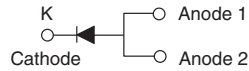


## Hyper Fast Rectifier, 6 A FRED Pt<sup>®</sup>



SMPC (TO-277A)



### FEATURES

- Hyper fast recovery time, reduced  $Q_{rr}$ , and soft recovery
- 175 °C maximum operating junction temperature
- For PFC, CRM/CCM, snubber operation
- Low forward voltage drop
- Low leakage current
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Meets JESD 201 class 2 whisker test
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
 COMPLIANT  
 HALOGEN  
**FREE**

PRODUCT SUMMARY	
Package	SMPC (TO-277A)
$I_{F(AV)}$	6 A
$V_R$	600 V
$V_F$ at $I_F$	1.05 V
$t_{rr}$ (typ.)	33 ns
$T_J$ max.	175 °C
Diode variation	Single die

### 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 PFC, boost, lighting, in the AC/DC section of SMPS, freewheeling and clamp diodes.

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

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Peak repetitive reverse voltage	$V_{RRM}$		600	V
Average rectified forward current	$I_{F(AV)}$	$T_{Sp} = 145$ °C	6	A
Non-repetitive peak surge current	$I_{FSM}$	$T_J = 25$ °C	90	
Operating junction and storage temperatures	$T_J, T_{Stg}$		-65 to +175	°C

ELECTRICAL SPECIFICATIONS ( $T_J = 25$ °C unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	$V_{BR}, V_R$	$I_R = 100$ $\mu$ A	600	-	-	V
		$I_F = 6$ A	-	1.30	1.80	
Forward voltage	$V_F$	$I_F = 6$ A, $T_J = 150$ °C	-	1.05	1.55	V
		$V_R = V_R$ rated	-	-	5	
Reverse leakage current	$I_R$	$T_J = 150$ °C, $V_R = V_R$ rated	-	50	300	$\mu$ A
			-	-	-	
Junction capacitance	$C_T$	$V_R = 600$ V	-	8	-	pF

<b>DYNAMIC RECOVERY CHARACTERISTICS</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	$t_{rr}$	$I_F = 1\text{ A}$ , $dI_F/dt = 50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	33	-	ns	
		$I_F = 0.5\text{ A}$ , $I_R = 1\text{ A}$ , $I_{rr} = 0.25\text{ A}$	-	-	40		
		$T_J = 25\text{ }^\circ\text{C}$	-	40	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	75	-		
Peak recovery current	$I_{RRM}$	$I_F = 6\text{ A}$ $dI_F/dt = 500\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	6.8	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	11	-	
Reverse recovery charge	$Q_{rr}$		$T_J = 25\text{ }^\circ\text{C}$	-	140	-	nC
			$T_J = 125\text{ }^\circ\text{C}$	-	400	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>						
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 solder pad	$R_{thJ-Sp}$		-	2.4	3.5	$^\circ\text{C}/\text{W}$
Approximate weight			0.1			g
			0.0035			oz.
Marking device		Case style SMPC (TO-277A)	NEH6			

