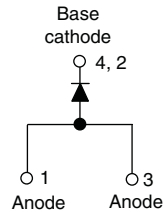


Schottky Rectifier, 10 A



D-PAK (TO-252AA)



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
- 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

PRODUCT SUMMARY

Package	D-PAK (TO-252AA)
$I_{F(AV)}$	10 A
V_R	45 V
V_F at I_F	0.53 V
I_{RM}	15 mA at 125 °C
T_J max.	175 °C
Diode variation	Single die
E_{AS}	20 mJ

DESCRIPTION

The VS-10WQ045FNHM3 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	10	A
V_{RRM}		45	V
I_{FSM}	$t_p = 5 \mu s$ sine	400	A
V_F	10 A _{pk} , $T_J = 125$ °C	0.53	V
T_J	Range	- 40 to 175	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-10WQ045FNHM3	UNITS
Maximum DC reverse voltage	V_R	45	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 $T_C = 157$ °C, rectangular waveform	10	A
Maximum peak one cycle non-repetitive surge current See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	400	A
		10 ms sine or 6 ms rect. pulse	75	
Non-repetitive avalanche energy	E_{AS}	$T_J = 25$ °C, $I_{AS} = 3$ A, $L = 4.4$ mH	20	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	3.0	A

**ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS	
Maximum forward voltage drop See fig. 1	$V_{FM}^{(1)}$	10 A	$T_J = 25\text{ }^{\circ}\text{C}$	0.63	V	
		20 A		0.80		
		10 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.53		
		20 A		0.71		
Maximum reverse leakage current See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	1	mA	
		$T_J = 125\text{ }^{\circ}\text{C}$		15		
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.255	V	
Forward slope resistance	r_t			22	mΩ	
Typical junction capacitance	C_T	$V_R = 5\text{ V}_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		760	pF	
Typical series inductance	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 storage temperature range	$T_J^{(1)}, T_{Stg}$		- 40 to 175	$^{\circ}\text{C}$
Maximum thermal resistance, junction to case	R_{thJC}	DC operation See fig. 4	2.0	$^{\circ}\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient	R_{thJA}		50	
Approximate weight			0.3	g
			0.01	oz.
Marking device		Case style D-PAK	10WQ045FNH	

