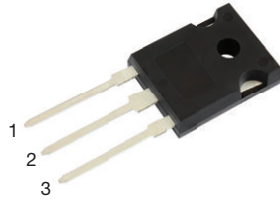
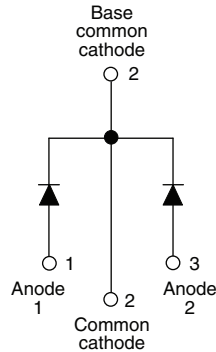


## Hyperfast Soft Recovery Diode, 2 x 30 A FRED Pt® Gen 4



TO-247AD 3L



### FEATURES

- Gen 4 FRED Pt® technology
- Low  $I_{RRM}$  and reverse recovery charge
- Very low forward voltage drop
- Polyimide passivated chip for high reliability standard
- 175 °C operating junction temperature
- Material categorization:  
for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



PRODUCT SUMMARY	
Package	TO-247AD 3L
$I_{F(AV)}$	2 x 30 A
$V_R$	600 V
$V_F$ at $I_F$	1.37 V
$t_{rr}$ typ.	see Recovery table
$T_J$ max.	175 °C
Diode variation	Common cathode

### DESCRIPTION

Gen 4 Fred technology, state of the art, ultralow  $V_F$ , soft switching optimized for Discontinuous (Critical) Mode (DCM) and IGBT F/W diode.

The minimized conduction loss, optimized stored charge and low recovery current minimized the switching losses and reduce over dissipation in the switching element and snubbers.

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Cathode to anode voltage	$V_R$		600	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 122$ °C	30	A
Non-repetitive peak surge current, per leg	$I_{FSM}$	$T_C = 25$ °C, $t_p = 8.3$ ms, half sine wave	240	
Operating junction and storage temperatures	$T_J, T_{Stg}$		-55 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
Forward voltage	$V_F$	$I_F = 30$ A	-	1.65	2	
		$I_F = 60$ A	-	1.95	-	
		$I_F = 30$ A, $T_J = 125$ °C	-	1.44	-	
		$I_F = 60$ A, $T_J = 125$ °C	-	1.78	-	
		$I_F = 30$ A, $T_J = 150$ °C	-	1.37	1.6	
		$I_F = 60$ A, $T_J = 150$ °C	-	1.68	-	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	-	50	$\mu$ A
		$T_J = 125$ °C, $V_R = V_R$ rated	-	-	500	
Junction capacitance	$C_T$	$V_R = 600$ V	-	18.3	-	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	$t_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	$I_F = 30\text{ A}$ $di_F/dt = 1000\text{ A}/\mu\text{s}$ $V_R = 400\text{ V}$	-	55	-	ns
		$T_J = 125\text{ }^\circ\text{C}$		-	75	-	
Peak recovery current	$I_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$		-	13	-	A
		$T_J = 125\text{ }^\circ\text{C}$		-	23	-	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$		-	500	-	nC
		$T_J = 125\text{ }^\circ\text{C}$		-	1250	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS</b>							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	$R_{thJC}$			-	-	1	$^\circ\text{C}/\text{W}$
Thermal resistance, case to heat sink	$R_{thCS}$	Mounting surface, flat, smooth, and greased		-	0.4	-	
Weight				-	6.0	-	g
				-	0.21	-	oz.
Mounting torque				6.0 (5)	-	12 (20)	kgf · cm (lbf · in)
Marking device		Case style TO-247AD 3L		C4PH6006L			

