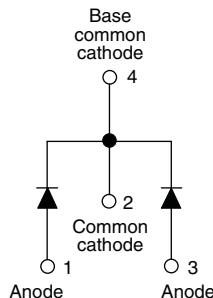


## Schottky Rectifier, 2 x 6 A


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


<b>PRODUCT SUMMARY</b>	
Package	D-PAK (TO-252AA)
$I_{F(AV)}$	2 x 6 A
$V_R$	60 V
$V_F$ at $I_F$	0.57 V
$I_{RM}$	35 mA at 125 °C
$T_J$ max.	150 °C
Diode variation	Common cathode
$E_{AS}$	7 mJ

### FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Popular D-PAK outline
- Center tap configuration
- Small foot print, surface mountable
- High frequency operation
- AEC-Q101 qualified
- Meets JESD 201 class 2 whisker test
- 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)


**RoHS**  
COMPLIANT  
HALOGEN  
FREE

### DESCRIPTION

The VS-12CWQ06FNHM3 surface mount, center tap, Schottky rectifier series 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>			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	12	A
$V_{RRM}$		60	V
$I_{FSM}$	$t_p = 5 \mu s$ sine	320	A
$V_F$	$6 A_{pk}$ , $T_J = 125$ °C (per leg)	0.57	V
$T_J$	Range	- 55 to 150	°C

<b>VOLTAGE RATINGS</b>			
PARAMETER	SYMBOL	VS-12CWQ06FNHM3	UNITS
Maximum DC reverse voltage	$V_R$	60	V
Maximum working peak reverse voltage	$V_{RWM}$		

<b>ABSOLUTE MAXIMUM RATINGS</b>						
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum average forward current per leg See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 131$ °C, rectangular waveform		6	A	
				12		
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	320	A	
		10 ms sine or 6 ms rect. pulse		105		
Non-repetitive avalanche energy per leg	$E_{AS}$	$T_J = 25$ °C, $I_{AS} = 1.2$ A, $L = 10$ mH		7	mJ	
Repetitive avalanche current per leg	$I_{AR}$	Current decaying linearly to zero in 1 $\mu s$ Frequency limited by $T_J$ maximum $V_A = 1.5 \times V_R$ typical		0.8	A	

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop per leg See fig. 1	V <sub>FM</sub> <sup>(1)</sup>	6 A	T <sub>J</sub> = 25 °C	0.61	V	
		12 A		0.79		
		6 A	T <sub>J</sub> = 125 °C	0.57		
		12 A		0.72		
Maximum reverse leakage current per leg 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>	3	mA	
		T <sub>J</sub> = 125 °C		35		
Threshold voltage	V <sub>F(TO)</sub>	T <sub>J</sub> = T <sub>J</sub> maximum		0.36	V	
Forward slope resistance	r <sub>f</sub>			24.14	mΩ	
Typical junction capacitance per leg	C <sub>T</sub>	V <sub>R</sub> = 5 V <sub>DC</sub> , (test signal range 100 kHz to 1 MHz), 25 °C		360	pF	
Typical series inductance per leg	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>			- 55 to 150	°C
Maximum thermal resistance, junction to case	per leg per device	R <sub>thJC</sub>	DC operation See fig. 4	3.0 1.5	°C/W
Approximate weight				0.3 0.01	g oz.
Marking device		Case style D-PAK		12CWQ06FNH	

**Note**

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

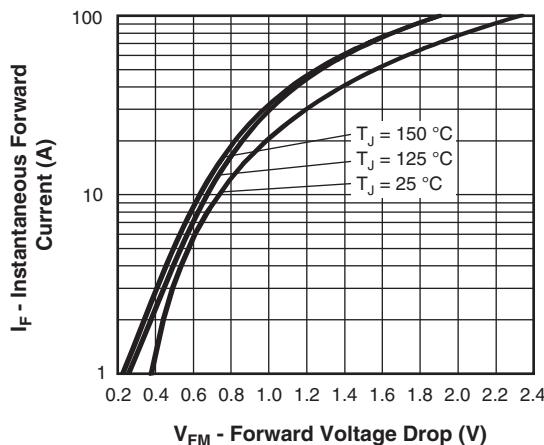


Fig. 1 - Maximum Forward Voltage Drop Characteristics  
(Per Leg)

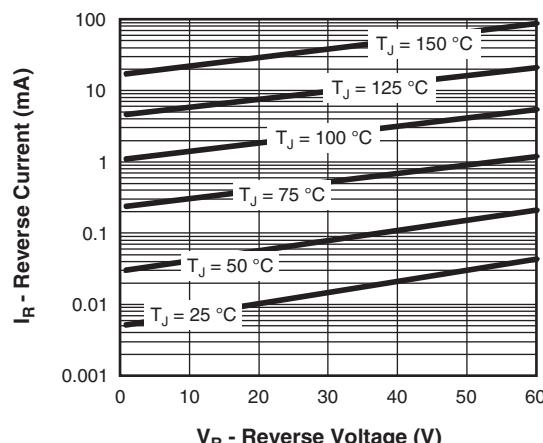


Fig. 2 - Typical Values of Reverse Current vs.  
Reverse Voltage (Per Leg)

