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[Vishay Semiconductor/Diodes Division](#)
[VS-50WQ03FNPBF](#)

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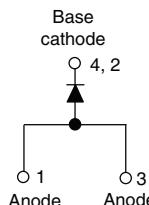
VS-50WQ03FNPbF

Vishay Semiconductors

Schottky Rectifier, 5.5 A



D-PAK (TO-252AA)



RoHS
COMPLIANT

FEATURES

- Popular D-PAK outline
- Small foot print, surface mountable
- Low forward voltage drop
- High frequency operation
- Guard ring for enhanced ruggedness and long term reliability
- Compliant to RoHS Directive 2002/95/EC
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C

DESCRIPTION

The VS-50WQ03FNPbF 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.

PRODUCT SUMMARY	
Package	D-PAK (TO-252AA)
$I_{F(AV)}$	5.5 A
V_R	30 V
V_F at I_F	See Electrical table
I_{RM}	58 mA at 125 °C
T_J max.	150 °C
Diode variation	Single die
E_{AS}	10 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	5.5	A
V_{RRM}		30	V
I_{FSM}	$t_p = 5 \mu s$ sine	320	A
V_F	5 Apk, $T_J = 125$ °C	0.35	V
T_J	Range	- 40 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-50WQ03FNPbF	UNITS
Maximum DC reverse voltage	V_R	30	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 $T_C = 136$ °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	Following any rated load condition and with rated V_{RRM} applied	320	A	
		10 ms sine or 6 ms rect. pulse		130		
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 5$ mH		10	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		2.0	A	

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ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	V _{FM} ⁽¹⁾	5 A	T _J = 25 °C	0.46	V	
		10 A		0.53		
		5 A	T _J = 125 °C	0.35		
		10 A		0.46		
Maximum reverse leakage current See fig. 2	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	3	mA	
		T _J = 125 °C		58		
Threshold voltage	V _{F(TO)}	T _J = T _J maximum		0.19	V	
Forward slope resistance	r _f			22.22	mΩ	
Typical junction capacitance	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C		590	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	°C
Maximum thermal resistance, junction to case	R _{thJC}	DC operation See fig. 4	3.0	°C/W
Approximate weight			0.3	g
			0.01	oz.
Marking device		Case style D-PAK (similar to TO-252AA)	50WQ03FN	

Note

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



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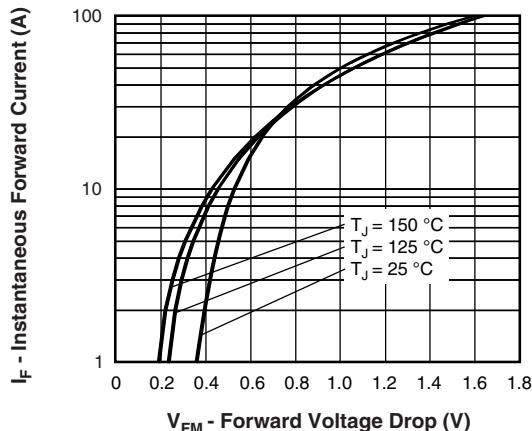


