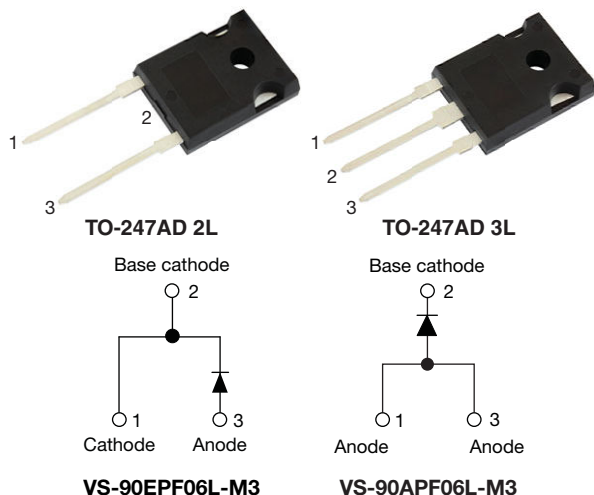


## Fast Soft Recovery Rectifier Diode, 90 A



### 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](http://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**

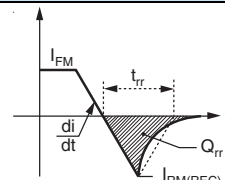
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 108\text{ }^{\circ}\text{C}$ , 180° conduction half sine wave	90	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	10 ms sine pulse, rated $V_{RRM}$ applied	850	
		10 ms sine pulse, no voltage reapplied	1000	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied	3610	$\text{A}^2\text{s}$
		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 <sub>pk</sub> 25 A/ $\mu\text{s}$ 25 $^{\circ}\text{C}$	190	ns
Reverse recovery current	$I_{rr}$		3.4	A
Reverse recovery charge	$Q_{rr}$		0.5	$\mu\text{C}$
Snap factor	S		0.5	

**THERMAL - MECHANICAL SPECIFICATIONS**

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T <sub>J</sub> , T <sub>Stg</sub>		-40 to +150	°C
Maximum thermal resistance, junction to case	R <sub>thJC</sub>	DC operation	0.2	°C/W
Maximum thermal resistance, junction to ambient	R <sub>thJA</sub>		40	
Typical thermal resistance, case to heatsink	R <sub>thCS</sub>	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	

