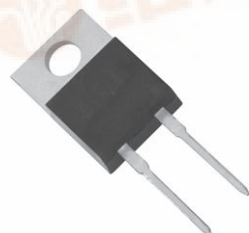
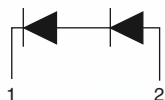


## Hyperfast Rectifier, 8 A FRED Pt®



2L TO-220



## FEATURES

- Hyperfast recovery time, extremely low  $Q_{rr}$
- Isolated TO-220 2 pin
- High frequency PFC CCM operation
- 175 °C maximum operating junction temperature
- Low leakage current
- Compliant to RoHS directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition
- Designed and qualified for industrial level



RoHS  
COMPLIANT  
HALOGEN  
FREE

## DESCRIPTION

VS-8S2TH06I-M 600 V series are the state of the art tandem hyperfast recovery rectifiers: the new insulated 2 pin TO-220 package provide benchmark thermal resistance that coupled with excellent switching performance and low forward voltage drop allow this device to provide 8 A DC at 120 °C case temperature.

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.

The new ceramic insulated package warranty insulation up to 2 kV and features easy mounting together with not insulated parts, with minimum effect on  $R_{thJC}$ .

## PRODUCT SUMMARY

Package	2L TO-220 Insulated
$I_{F(AV)}$	8 A
$V_R$	600 V
$V_F$ at $I_F$	3.1 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	$I_F$	50 % duty cycle, rect. waveforms, $T_C = 120$ °C	8	A
Non-repetitive peak surge current	$I_{FSM}$	$T_C = 25$ °C	140	
Operating junction and storage temperatures	$T_J, T_{Stg}$		- 55 to 175	°C

ELECTRICAL SPECIFICATIONS FOR BOTH DIODES ( $T_J = 25$  °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	$V_F$	$I_F = 8$ A	-	2.7	3.1	
		$I_F = 8$ A, $T_J = 125$ °C	-	2.1	2.3	
		$I_F = 8$ A, $T_J = 150$ °C	-	1.9	2.1	
Reverse leakage current	$I_R$	$V_R = V_R$ rated	-	< 1	10	$\mu$ A
		$T_J = 125$ °C, $V_R = V_R$ rated	-	7	50	
		$T_J = 150$ °C, $V_R = V_R$ rated	-	27	80	
Junction capacitance	$C_T$	$V_R = 600$ V	-	10.5	-	pF



DYNAMIC RECOVERY CHARACTERISTICS FOR BOTH DIODES (T <sub>J</sub> = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time	t <sub>rr</sub>	I <sub>F</sub> = 1.0 A, di <sub>F</sub> /dt = - 50 A/μs, V <sub>R</sub> = 30 V		-	13	20	ns
		T <sub>J</sub> = 25 °C	I <sub>F</sub> = 8 A di <sub>F</sub> /dt = - 200 A/μs V <sub>R</sub> = 390 V	-	11	16	
		T <sub>J</sub> = 125 °C		-	23	30	
Peak recovery current	I <sub>RRM</sub>	T <sub>J</sub> = 25 °C		-	1.5	2.5	A
		T <sub>J</sub> = 125 °C		-	2.8	3.7	
Reverse recovery charge	Q <sub>rr</sub>	T <sub>J</sub> = 25 °C		-	7	15	nC
		T <sub>J</sub> = 125 °C		-	35	51	

<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	$R_{thJC}$		-	2.30	2.85	$^{\circ}\text{C}/\text{W}$
Thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, flat, smooth and greased	-	0.1	-	
Approximate weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style 2L TO-220	8S2TH06I			

