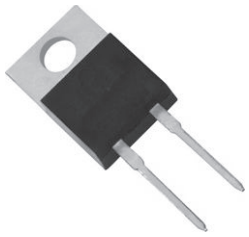
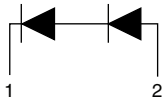
Hyperfast Rectifier, 8 A FRED Pt®



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 µA	600	-	-	V
Forward voltage	V_F	I_F = 8 A	-	2.7	3.1	V
		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	µA
		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_J = 25 °C unless otherwise specified)							
PARAMETER	**SYMBOL**	**TEST CONDITIONS**		**MIN.**	**TYP.**	**MAX.**	**UNITS**
Reverse recovery time	t_{rr}	I_F = 1.0 A, dI_F/dt = - 50 A/µs, V_R = 30 V		-	13	20	ns
		T_J = 25 °C	I_F = 8 A dI_F/dt = - 200 A/µs V_R = 390 V	-	11	16	
		T_J = 125 °C		-	23	30	
Peak recovery current	I_{RRM}	T_J = 25 °C		-	1.5	2.5	A
		T_J = 125 °C		-	2.8	3.7	
Reverse recovery charge	Q_{rr}	T_J = 25 °C		-	7	15	nC
		T_J = 125 °C		-	35	51	

THERMAL - MECHANICAL SPECIFICATIONS FOR BOTH DIODES						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNITS**
Maximum junction and storage temperature range	T_J, T_{Stg}		- 55	-	175	°C
Thermal resistance, junction to case	R_{thJC}		-	2.30	2.85	°C/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			