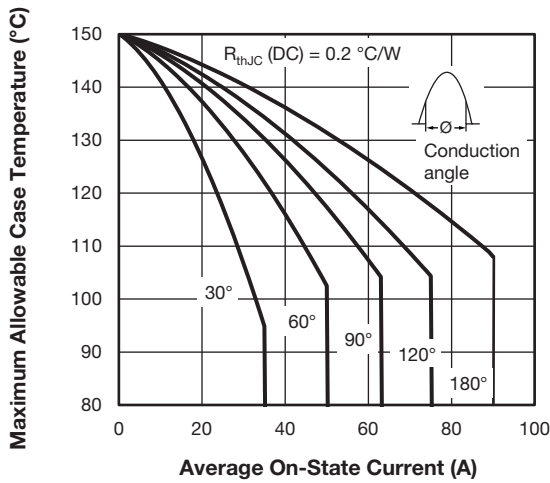


Fig. 1 - Current Rating Characteristics

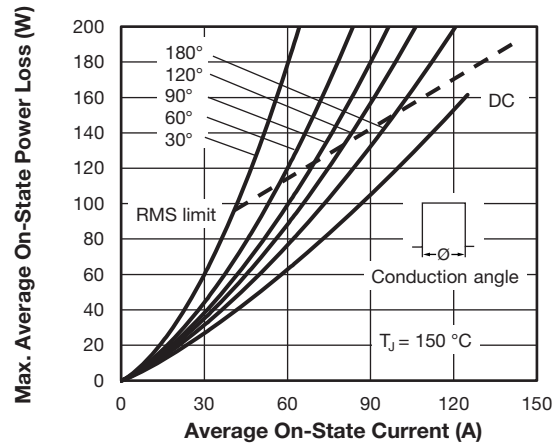


Fig. 4 - Forward Power Loss Characteristics

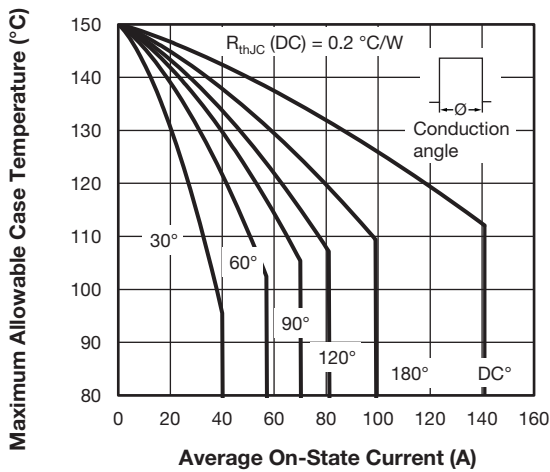


Fig. 2 - Current Rating Characteristics

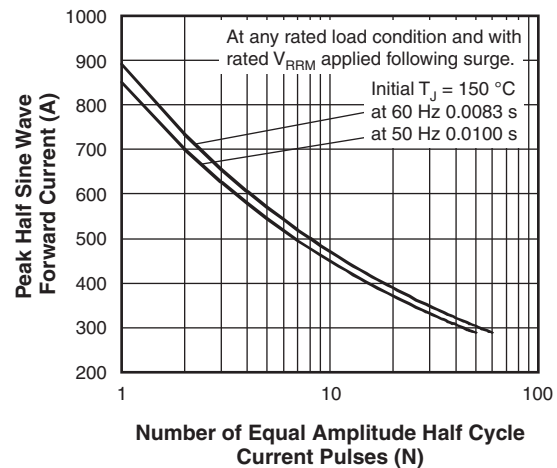


Fig. 5 - Maximum Non-Repetitive Surge Current

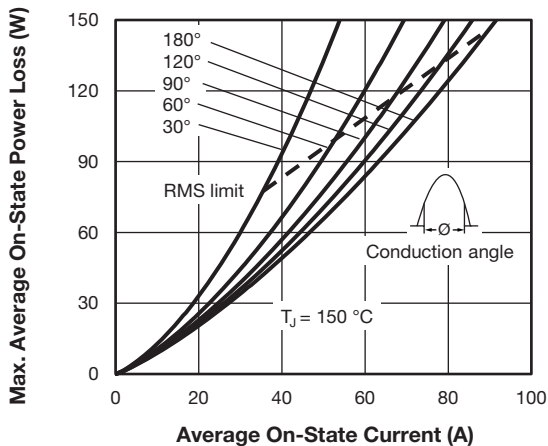


Fig. 3 - Forward Power Loss Characteristics