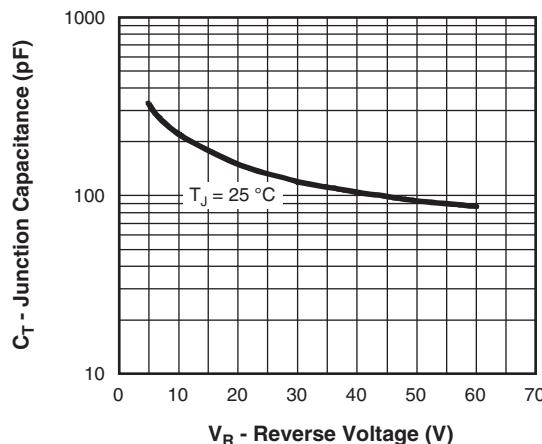


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

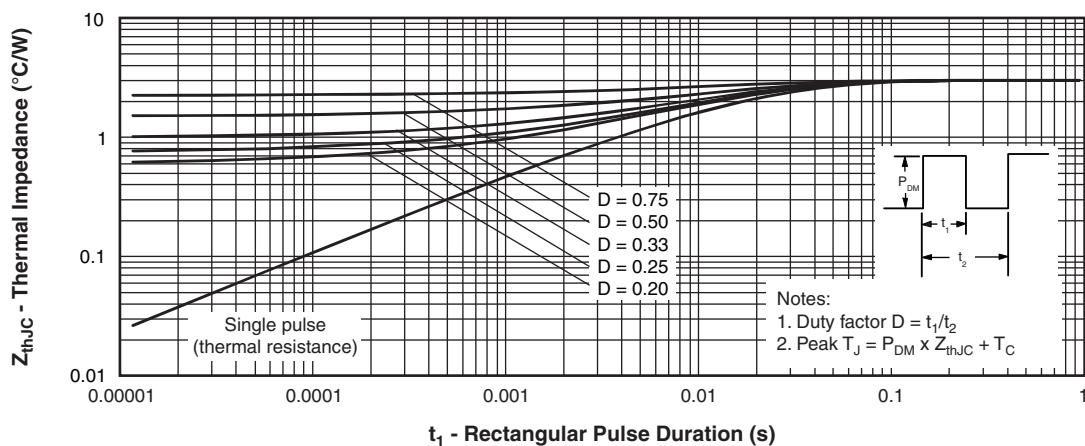


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics (Per Leg)

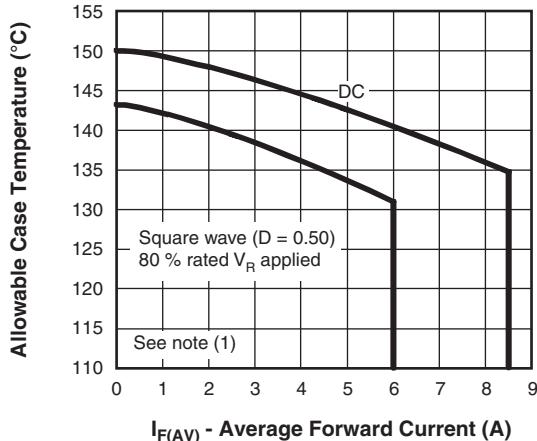


Fig. 5 - Maximum Allowable Case Temperature vs.  
Average Forward Current (Per Leg)

