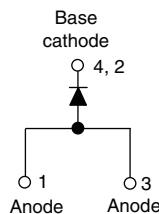


Schottky Rectifier, 5.5 A



D-PAK (TO-252AA)



PRODUCT SUMMARY

Package	D-PAK (TO-252AA)
$I_{F(AV)}$	5.5 A
V_R	40 V
V_F at I_F	See Electrical table
I_{RM}	40 mA at 125 °C
T_J max.	150 °C
Diode variation	Single die
E_{AS}	9 mJ

FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Small foot print, surface mountable
- High frequency operation
- Popular D-PAK outline
- AEC-Q101 qualified
- Meets JESD 201 class 2 whisker test
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN FREE

DESCRIPTION

The VS-50WQ04FNHM3 surface mount Schottky rectifier has been designed for applications requiring low forward drop and small foot prints on PC board. Typical applications are in disk drives, switching power supplies, converters, freewheeling diodes, battery charging, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	5.5	A
V_{RRM}		40	V
I_{FSM}	$t_p = 5 \mu s$ sine	340	A
V_F	$5 A_{pk}, T_J = 125^\circ C$	0.44	V
T_J	Range	- 40 to 150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-50WQ04FNHM3	UNITS
Maximum DC reverse voltage	V_R	40	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 135^\circ C$, rectangular waveform	5.5	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	550	
		10 ms sine or 6 ms rect. pulse	90	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25^\circ C, I_{AS} = 1.5 A, L = 8 mH$	9	mJ
Repetitive avalanche current	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	1.2	A

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	5 A	$T_J = 25 \text{ }^\circ\text{C}$	0.51	V	
		10 A		0.63		
		5 A	$T_J = 125 \text{ }^\circ\text{C}$	0.44		
		10 A		0.59		
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25 \text{ }^\circ\text{C}$	$V_R = \text{Rated } V_R$	3	mA	
		$T_J = 125 \text{ }^\circ\text{C}$		40		
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.27	V	
Forward slope resistance	r_t			26.77	$\text{m}\Omega$	
Typical junction capacitance	C_T	$V_R = 5 \text{ V}_\text{DC}$ (test signal range 100 kHz to 1 MHz), $25 \text{ }^\circ\text{C}$		405	pF	
Typical series inductance	L_S	Measured lead to lead 5 mm from package body		5.0	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	$^\circ\text{C}$
Maximum thermal resistance, junction to case	R_{thJC}	DC operation See fig. 4		3.0	$^\circ\text{C/W}$
Approximate weight				0.3	g
				0.01	oz.
Marking device		Case style D-PAK		50WQ04FNH	