Note

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

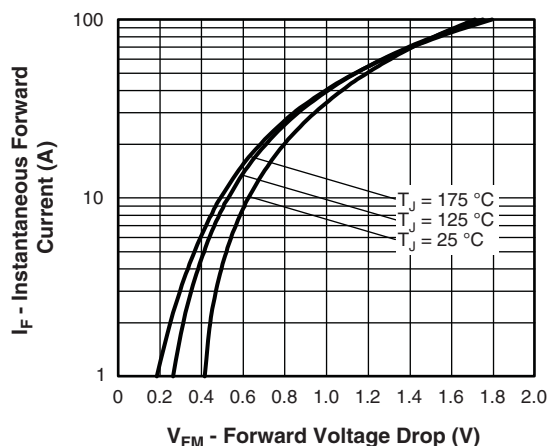


Fig. 1 - Maximum Forward Voltage Drop Characteristics

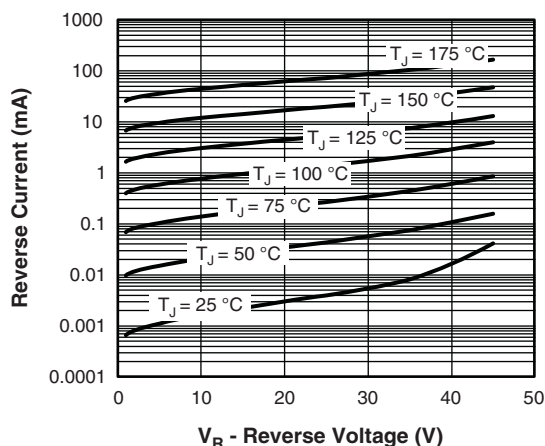


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

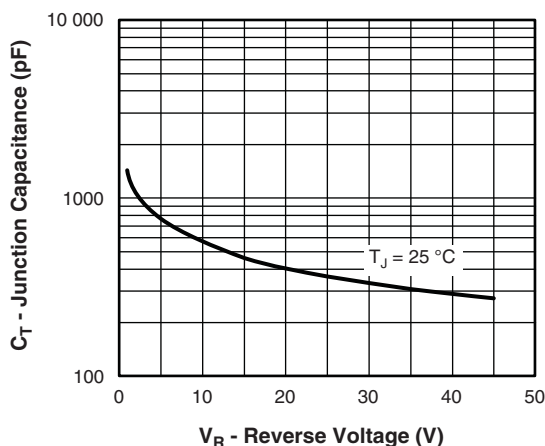
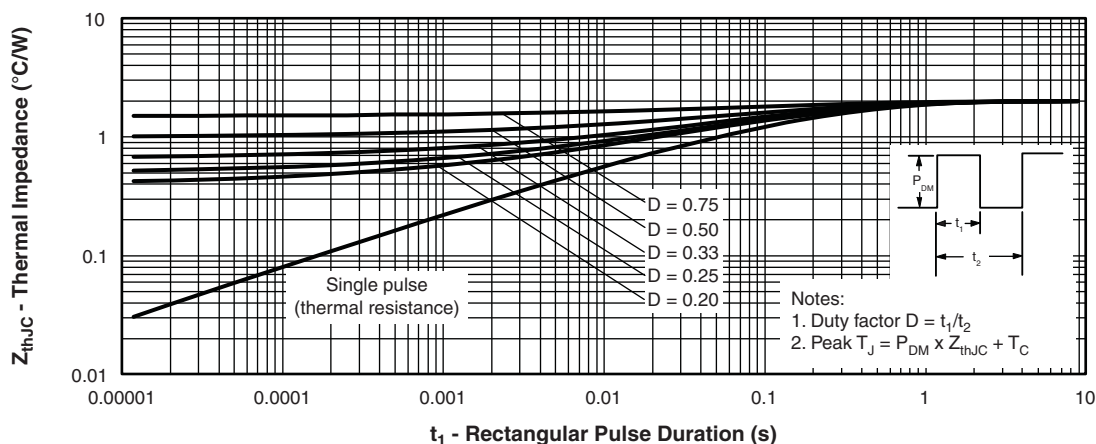


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

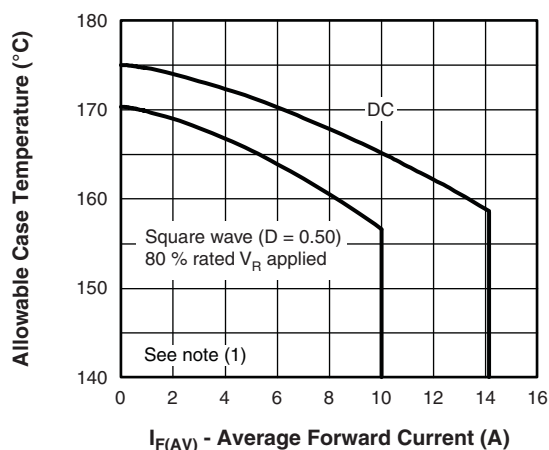


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

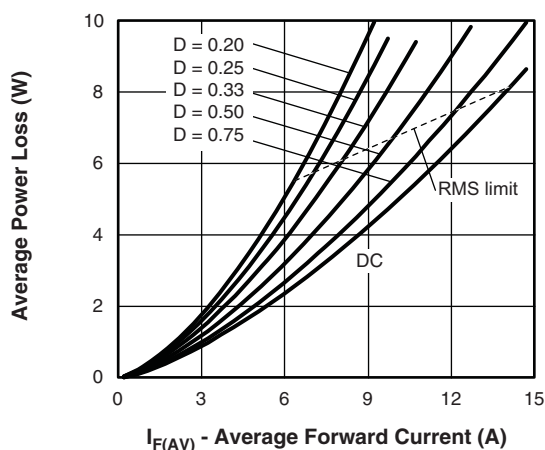


Fig. 6 - Forward Power Loss Characteristics

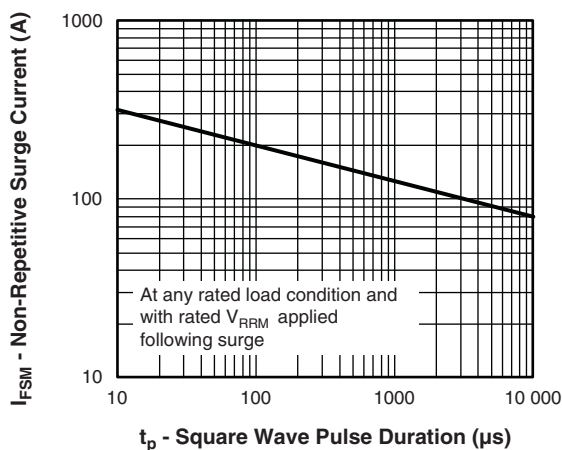


Fig. 7 - Maximum Non-Repetitive Surge Current

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-	10	W	Q	045	FN	TRL	H	M3
	1	2	3	4	5	6	7	8	9

