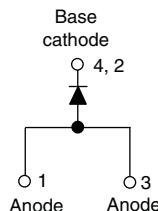


## Schottky Rectifier, 5.5 A


**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
- 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](http://www.vishay.com/doc?99912)

### DESCRIPTION

The VS-50WQ10FNPbF 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.

<b>PRODUCT SUMMARY</b>	
Package	D-PAK (TO-252AA)
$I_{F(AV)}$	5.5 A
$V_R$	100 V
$V_F$ at $I_F$	See Electrical table
$I_{RM}$	4 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	6 mJ

<b>MAJOR RATINGS AND CHARACTERISTICS</b>			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	5.5	A
$V_{RRM}$		100	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	330	A
$V_F$	5 A <sub>pk</sub> , $T_J = 125$ °C	0.63	V
$T_J$	Range	- 40 to 150	°C

<b>VOLTAGE RATINGS</b>			
PARAMETER	SYMBOL	VS-50WQ10FNPbF	UNITS
Maximum DC reverse voltage	$V_R$	100	V
Maximum working peak reverse voltage	$V_{RWM}$		

<b>ABSOLUTE MAXIMUM RATINGS</b>				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 135$ °C, rectangular waveform	5.5	A
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	330	
		10 ms sine or 6 ms rect. pulse	110	
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 0.5$ A, $L = 40$ mH	6.0	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	0.5	A

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	V <sub>FM</sub> <sup>(1)</sup>	5 A	T <sub>J</sub> = 25 °C	0.77	V	
		10 A		0.91		
		5 A	T <sub>J</sub> = 125 °C	0.63		
		10 A		0.74		
Maximum reverse leakage current See fig. 2	I <sub>RM</sub> <sup>(1)</sup>	T <sub>J</sub> = 25 °C	V <sub>R</sub> = Rated V <sub>R</sub>	1	mA	
		T <sub>J</sub> = 125 °C		4		
Threshold voltage	V <sub>F(TO)</sub>	T <sub>J</sub> = T <sub>J</sub> maximum		0.47	V	
Forward slope resistance	r <sub>f</sub>			21.46	mΩ	
Typical junction capacitance	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> (test signal range 100 kHz to 1 MHz), 25 °C		183	pF	
Typical series inductance	L <sub>S</sub>	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 <sub>J</sub> <sup>(1)</sup> , T <sub>Stg</sub>			- 40 to 150	°C
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	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)		50WQ10FN	