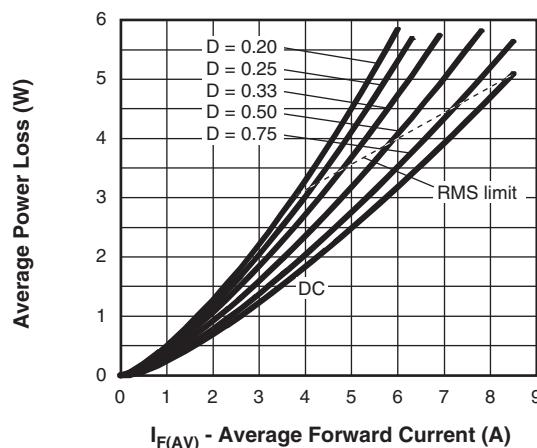


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

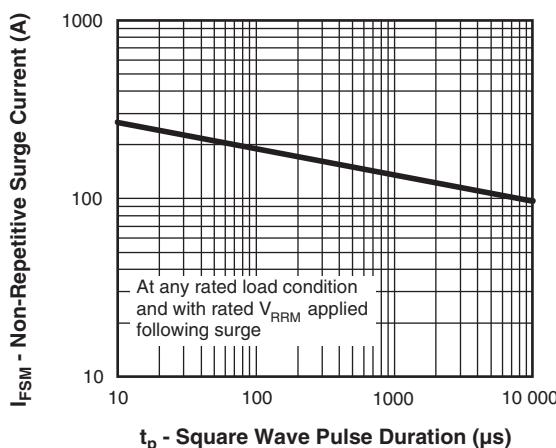


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

#### Note

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

**ORDERING INFORMATION TABLE**

Device code	VS-	12	C	W	Q	06	FN	TRL	H	M3
	1	2	3	4	5	6	7	8	9	10

- |    |  |
|----|--|
| 1  | - Vishay Semiconductors product  |
| 2  | - Current rating (12 A)  |
| 3  | - Center tap configuration   |
| 4  | - Package identifier:<br>W = D-PAK   |
| 5  | - Schottky "Q" series  |
| 6  | - Voltage rating (06 = 60 V)   |
| 7  | - FN = TO-252AA  |
| 8  | - • None = Tube<br>• TR = Tape and reel<br>• TRL = Tape and reel (left oriented)<br>• TRR = Tape and reel (right oriented) |
| 9  | - H = AEC-Q101 qualified   |
| 10 | - Environmental digit:<br>M3 = Halogen-free, RoHS-compliant, and terminations lead (Pb)-free                               |

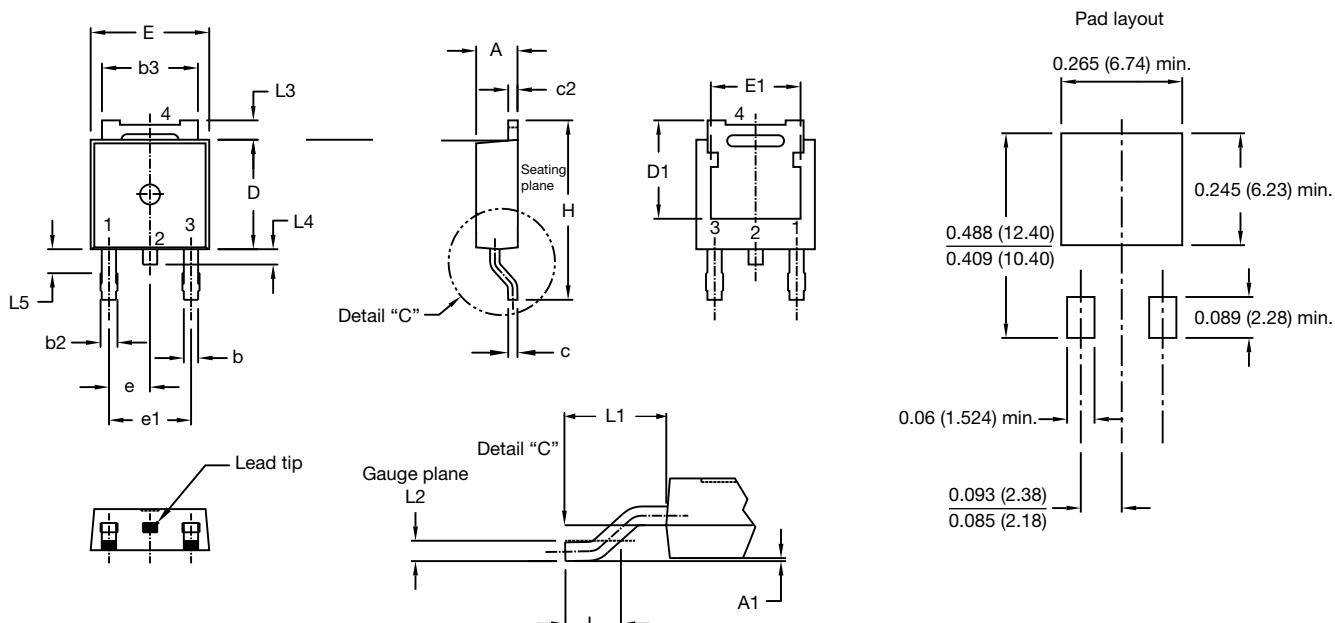
**ORDERING INFORMATION (Example)**

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-12CWQ06FNHM3	75	3000	Antistatic plastic tube
VS-12CWQ06FNTRHM3	2000	2000	13" diameter reel
VS-12CWQ06FNTRRRHM3	3000	3000	13" diameter reel
VS-12CWQ06FNTRLHM3	3000	3000	13" diameter reel

**LINKS TO RELATED DOCUMENTS**

Dimensions	<a href="http://www.vishay.com/doc?95519">www.vishay.com/doc?95519</a>
Part marking information	<a href="http://www.vishay.com/doc?95518">www.vishay.com/doc?95518</a>
Packaging information	<a href="http://www.vishay.com/doc?95033">www.vishay.com/doc?95033</a>

## DPAK (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							
E	6.35	6.73	0.250	0.265	5							
E1	4.32	-	0.170	-	3							

**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) Dimensions 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
- (5) Outline conforms to JEDEC® outline TO-252AA

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