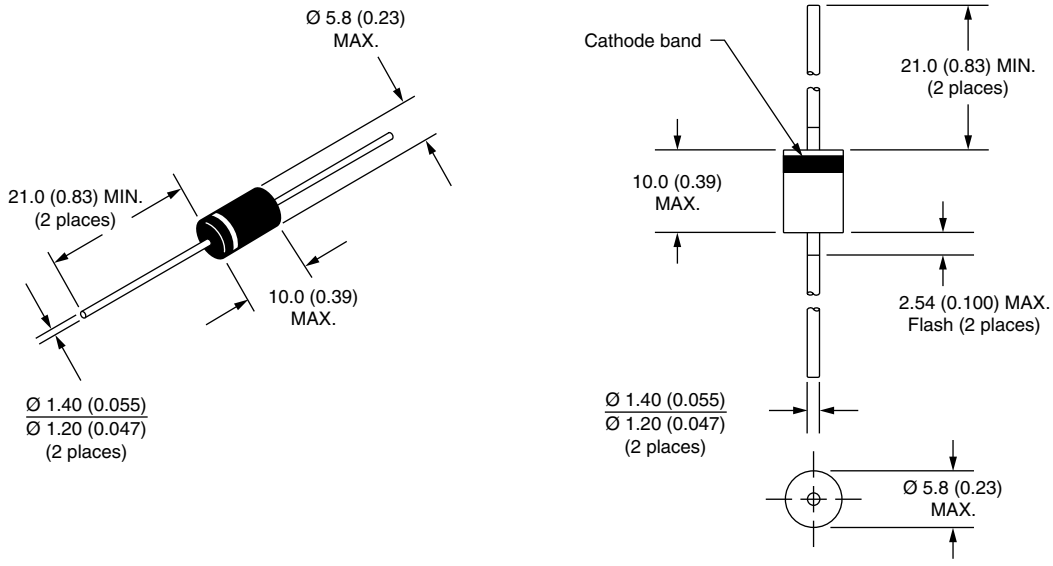
ORDERING INFORMATION (Example)

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	www.vishay.com/doc?95242
Part marking information	www.vishay.com/doc?95304
Packaging information	www.vishay.com/doc?95338

Axial DO-201AD (C-16)

DIMENSIONS in millimeters (inches)



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