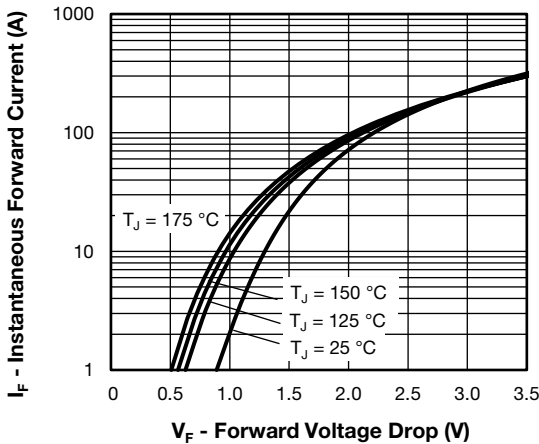


Fig. 1 - Typical Forward Voltage Drop Characteristics

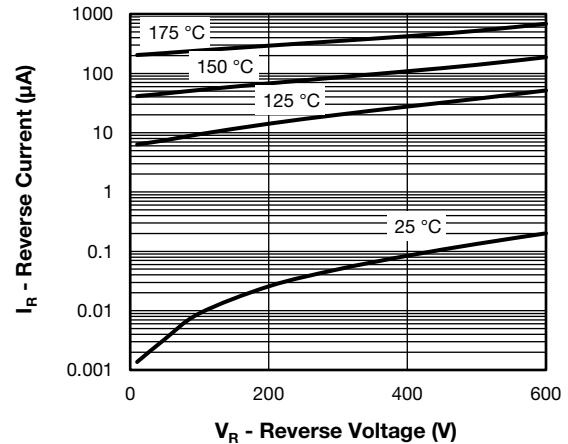


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

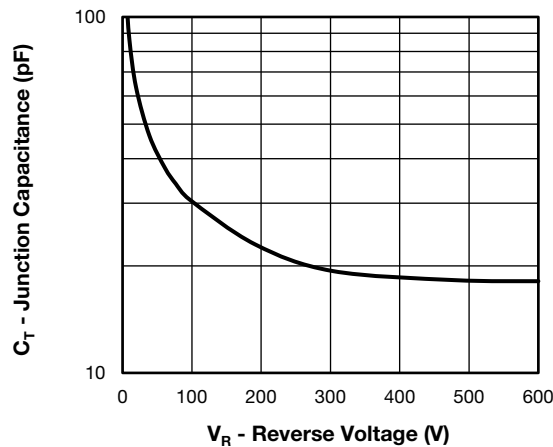


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

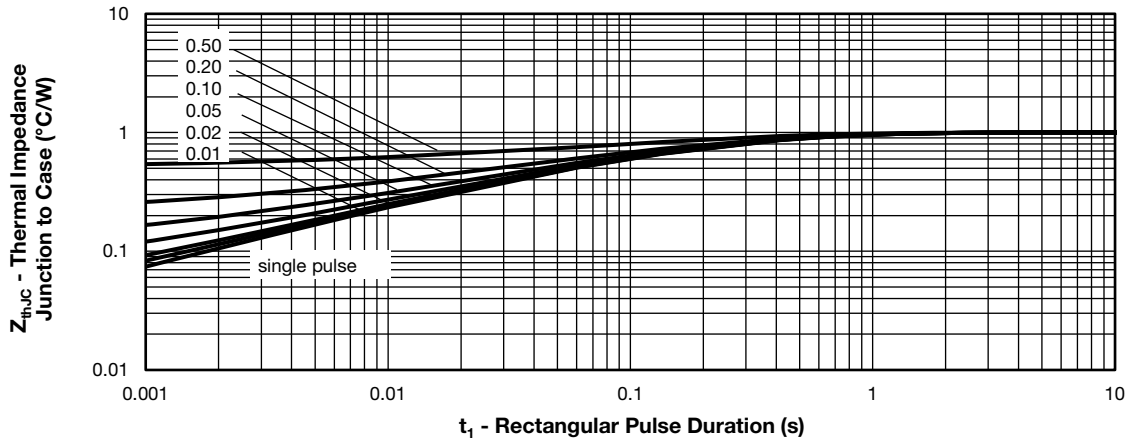


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

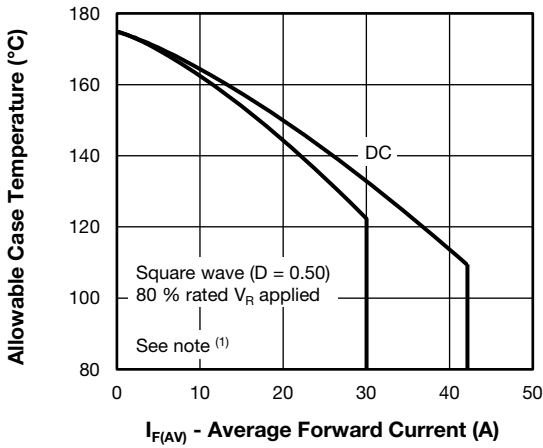


Fig. 5 - Max. Allowable Case Temperature vs. Average Forward Current

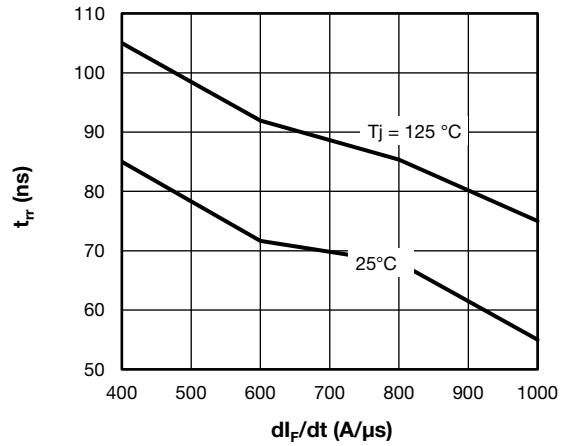


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$

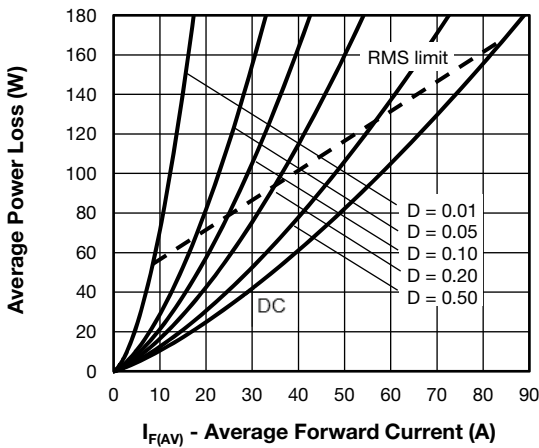


Fig. 6 - Forward Power Loss Characteristics

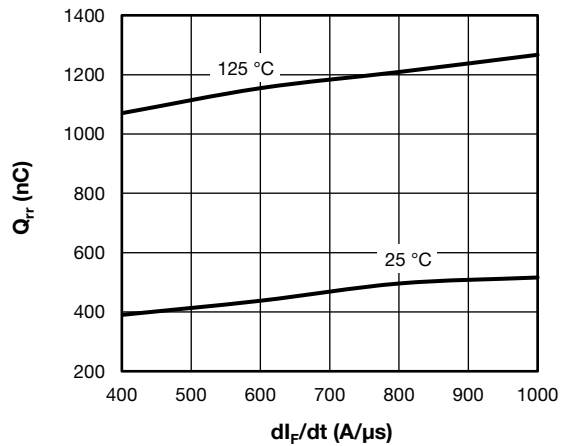


Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$

**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.5)  
 $P_{dREV}$  = Inverse power loss =  $V_{R1} \times I_R (1 - D)$ ;  $I_R$  at  $V_R$  = rated  $V_R$

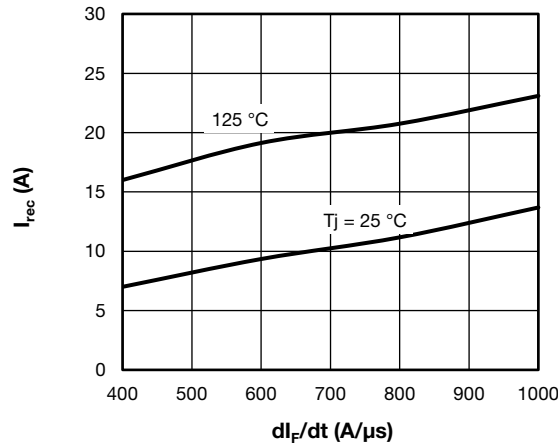


Fig. 9 - Typical Reverse Recovery vs.  $di_F/dt$

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>C</b>	<b>4</b>	<b>P</b>	<b>H</b>	<b>60</b>	<b>06</b>	<b>L</b>	<b>-N3</b>
	①	②	③	④	⑤	⑥	⑦	⑧	⑨

- 1** - Vishay Semiconductors product
- 2** - Circuit configuration:  
C = common cathode
- 3** - FRED Gen 4
- 4** - P = TO-247 package
- 5** - Process type:  
H = hyperfast recovery
- 6** - Current rating (60 = 60 A)
- 7** - Voltage rating (06 = 600 V)
- 8** - L = long lead
- 9** - Environmental digit:  
-N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free

<b>ORDERING INFORMATION</b> (Example)			
PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-C4PH6006L-N3	25	500	Antistatic plastic tube

<b>LINKS TO RELATED DOCUMENTS</b>		
Dimensions	TO-247AD 3L	<a href="http://www.vishay.com/doc?95626">www.vishay.com/doc?95626</a>
Part marking information	TO-247AD 3L	<a href="http://www.vishay.com/doc?95007">www.vishay.com/doc?95007</a>



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