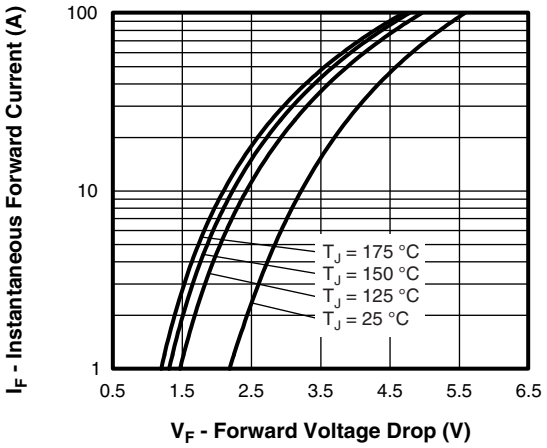


Fig. 1 - Typical Forward Voltage Drop Characteristics

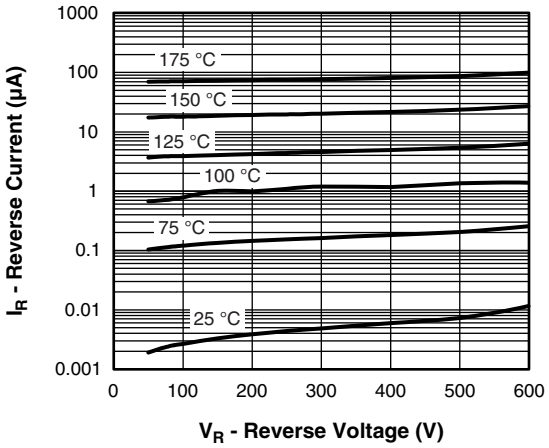


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

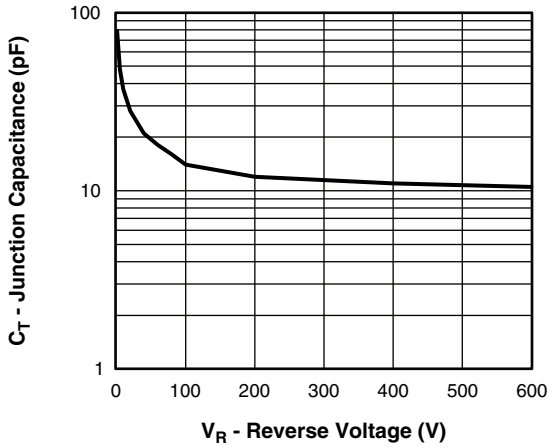


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

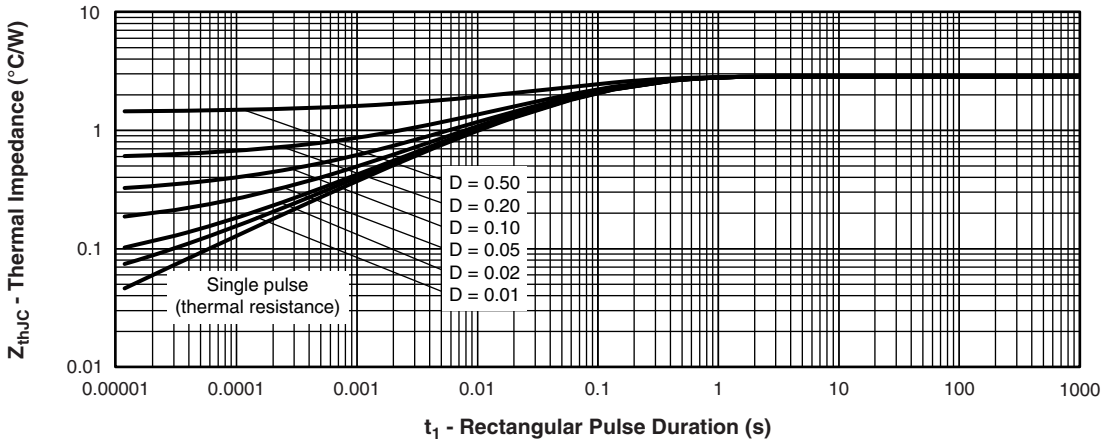


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

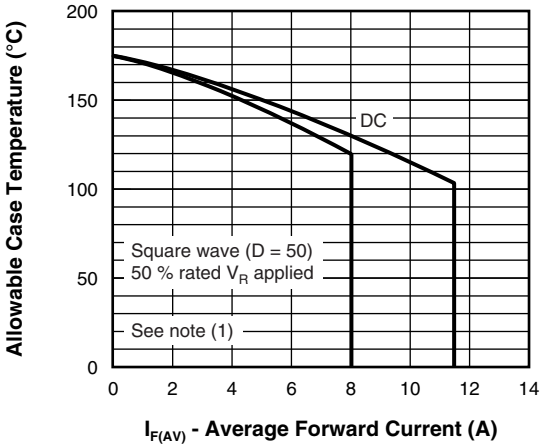


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

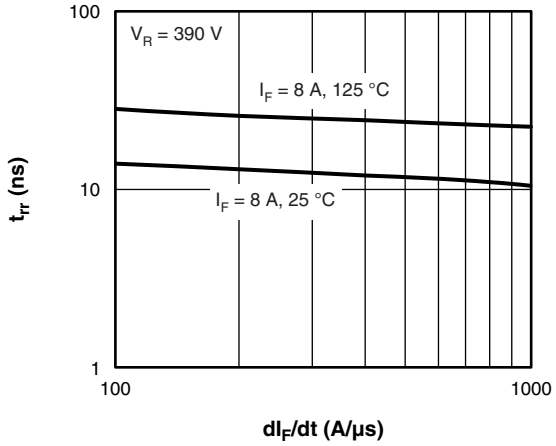


Fig. 7 - Typical Reverse Recovery Time vs. dI_F/dt

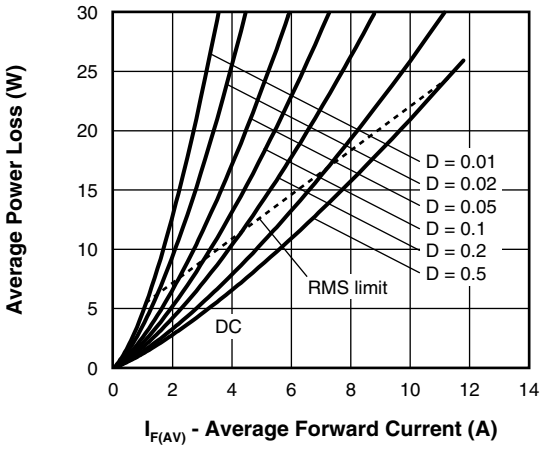


Fig. 6 - Forward Power Loss Characteristics

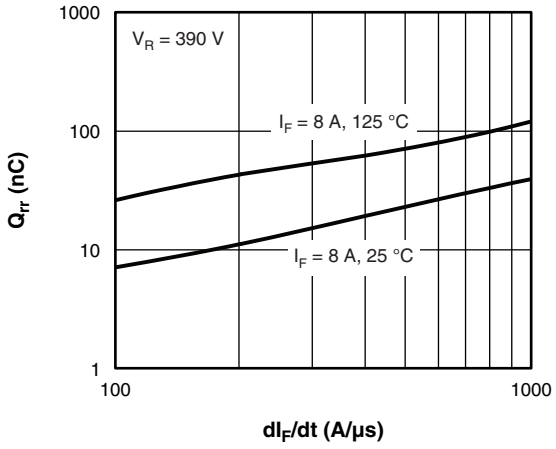


Fig. 8 - Typical Stored Charge vs. dI_F/dt

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at ($I_{F(AV)}$/D) (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = 50 % rated V_R

For technical questions within your region, please contact one of the following:
