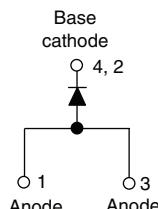


High Performance Schottky Rectifier, 3.5 A


D-PAK (TO-252AA)

RoHS
COMPLIANT
HALOGEN
FREE

FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Popular D-PAK outline
- Small foot print, surface mountable
- High frequency operation
- 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-30WQ06FN-M3 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	TO-252AA (D-PAK)
$I_{F(AV)}$	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

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	3.5	A
V_{RRM}		60	V
I_{FSM}	$t_p = 5 \mu s$ sine	490	A
V_F	$3 A_{pk}, T_J = 125 \text{ }^{\circ}\text{C}$	0.53	V
T_J		-40 to +150	$^{\circ}\text{C}$

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-30WQ06FN-M3	UNITS
Maximum DC reverse voltage	V_R	60	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 $T_C = 133 \text{ }^{\circ}\text{C}$, rectangular waveform		3.5	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	490		
		10 ms sine or 6 ms rect. pulse		70		
Non-repetitive avalanche energy	E_{AS}	$T_J = 25 \text{ }^{\circ}\text{C}, I_{AS} = 1 \text{ A}, L = 12 \text{ mH}$		6.0	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		1.0	A	

ELECTRICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	V _{FM} ⁽¹⁾	3 A	T _J = 25 °C	0.61	V	
		6 A		0.76		
		3 A	T _J = 125 °C	0.53		
		6 A		0.65		
Maximum reverse leakage current See fig. 2	I _{RM} ⁽¹⁾	T _J = 25 °C	V _R = Rated V _R	2	mA	
		T _J = 125 °C		30		
Threshold voltage	V _{F(TO)}	T _J = T _J maximum		0.38	V	
Forward slope resistance	r _f			34.31	mΩ	
Typical junction capacitance	C _T	V _R = 5 V _{DC} (test signal range 100 kHz to 1 MHz), 25 °C		145	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 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		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

