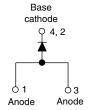


Vishay Semiconductors

High Performance Schottky Rectifier, 3.5 A





D-PAK (TO-252AA)

PRODUCT SUMMARY				
Package	D-PAK (TO-252AA)			
I _{F(AV)}	3.5 A			
V_{R}	40 V			
V _F at I _F	See Electrical table			
I _{RM}	24 mA at 125 °C			
T _J max.	150 °C			
Diode variation	Single die			
EAS	8 mJ			

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

DESCRIPTION

The VS-30WQ04FNPbF 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	3.5	Α		
V _{RRM}		40	V		
I _{FSM}	$t_p = 5 \mu s sine$	500	Α		
V _F	3 A _{pk} , T _J = 125 °C	0.49	V		
T _J		-40 to +150	°C		

VOLTAGE RATINGS				
PARAMETER	SYMBOL	VS-30WQ04FNPbF	UNITS	
Maximum DC reverse voltage	V_{R}	40	V	
Maximum working peak reverse voltage	V_{RWM}] 40 v		

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 °C, rectangular waveform		3.5	
Maximum peak one cycle non-repetitive surge current	I _{FSM}	5 μs sine or 3 μs rect. pulse	Following any rated load condition and with rated V _{RRM} applied	500	Α
See fig. 7		10 ms sine or 6 ms rect. pulse		80	
Non-repetitive avalanche energy	E _{AS}	$T_J = 25 ^{\circ}\text{C}, I_{AS} = 1 \text{A}, L = 16 \text{mH}$		8.0	mJ
Repetitive avalanche current	I _{AR}	Current decaying linearly to zero in 1 μ s Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical		1.0	А



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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	V _{FM} ⁽¹⁾	3 A	T _J = 25 °C	0.53	V
		6 A		0.67	
		3 A	- T _J = 125 °C	0.49	
		6 A		0.62	
Maximum reverse leakage current	Maximum reverse leakage current	T _J = 25 °C	V _R = Rated V _R	2	- mA
See fig. 2	IRM (**	T _J = 125 °C		24	
Threshold voltage	V _{F(TO)}	T _{.l} = T _{.l} maximum		0.34	V
Forward slope resistance	r _t			37.33	mΩ
Typical junction capacitance	C _T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz), 25 °C		189	pF
Typical series inductance	L _S	Measured lead to lead 5 mm from package body		5.0	nH
Maximum voltage rate of change	dV/dt	Rated V _R		10 000	V/µs

Note

 $^{^{(1)}\,}$ Pulse width < 300 $\mu s,$ 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	4.7	°C/W
Approximate weight			0.3	g
		0.01	oz.	
Marking device		Case style D-PAK (similar to TO-252AA)	30WC	04FN

Note

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

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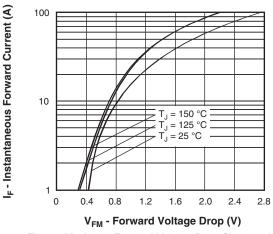


Fig. 1 - Maximum Forward Voltage Drop Characteristics

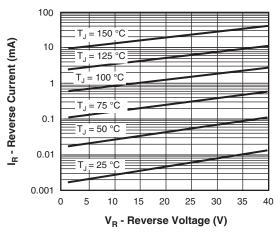


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

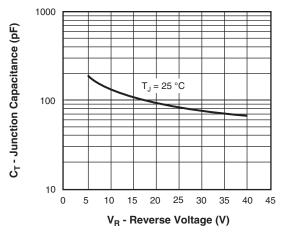


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

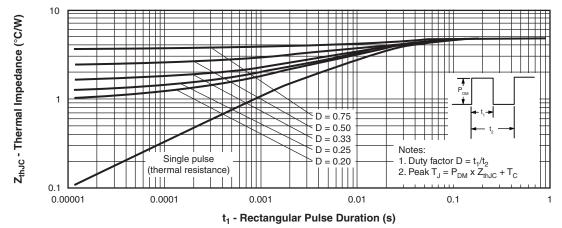


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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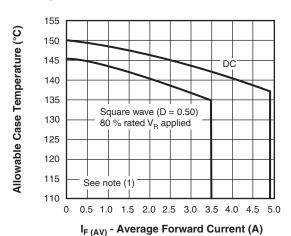
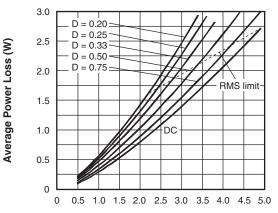


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current



I_{F (AV)} - Average Forward Current (A)

Fig. 6 - Forward Power Loss Characteristics

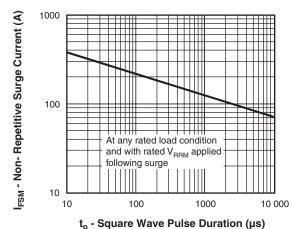


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

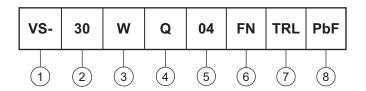
 $\begin{array}{ll} \text{(1)} & \text{Formula used: } T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}; \\ Pd = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D) \text{ (see fig. 6);} \\ Pd_{REV} = \text{Inverse power loss} = V_{R1} \times I_R \text{ (1 - D); } I_R \text{ at } V_{R1} = 80 \text{ \% rated } V_R \\ \end{array}$



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ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product

Current rating (3.5 A)

3 - Package identifier:

W = D-PAK

4 - Schottky "Q" series

- Voltage rating (04 = 40 V)

- FN = TO-252AA (D-PAK)

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 <u>www.vishay.com/doc?95016</u>				
Part marking information	www.vishay.com/doc?95059			
Packaging information	www.vishay.com/doc?95033			
SPICE model	www.vishay.com/doc?95288			
	www.vishay.com/doc?95630			

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