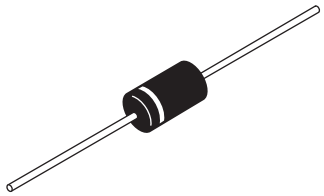
Schottky Rectifier, 2 A



DO-204AL

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-21DQ04... 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-204AL (DO-41)
$I_{F(AV)}$	2 A
V_R	40 V
V_F at I_F	0.5 V
I_{RM} max.	10 mA at 125 °C
T_J max.	150 °C
Diode variation	Single die
E_{AS}	5.0 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	2	A
V_{RRM}		40	V
V_F	2 Apk, T_J = 125 °C	0.5	
T_J	Range	- 40 to 150	°C

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-21DQ04	VS-21DQ04-M3	UNITS
Maximum DC reverse voltage	V_R	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_C = 112 °C, rectangular waveform		2	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	420	
		10 ms sine or 6 ms rect. pulse		70	
Non-repetitive avalanche energy	E_{AS}	T_J = 25 °C, I_{AS} = 1.0 A, L = 10 mH		5.0	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
				TYP.	MAX.	
Maximum forward voltage drop	V_{FM} (1)	2 A	T_J = 25 °C	0.49	0.55	V
		4 A		0.60	0.65	
		2 A	T_J = 125 °C	0.42	0.5	
		4 A		0.56	0.62	
Maximum reverse leakage current	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	0.01	0.50	mA
		T_J = 125 °C		5.2	10	
Typical junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz) 25 °C		130		pF
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		8.0		nH

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	100	°C/W
Typical thermal resistance, junction to lead	R_{thJL}	DC operation See fig. 4	25	
Approximate weight			0.33	g
			0.012	oz.
Marking device		Case style DO-204AL (D-41)	21DQ04	