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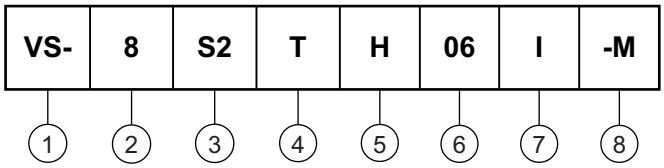
Revision: 19-Aug-10

ORDERING INFORMATION TABLE

Device code

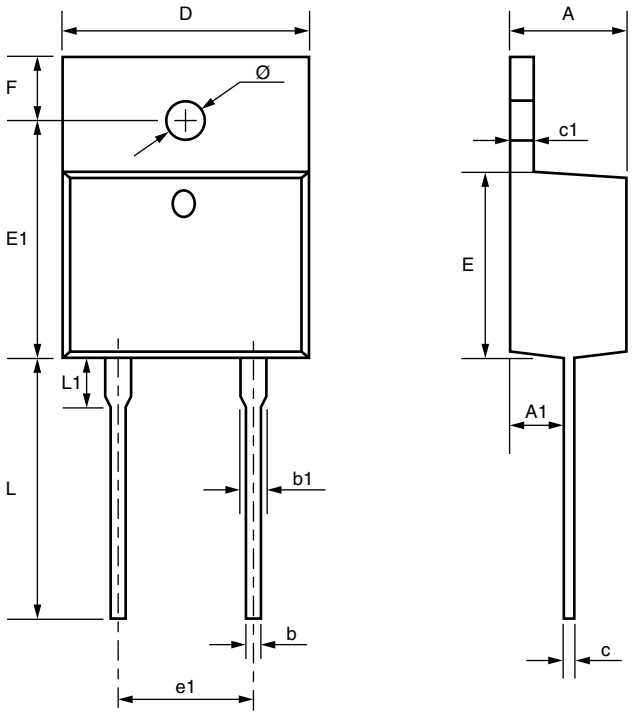


1 - Vishay Semiconductors product suffix
2 - Current rating (8 = 8 A)
3 - S2 = Doubler true 2 pin
4 - T = TO-220
5 - H = Hyperfast recovery
6 - Voltage rating (06 = 600 V)
7 - I = Insulated
8 - Environmental digit:
-M = Halogen-free, RoHS compliant and terminations lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95171
Part marking information	www.vishay.com/doc?95170
SPICE model	www.vishay.com/doc?95257

TO-220-2L

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.420	4.720	0.174	0.186
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.360	0.460	0.014	0.018
c1	1.170	1.370	0.046	0.054
D	9.950	10.250	0.392	0.404
E	8.990	9.290	0.354	0.366
E1	12.550	12.850	0.494	0.506
e1	4.980	5.180	0.196	0.204
F	2.59	2.89	0.102	0.114
L	13.08	13.48	0.515	0.531
L1	3.47	3.87	0.136	0.152
Ø	3.79	3.89	0.149	0.153

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