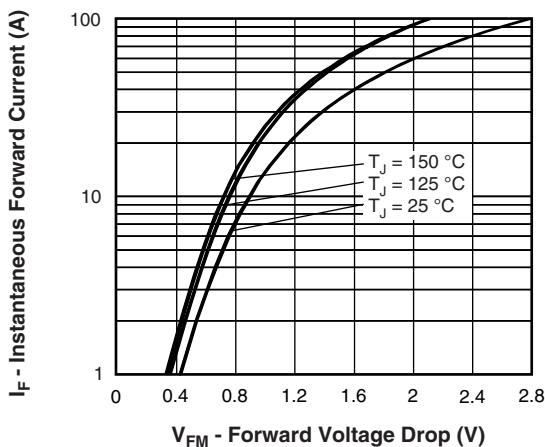


Fig. 1 - Maximum Forward Voltage Drop Characteristics

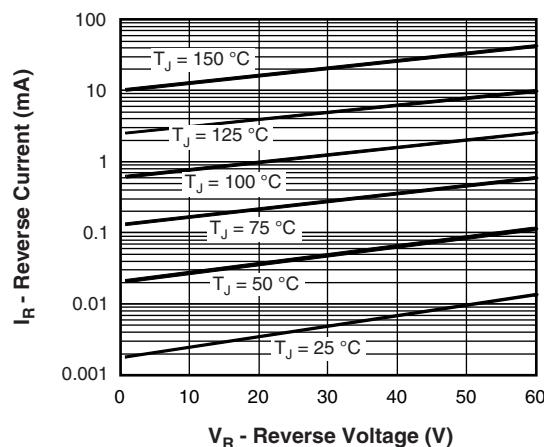


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

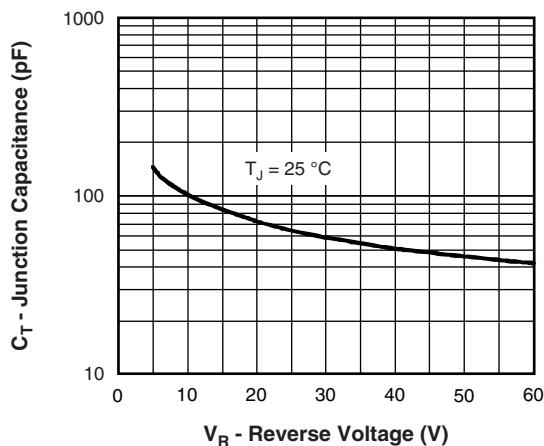


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

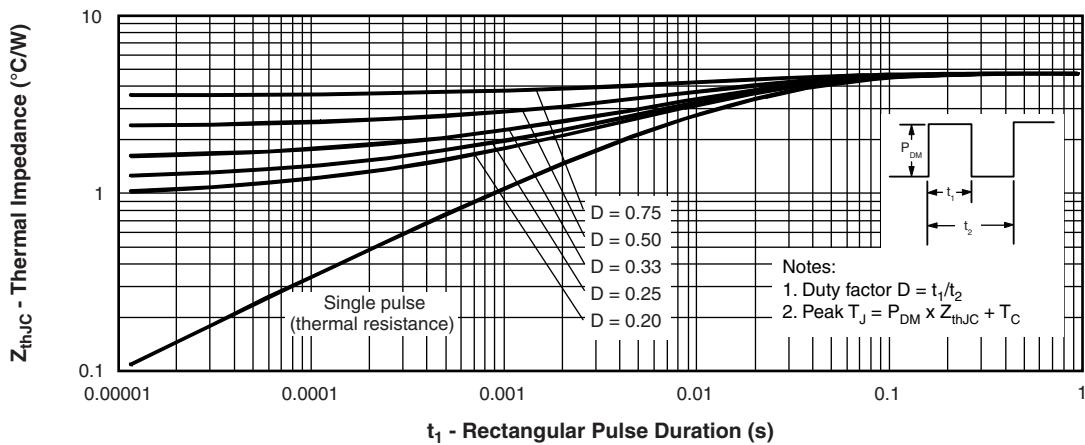


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

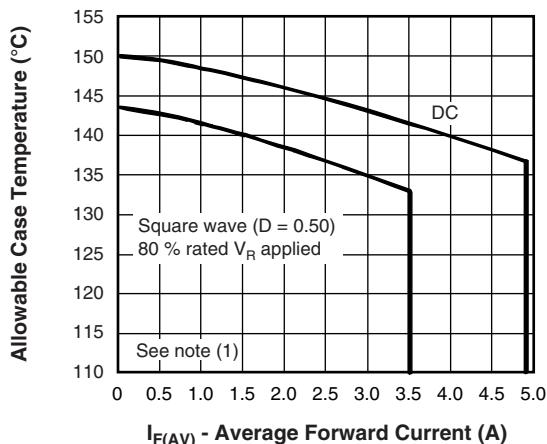


Fig. 5 - Maximum Allowable Case Temperature vs.
Average Forward Current

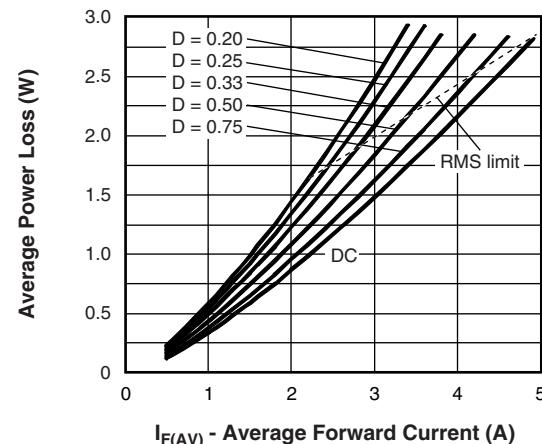


Fig. 6 - Forward Power Loss Characteristics

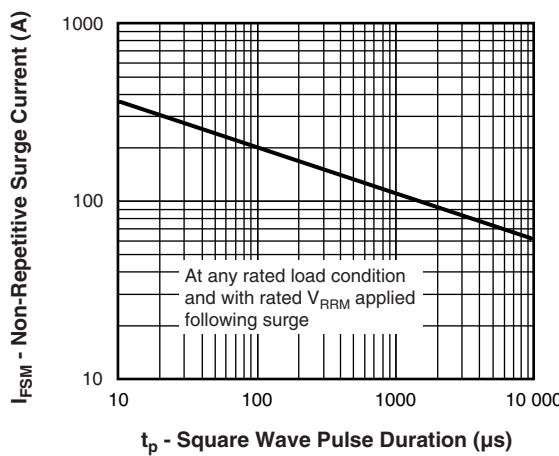


Fig. 7 - Maximum Non-Repetitive Surge Current

Note

(1) Formula used: $T_C = T_J - (P_d + P_{dREV}) \times R_{thJC}$;
 P_d = forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 P_{dREV} = 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	-M3
	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
• TR = tape and reel
• TRL = tape and reel (left oriented)
• TRR = tape and reel (right oriented)
- 8** - 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-30WQ06FN-M3	75	3000	Antistatic plastic tube
VS-30WQ06FNTR-M3	2000	2000	13" diameter reel
VS-30WQ06FNTRL-M3	3000	3000	13" diameter reel
VS-30WQ06FNTRR-M3	3000	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95627
Part marking information	www.vishay.com/doc?95176
Packaging information	www.vishay.com/doc?95033
SPICE model	www.vishay.com/doc?95687

D-PAK (TO-252AA) "M"

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			2.29	BSC	0.090	BSC	
A1	-	0.13	-	0.005			9.40	10.41	0.370	0.410	
b	0.64	0.89	0.025	0.035			1.40	1.78	0.055	0.070	
b2	0.76	1.14	0.030	0.045			2.74	BSC	0.108	REF.	
b3	4.95	5.46	0.195	0.215	3		0.51	BSC	0.020	BSC	
c	0.46	0.61	0.018	0.024			0.89	1.27	0.035	0.050	3
c2	0.46	0.89	0.018	0.035			-	1.02	-	0.040	
D	5.97	6.22	0.235	0.245	5		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 0.010") 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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