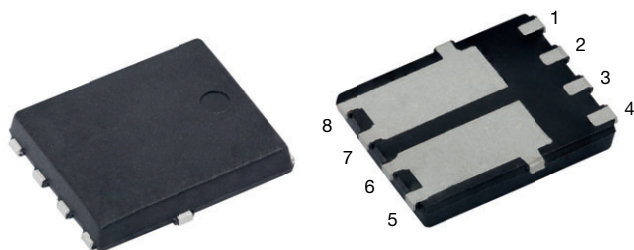
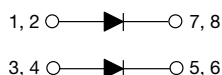


Hyper Fast Rectifier, 2 x 4 A FRED Pt®



FlatPAK 5 x 6



FEATURES

- Hyper fast recovery time, reduced Q_{rr} , and soft recovery
- 175 °C maximum operating junction temperature
- Specific for output and snubber operation
- Low forward voltage drop
- Low leakage current
- 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 / APPLICATIONS

State of the art hyper fast recovery rectifiers specifically designed with optimized performance of forward voltage drop and hyper fast recovery time.

The planar structure and the platinum doped life time control guarantee the best overall performance, ruggedness, and reliability characteristics.

These devices are intended for use in snubber, boost, piezo-injection, as high frequency rectifiers, and freewheeling diodes.

The extremely optimized stored charge and low recovery current minimize the switching losses and reduce power dissipation in the switching element.

MECHANICAL DATA

Case: FlatPAK 5 x 6

Molding compound meets UL 94 V-0 flammability rating
Base P/N-M3 - halogen-free, RoHS-compliant

Terminals: matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

M3 suffix meets JESD 201 class 2 whisker test

PRODUCT SUMMARY	
Package	FlatPAK 5 x 6
$I_{F(AV)}$	2 x 4 A
V_R	200 V
V_F at I_F	0.7 V
t_{rr} (typ.)	25 ns
T_J max.	175 °C
Diode variation	Separated cathode

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	V_{RRM}		200	V
Average rectified forward current per device	$I_{F(AV)}$	$T_{Solderpad} = 170\text{ °C}$, DC	8	A
		$T_{Solderpad} = 169\text{ °C}$, $D = 0.5$		
Non-repetitive peak surge current per device per diode	I_{FSM}	$T_J = 25\text{ °C}$, 10 ms sinusoidal pulse	173	
			87	
Operating junction and storage temperatures	T_J, T_{Stg}		-55 to +175	°C



ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	V_{BR}, V_R	$I_R = 100\text{ }\mu\text{A}$	200	-	-	V
Forward voltage, per diode	V_F	$I_F = 4\text{ A}$	-	0.87	0.96	
		$I_F = 4\text{ A}, T_J = 150\text{ }^{\circ}\text{C}$	-	0.7	0.78	
Reverse leakage current, per diode	I_R	$V_R = V_R\text{ rated}$	-	-	2	μA
		$T_J = 150\text{ }^{\circ}\text{C}, V_R = V_R\text{ rated}$	-	7	80	
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	19	-	pF

DYNAMIC RECOVERY CHARACTERISTICS ($T_J = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 1.0\text{ A}, dI_F/dt = 50\text{ A}/\mu\text{s}, V_R = 30\text{ V}$	-	20	-	ns
		$I_F = 0.5\text{ A}, I_R = 1\text{ A}, I_{rr} = 0.25\text{ A}$	-	-	25	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	17	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	29	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	2.1	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	4	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	18	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	60	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-55	-	175	$^{\circ}\text{C}$
Thermal resistance, junction to ambient, per diode	$R_{thJA}^{(1)(2)}$		-	89	103	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction to case, per diode	$R_{thJC}^{(3)}$		-	1.8	2.1	

Notes

- (1) The heat generated must be less than the thermal conductivity from junction to ambient: $dP_D/dT_J < 1/R_{thJA}$
 (2) Free air, mounted or recommended copper pad area; thermal resistance R_{thJA} - junction to ambient
 (3) Mounted on infinite heatsink

