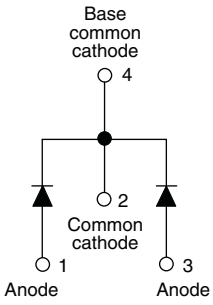
Schottky Rectifier, 2 x 6 A



D-PAK (TO-252AA)



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

RoHS COMPLIANT

HALOGEN FREE

DESCRIPTION

The VS-12CWQ04FNHM3 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.

PRODUCT SUMMARY	
Package	D-PAK (TO-252AA)
$I_{F(AV)}$	2 x 6 A
V_R	40 V
V_F at I_F	0.48 V
I_{RM}	40 mA at 125 °C
T_J max.	150 °C
Diode variation	Common cathode
E_{AS}	9 mJ

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	12	A
V_{RRM}		40	V
I_{FSM}	t_p = 5 µs sine	550	A
V_F	6 A_{pk}, T_J = 125 °C (per leg)	0.48	V
T_J	Range	- 55 to 150	°C

VOLTAGE RATINGS			
PARAMETER	SYMBOL	VS-12CWQ04FNHM3	UNITS
Maximum DC reverse voltage	V_R	40	V
Maximum working peak reverse voltage	V_{RWM}		

ABSOLUTE MAXIMUM RATINGS						
PARAMETER		SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average forward current See fig. 5	per leg	$I_{F(AV)}$	50 % duty cycle at T_C = 134 °C, rectangular waveform		6	A
	per device				12	
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	550	A
			10 ms sine or 6 ms rect. pulse		90	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 1.5 A, L = 8 mH		9	mJ
Repetitive avalanche current per leg		I_{AR}	Current decaying linearly to zero in 1 µs Frequency limited by T_J maximum V_A = 1.5 x V_R typical		1.2	A

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ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop per leg See fig. 1	V_{FM} (1)	6 A	T_J = 25 °C	0.53	V
		12 A		0.68	
		6 A	T_J = 125 °C	0.48	
		12 A		0.64	
Maximum reverse leakage current per leg See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = Rated V_R	3	mA
		T_J = 125 °C		40	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.28	V
Forward slope resistance	r_t			25.58	mΩ
Typical junction capacitance per leg	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz), 25 °C		405	pF
Typical series inductance per leg	L_S	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 srorage temperature range		T_J (1), T_{Stg}		- 55 to 150	°C
Maximum thermal resistance, junction to case	per leg	R_{thJC}	DC operation See fig. 4	3.0	°C/W
	per device			1.5	
Approximate weight				0.3	g
				0.01	oz.
Marking device			Case style D-PAK	12CWQ04FNH	

Note

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

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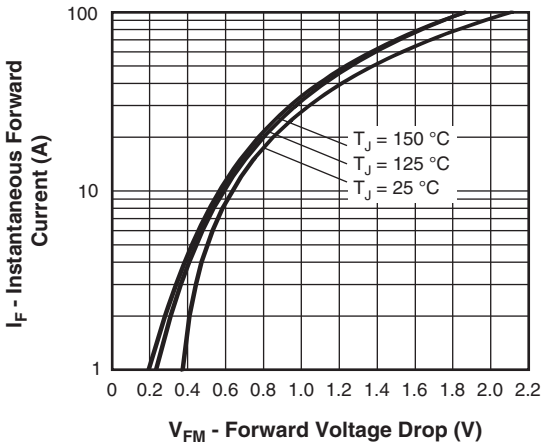


Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

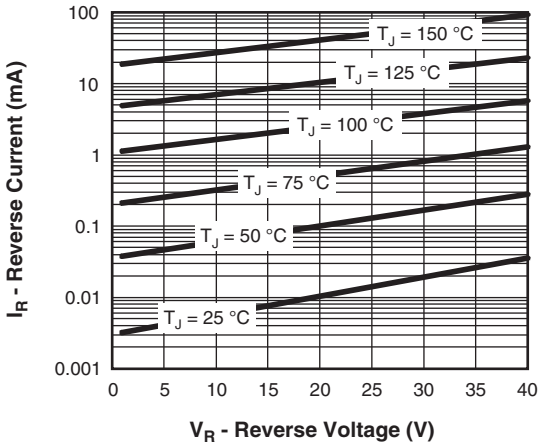


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

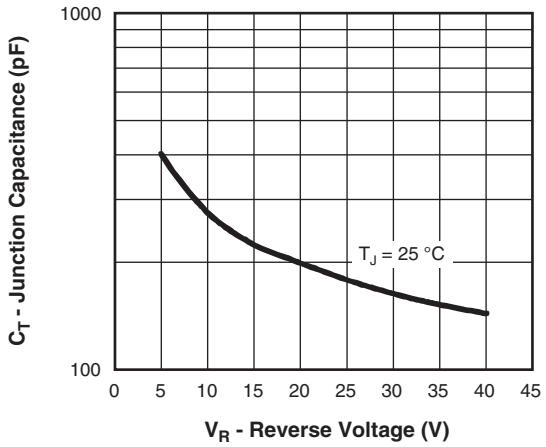


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

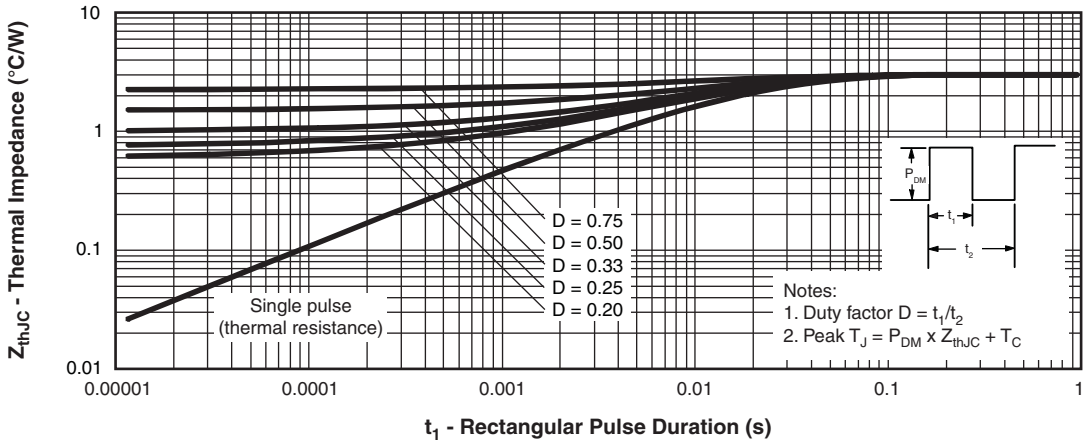


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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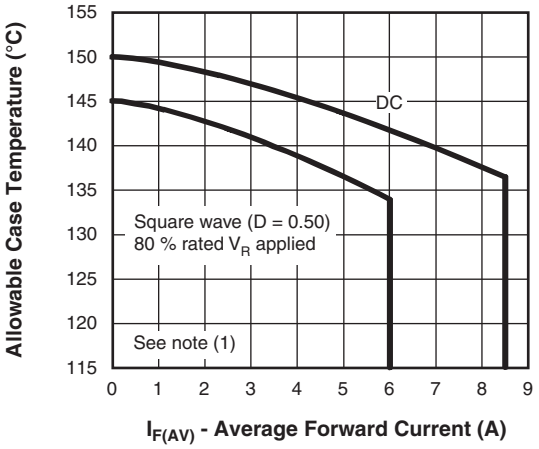


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

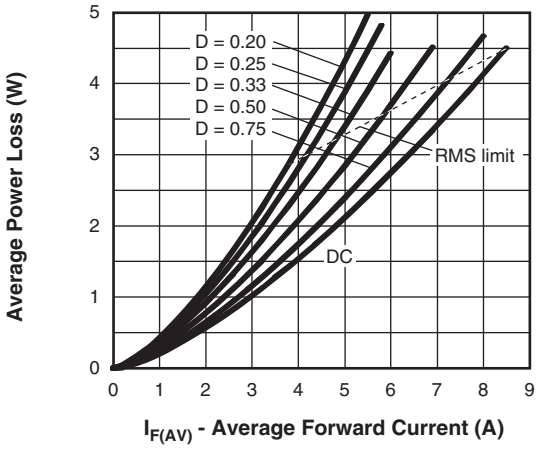


Fig. 6 - Forward Power Loss Characteristics (Per Leg)

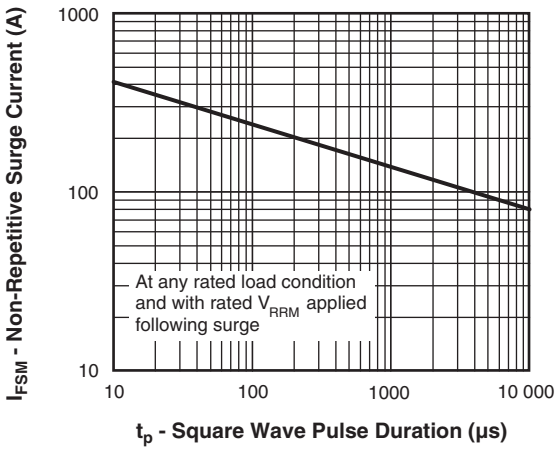


Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

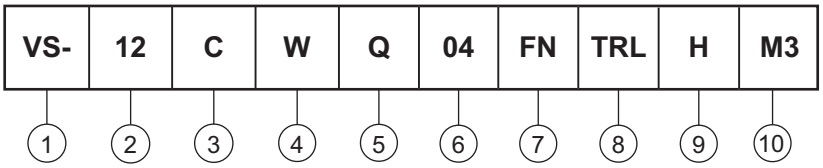
Note

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

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ORDERING INFORMATION TABLE

Device code



1 - Vishay Semiconductors product
2 - Current rating (12 A)
3 - Center tap configuration
4 - Package identifier:
W = D-PAK
5 - Schottky “Q” series
6 - Voltage rating (04 = 40 V)
7 - FN = TO-252AA
8 - • None = Tube
• TR = Tape and reel
• TRL = Tape and reel (left oriented)
• TRR = Tape and reel (right oriented)
9 - H = AEC-Q101 qualified
10 - 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-12CWQ04FNHM3	75	3000	Antistatic plastic tube
VS-12CWQ04FNTRHM3	2000	2000	13" diameter reel
VS-12CWQ04FNTRRHM3	3000	3000	13" diameter reel
VS-12CWQ04FNTRLHM3	3000	3000	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95519
Part marking information	www.vishay.com/doc?95518
Packaging information	www.vishay.com/doc?95033

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