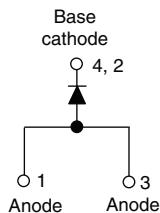


## Schottky Rectifier, 3.5 A


**D-PAK (TO-252AA)**


<b>PRODUCT SUMMARY</b>	
Package	D-PAK (TO-252AA)
$I_{F(AV)}$	3.5 A
$V_R$	60 V
$V_F$ at $I_F$	See Electrical table
$I_{RM}$	30 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Single die
$E_{AS}$	6 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
- Compliant to RoHS Directive 2002/95/EC
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C


**RoHS  
COMPLIANT**

### DESCRIPTION

The VS-30WQ06FNPbF 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>MAJOR RATINGS AND CHARACTERISTICS</b>			
<b>SYMBOL</b>	<b>CHARACTERISTICS</b>	<b>VALUES</b>	<b>UNITS</b>
$I_{F(AV)}$	Rectangular waveform	3.5	A
$V_{RRM}$		60	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	490	A
$V_F$	3 Apk, $T_J = 125$ °C	0.53	V
$T_J$		- 40 to 150	°C

<b>VOLTAGE RATINGS</b>			
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>VS-30WQ06FNPbF</b>	<b>UNITS</b>
Maximum DC reverse voltage	$V_R$	60	V
Maximum working peak reverse voltage	$V_{RWM}$		

<b>ABSOLUTE MAXIMUM RATINGS</b>						
<b>PARAMETER</b>	<b>SYMBOL</b>	<b>TEST CONDITIONS</b>		<b>VALUES</b>	<b>UNITS</b>	
Maximum average forward current See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 133$ °C, rectangular waveform		3.5	A	
Maximum peak one cycle non-repetitive surge current See fig. 7	$I_{FSM}$	5 $\mu s$ sine or 3 $\mu s$ rect. pulse	Following any rated load condition and with rated $V_{RRM}$ applied	490		
		10 ms sine or 6 ms rect. pulse		70		
Non-repetitive avalanche energy	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 1$ A, $L = 12$ 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		1.0	A	

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	V <sub>FM</sub> <sup>(1)</sup>	3 A	T <sub>J</sub> = 25 °C	0.61	V	
		6 A		0.76		
		3 A	T <sub>J</sub> = 125 °C	0.53		
		6 A		0.65		
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>	2	mA	
		T <sub>J</sub> = 125 °C		30		
Threshold voltage	V <sub>F(TO)</sub>	T <sub>J</sub> = T <sub>J</sub> maximum		0.38	V	
Forward slope resistance	r <sub>f</sub>			34.31	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		145	pF	
Typical series inductance	L <sub>S</sub>	Measured lead to lead 5 mm from package body		5.0	nH	
Maximum voltage rate of change	dV/dt	Rated V <sub>R</sub>		10 000	V/μs	

**Note**

(1) Pulse width &lt; 300 μs, duty cycle &lt; 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		4.7	°C/W
Approximate weight				0.3	g
				0.01	oz.
Marking device		Case style D-PAK (similar to TO-252AA)		30WQ06FN	

