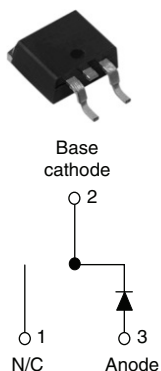


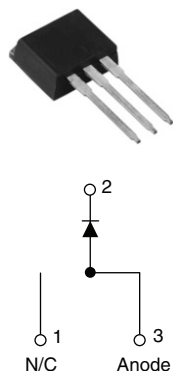
Ultralow V_F Hyperfast Rectifier for Discontinuous Mode PFC, 15 A FRED Pt™

15ETL06SPbF



D²PAK

15ETL06-1PbF



TO-262

FEATURES

- Benchmark ultralow forward voltage drop
- Hyperfast recovery time
- Low leakage current
- 175 °C operating junction temperature
- Lead (Pb)-free ("PbF" suffix)
- Designed and qualified for Q101 level



RoHS*
COMPLIANT

DESCRIPTION

State of the art, ultralow V_F , soft-switching hyperfast rectifiers optimized for Discontinuous (Critical) Mode (DCM) Power Factor Correction (PFC).

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

The device is also intended for use as a freewheeling diode in power supplies and other power switching applications.

APPLICATIONS

AC-DC SMPS 70 W to 400 W

e.g. laptop and printer AC adaptors, desktop PC, TV and monitor, games units and DVD AC-DC power supplies.

PRODUCT SUMMARY

V_F (typical)	0.99 V
$I_{F(AV)}$	15 A
V_R	600 V

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Peak repetitive reverse voltage	V_{RRM}		600	V
Average rectified forward current	$I_{F(AV)}$	$T_C = 154\text{ °C}$	15	A
Non-repetitive peak surge current	I_{FSM}	$T_J = 25\text{ °C}$	250	
Peak repetitive forward current	I_{FM}		30	
Operating junction and storage temperatures	T_J, T_{Stg}		- 65 to 175	°C

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	$I_R = 100\text{ }\mu\text{A}$	600	-	-	V
Forward voltage	V_F	$I_F = 15\text{ A}$	-	0.99	1.05	
		$I_F = 15\text{ A}, T_J = 150\text{ °C}$	-	0.85	0.92	
Reverse leakage current	I_R	$V_R = V_R$ rated	-	0.1	10	μA
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	15	120	
Junction capacitance	C_T	$V_R = 600\text{ V}$	-	20	-	pF
Series inductance	L_S	Measured lead to lead 5 mm from package body	-	8.0	-	nH

* Pb containing terminations are not RoHS compliant, exemptions may apply

15ETL06SPbF/15ETL06-1PbF

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DYNAMIC RECOVERY CHARACTERISTICS ($T_C = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t_{rr}	$I_F = 1\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	60	120	ns
		$I_F = 15\text{ A}$, $dI_F/dt = 100\text{ A}/\mu\text{s}$, $V_R = 30\text{ V}$	-	190	270	
		$T_J = 25\text{ }^{\circ}\text{C}$	-	220	-	
		$T_J = 125\text{ }^{\circ}\text{C}$	-	320	-	
Peak recovery current	I_{RRM}	$T_J = 25\text{ }^{\circ}\text{C}$	-	19	-	A
		$T_J = 125\text{ }^{\circ}\text{C}$	-	26	-	
Reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^{\circ}\text{C}$	-	2.2	-	μC
		$T_J = 125\text{ }^{\circ}\text{C}$	-	4.3	-	

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 case per leg	R_{thJC}		-	1.0	1.3	$^{\circ}\text{C}/\text{W}$
Thermal resistance, junction to ambient per leg	$R_{thJA}^{(1)}$	Typical socket mount	-	-	70	
Thermal resistance, case to heatsink	$R_{thCS}^{(2)}$	Mounting surface, flat, smooth and greased	-	0.5	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style D ² PAK	15ETL06S			
		Case style TO-262	15ETL06-1			



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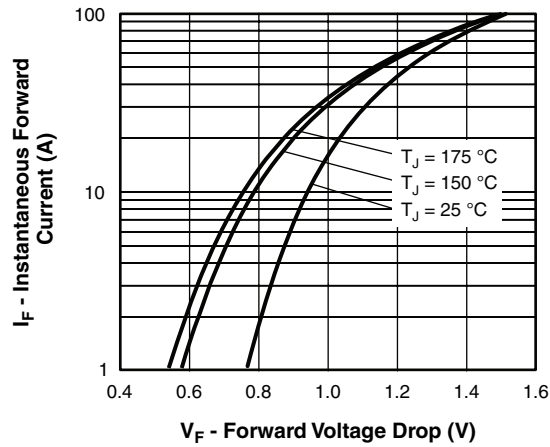


