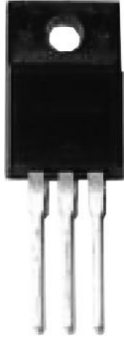
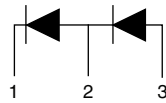


## Hyperfast Rectifier, 15 A FRED Pt®


**3L TO-220 FULL-PAK**


### FEATURES

- Hyperfast recovery time, extremely low  $Q_{rr}$
- 175 °C maximum operating junction temperature
- High frequency PFC CCM operation
- Low leakage current
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified for industrial level



### DESCRIPTION

VS-15STH06FP 600 V series are the state of the art tandem hyperfast recovery rectifiers: excellent switching performance and extremely low forward voltage drop trade off is overcome, boosting overall application performance. Specially designed for CCM PFC application, these devices show incomparable performance in every current intensive hard switching application.

Optimized reverse recovery stored charge enables downsizing of boosting switch and cooling system, increased operating frequency make possible use of smaller reactive elements. Cost effective PFC application is then possible with high efficiency over wide input voltage range and loading factor.

Plastic insulated package features easy mounting together with not insulated parts.

### PRODUCT SUMMARY

Package	3L TO-220FP
$I_{F(AV)}$	15 A
$V_R$	600 V
$V_F$ at $I_F$	2.4 V
$t_{rr}$ (typ.)	See Recovery table
$T_J$ max.	175 °C
Diode variation	Doubler

### ABSOLUTE MAXIMUM RATINGS FOR BOTH DIODES

PARAMETER	SYMBOL	TEST CONDITIONS	MAX.	UNITS
Repetitive peak reverse voltage	$V_{RRM}$		600	V
DC forward current	$I_F$	$T_C = 73\text{ °C}$	15	A
Non-repetitive peak surge current	$I_{FSM}$	$T_C = 25\text{ °C}$	115	
Operating junction and storage temperatures	$T_J, T_{Stg}$		- 55 to 175	°C

### ELECTRICAL SPECIFICATIONS FOR BOTH DIODES ( $T_J = 25\text{ °C}$ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Breakdown voltage, blocking voltage	$V_{BR}, V_R$	$I_R = 100\ \mu\text{A}$	600	-	-	V
Forward voltage	$V_F$	$I_F = 15\text{ A}$	-	2.2	2.4	
		$I_F = 15\text{ A}, T_J = 125\text{ °C}$	-	1.9	2.1	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	< 1	10	$\mu\text{A}$
		$T_J = 125\text{ °C}, V_R = V_R$ rated	-	10	100	
		$T_J = 150\text{ °C}, V_R = V_R$ rated	-	40	200	
Junction capacitance	$C_T$	$V_R = 600\text{ V}$	-	17	-	pF

<b>DYNAMIC RECOVERY CHARACTERISTICS FOR BOTH DIODES</b> ( $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS	
Reverse recovery time	$t_{rr}$	$I_F = 1.0\text{ A}$ , $di_F/dt = -50\text{ A}/\mu\text{s}$ , $V_R = 30\text{ V}$	-	-	28	ns	
		$T_J = 25\text{ }^\circ\text{C}$	-	20	-		
		$T_J = 125\text{ }^\circ\text{C}$	-	45	-		
Peak recovery current	$I_{RRM}$	$I_F = 15\text{ A}$ $di_F/dt = -200\text{ A}/\mu\text{s}$ $V_R = 390\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	-	2.6	-	A
			$T_J = 125\text{ }^\circ\text{C}$	-	5.6	6.5	
Reverse recovery charge	$Q_{rr}$	$T_J = 25\text{ }^\circ\text{C}$	$T_J = 25\text{ }^\circ\text{C}$	-	28	-	nC
			$T_J = 125\text{ }^\circ\text{C}$	-	140	-	

<b>THERMAL - MECHANICAL SPECIFICATIONS FOR BOTH DIODES</b>						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		- 55	-	175	$^\circ\text{C}$
Thermal resistance, junction to case	$R_{thJC}$		-	-	3.9	$^\circ\text{C}/\text{W}$
Thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased	-	0.2	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style 3L TO-220 FULL-PAK	15STH06FP			