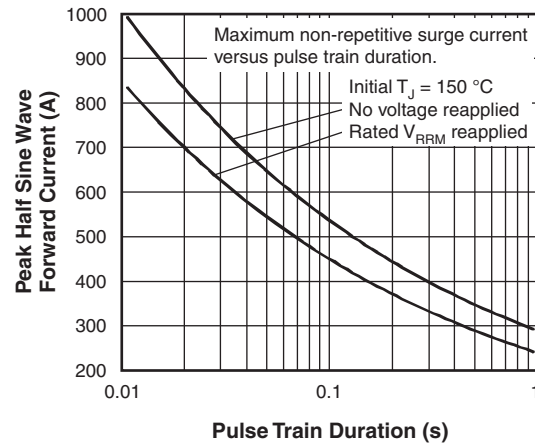


Fig. 6 - Maximum Non-Repetitive Surge Current

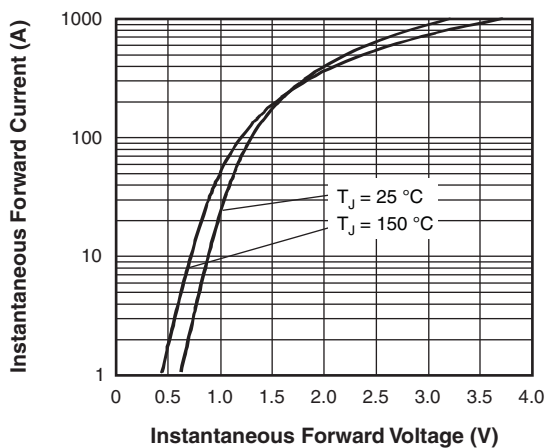
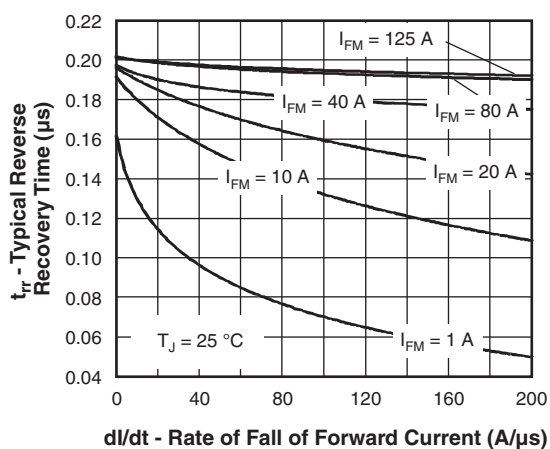
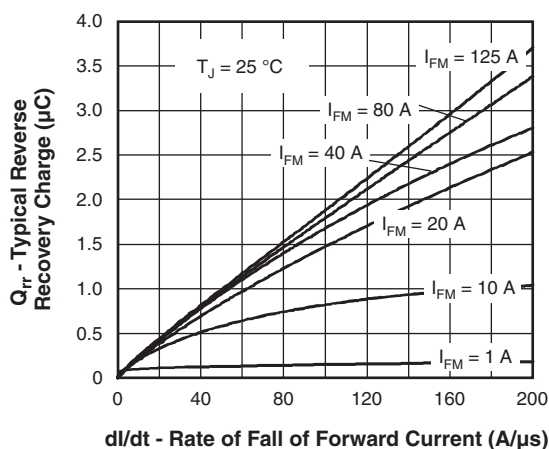
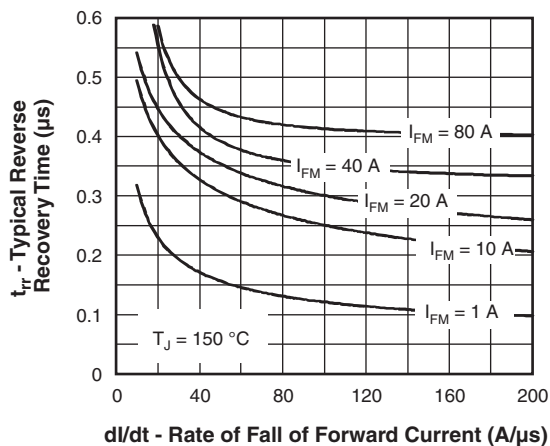
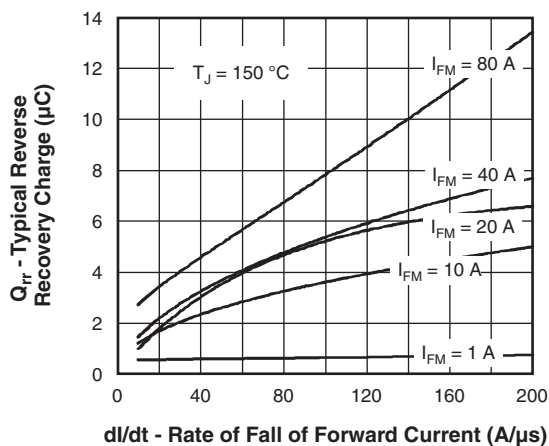


Fig. 7 - Forward Voltage Drop Characteristics


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,  $T_J = 150\text{ }^{\circ}\text{C}$