Fig. 1 - Maximum Forward Voltage Drop Characteristics

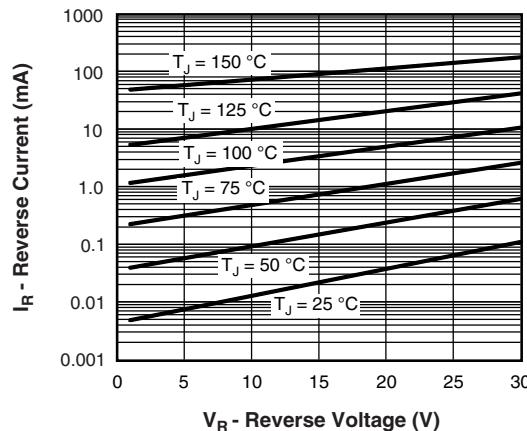


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

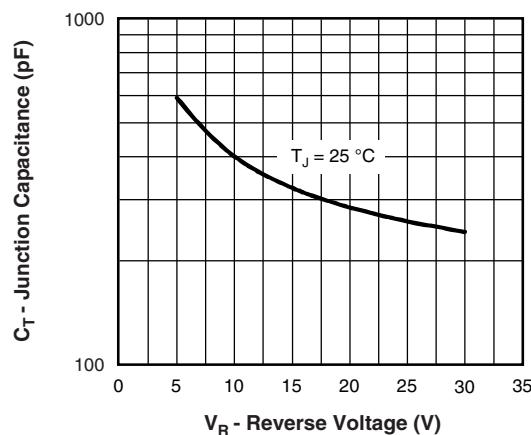


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

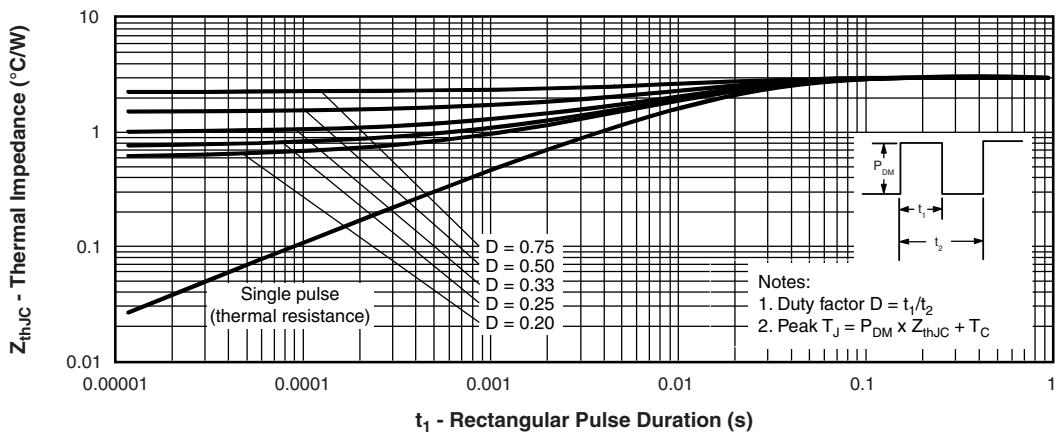


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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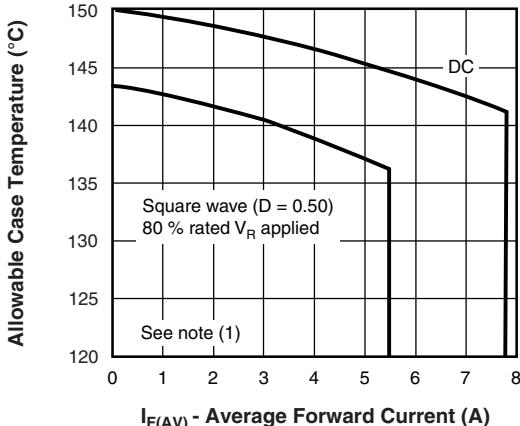


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

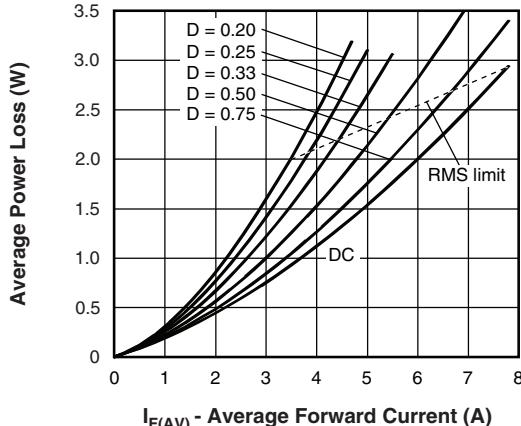


Fig. 6 - Forward Power Loss Characteristics

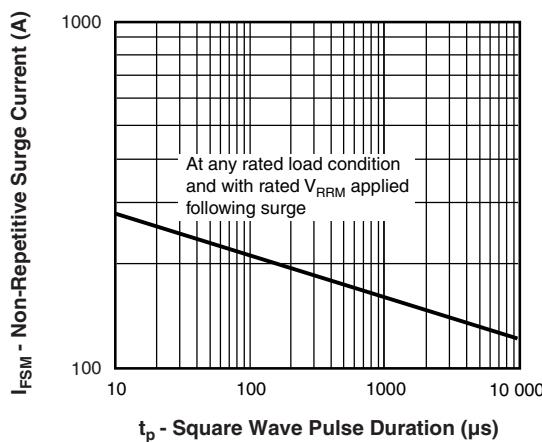


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

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



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ORDERING INFORMATION TABLE

Device code	VS-	50	W	Q	03	FN	TRL	PbF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	- Vishay Semiconductors product							
2	- Current rating (5.5 A)							
3	- Package identifier: W = D-PAK							
4	- Schottky "Q" series							
5	- Voltage rating (03 = 30 V)							
6	- FN = TO-252AA (D-PAK)							
7	- • None = Tube (50 pieces) • TR = Tape and reel • TRL = Tape and reel (left oriented) • TRR = Tape and reel (right oriented)							
8	- PbF = Lead (Pb)-free							

