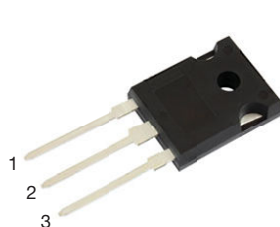
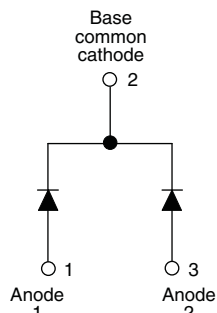


Hyperfast Soft Recovery Diode, 2 x 15 A FRED Pt® Gen 4



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
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

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 minimize the switching losses and reduce power dissipation in the switching element and snubbers.

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	2 x 15 A
V_R	600 V
V_F at I_F	1.28 V
t_{rr} typ.	See Recovery table
T_J max.	175 °C
Package	TO-247AD 3L
Circuit configuration	Common cathode

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	V_{RRM}		600	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 142$ °C	15	A
Non-repetitive peak surge current, per leg	I_{FSM}	$T_C = 25$ °C, $t_p = 8.3$ ms, half sine wave	200	
Operating junction and storage temperature	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	$I_R = 100$ μ A	600	-	-	V
Forward voltage	V_F	$I_F = 15$ A	-	1.6	1.9	
		$I_F = 30$ A	-	1.87	-	
		$I_F = 15$ A, $T_J = 125$ °C	-	1.35	-	
		$I_F = 30$ A, $T_J = 125$ °C	-	1.67	-	
		$I_F = 15$ A, $T_J = 150$ °C	-	1.28	1.52	
		$I_F = 30$ A, $T_J = 150$ °C	-	1.61	-	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	-	15	μ A
		$T_J = 125$ °C, $V_R = V_R$ rated	-	-	500	
Junction capacitance	C_T	$V_R = 600$ V	-	16	-	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}	$T_J = 25\text{ }^{\circ}\text{C}$	-	50	-	ns
		$T_J = 125\text{ }^{\circ}\text{C}$	-	70	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	8.5	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	16	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	250	-	nC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	600	-	

 $I_F = 15\text{ A}$
 $di_F/dt = 1000\text{ A}/\mu\text{s}$
 $V_R = 400\text{ V}$
THERMAL - MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Thermal resistance, junction to case	R_{thJC}		-	-	1.4	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction to ambient	R_{thJA}	Typical socket mount	-	-	40	
Thermal resistance, case to heat sink	R_{thCS}		-	0.4	-	
Weight			-	6.0	-	g
			-	0.21	-	oz.
Mounting torque			6.0 (5)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-247AD 3L	C4PH3006L			