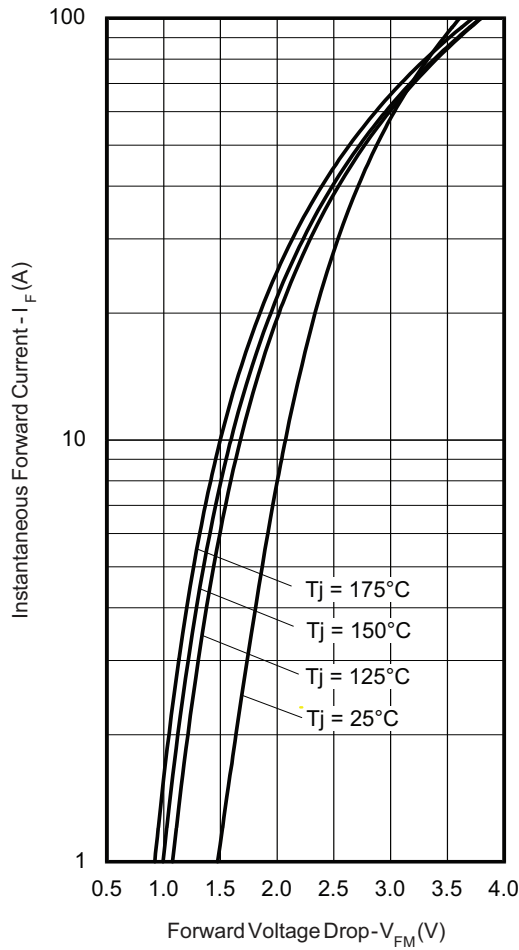


Fig. 1 - Maximum Forward Voltage Drop Characteristics

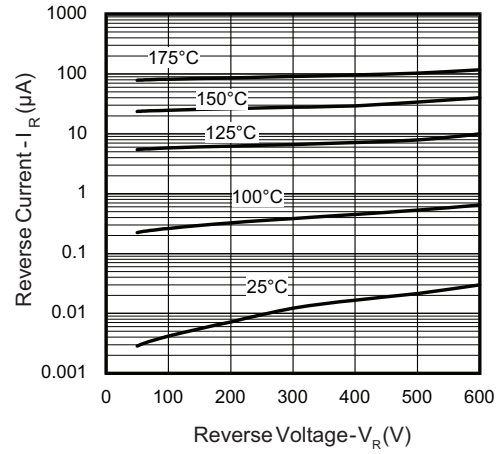


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

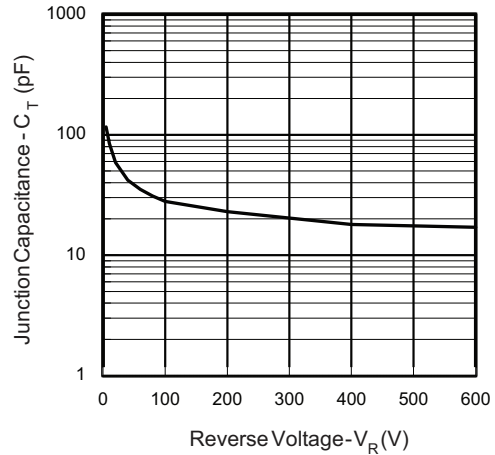
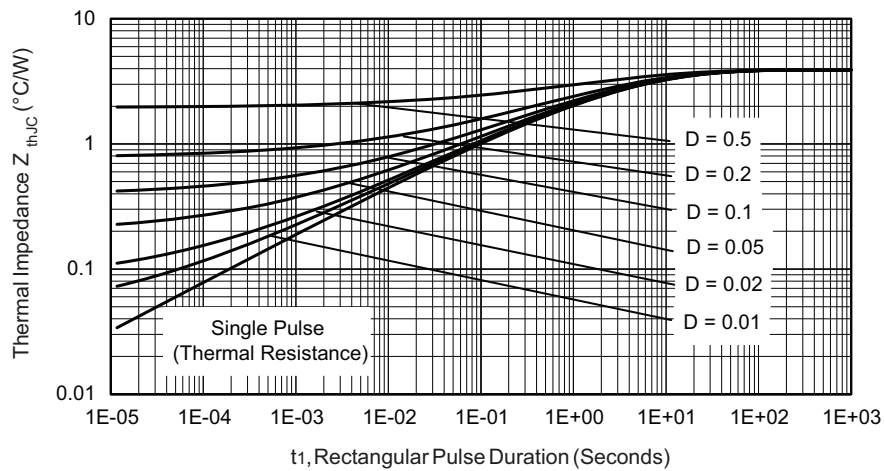