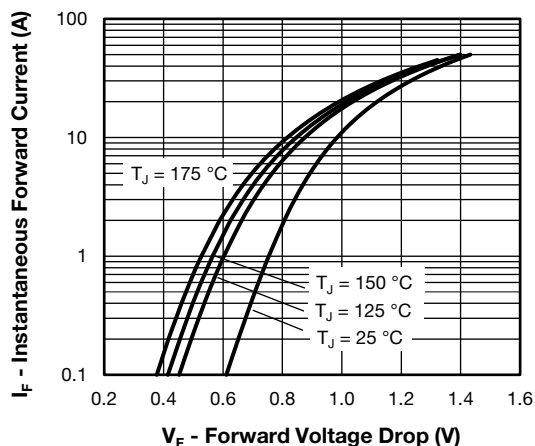


Fig. 1 - Typical Forward Voltage Drop Characteristics

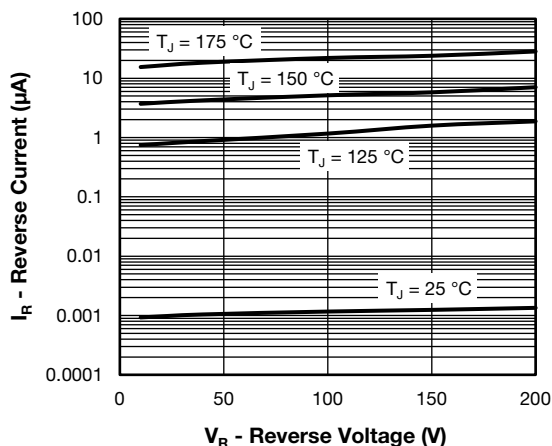


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

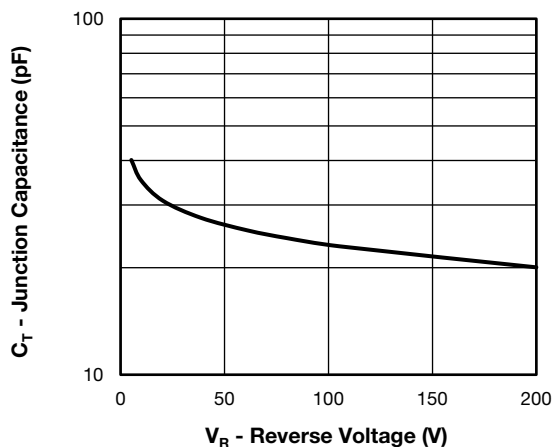
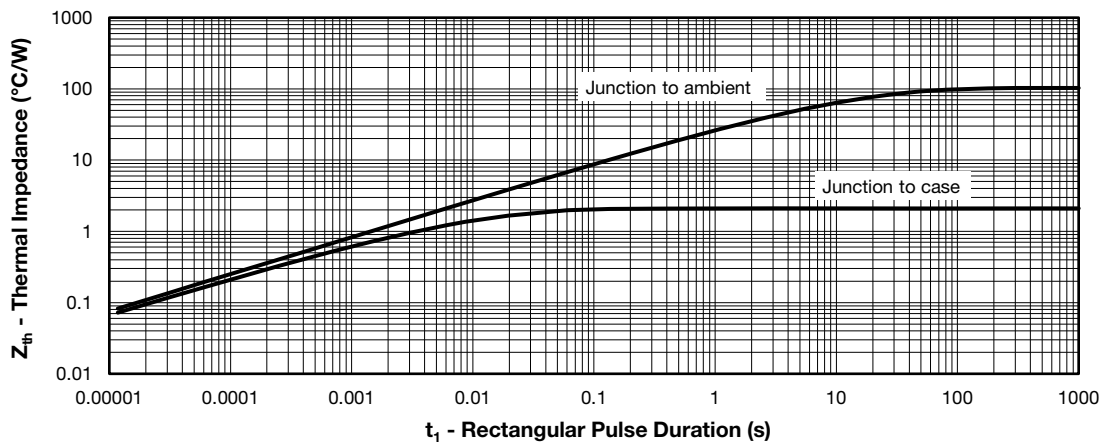