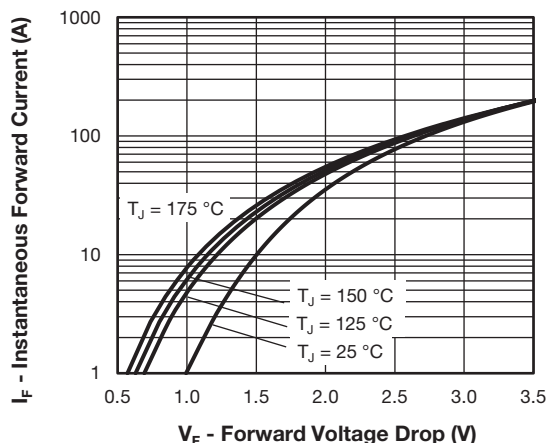


Fig. 1 - Typical Forward Voltage Drop Characteristics

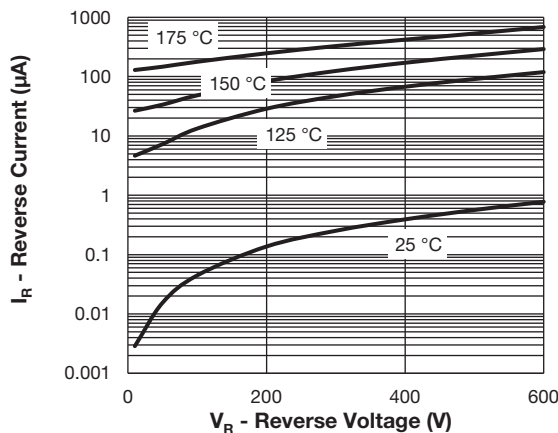


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

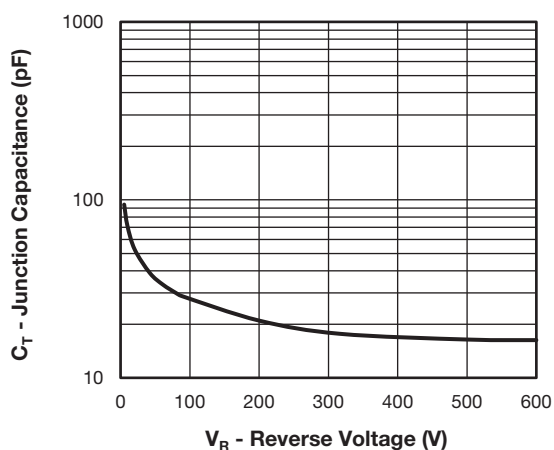


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

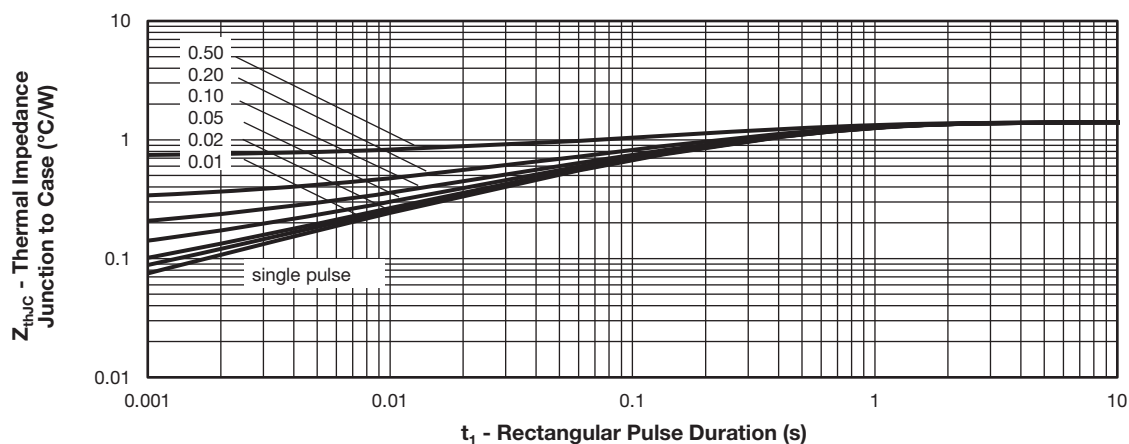
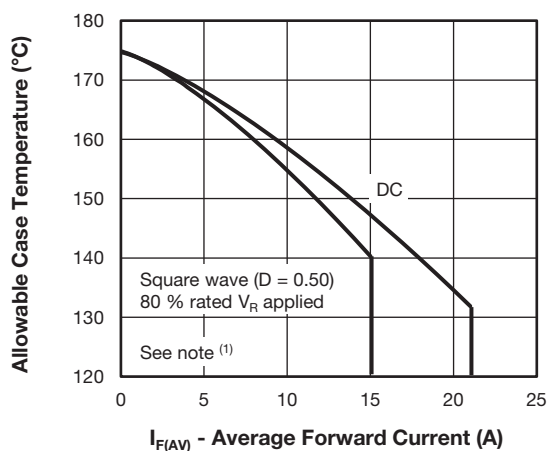