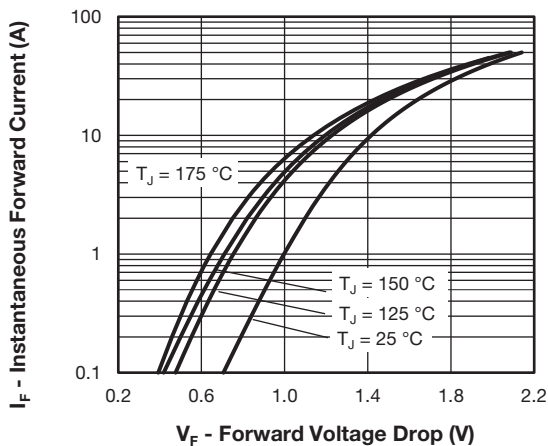


Fig. 1 - Typical Forward Voltage Drop Characteristics

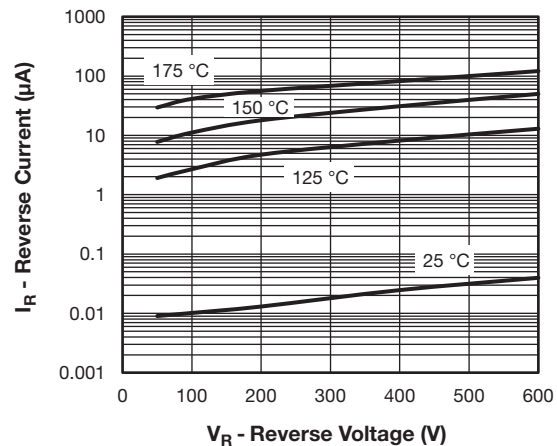


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

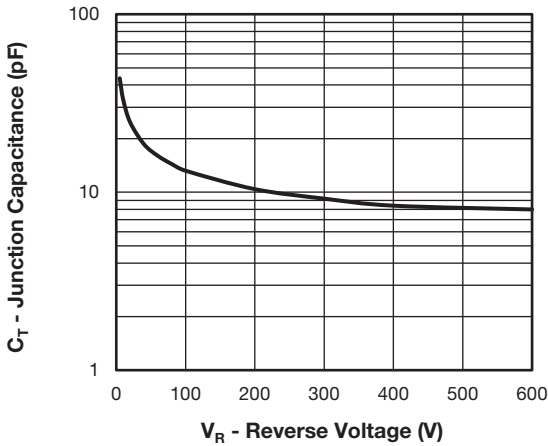


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

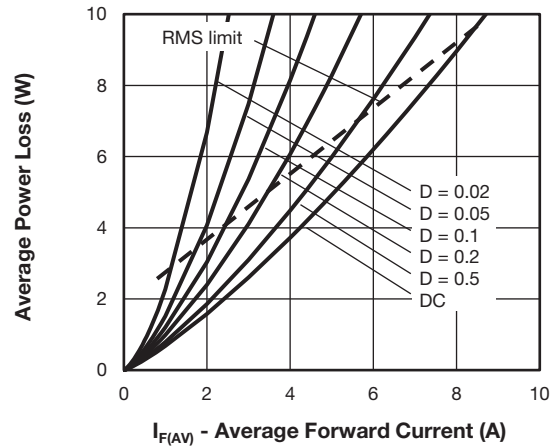


Fig. 5 - Forward Power Loss Characteristics

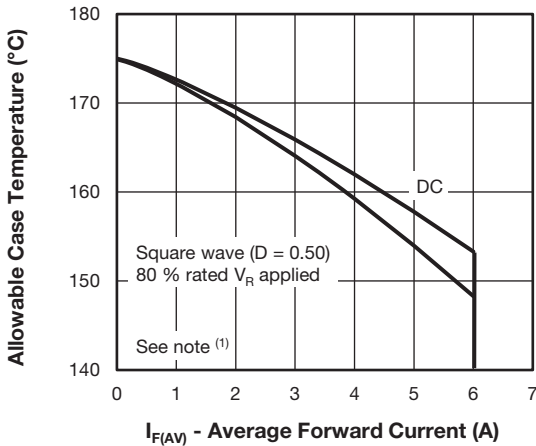


Fig. 4 - Maximum Allowable Case Temperature vs. Average Forward Current

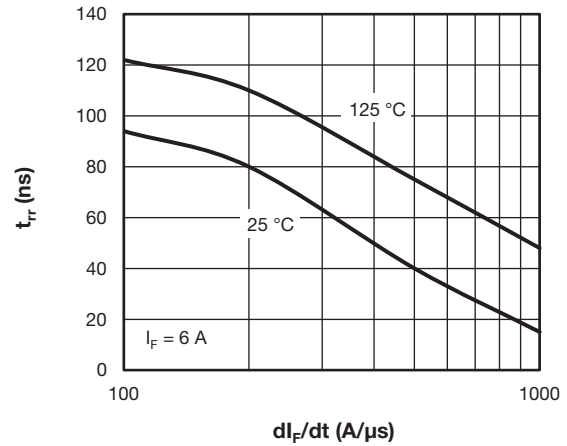


Fig. 6 - Typical Reverse Recovery Time vs.  $di_F/dt$

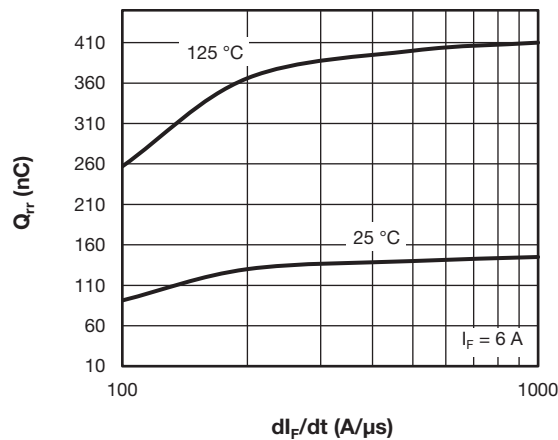


