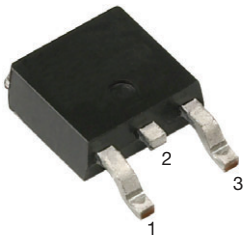
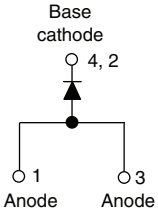
THE DATASHEET OF

VS-10WQ045FNTRHM3

High Performance Schottky Rectifier, 10 A



DPAK (TO-252AA)



FEATURES

- Low forward voltage drop
- Guard ring for enhanced ruggedness and long term reliability
- Popular DPAK (TO-252AA) 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

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.

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	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
E_{AS}	20 mJ
Package	DPAK (TO-252AA)
Circuit configuration	Single

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	10	A
V_{RRM}		45	V
I_{FSM}	t_p = 5 µs 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	Following any rated load condition and with rated V_{RRM} applied	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 x V_R typical		3.0	A

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ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop See fig. 1	V_{FM} (1)	10 A	T_J = 25 °C	0.63	V
		20 A		0.80	
		10 A	T_J = 125 °C	0.53	
		20 A		0.71	
Maximum reverse leakage current See fig. 2	I_{RM} (1)	T_J = 25 °C	V_R = rated V_R	1	mA
		T_J = 125 °C		15	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.255	V
Forward slope resistance	r_t			22	mΩ
Typical junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz), 25 °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	°C
Maximum thermal resistance, junction to case	R_{thJC}	DC operation See fig. 4	2.0	°C/W
Maximum thermal resistance, junction to ambient	R_{thJA}		50	
Approximate weight			0.3	g
			0.01	oz.
Marking device		Case style DPAK (TO-252AA)	10WQ045FNH	

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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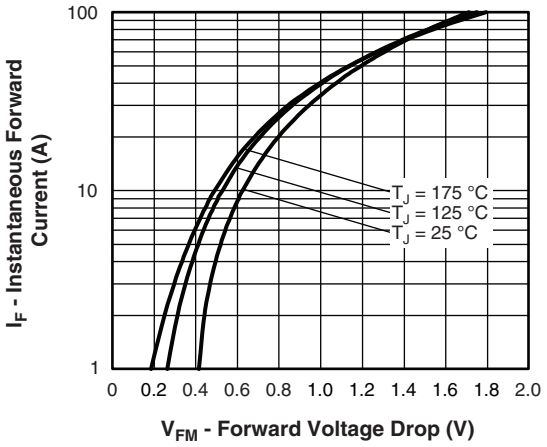