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

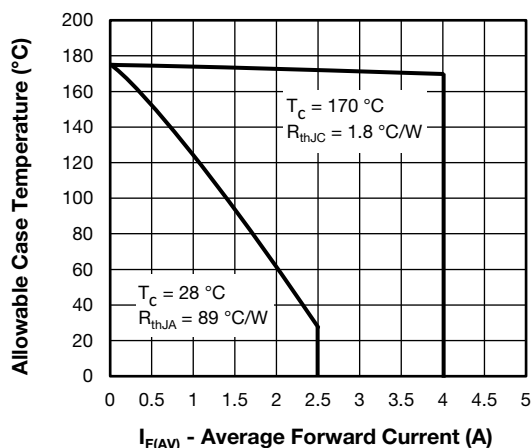


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

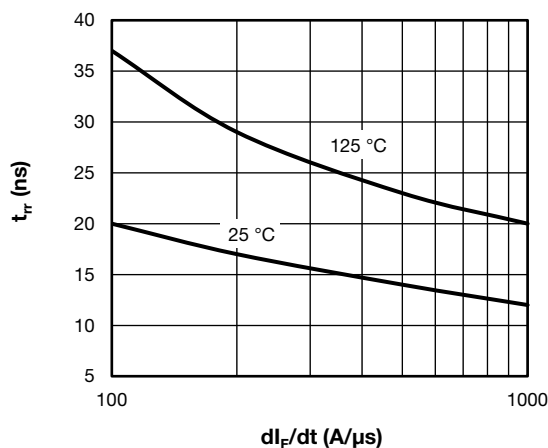


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

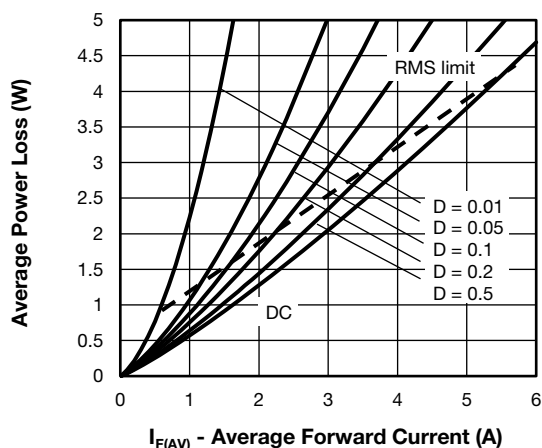


Fig. 6 - Forward Power Loss Characteristics

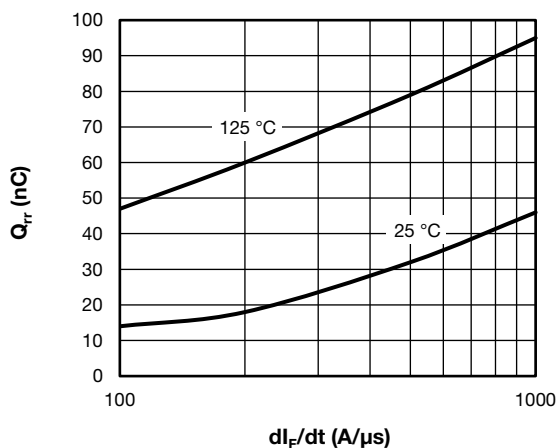


Fig. 8 - Typical Stored Charge vs. dI_F/dt

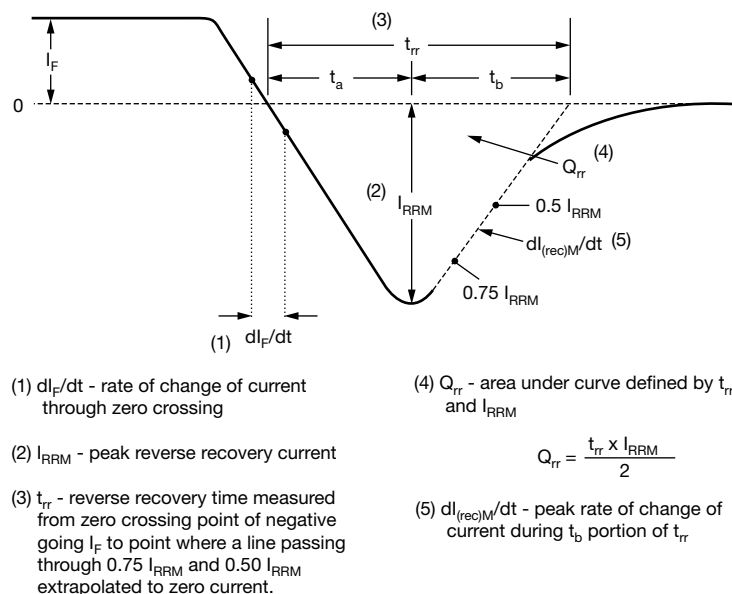


Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE

Device code	VS-	8	D	K	H	02	-M3
	1	2	3	4	5	6	7

- 1 - Vishay Semiconductors product
- 2 - Current rating (8 = 8 A)
- 3 - Circuit configuration:
D = separated cathode
- 4 - K = FlatPAK package
- 5 - Process type,
H = hyper fast recovery
- 6 - Voltage code (02 = 200 V)
- 8 - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