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

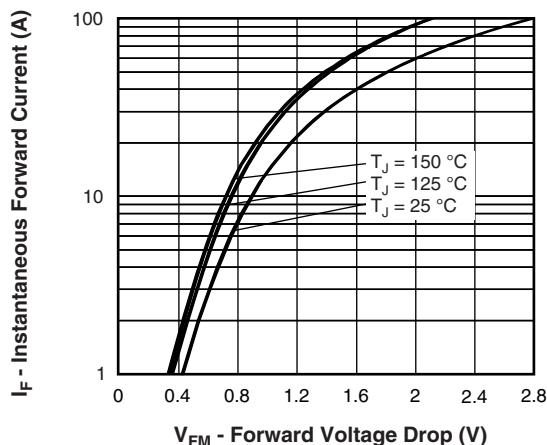


Fig. 1 - Maximum Forward Voltage Drop Characteristics

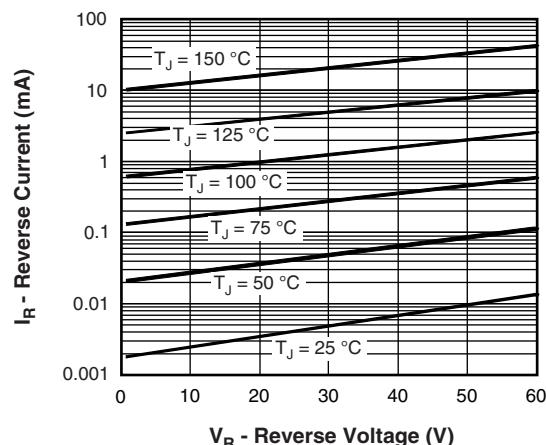


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

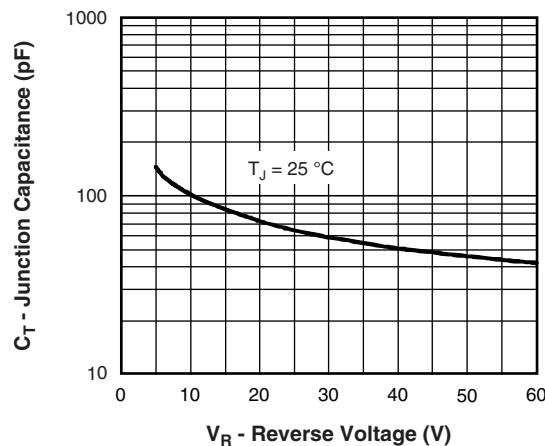


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

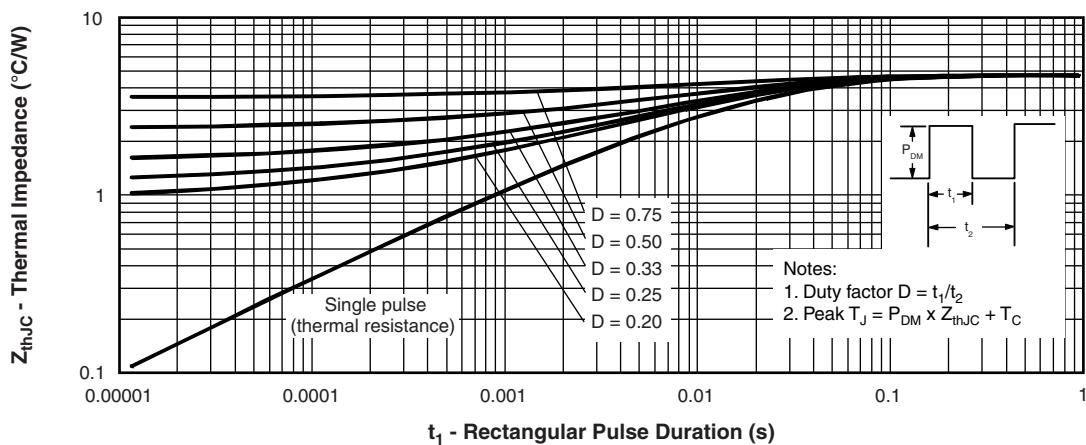


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

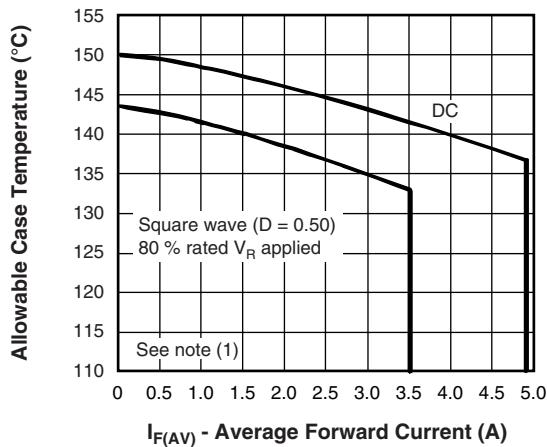


Fig. 5 - Maximum Allowable Case Temperature vs.  
Average Forward Current

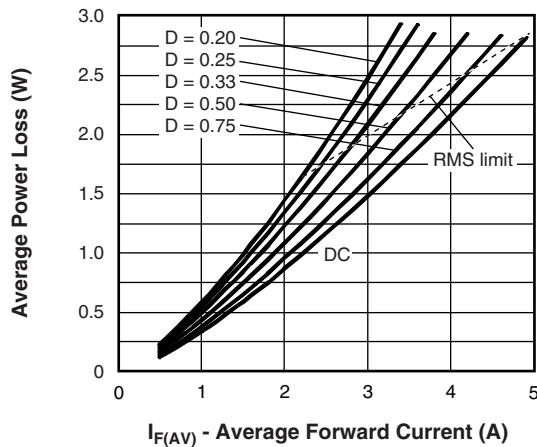


Fig. 6 - Forward Power Loss Characteristics

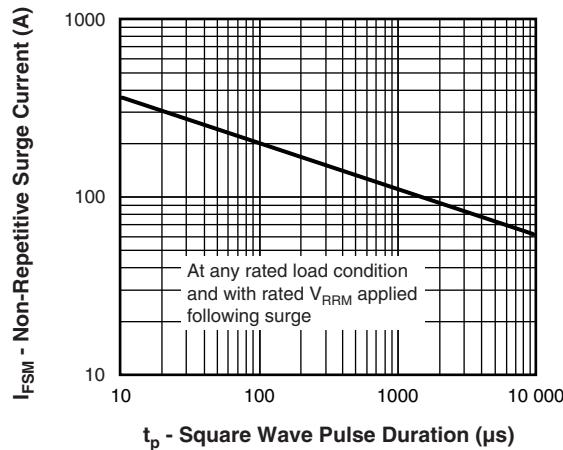


Fig. 7 - Maximum Non-Repetitive Surge Current

#### Note

(1) Formula used:  $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$ ;  
 $P_d = \text{Forward power loss} = I_{F(AV)} \times V_{FM} \text{ at } (I_{F(AV)}/D)$  (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**

