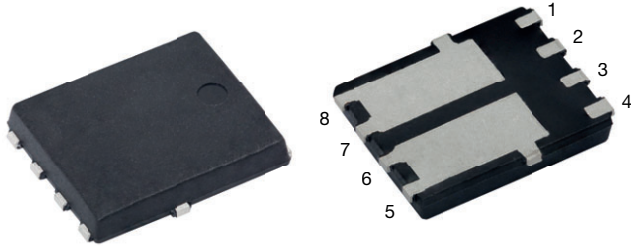


Hyper Fast Rectifier, 2 x 3 A FRED Pt®


FlatPAK 5 x 6

1, 2 7, 8

3, 4 5, 6

FEATURES

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

PRODUCT SUMMARY	
Package	FlatPAK 5 x 6
$I_{F(AV)}$	2 x 3 A
V_R	200 V
V_F at I_F	0.71 V
t_{rr}	25 ns
T_J max.	175 °C
Diode variation	Separated cathode

MECHANICAL DATA

Case: FlatPAK 5 x 6

Molding compound meets UL 94 V-0 flammability rating

Base P/N-M3 - halogen-free, RoHS-compliant

M3 suffix meets JESD 201 class 2 whisker test

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	3	
Non-repetitive peak surge current per device per diode	I_{FSM}	$T_{Solderpad} = 169\text{ °C}$, $D = 0.5$	147	A
		$T_J = 25\text{ °C}$, 10 ms sinusoidal pulse		

ELECTRICAL SPECIFICATIONS ($T_J = 25\text{ °C}$ 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	V_F	$I_F = 3\text{ A}$	-	0.88	0.94	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	2	μA
		$T_J = 150\text{ °C}$, $V_R = V_R$ rated	-	6	40	
Junction capacitance	C_T	$V_R = 200\text{ V}$	-	14	-	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}	$I_F = 1.0\text{ A}$, $di_F/dt = 50\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	26	-	ns	
		$I_F = 0.5\text{ A}$, $I_R = 1\text{ A}$, $I_{rr} = 0.25\text{ A}$	-	-	25		
		$T_J = 25\text{ }^\circ\text{C}$	-	15	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	25	-		
Peak recovery current	I_{RRM}	$I_F = 3\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 160\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	2	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	3	-	
Reverse recovery charge	Q_{rr}	$I_F = 3\text{ A}$ $di_F/dt = 200\text{ A}/\mu\text{s}$ $V_R = 160\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	12	-	nC
			$T_J = 125\text{ }^\circ\text{C}$	-	40	-	

THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	T_J , T_{Stg}		-65	-	175	$^\circ\text{C}$
Thermal resistance, junction to ambient	R_{thJA} (1)(2)		-	90	103	
Thermal resistance, junction to case	R_{thJC} (3)		-	2.3	2.6	$^\circ\text{C}/\text{W}$