Fig. 1 - Typical Forward Voltage Drop Characteristics

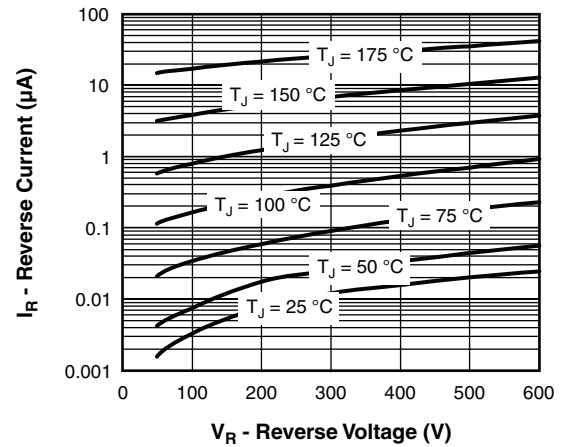


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

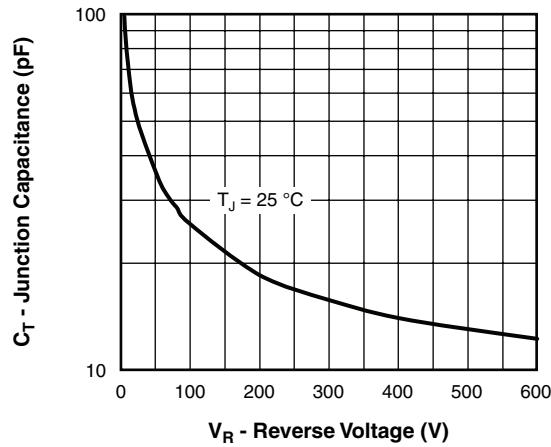


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

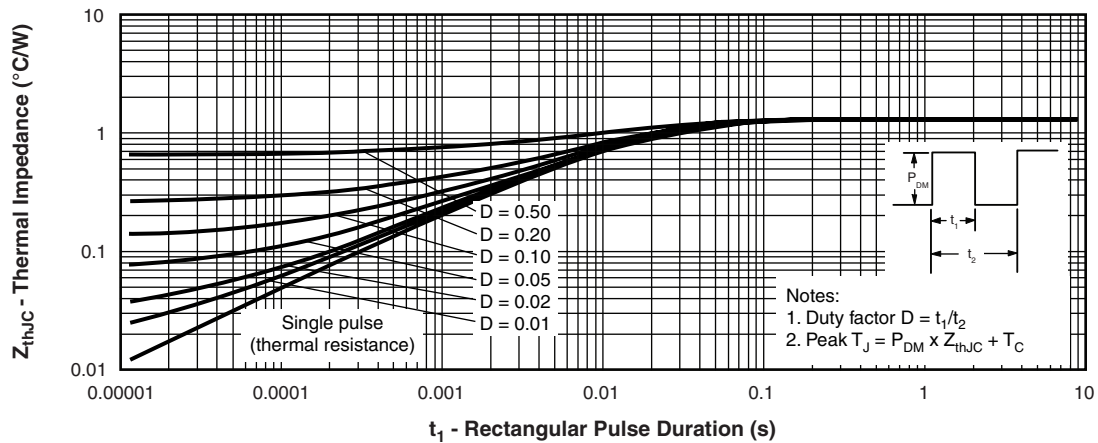


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

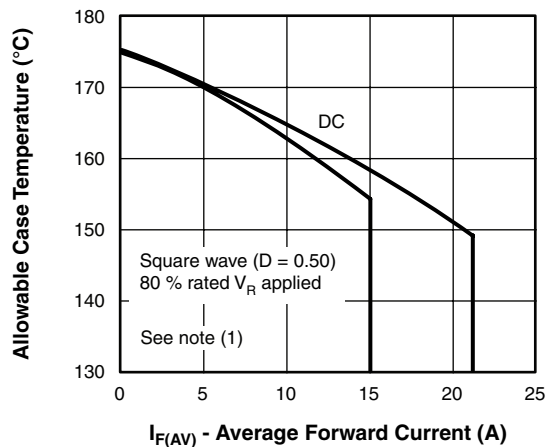


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

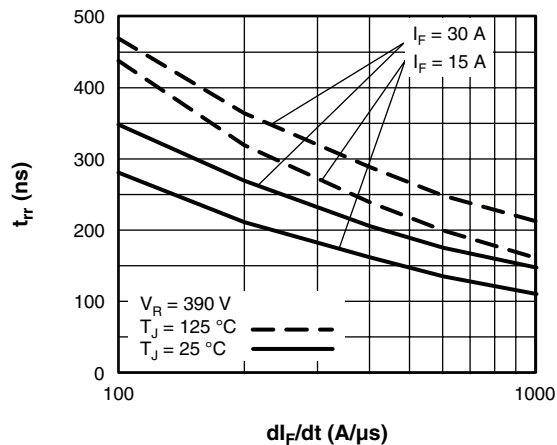


Fig. 7 - Typical Reverse Recovery Time vs. di_F/dt

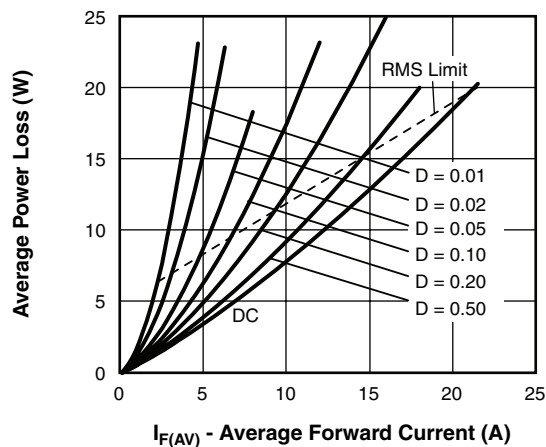


Fig. 6 - Forward Power Loss Characteristics

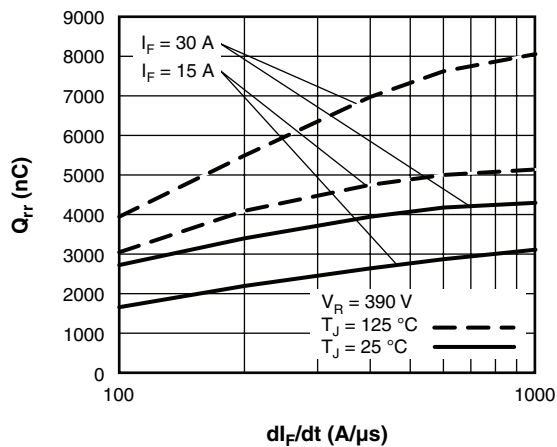


Fig. 8 - Typical Stored Charge vs. di_F/dt

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{d_{REV}}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

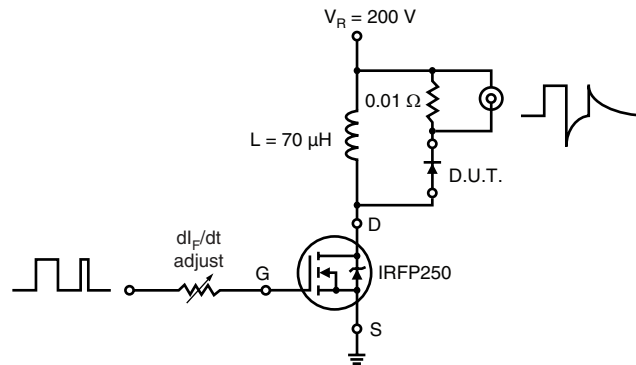


Fig. 9 - Reverse Recovery Parameter Test Circuit

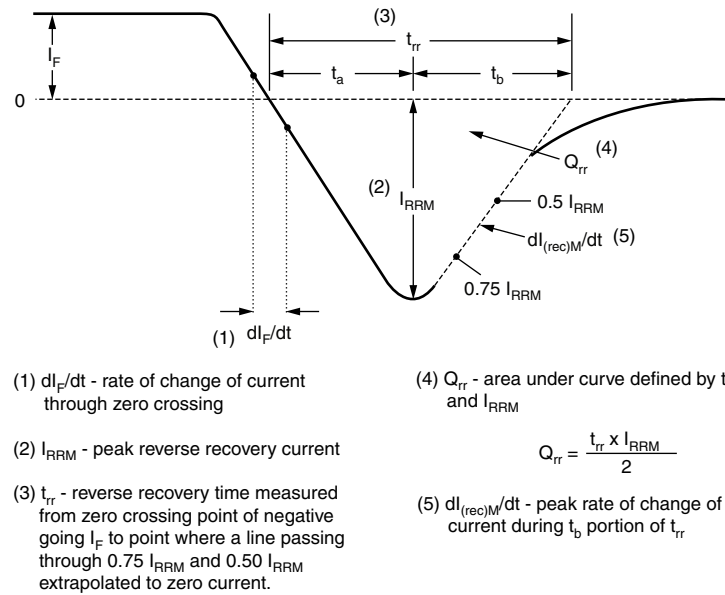


Fig. 10 - Reverse Recovery Waveform and Definitions

15ETL06SPbF/15ETL06-1PbF

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ORDERING INFORMATION TABLE

Device code	15	E	T	L	06	S	TRL	PbF
	1	2	3	4	5	6	7	8

- | | | |
|----------|---|--|
| 1 | - | Current rating (15 A) |
| 2 | - | E = Single diode |
| 3 | - | T = TO-220, D ² PAK |
| 4 | - | L = Ultralow V_F hyperfast recovery |
| 5 | - | Voltage rating (06 = 600 V) |
| 6 | - | <ul style="list-style-type: none">S = D²PAK-1 = TO-262 |
| 7 | - | <ul style="list-style-type: none">None = Tube (50 pieces)TRL = Tape and reel (left oriented, for D²PAK package)TRR = Tape and reel (right oriented, for D²PAK package) |
| 8 | - | <ul style="list-style-type: none">None = Standard productionPbF = Lead (Pb)-free |

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95014
Part marking information	http://www.vishay.com/doc?95008
Packaging information	http://www.vishay.com/doc?95032
SPICE model	http://www.vishay.com/doc?95270



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