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics


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

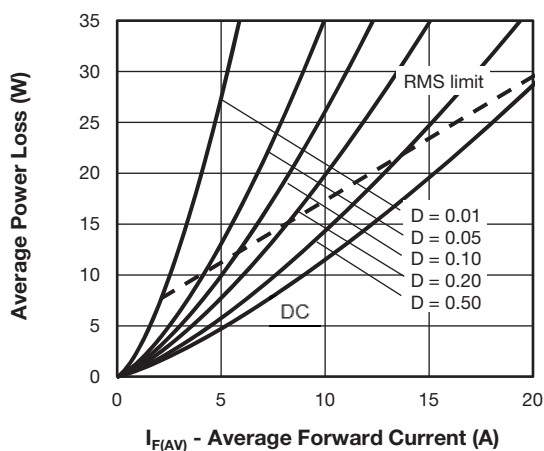
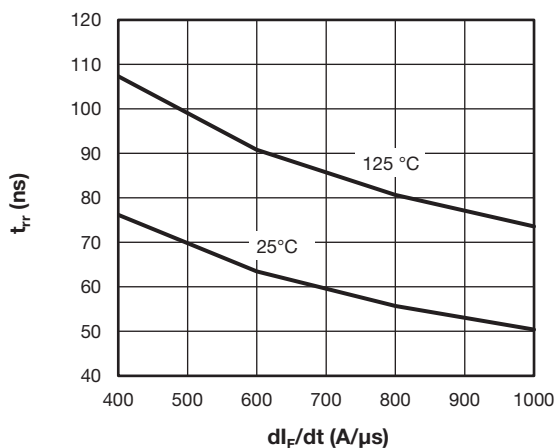
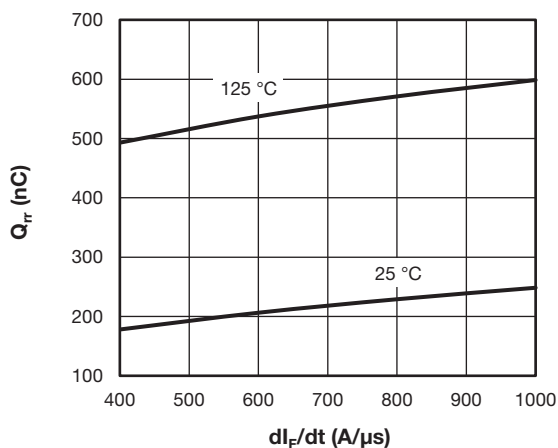
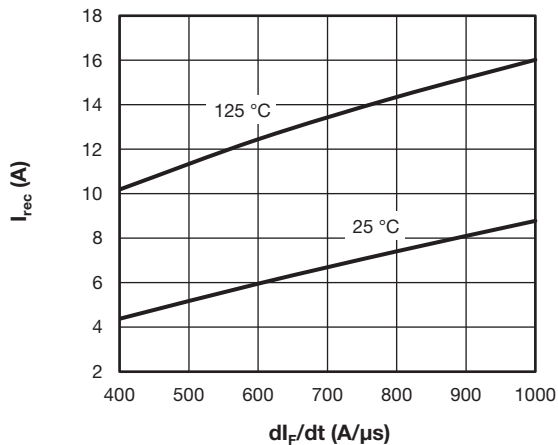


Fig. 6 - Forward Power Loss Characteristics

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

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

Fig. 9 - Typical Reverse Current vs. dI_F/dt

**ORDERING INFORMATION TABLE**

Device code	VS-	C	4	P	H	30	06	L	-N3
	1	2	3	4	5	6	7	8	9

- | | |
|----------|--|
| 1 | - Vishay Semiconductors product |
| 2 | - Circuit configuration:
C = common cathode |
| 3 | - FRED Pt Gen 4 |
| 4 | - P = TO-247 package |
| 5 | - Process type:
H = hyperfast recovery |
| 6 | - Current rating (30 = 2 x 15 A) |
| 7 | - Voltage rating (06 = 600 V) |
| 8 | - Package: L = long lead |
| 9 | - Environmental digit:
-N3 = halogen-free, RoHS-compliant, and totally lead (Pb)-free |

ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER TUBE	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-C4PH3006L-N3	25	500	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95626
Part marking information	www.vishay.com/doc?95007



TO-247AD 3L

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.34	0.065	0.092	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.89	0.015	0.035	
c1	0.38	0.84	0.015	0.033	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.46	-	0.53	-	
e	5.46 BSC		0.215 BSC		
ΦK	0.254		0.010		
L	19.81	20.32	0.780	0.800	
L1	3.71	4.29	0.146	0.169	
ΦP	3.56	3.66	0.14	0.144	
$\Phi P1$	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		

Notes

- Dimensioning and tolerancing per ASME Y14.5M-1994
- Contour of slot optional
- Dimension D and E do not include mold flash. These dimensions are measured at the outermost extremes of the plastic body
- Thermal pad contour optional with dimensions D1 and E1
- Lead finish uncontrolled in L1
- ΦP to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- Outline conforms to JEDEC® outline TO-247 with exception of dimension A min., D, E min., Q min., S, and note 4



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