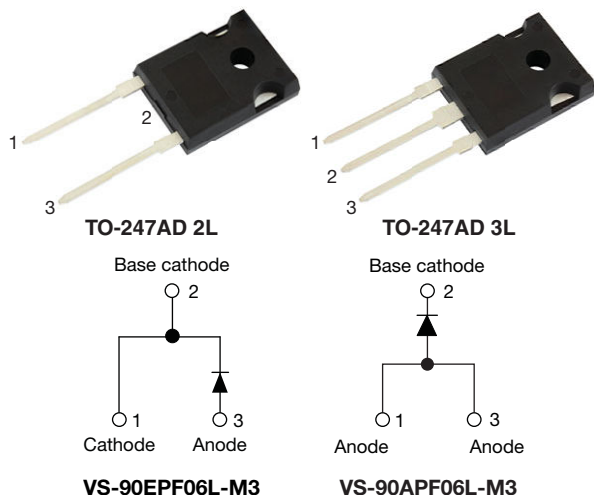


Fast Soft Recovery Rectifier Diode, 90 A



FEATURES

- Glass passivated pellet chip junction
- Low forward voltage drop and short reverse recovery time
- 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

APPLICATIONS

These devices are intended for use in output rectification and freewheeling in inverters, choppers and converters as well as in input rectification where severe restrictions on conducted EMI should be met.

DESCRIPTION

The VS-90EPF006L-M3, VS-90APF006L-M3 soft recovery rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.

The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

PRIMARY CHARACTERISTICS

$I_{F(AV)}$	90 A
V_R	600 V
V_F at I_F	1.3 V
I_{FSM}	1000 A
t_{rr}	70 ns
T_J max.	150 °C
Package	TO-247AD 2L, TO-247AD 3L
Circuit configuration	Single
Snap factor	0.5

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		600	V
$I_{F(AV)}$	Sinusoidal waveform	90	A
I_{FSM}		1000	
t_{rr}	1 A, -100 A/μs	70	ns
V_F	40 A, $T_J = 25$ °C	1.12	V
T_J	Range	-40 to +150	°C

VOLTAGE RATINGS

PART NUMBER	V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} AT 150 °C mA
VS-90EPF06L-M3	600	700	17
VS-90APF06L-M3	600	700	17

**ABSOLUTE MAXIMUM RATINGS**

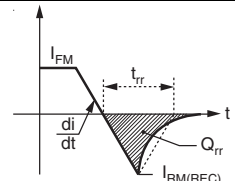
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 108\text{ }^{\circ}\text{C}$, 180° conduction half sine wave	90	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied	850	
		10 ms sine pulse, no voltage reapplied	1000	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	3610	A^2s
		10 ms sine pulse, no voltage reapplied	5100	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to }10\text{ ms}$, no voltage reapplied	51 000	$\text{A}^2\sqrt{\text{s}}$

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum forward voltage drop	V_{FM}	90 A, $T_J = 25\text{ }^{\circ}\text{C}$	1.3	V
Forward slope resistance	r_t	$T_J = 150\text{ }^{\circ}\text{C}$	3.5	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$		0.85	V
Maximum reverse leakage current	I_{RM}	$T_J = 25\text{ }^{\circ}\text{C}$	0.1	mA
		$T_J = 150\text{ }^{\circ}\text{C}$	17	

 $V_R = \text{rated } V_{RRM}$ **RECOVERY CHARACTERISTICS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	t_{rr}	I_F at 40 A _{pk} 25 A/ μs 25 $^{\circ}\text{C}$	190	ns
Reverse recovery current	I_{rr}		3.4	A
Reverse recovery charge	Q_{rr}		0.5	μC
Snap factor	S		0.5	

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T _J , T _{Stg}		-40 to +150	°C
Maximum thermal resistance, junction to case	R _{thJC}	DC operation	0.2	°C/W
Maximum thermal resistance, junction to ambient	R _{thJA}		40	
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth, and greased	0.25	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-247AD 2L	90EPF06L	
		Case style TO-247AD 3L	90APF06L	