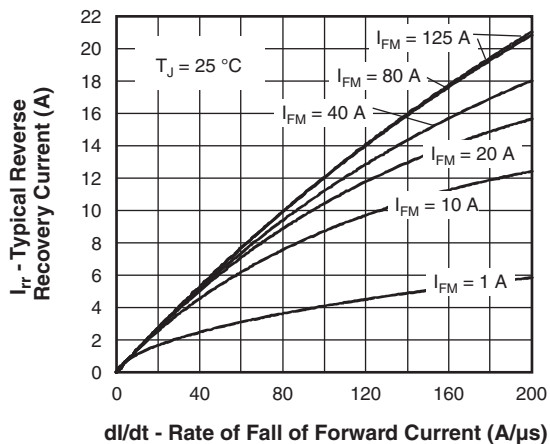


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^{\circ}\text{C}$

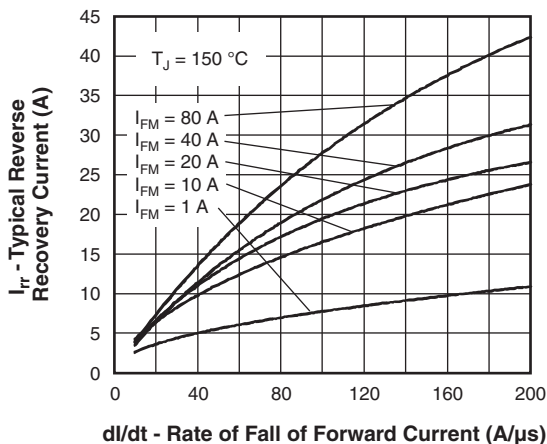


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^{\circ}\text{C}$

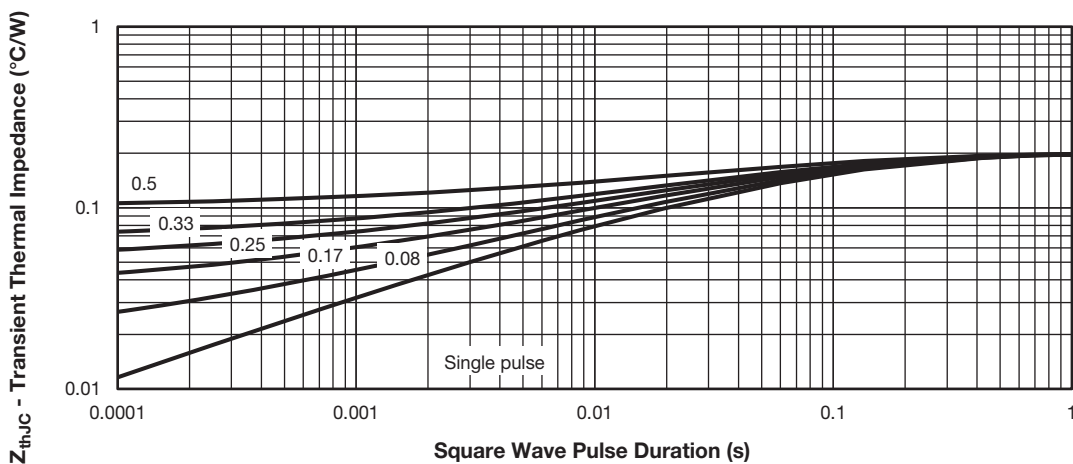


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

**ORDERING INFORMATION TABLE**

Device code	<b>VS-</b>	<b>90</b>	<b>A</b>	<b>P</b>	<b>F</b>	<b>06</b>	<b>L</b>	<b>-M3</b>
	1	2	3	4	5	6	7	8
	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 terminations lead (Pb)-free

<b>ORDERING INFORMATION</b> (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	<a href="http://www.vishay.com/doc?95536">www.vishay.com/doc?95536</a>
	TO-247AD 3L	<a href="http://www.vishay.com/doc?95626">www.vishay.com/doc?95626</a>
Part marking information	TO-247AD 2L	<a href="http://www.vishay.com/doc?95648">www.vishay.com/doc?95648</a>
	TO-247AD 3L	<a href="http://www.vishay.com/doc?95007">www.vishay.com/doc?95007</a>



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