Notes

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

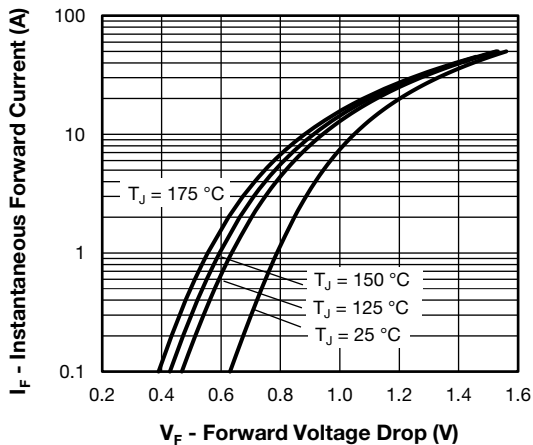


Fig. 1 - Typical Forward Voltage Drop Characteristics

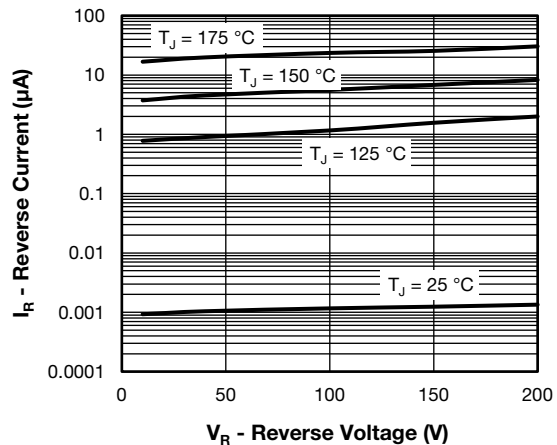


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

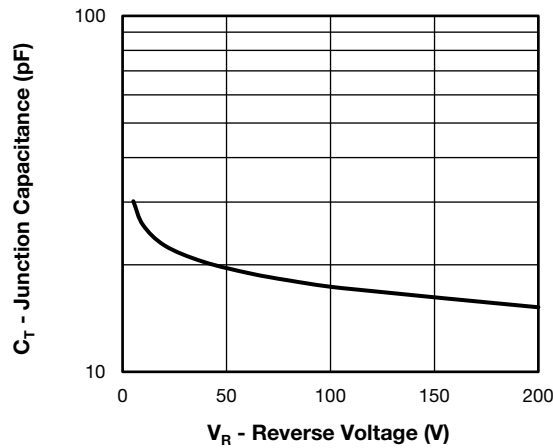


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

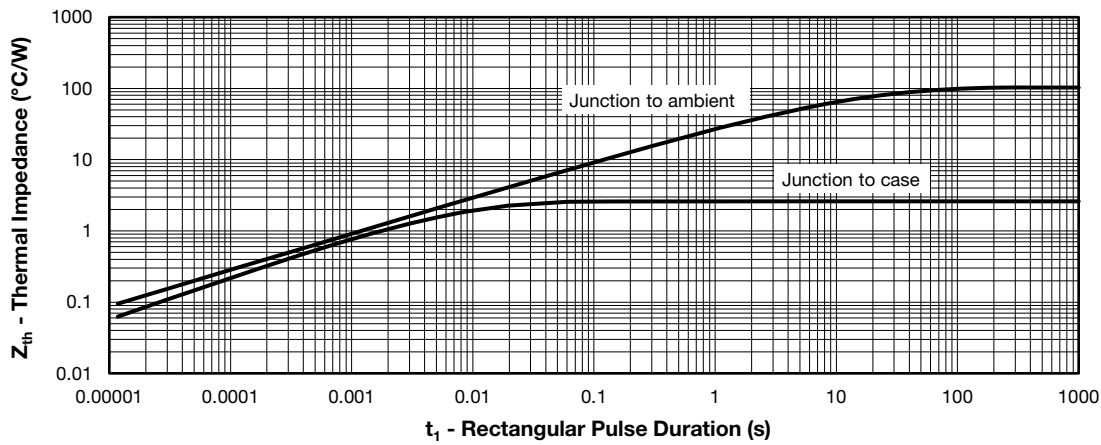


Fig. 4 - Maximum Thermal Impedance Z_{th} Characteristics

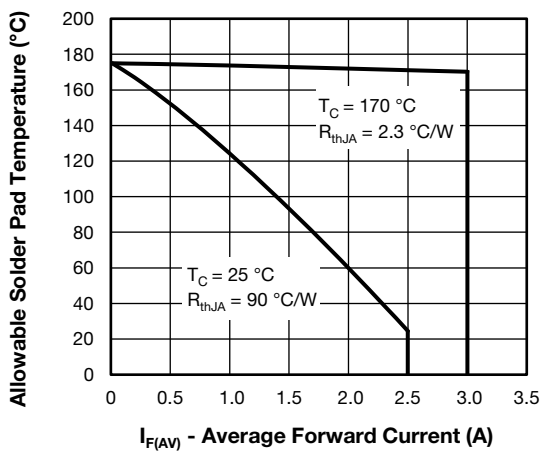


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

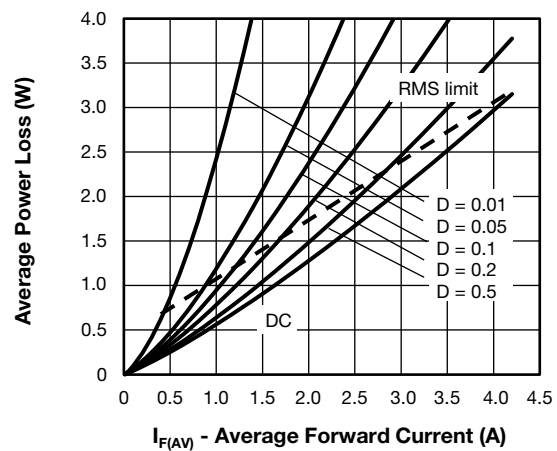


Fig. 6 - Forward Power Loss Characteristics

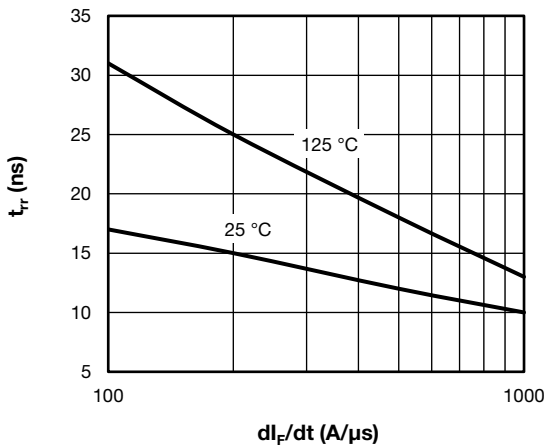


Fig. 7 - Typical Reverse Recovery vs. di_F/dt

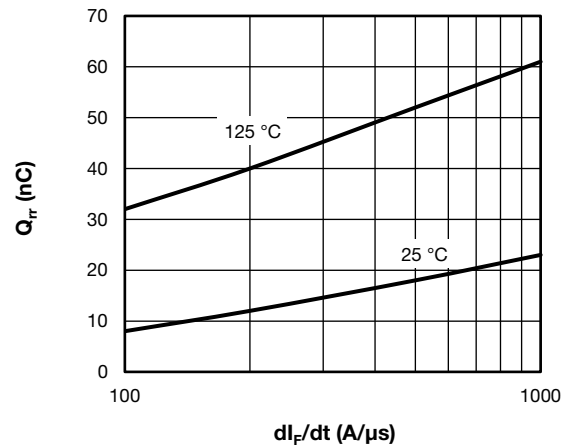
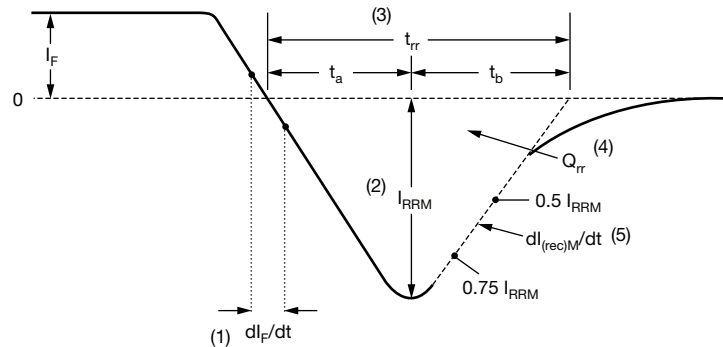


Fig. 8 - Typical Stored Charge vs. di_F/dt

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} = rated V_R

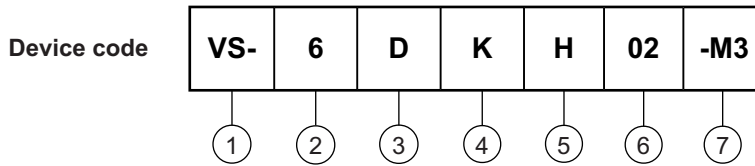


- (1) di_F/dt - rate of change of current through zero crossing
- (2) I_{RRM} - peak reverse recovery current
- (3) t_{rr} - reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.
- (4) Q_{rr} - area under curve defined by t_{rr} and I_{RRM}
- $$Q_{rr} = \frac{t_{rr} \times I_{RRM}}{2}$$
- (5) $dl_{(rec)M}/dt$ - peak rate of change of current during t_b portion of t_{rr}

Fig. 9 - Reverse Recovery Waveform and Definitions



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (6 = 6 A)
- 3** - Circuit configuration:
D = separated cathode
- 4** - K = FlatPAK package
- 5** - Process type:
H = hyperfast recovery
- 6** - Voltage code (02 = 200 V)
- 7** - -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-6DKH02-M3/H	0.10	H	1500	7" diameter plastic tape and reel
VS-6DKH02-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



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