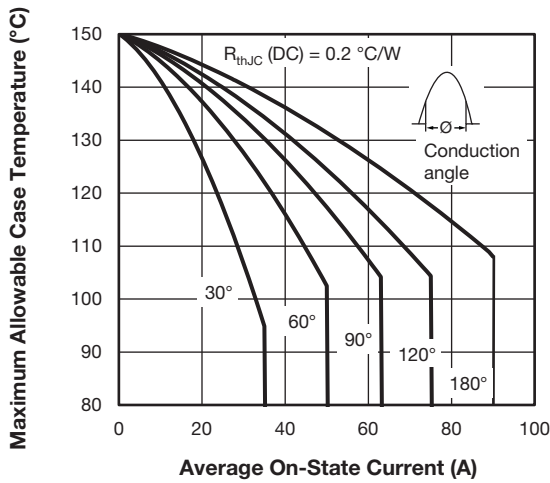


Fig. 1 - Current Rating Characteristics

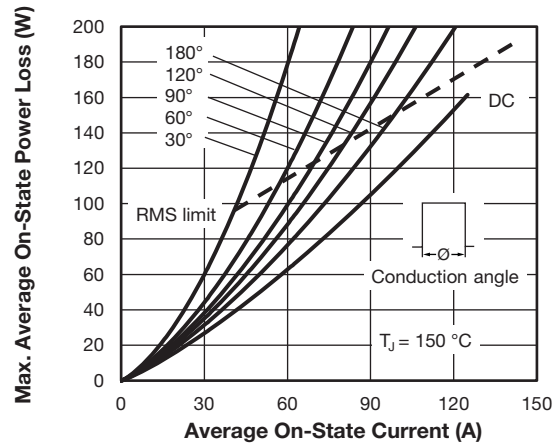


Fig. 4 - Forward Power Loss Characteristics

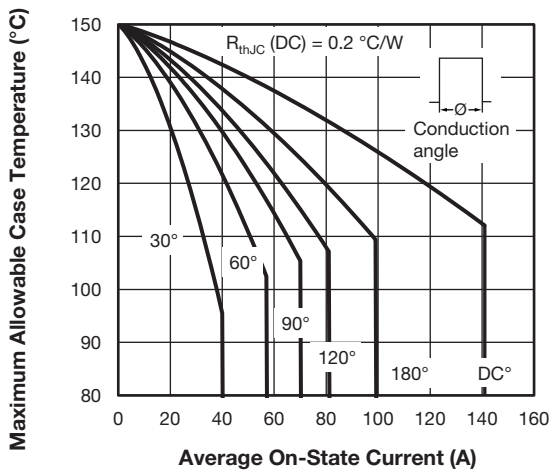


Fig. 2 - Current Rating Characteristics

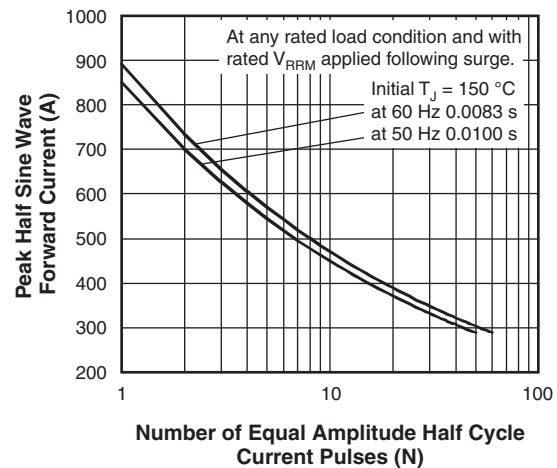


Fig. 5 - Maximum Non-Repetitive Surge Current