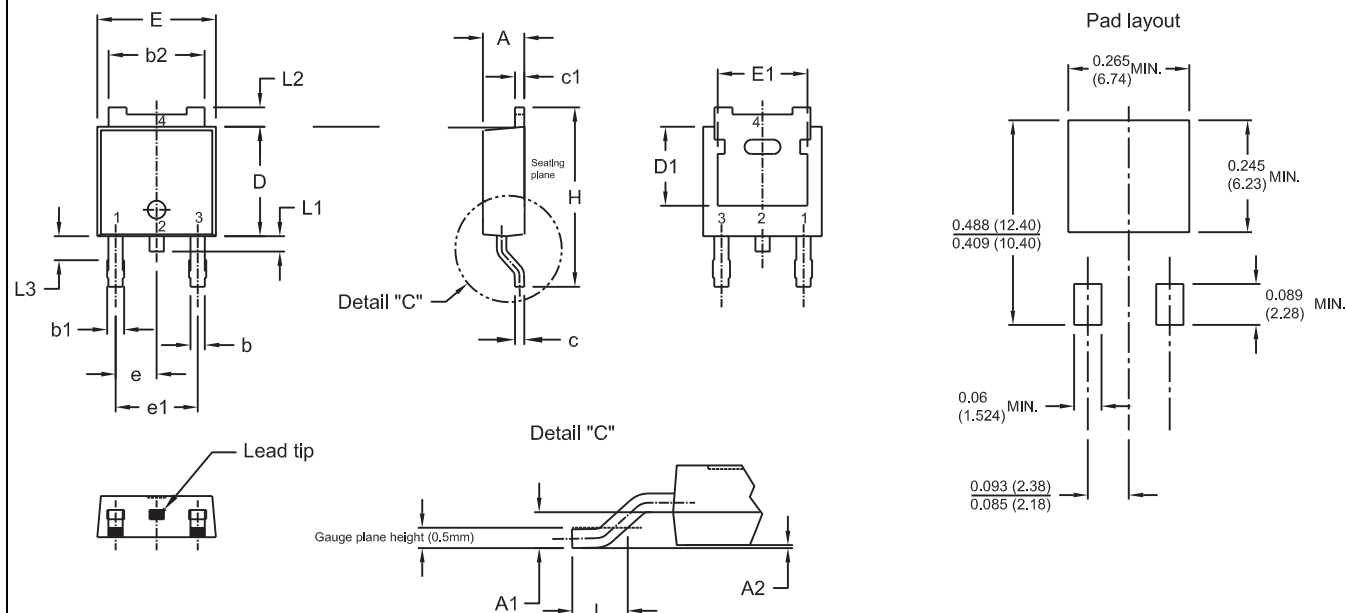
- 1** - Vishay Semiconductors product
- 2** - Current rating (10 A)
- 3** - Package identifier:
W = D-PAK
- 4** - Schottky "Q" series
- 5** - Voltage rating (045 = 45 V)
- 6** - FN = TO-252AA (D-PAK)
- 7** -
 - None = Tube
 - TR = Tape and reel
 - TRL = Tape and reel (left oriented)
 - TRR = Tape and reel (right oriented)
- 8** - H = AEC-Q101 qualified
- 9** - 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-10WQ045FNHM3	75	3000	Antistatic plastic tube
VS-10WQ045FNTRHM3	2000	2000	13" diameter reel
VS-10WQ045FNTRRHM3	3000	3000	13" diameter reel
VS-10WQ045FNTRLHM3	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

D-PAK (TO-252AA)

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	2.21	2.38	0.087	0.094	
A2	0.03	0.127	0.001	0.005	
b	0.71	0.88	0.028	0.035	
b1	0.76	1.14	0.030	0.045	
b2	5.23	5.44	0.206	0.214	
C	0.46	0.58	0.018	0.023	
C1	0.46	0.58	0.018	0.023	
D	5.97	6.22	0.235	0.2455	
D1	4.32	4.45	0.170	0.175	
E	6.48	6.73	0.255	0.2655	
E1	4.49	5.50	0.177	0.217	

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A1	0.89	1.14	0.035	0.045	
H	9.65	10.41	0.380	0.410	
L	1.40	1.78	0.055	0.070	
e	2.28 BSC		0.09 BSC		
e1	4.57 BSC		0.18 BSC		
L1	0.64	1.02	0.025	0.040	
L2	0.89	1.27	0.035	0.050	
L3	1.15	1.52	0.040	0.060	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-1994
- (2) Lead dimension uncontrolled in L3 only for reference
- (3) Dimension D1, E1, L2 and b2 establish a minimum mounting surface for thermal pad
- (4) Dimensions D and E do not include mold flash.
- (5) Outline conforms to JEDEC outline TO-252AA



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