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage


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

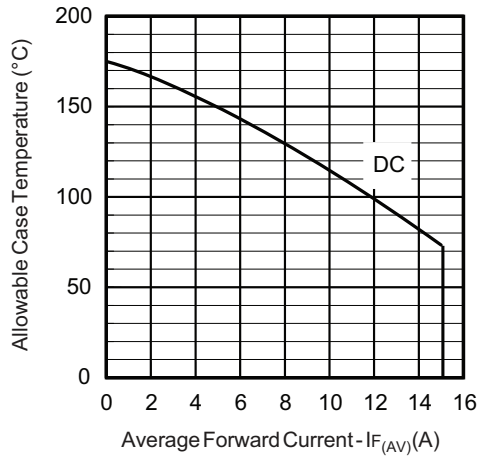


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

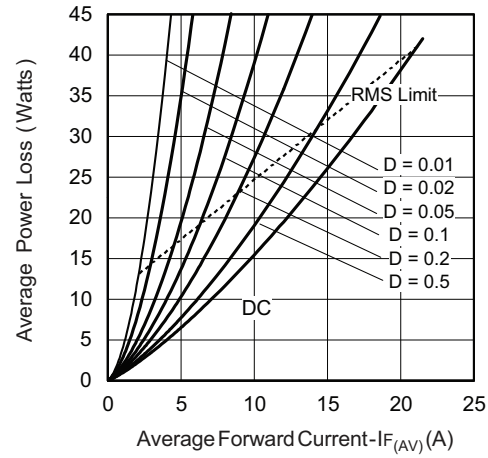


Fig. 6 - Forward Power Loss Characteristics

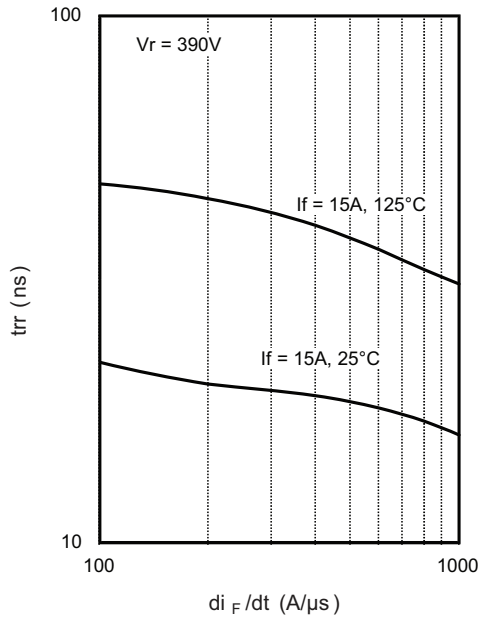


Fig. 7 - Typical Reverse Recovery Time vs.  $di_F/dt$

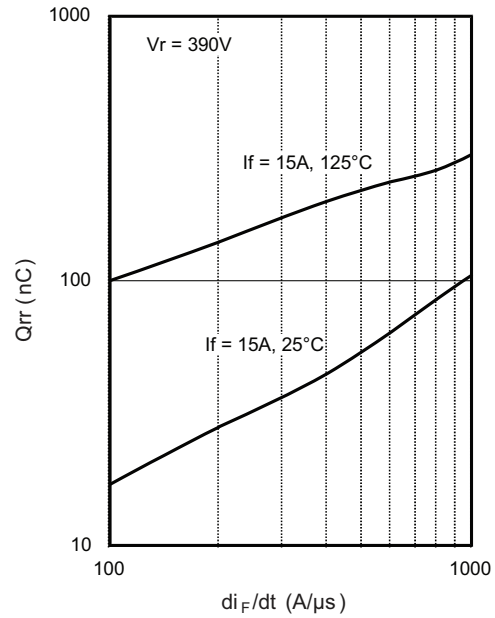
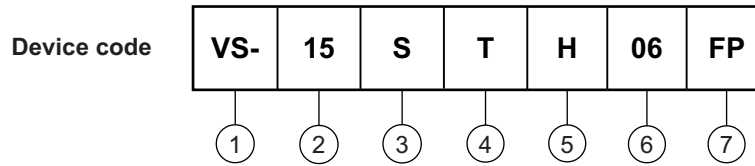


Fig. 8 - Typical Stored Charge vs.  $di_F/dt$



**ORDERING INFORMATION TABLE**



- 1** - Vishay Semiconductors product suffix
- 2** - Current rating (15 = 15 A)
- 3** - S = Doubler
- 4** - T = TO-220
- 5** - H = Hyperfast recovery
- 6** - Voltage rating (06 = 600 V)
- 7** - FP = TO-220 FULL-PAK

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95264">www.vishay.com/doc?95264</a>
Part marking information	<a href="http://www.vishay.com/doc?95266">www.vishay.com/doc?95266</a>



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