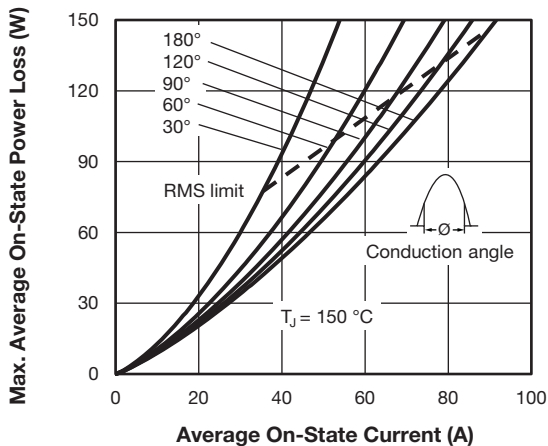


Fig. 3 - Forward Power Loss Characteristics

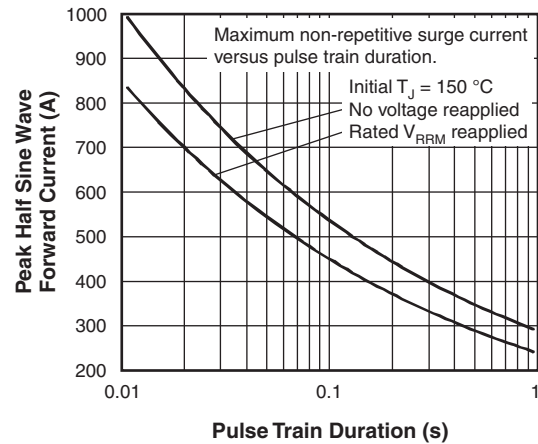


Fig. 6 - Maximum Non-Repetitive Surge Current

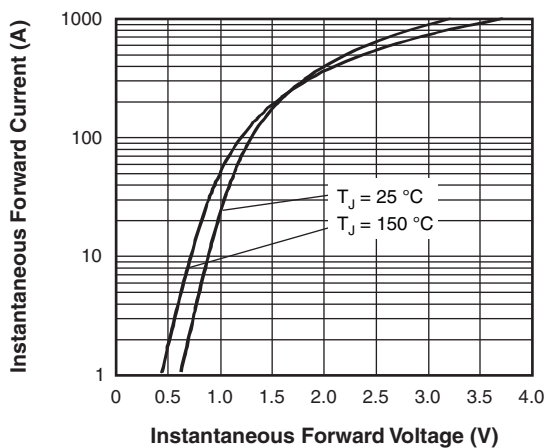
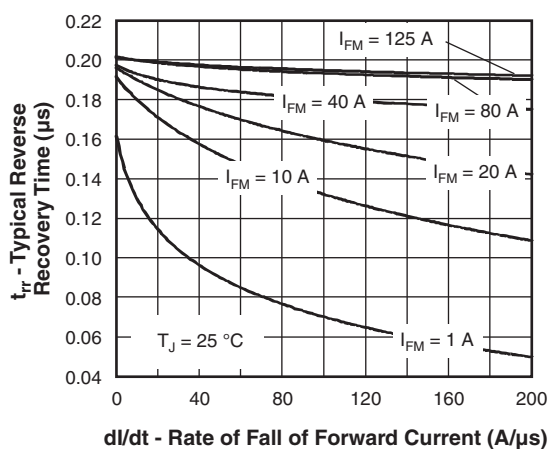
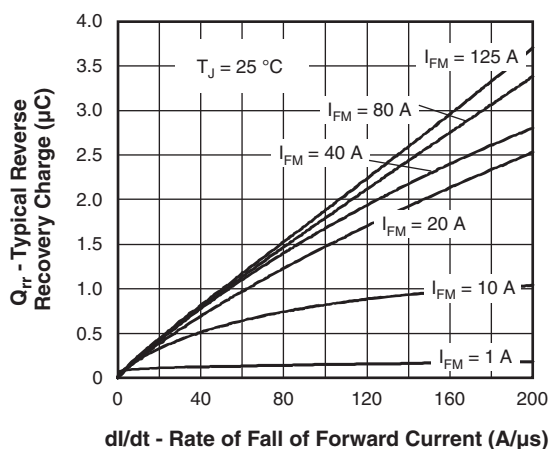
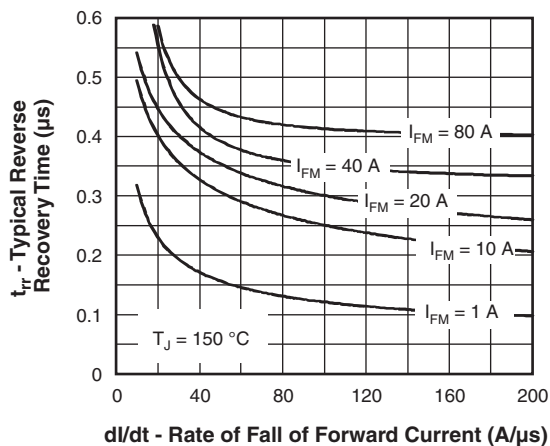
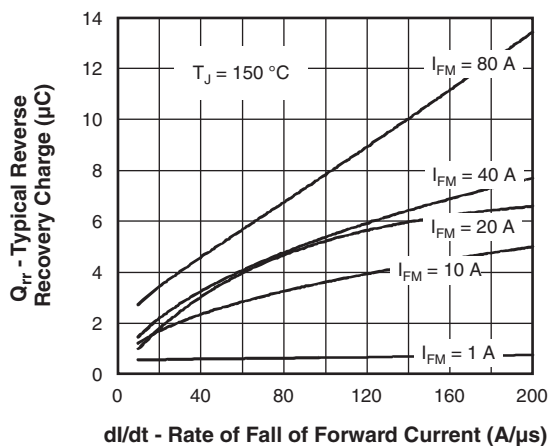