Note

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

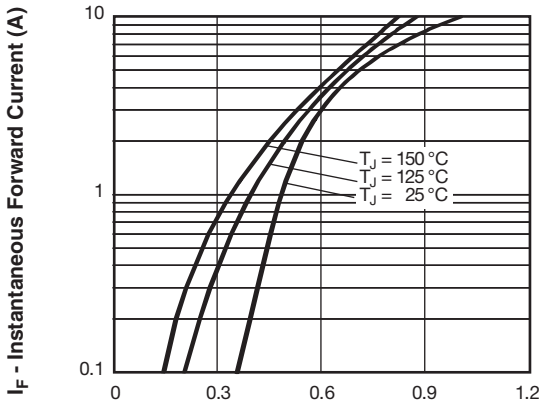


Fig. 1 - Maximum Forward Voltage Drop Characteristics

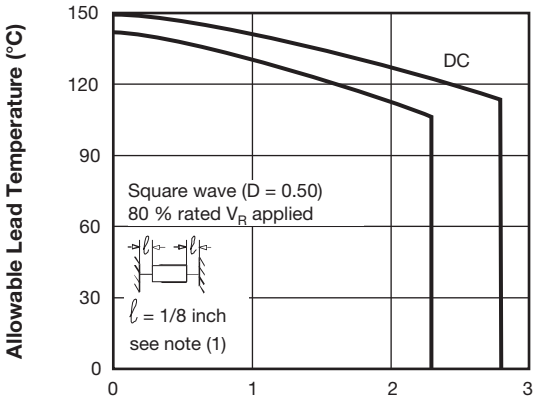


Fig. 4 - Maximum Allowable Lead Temperature vs. Average Forward Current

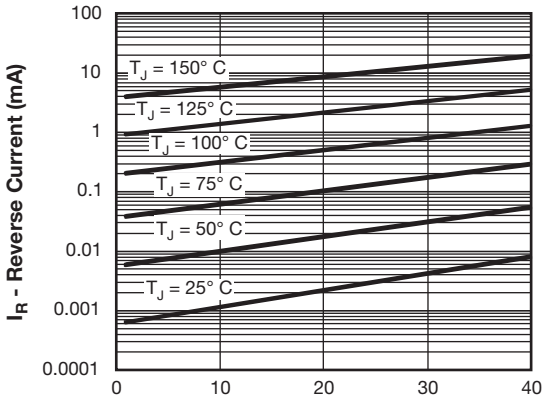


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

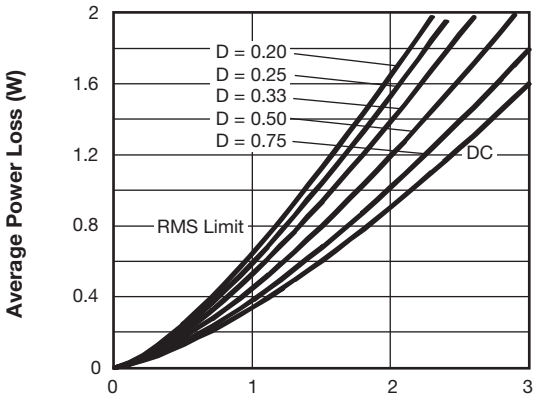


Fig. 5 - Forward Power Loss Characteristics

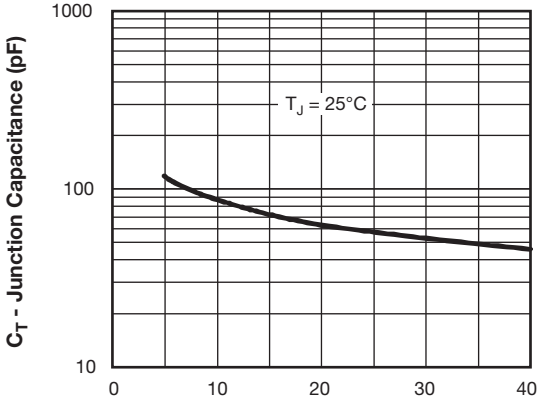


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

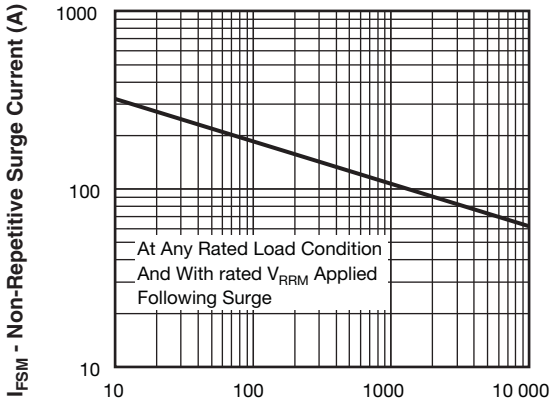


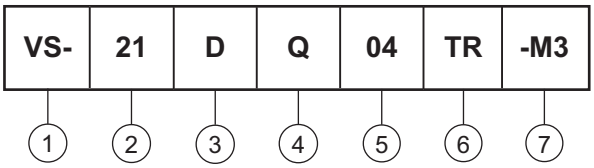
Fig. 6 - Maximum Non-Repetitive Surge Current

Note

(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

ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

2 - 21 = Current Rating 2 A

3 - D = DO-41 package

4 - Q = Schottky Q.. series

5 - 04 = Voltage rating: 40 V

6 - TR = Tape and reel package
TB = Tape and ammo box package
None = Bulk package

7 - Environmental digit
- None = Lead (Pb)-free and RoHS compliant
- -M3 = Halogen-free, RoHS compliant, and terminations lead (Pb)-free

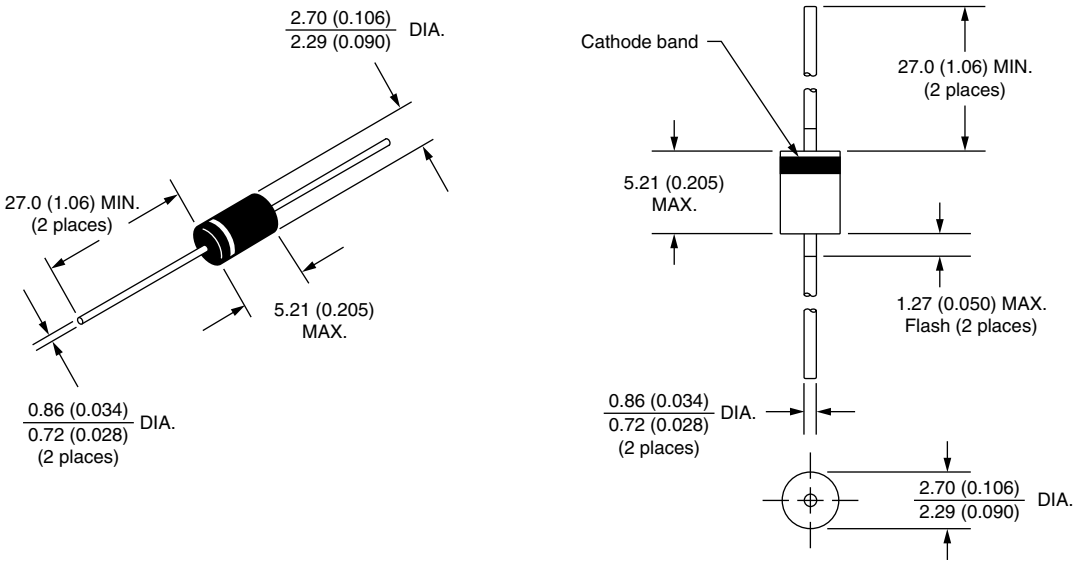
ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-21DQ04	1000	1000	Bulk
VS-21DQ04TR	5000	5000	Tape and Reel
VS-21DQ04TB	3000	3000	Tape and ammo box
VS-21DQ04-M3	1000	1000	Bulk
VS-21DQ04TR-M3	5000	5000	Tape and Reel
VS-21DQ04TB-M3	3000	3000	Tape and ammo box

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95241
Part marking information	www.vishay.com/doc?95304
Packaging information	www.vishay.com/doc?95338

Axial DO-204AL (DO-41)

DIMENSIONS in millimeters (inches)



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