**Note**

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

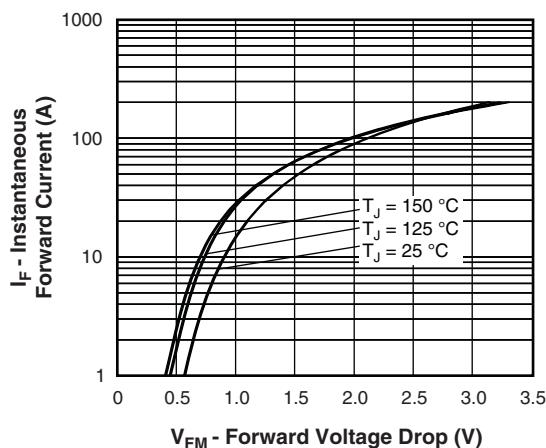


Fig. 1 - Maximum Forward Voltage Drop Characteristics

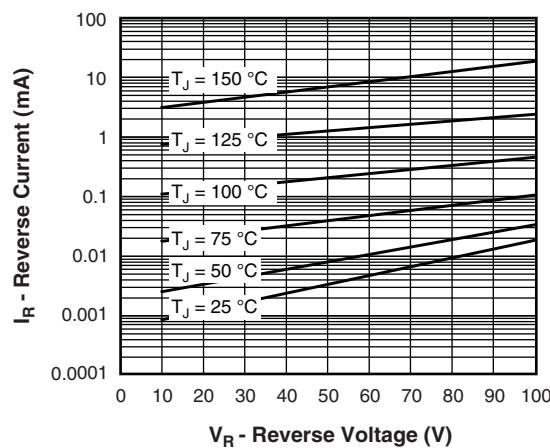


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

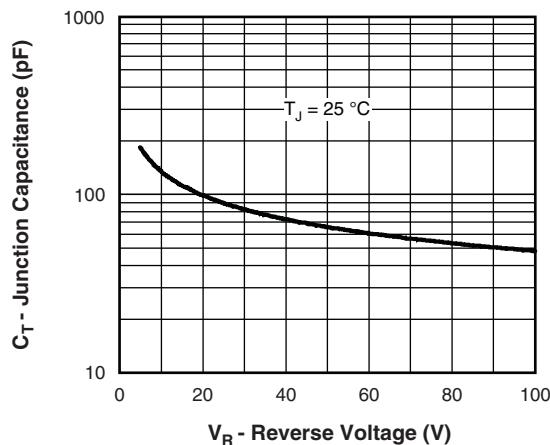


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

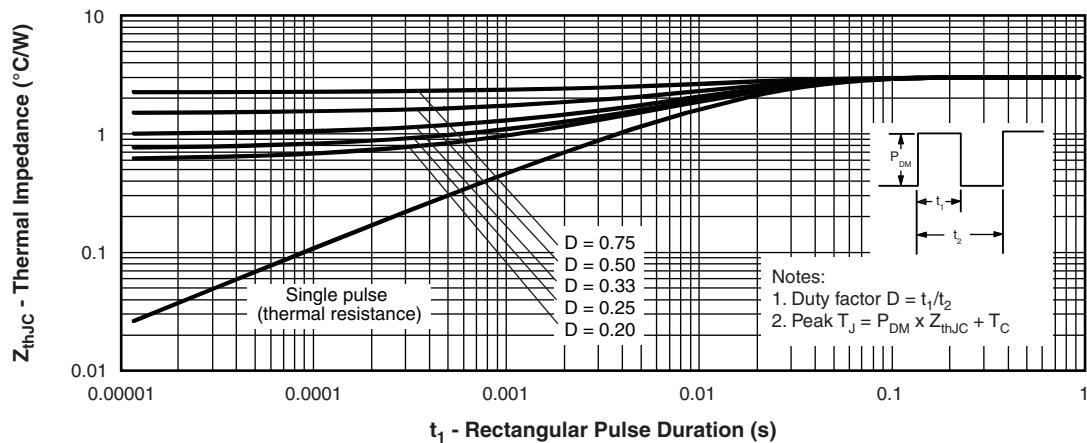


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

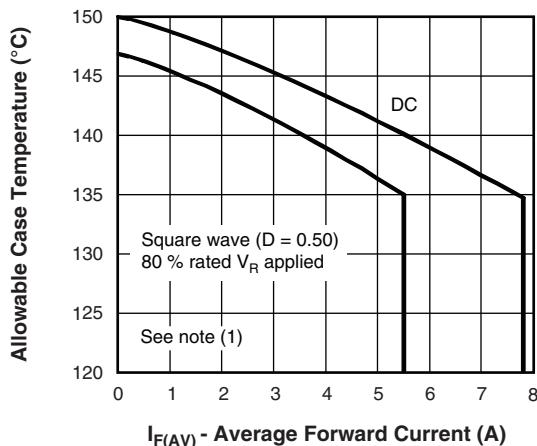


Fig. 5 - Maximum Allowable Case Temperature vs.  
Average Forward Current

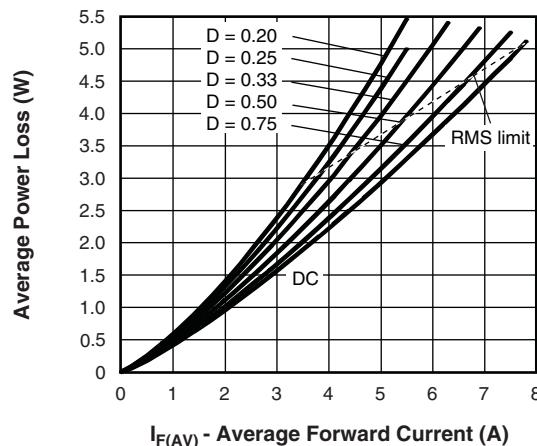


Fig. 6 - Forward Power Loss Characteristics

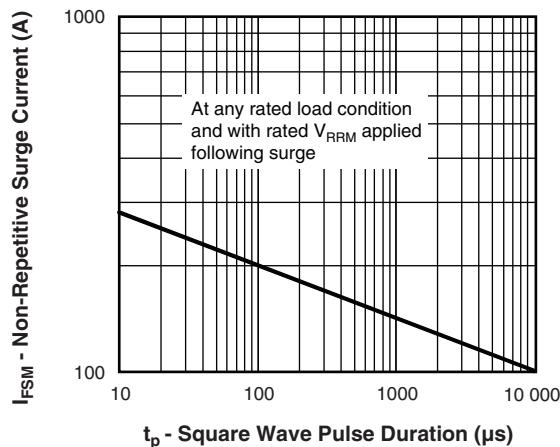


Fig. 7 - Maximum Non-Repetitive Surge Current

#### Note

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

**ORDERING INFORMATION TABLE**

Device code	VS-	50	W	Q	10	FN	TRL	PbF
	1	2	3	4	5	6	7	8
<b>1</b>	-	Vishay Semiconductors product						
<b>2</b>	-	Current rating (5.5 A)						
<b>3</b>	-	Package identifier: W = D-PAK						
<b>4</b>	-	Schottky "Q" series						
<b>5</b>	-	Voltage rating (10 = 100 V)						
<b>6</b>	-	FN = TO-252AA (D-PAK)						
<b>7</b>	-	<ul style="list-style-type: none"> <li>• None = Tube (50 pieces)</li> <li>• TR = Tape and reel</li> <li>• TRL = Tape and reel (left oriented)</li> <li>• TRR = Tape and reel (right oriented)</li> </ul>						
<b>8</b>	-	PbF = Lead (Pb)-free						

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95016">www.vishay.com/doc?95016</a>
Part marking information	<a href="http://www.vishay.com/doc?95059">www.vishay.com/doc?95059</a>
Packaging information	<a href="http://www.vishay.com/doc?95033">www.vishay.com/doc?95033</a>
SPICE model	<a href="http://www.vishay.com/doc?95549">www.vishay.com/doc?95549</a>

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