Note

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

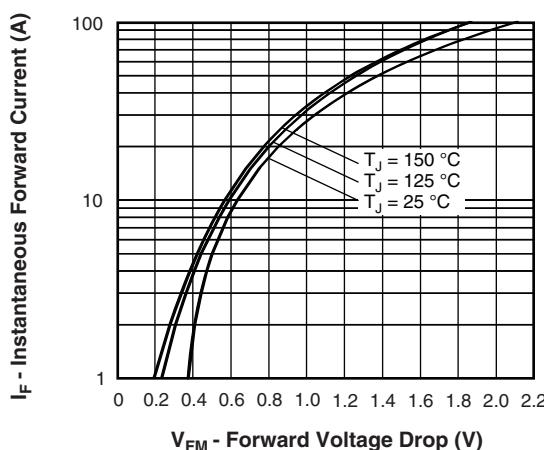


Fig. 1 - Maximum Forward Voltage Drop Characteristics

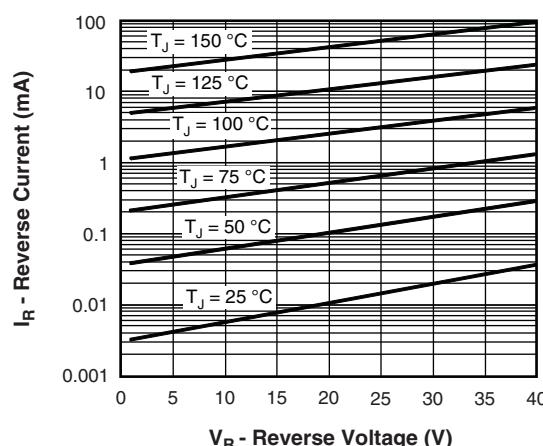


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

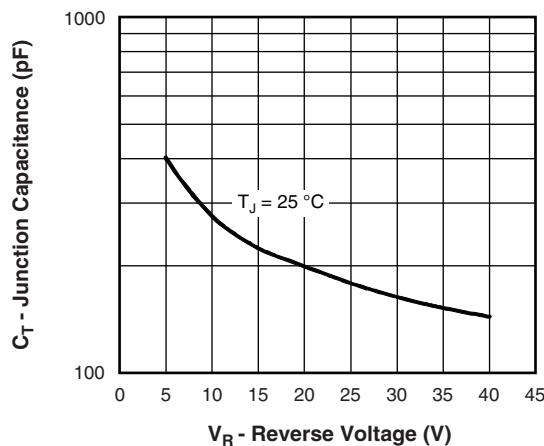


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

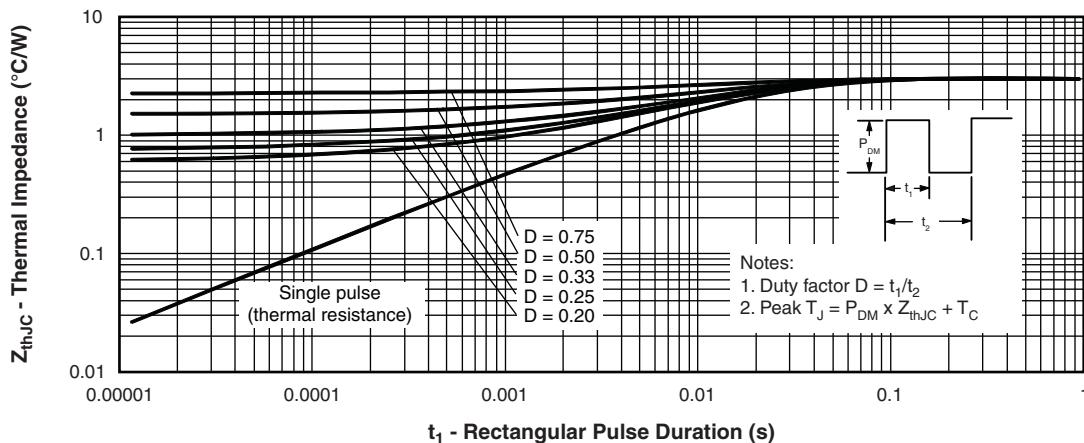


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

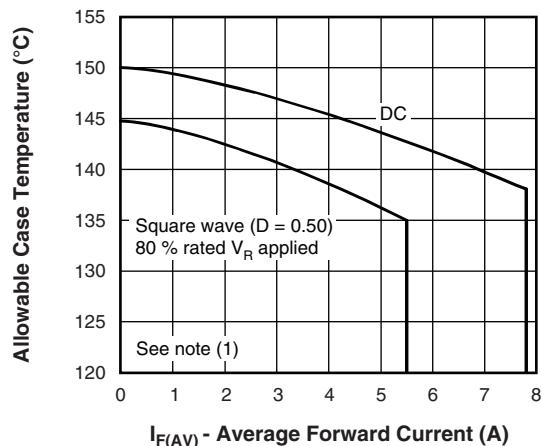


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

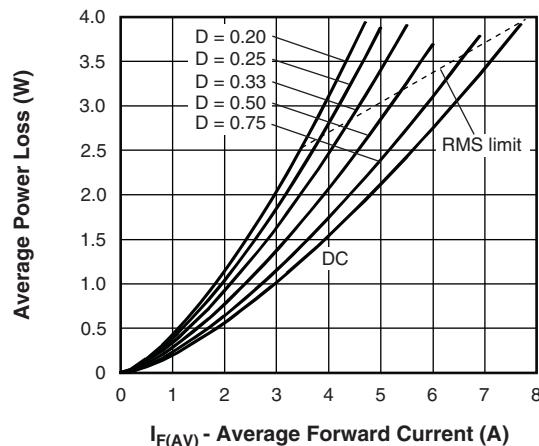


Fig. 6 - Forward Power Loss Characteristics

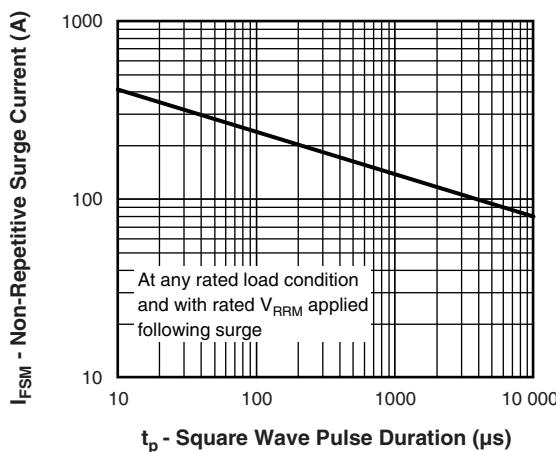
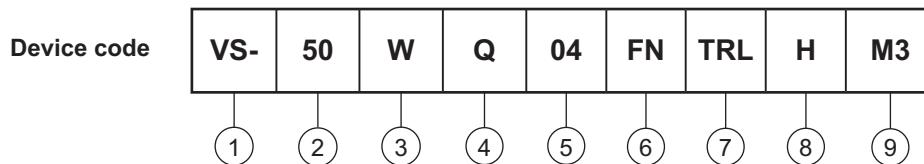


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

(1) Formula used: $T_C = T_J - (P_d + P_{d,REV}) \times R_{thJC}$;
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 6);}$
 $P_{d,REV} = \text{Inverse power loss} = V_{R1} \times I_R \text{ at } V_{R1} = 80\% \text{ rated } V_R$

