



## Schottky Rectifier, 1.1 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)



PRODUCT SUMMARY	
Package	DO-204AL (DO-41)
$I_{F(AV)}$	1.1 A
$V_R$	30 V, 40 V
$V_F$ at $I_F$	See Electrical table
$I_{RM}$ max.	6.0 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	3.0 mJ

### DESCRIPTION

The VS-11DQ... 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	1.1	A
$V_{RRM}$		30/40	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	225	A
$V_F$	1 Apk, $T_J = 25^\circ C$	0.55	V
$T_J$	Range	- 40 to 150	°C

VOLTAGE RATINGS						
PARAMETER	SYMBOL	VS-11DQ03	VS-11DQ03-M3	VS-11DQ04	VS-11DQ04-M3	UNITS
Maximum DC reverse voltage	$V_R$	30	30	40	40	V
Maximum working peak reverse voltage	$V_{RWM}$					

ABSOLUTE MAXIMUM					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 4	$I_{F(AV)}$	50 % duty cycle at $T_C = 75^\circ C$ , rectangular waveform		1.1	A
Maximum peak one cycle non-repetitive surge current See fig. 6	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	225	
		10 ms sine or 6 ms rect. pulse		35	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25^\circ C$ , $I_{AS} = 1.0$ A, $L = 6$ mH		3.0	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

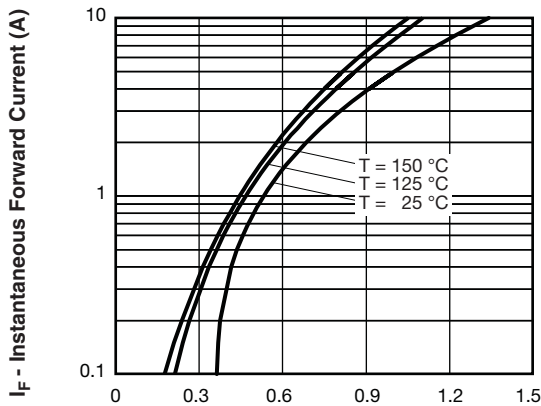


<b>ELECTRICAL SPECIFICATIONS</b>					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	1 A	$T_J = 25\text{ }^\circ\text{C}$	0.55	V
		2 A		0.71	
		1 A	$T_J = 125\text{ }^\circ\text{C}$	0.50	
		2 A		0.61	
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	1.0	mA
		$T_J = 125\text{ }^\circ\text{C}$		6.0	
Typical junction capacitance	$C_T$	$V_R = 5 V_{DC}$ (test signal range 100 kHz to 1 MHz) $25\text{ }^\circ\text{C}$		60	pF
Typical series inductance	$L_S$	Measured lead to lead 5 mm from package body		8.0	nH
Maximum voltage rate of change	dV/dt	Rated $V_R$		10 000	V/ $\mu\text{s}$

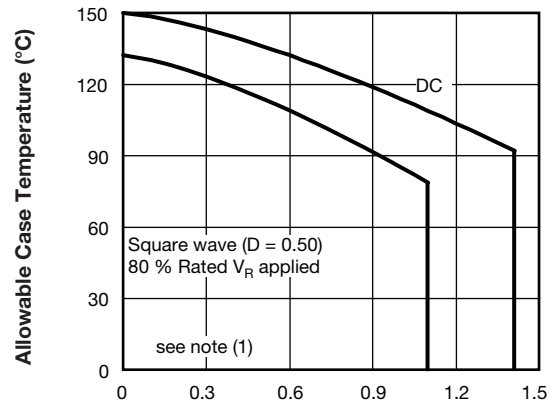
**Note**(1) Pulse width < 300  $\mu\text{s}$ , duty cycle < 2 %

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>					
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		100	$^\circ\text{C/W}$
Typical thermal resistance, junction to lead	$R_{thJL}$	DC operation See fig. 4		81	
Approximate weight				0.33	g
				0.012	oz.
Marking device		Case style DO-204AL (DO-41)		11DQ03	
				11DQ04	

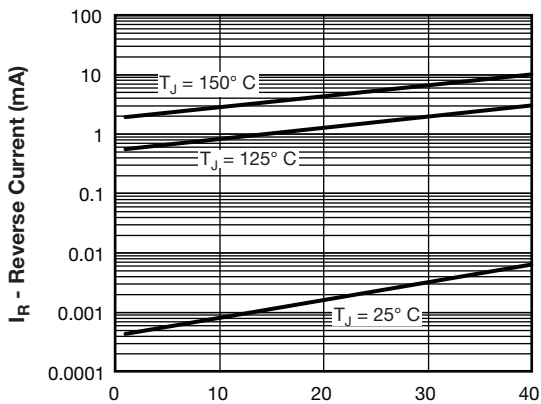
**Note**(1)  $\frac{dP_{tot}}{dT_J} < \frac{1}{R_{thJA}}$  thermal runaway condition for a diode on its own heatsink