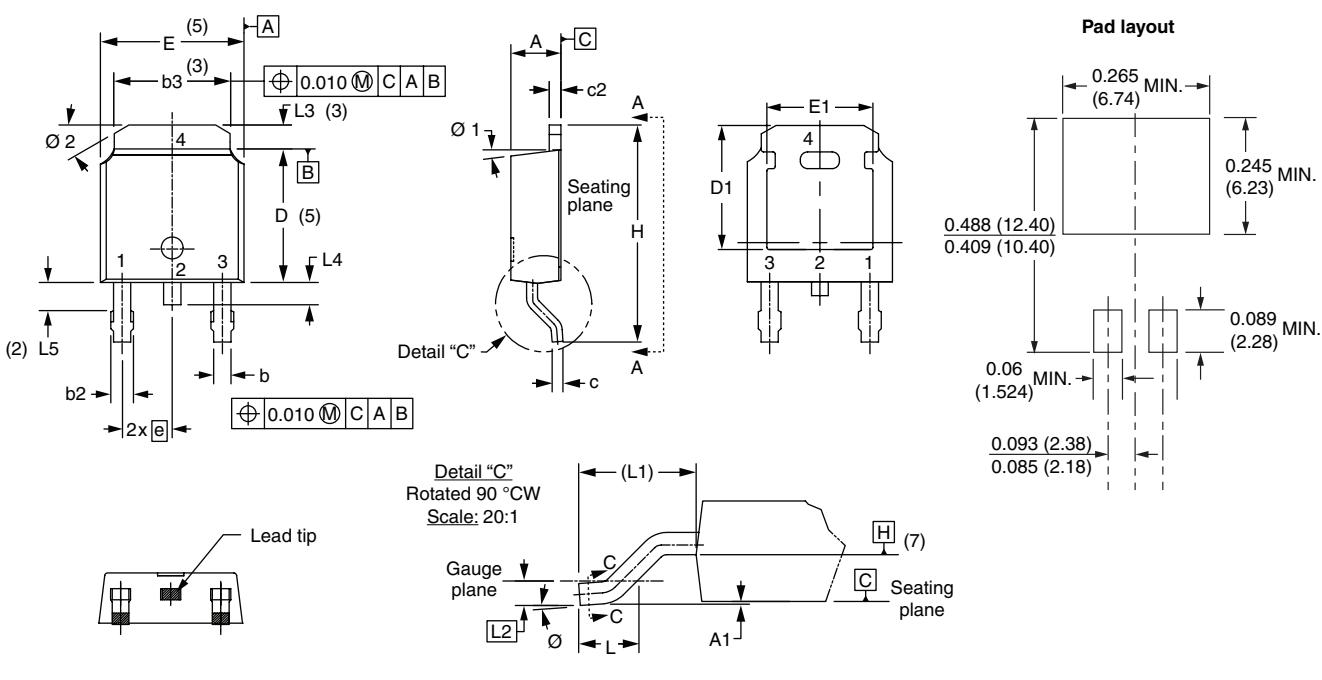
Device code	VS-	30	W	Q	06	FN	TRL	PbF
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

**1** - Vishay Semiconductors product  
**2** - Current rating (3.5 A)  
**3** - Package identifier:  
 W = D-PAK  
**4** - Schottky "Q" series  
**5** - Voltage rating (06 = 60 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	<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>

### D-PAK (TO-252AA)

#### DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	2.18	2.39	0.086	0.094	
A1	-	0.13	-	0.005	
b	0.64	0.89	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	3
c	0.46	0.61	0.018	0.024	
c2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	5
D1	5.21	-	0.205	-	3
E	6.35	6.73	0.250	0.265	5
E1	4.32	-	0.170	-	3

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
e	2.29 BSC		0.090 BSC		
H	9.40	10.41	0.370	0.410	
L	1.40	1.78	0.055	0.070	
L1	2.74 BSC		0.108 REF.		
L2	0.51 BSC		0.020 BSC		
L3	0.89	1.27	0.035	0.050	3
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	2
Ø	0°	10°	0°	10°	
Ø1	0°	15°	0°	15°	
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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