Fig. 7 - Typical Stored Charge vs.  $di_F/dt$

**Note**

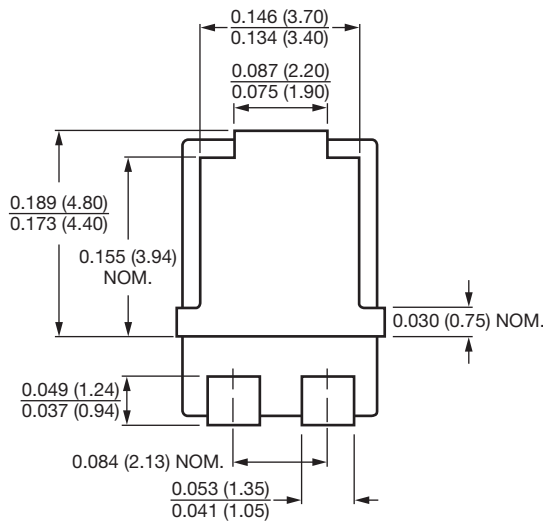
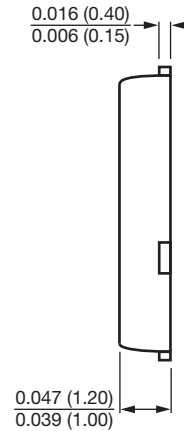
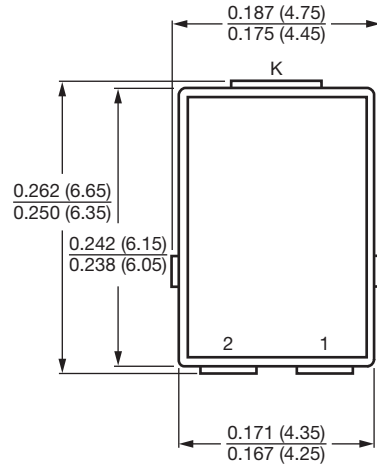
- (1) Formula used:  $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$ ;
- $Pd$  = forward power loss =  $I_{F(AV)} \times V_{FM}$  at  $(I_{F(AV)}/D)$  (see fig. 5);
- $Pd_{REV}$  = inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_{R1}$  = rated  $V_R$



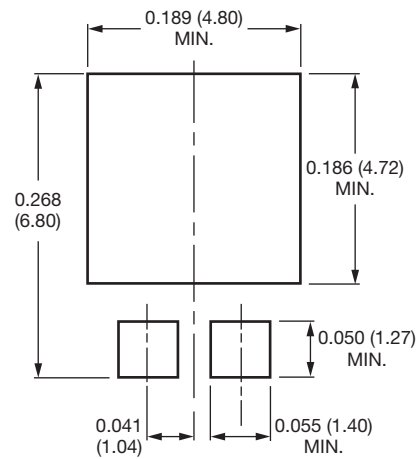


## TO-277A (SMPC)

**DIMENSIONS** in inches (millimeters)



### Mounting Pad Layout



Conform to JEDEC® TO-277A



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