LINKS TO RELATED DOCUMENTS

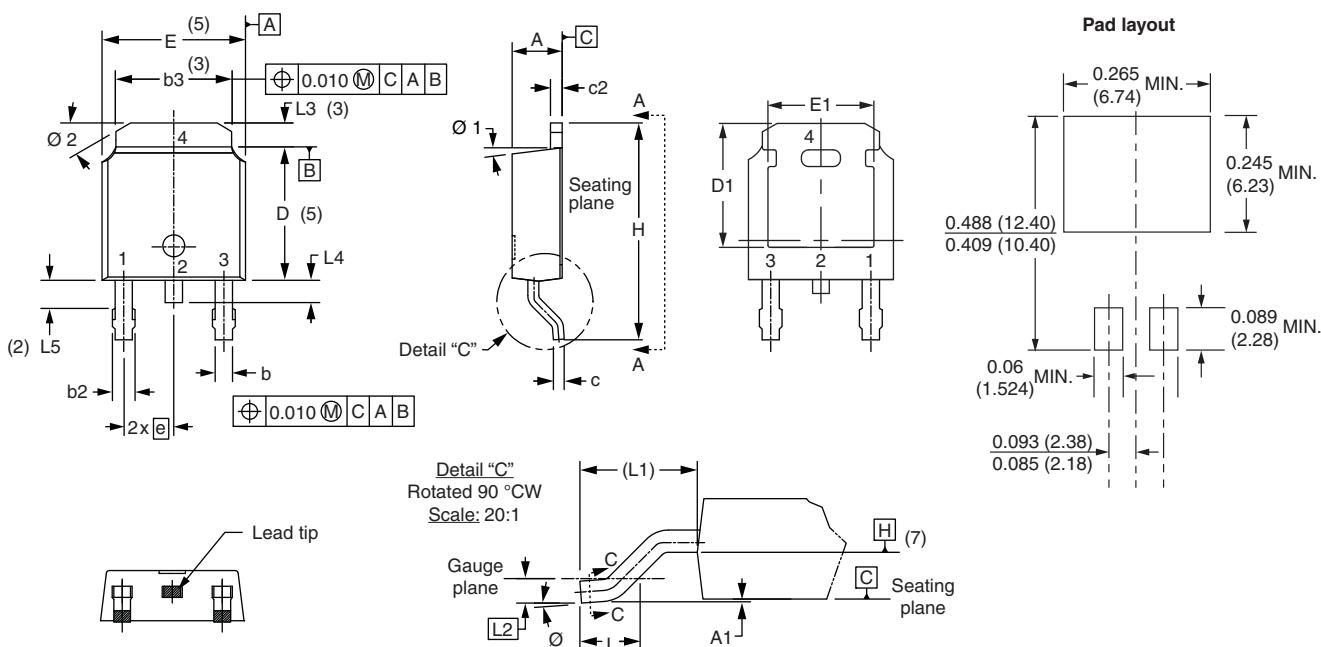
Dimensions	www.vishay.com/doc?95016
Part marking information	www.vishay.com/doc?95059
Packaging information	www.vishay.com/doc?95033
SPICE model	www.vishay.com/doc?95408

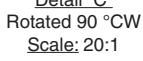
Outline Dimensions

Vishay Semiconductors

D-PAK (TO-252AA)

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES		SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	0.094			e	2.29 BSC		0.090 BSC		
A1	-	0.13	-	0.005			H	9.40	10.41	0.370	0.410	
b	0.64	0.89	0.025	0.035			L	1.40	1.78	0.055	0.070	
b2	0.76	1.14	0.030	0.045			L1	2.74 BSC		0.108 REF.		
b3	4.95	5.46	0.195	0.215	3		L2	0.51 BSC		0.020 BSC		
c	0.46	0.61	0.018	0.024			L3	0.89	1.27	0.035	0.050	3
c2	0.46	0.89	0.018	0.035			L4	-	1.02	-	0.040	
D	5.97	6.22	0.235	0.245	5		L5	1.14	1.52	0.045	0.060	2
D1	5.21	-	0.205	-	3		Ø	0°	10°	0°	10°	
E	6.35	6.73	0.250	0.265	5		Ø1	0°	15°	0°	15°	
E1	4.32	-	0.170	-	3		Ø2	25°	35°	25°	35°	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension uncontrolled in L5
- (3) Dimension D1, E1, L3 and b3 establish a minimum mounting surface for thermal pad
- (4) Section C - C dimension apply to the flat section of the lead between 0.13 and 0.25 mm (0.005 and 0.10") from the lead tip
- (5) Dimension D, and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (6) Dimension b1 and c1 applied to base metal only
- (7) Datum A and B to be determined at datum plane H
- (8) Outline conforms to JEDEC outline TO-252AA

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