Fig. 7 - Forward Voltage Drop Characteristics


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ }^{\circ}\text{C}$

Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ }^{\circ}\text{C}$

Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ }^{\circ}\text{C}$

Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ }^{\circ}\text{C}$

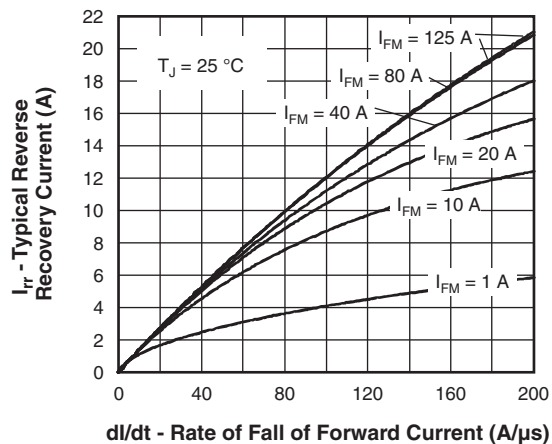


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ }^{\circ}\text{C}$

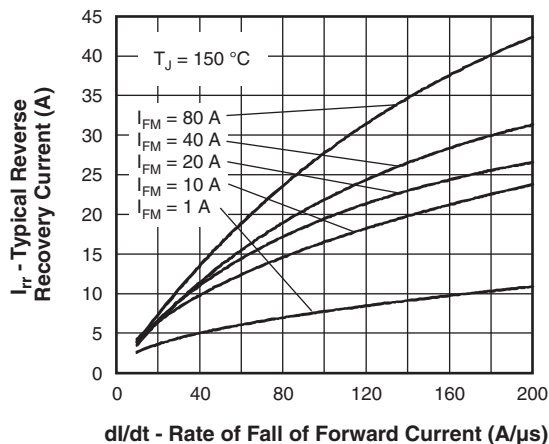


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^{\circ}\text{C}$

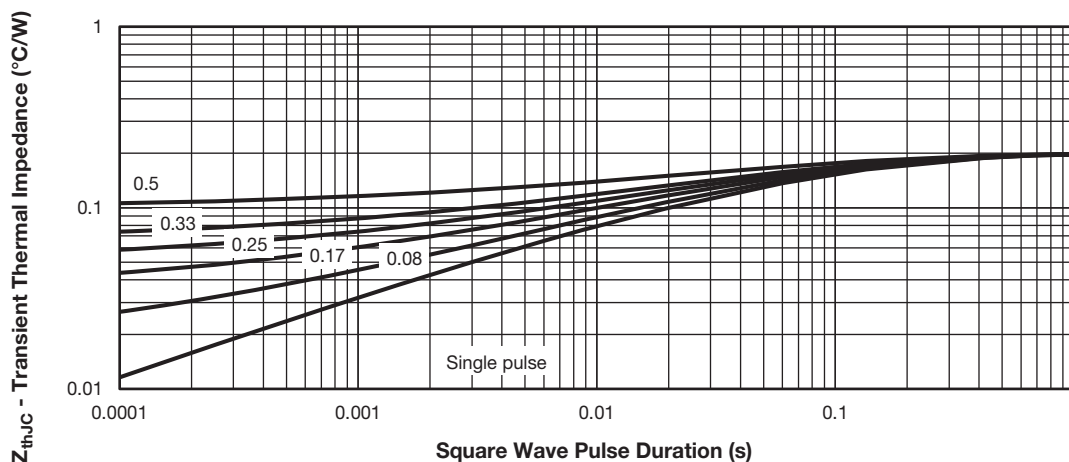


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

**ORDERING INFORMATION TABLE**

Device code	VS-	90	A	P	F	06	L	-M3
	1	2	3	4	5	6	7	8
	1	- Vishay Semiconductors product						
	2	- Current rating (90 = 90 A)						
	3	- Circuit configuration: E = single, 2 pins A = single, 3 pins						
	4	- Package: P = TO-247AD						
	5	- Type of silicon: F = fast recovery						
	6	- Voltage code x 100 = V_{RRM}					06 = 600 V	
	7	- L = long lead						
	8	- Environmental digit: • -M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free						

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER TUBES	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-90EPF06L-M3	25	500	Antistatic plastic tubes
VS-90APF06L-M3	25	500	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions	TO-247AD 2L	www.vishay.com/doc?95536
	TO-247AD 3L	www.vishay.com/doc?95626
Part marking information	TO-247AD 2L	www.vishay.com/doc?95648
	TO-247AD 3L	www.vishay.com/doc?95007



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.