Fig. 1 - Maximum Forward Voltage Drop Characteristics

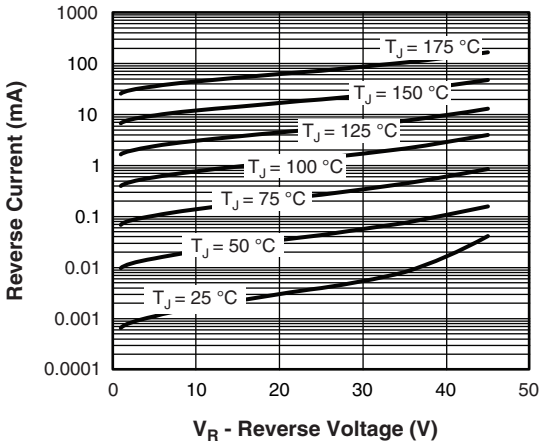

Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

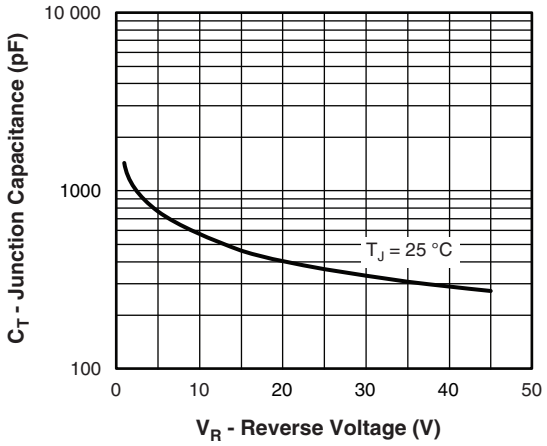

Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

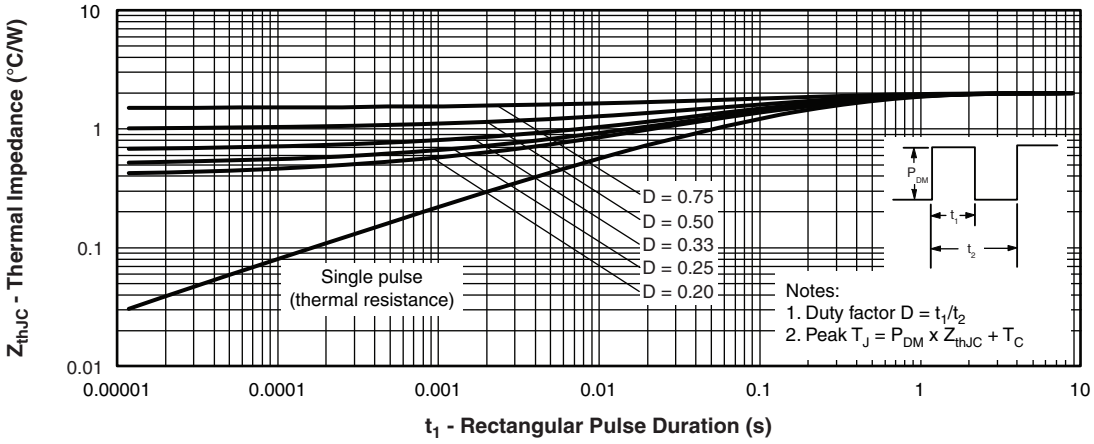

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

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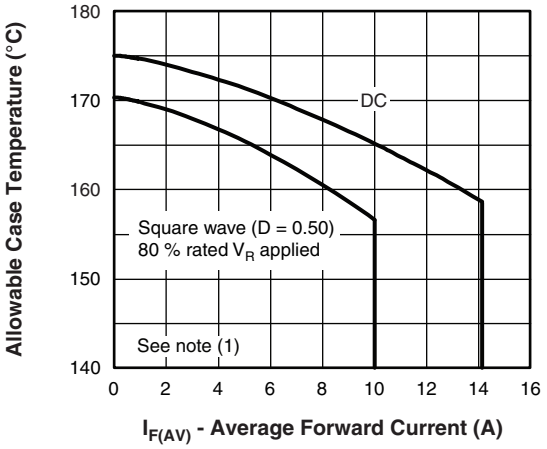

Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

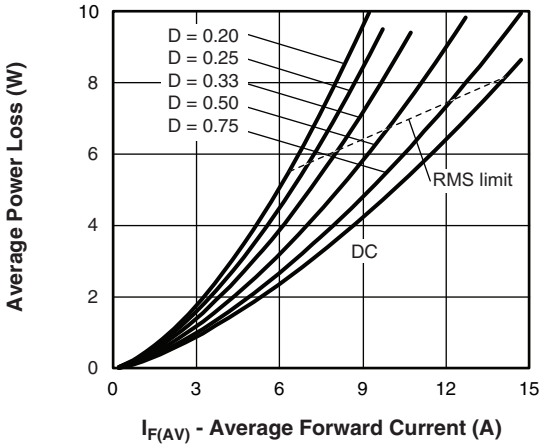

Fig. 6 - Forward Power Loss Characteristics

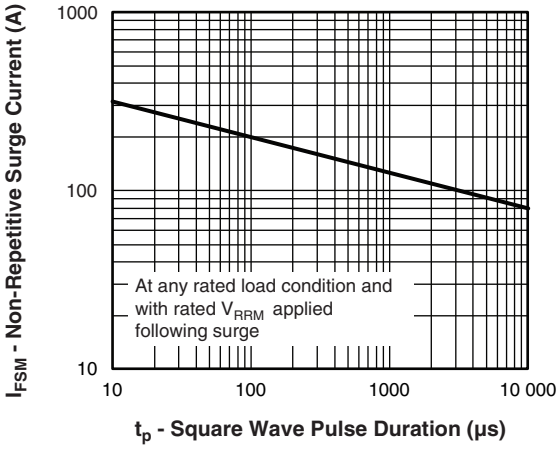

Fig. 7 - Maximum Non-Repetitive Surge Current

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
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

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 = DPAK

4 - Schottky “Q” series

5 - Voltage rating (045 = 45 V)

6 - FN = TO-252AA (DPAK)

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
SPICE model	www.vishay.com/doc?96555

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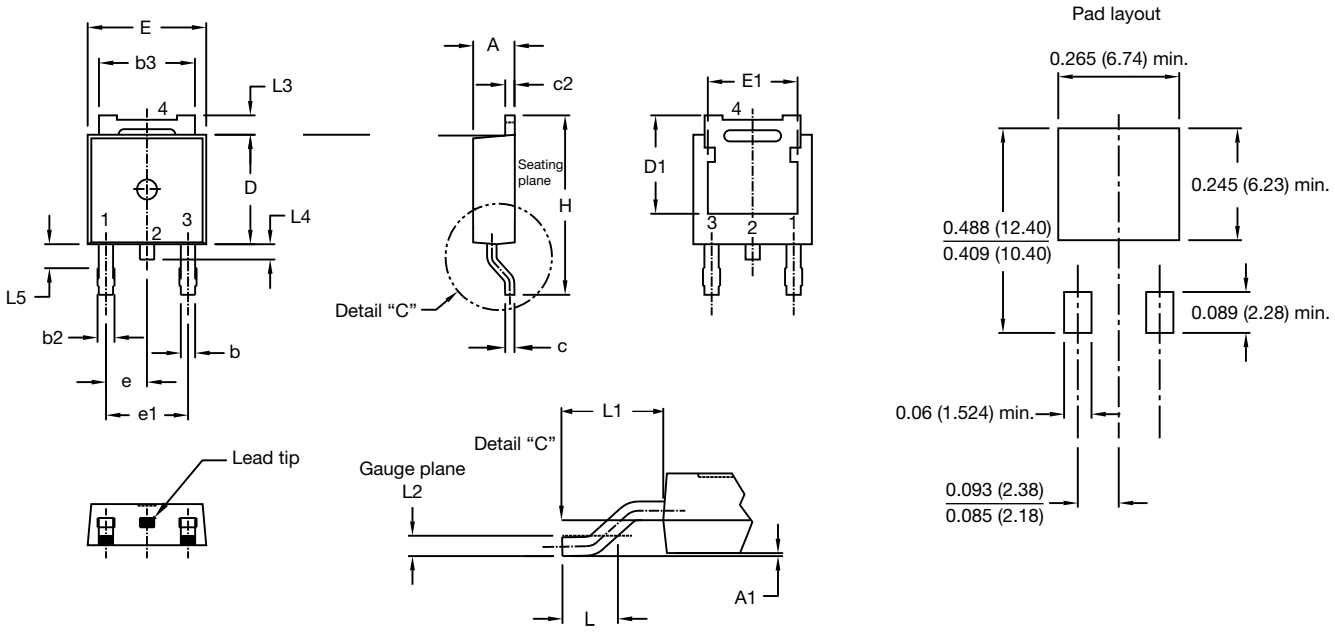
DPAK (TO-252AA)

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	4.93	-	0.194	-	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

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, except for D1 dimension

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