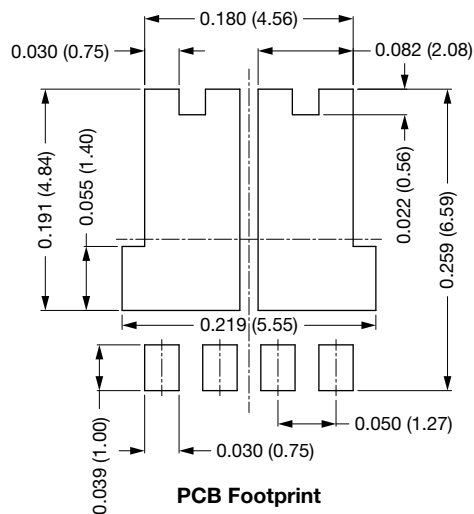
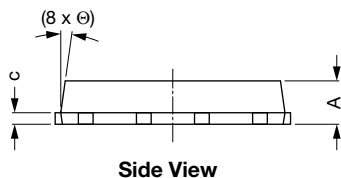
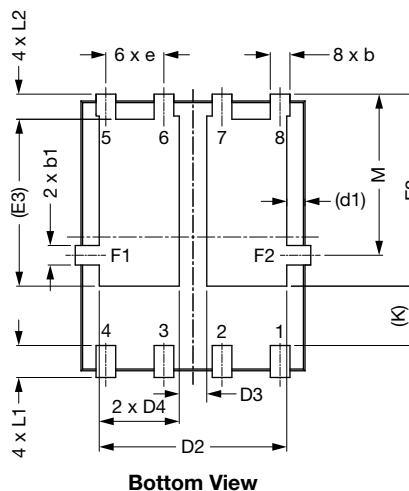
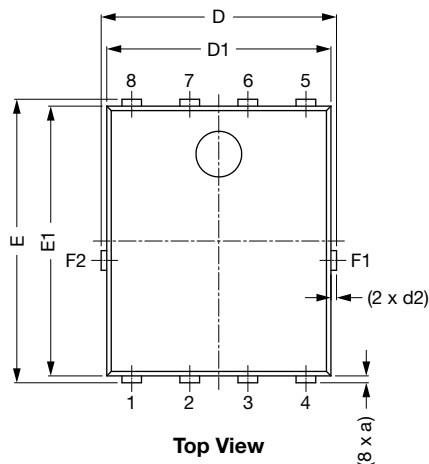
ORDERING INFORMATION (example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	PACKAGING DESCRIPTION
VS-8DKH02-M3/H	0.10	H	1500	7" diameter plastic tape and reel
VS-8DKH02-M3/I	0.10	I	6000	13" diameter plastic tape and reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96056
Part marking information	www.vishay.com/doc?96059
Packaging information	www.vishay.com/doc?88869



FlatPAK 5 x 6 (Dual)

DIMENSIONS in inches (millimeters)



DIM.	INCHES			MILLIMETERS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.035	0.039	0.043	0.89	0.99	1.09
(a)	-	0.006	-	-	0.15	-
b	0.013	0.017	0.020	0.32	0.43	0.52
b1	0.013	0.017	0.020	0.32	0.43	0.52
c	0.008	-	0.014	0.20	-	0.35
D	0.197	0.203	0.209	5.00	5.15	5.30
D1	0.189	0.193	0.197	4.80	4.90	5.00
D2	0.154	0.161	0.169	3.90	4.10	4.30
D3	0.020	0.024	0.031	0.50	0.60	0.80
D4	0.063	0.069	0.075	1.60	1.75	1.90
(d1)	-	0.016	-	-	0.40	-
(d2)	-	0.005	-	-	0.125	-
E	0.238	0.244	0.250	6.05	6.20	6.35



DIM.	INCHES			MILLIMETERS		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
E1	0.228	0.232	0.236	5.80	5.90	6.00
E2	0.157	0.165	0.173	4.00	4.20	4.40
(E3)	-	0.144	-	-	3.65	-
e	0.050 BSC			1.27 BSC		
(K)	0.039	-	-	1.00	-	-
L1	0.019	-	0.043	0.48	-	1.10
L2	0.012	-	0.031	0.30	-	0.80
M	0.128	0.138	0.148	3.25	3.50	3.75
Θ	0°	-	10°	0°	-	10°

Notes

- Dimensioning and tolerancing per ASME Y14.5-2009
- Dimensions D1 and E1 do not include mold flash or gate burrs
- Dimension (XX) means reference only



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