ORDERING INFORMATION TABLE


- 1** - Vishay Semiconductors product
- 2** - Current rating (5.5 A)
- 3** - Package identifier:
W = D-PAK
- 4** - Schottky "Q" series
- 5** - Voltage rating (04 = 40 V)
- 6** - FN = TO-252AA (D-PAK)
- 7** - • None = Tube
• TR = Tape and reel
• TRL = Tape and reel (left oriented)
• TRR = Tape and reel (right oriented)
- 8** - H = AEC-Q101 qualified
- 9** - Environmental digit:
M3 = Halogen-free, RoHS-compliant, and terminations lead (Pb)-free

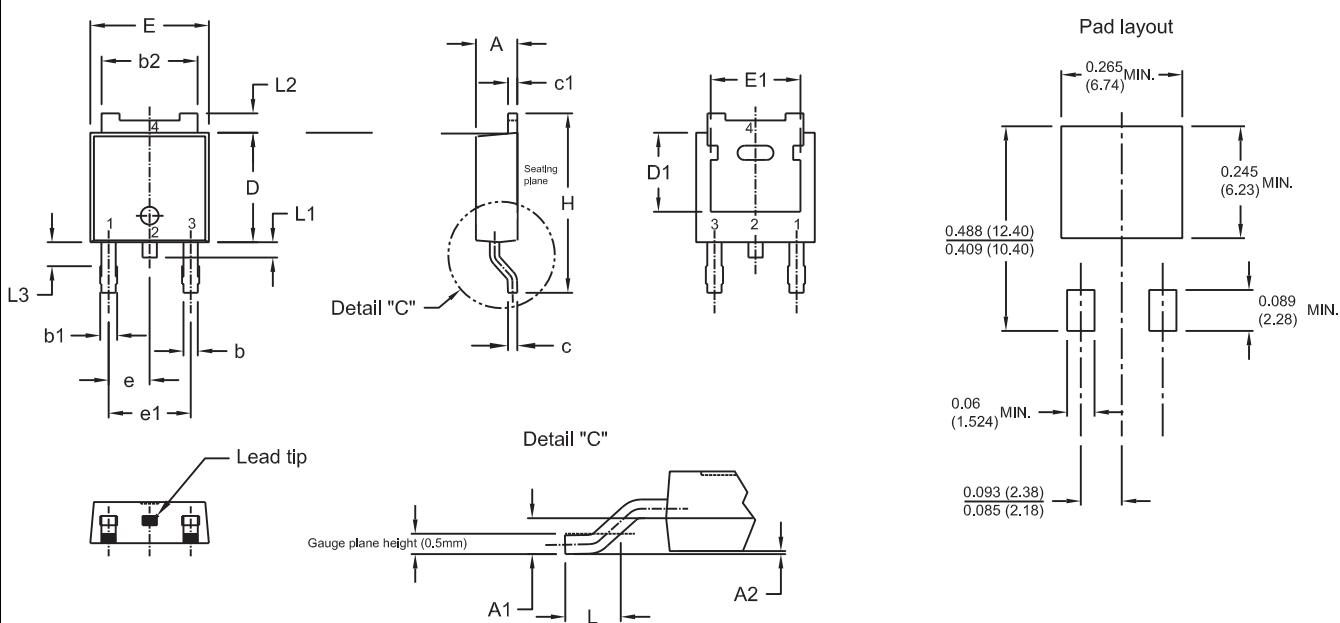
ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-50WQ04FNHM3	75	3000	Antistatic plastic tube
VS-50WQ04FNTRHM3	2000	2000	13" diameter reel
VS-50WQ04FNTRRRHM3	3000	3000	13" diameter reel
VS-50WQ04FNTRLHM3	3000	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95519
Part marking information	www.vishay.com/doc?95518
Packaging information	www.vishay.com/doc?95033

D-PAK (TO-252AA)

DIMENSIONS in millimeters and inches


SYMBOL	MILLIMETERS		INCHES		NOTES	Detail "C"	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	2.21	2.38	0.087	0.094			A1	0.89	1.14	0.035	0.045	
A2	0.03	0.127	0.001	0.005			H	9.65	10.41	0.380	0.410	
b	0.71	0.88	0.028	0.035			L	1.40	1.78	0.055	0.070	
b1	0.76	1.14	0.030	0.045			e	2.28 BSC		0.09 BSC		
b2	5.23	5.44	0.206	0.214			e1	4.57 BSC		0.18 BSC		
C	0.46	0.58	0.018	0.023			L1	0.64	1.02	0.025	0.040	
C1	0.46	0.58	0.018	0.023			L2	0.89	1.27	0.035	0.050	
D	5.97	6.22	0.235	0.2455			L3	1.15	1.52	0.040	0.060	
D1	4.32	4.45	0.170	0.175								
E	6.48	6.73	0.255	0.2655								
E1	4.49	5.50	0.177	0.217								

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension uncontrolled in L3 only for reference
- (3) Dimension D1, E1, L2 and b2 establish a minimum mounting surface for thermal pad
- (4) Dimensions D and E do not include mold flash.
- (5) Outline conforms to JEDEC outline TO-252AA

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