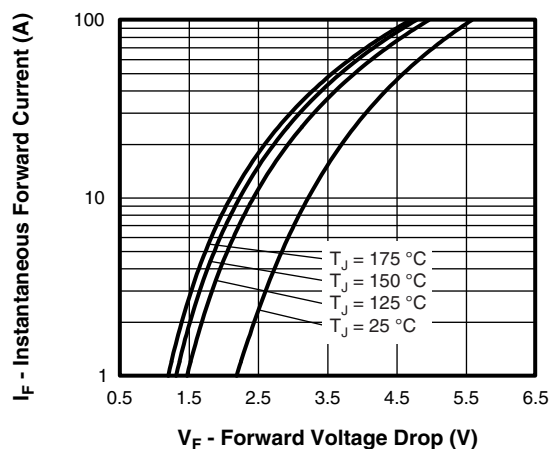


Fig. 1 - Typical Forward Voltage Drop Characteristics

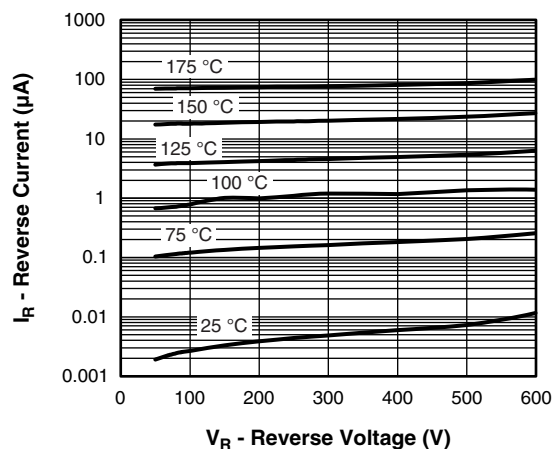


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

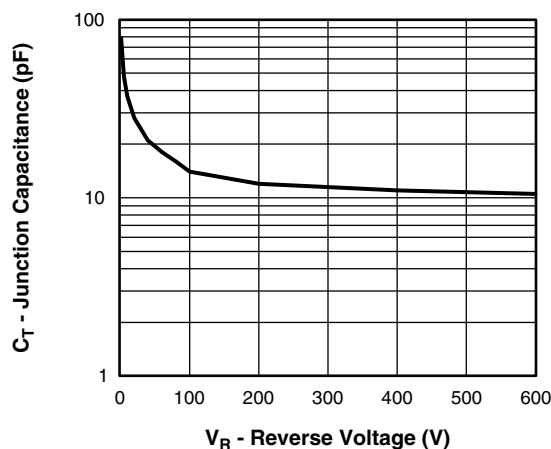


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

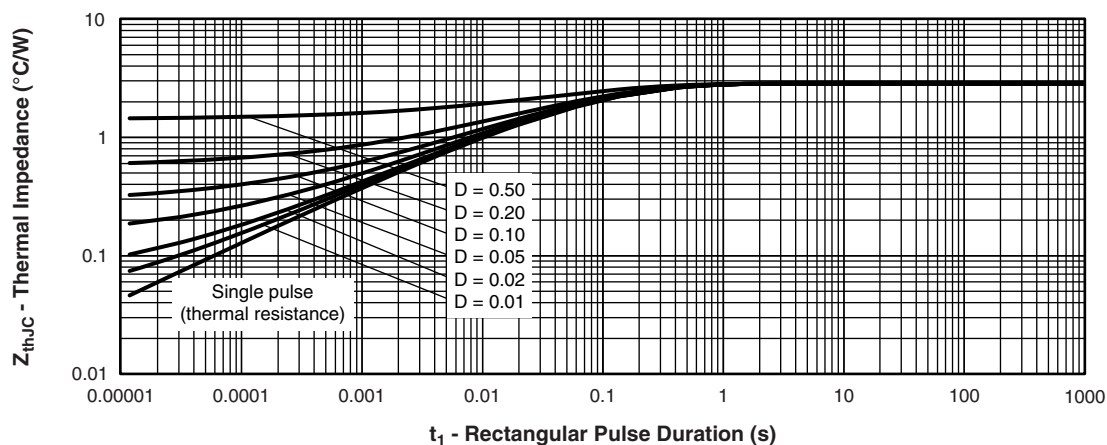


Fig. 4 - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

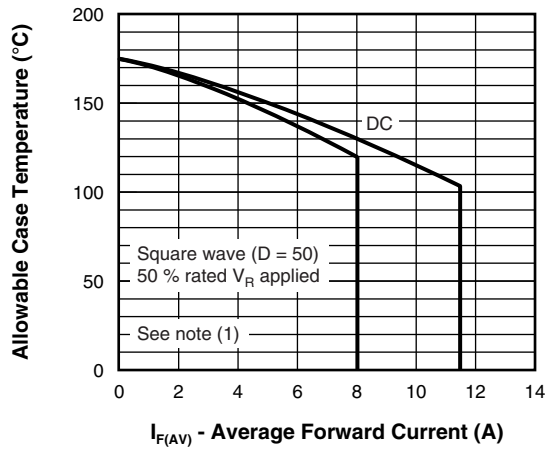


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

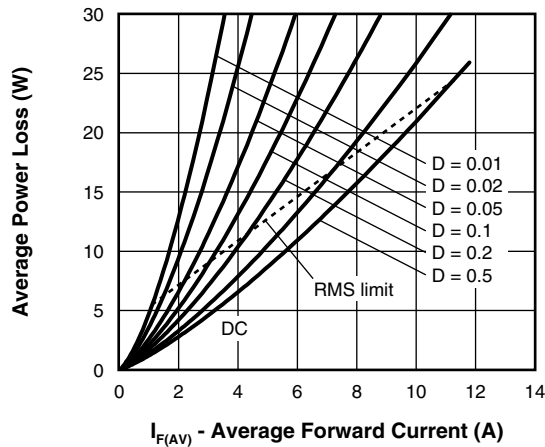


Fig. 6 - Forward Power Loss Characteristics

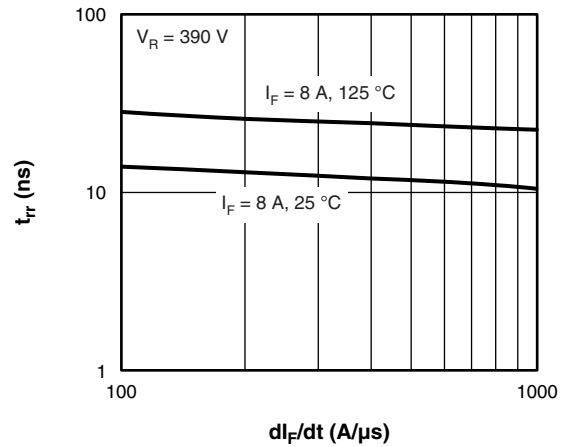


Fig. 7 - Typical Reverse Recovery Time vs.  $dI_F/dt$

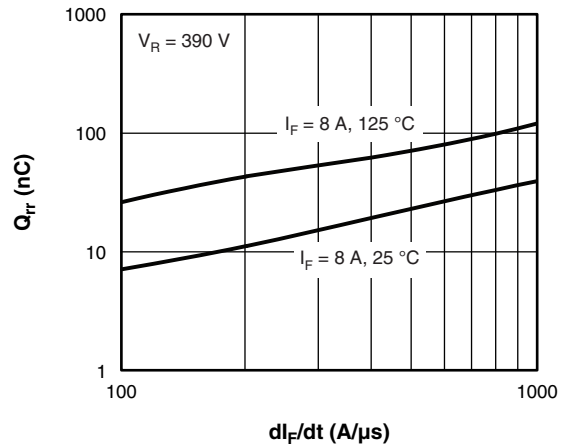


Fig. 8 - Typical Stored Charge vs.  $dI_F/dt$

## 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  $V_{R1} = 50\%$  rated  $V_R$

## ORDERING INFORMATION TABLE

Device code	<b>VS-</b>	<b>8</b>	<b>S2</b>	<b>T</b>	<b>H</b>	<b>06</b>	<b>I</b>	<b>-M</b>
	①	②	③	④	⑤	⑥	⑦	⑧

- 1 - Vishay Semiconductors product suffix
- 2 - Current rating (8 = 8 A)
- 3 - S2 = Doubler true 2 pin
- 4 - T = TO-220
- 5 - H = Hyperfast recovery
- 6 - Voltage rating (06 = 600 V)
- 7 - I = Insulated
- 8 - Environmental digit:  
-M = Halogen-free, RoHS compliant and terminations lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	<a href="http://www.vishay.com/doc?95171">www.vishay.com/doc?95171</a>
Part marking information	<a href="http://www.vishay.com/doc?95170">www.vishay.com/doc?95170</a>
SPICE model	<a href="http://www.vishay.com/doc?95257">www.vishay.com/doc?95257</a>

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