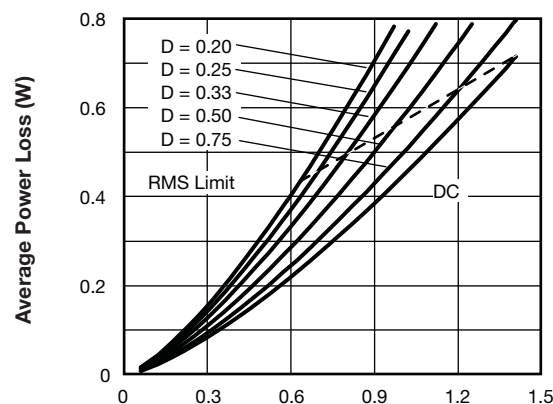
93205\_01 **V<sub>FM</sub> - Forward Voltage Drop (V)**  
Fig. 1 - Maximum Forward Voltage Drop Characteristics



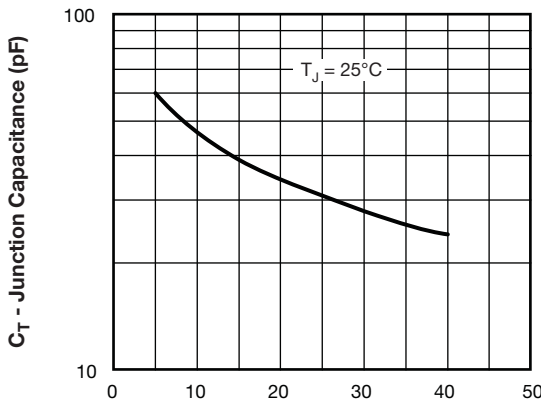
93205\_04 **I<sub>F(AV)</sub> - Average Forward Current (A)**  
Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current



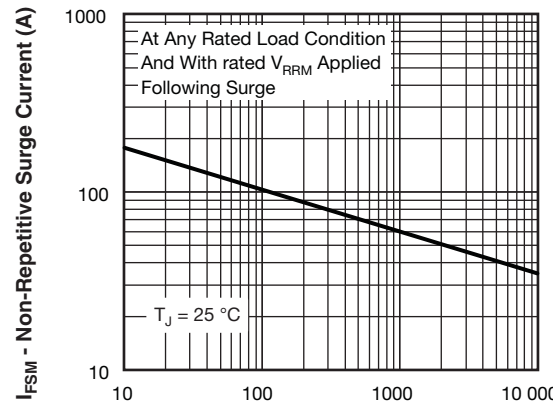
93205\_02 **V<sub>R</sub> - Reverse Voltage (V)**  
Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage



93205\_05 **Average Forward Current - I<sub>F(AV)</sub> (A)**  
Fig. 5 - Forward Power Loss Characteristics



93205\_03 **V<sub>R</sub> - Reverse Voltage (V)**  
Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage



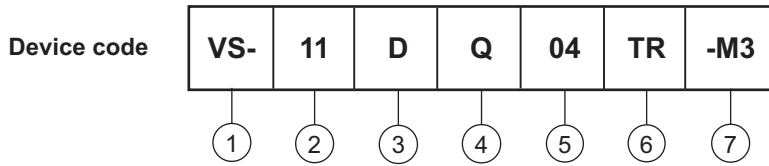
93205\_06 **t<sub>p</sub> - Square Wave Pulse Duration (μs)**  
Fig. 6 - Maximum Non-Repetitive Surge Current

**Note**

(1) 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



- 1** - Vishay Semiconductors product
- 2** - 11 = 1.1 A (axial and small packages - current is x 10)
- 3** - D = DO-41 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-11DQ03	1000	1000	Bulk
VS-11DQ03TR	5000	5000	Tape and reel
VS-11DQ03-M3	1000	1000	Bulk
VS-11DQ03TR-M3	5000	5000	Tape and reel
VS-11DQ04	1000	1000	Bulk
VS-11DQ04TR	5000	5000	Tape and reel
VS-11DQ04-M3	1000	1000	Bulk
VS-11DQ04TR-M3	5000	5000	Tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95241">www.vishay.com/doc?95241</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-204AL (DO-41)

**DIMENSIONS** in millimeters (inches)





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