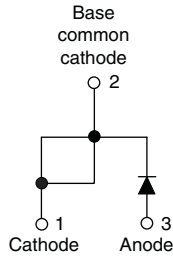


## Fast Soft Recovery Rectifier Diode, 30 A



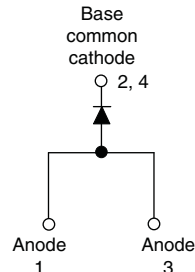
TO-247AC modified



VS-30EPF1...



TO-247AC



VS-30APF1...

### FEATURES

- 150 °C max. operating junction temperature
- Low forward voltage drop and short reverse recovery time
- Designed and qualified according to JEDEC-JESD47
- Compliant to RoHS Directive 2002/95/EC
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

### 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-30EPF1... and VS-30APF1... 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.

PRODUCT SUMMARY	
Package	TO-247AC, TO-247AC modified (2 pins)
$I_{F(AV)}$	30 A
$V_R$	1000 V, 1200 V
$V_F$ at $I_F$	1.41 V
$I_{FSM}$	350 A
$t_{rr}$	95 ns
$T_J$ max.	150 °C
Diode variation	Single die
Snap factor	0.6

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	30	A
$V_{RRM}$		1000 to 1200	V
$I_{FSM}$		350	A
$V_F$	30 A, $T_J = 25$ °C	1.41	V
$t_{rr}$	1 A, 100 A/ $\mu$ s	95	ns
$T_J$		- 40 to 150	°C

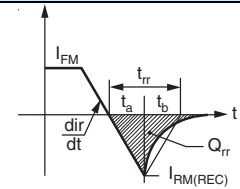
VOLTAGE RATINGS			
PART NUMBER	$V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT 150 °C mA
VS-30EPF10PbF, VS-30APF10PbF VS-30EPF10-M3, VS-30APF10-M3	1000	1100	6
VS-30EPF12PbF, VS-30APF12PbF VS-30EPF12-M3, VS-30APF12-M3	1200	1300	



ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 95\text{ }^\circ\text{C}$ , 180° conduction half sine wave	30	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	10 ms sine pulse, rated $V_{RRM}$ applied	300	
		10 ms sine pulse, no voltage reapplied	350	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied	450	$\text{A}^2\text{s}$
		10 ms sine pulse, no voltage reapplied	636	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1\text{ ms to } 10\text{ ms}$ , no voltage reapplied	6360	$\text{A}^2\sqrt{\text{s}}$

ELECTRICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	30 A, $T_J = 25\text{ }^\circ\text{C}$	1.41	V
Forward slope resistance	$r_t$	$T_J = 150\text{ }^\circ\text{C}$	10.09	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$		0.992	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	6	mA
		$T_J = 150\text{ }^\circ\text{C}$		

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	$t_{rr}$	$I_F$ at 30 A <sub>pk</sub> 25 A/ $\mu\text{s}$ 25 °C	450	ns
Reverse recovery current	$I_{rr}$		6.1	A
Reverse recovery charge	$Q_{rr}$		2.16	$\mu\text{C}$
Snap factor	S		Typical	0.6



THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	$T_J, T_{Stg}$		- 40 to 150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	$R_{thJC}$	DC operation	0.8	$^\circ\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$		40	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	0.2	
Approximate weight			6	g
			0.21	oz.
Mounting torque	minimum		6 (5)	$\text{kgf} \cdot \text{cm}$ ( $\text{lb} \cdot \text{in}$ )
	maximum		12 (10)	
Marking device		Case style TO-247AC modified	30EPF10	
			30EPF12	
		Case style TO-247AC	30APF10	
			30APF12	

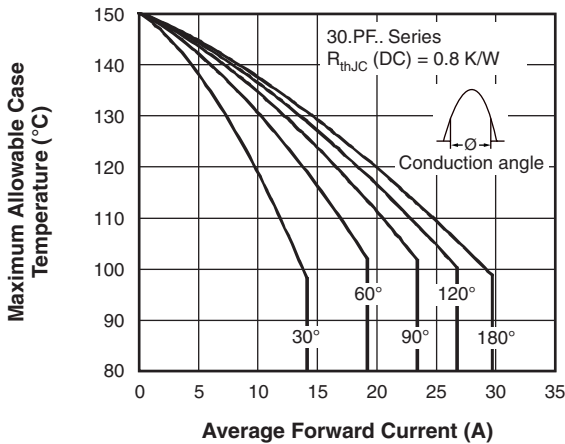


Fig. 1 - Current Rating Characteristics

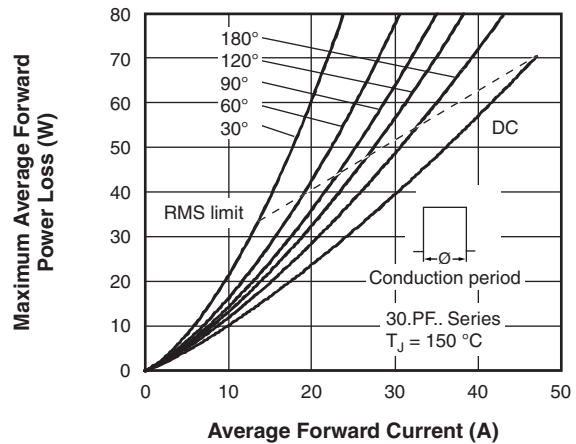


Fig. 4 - Forward Power Loss Characteristics

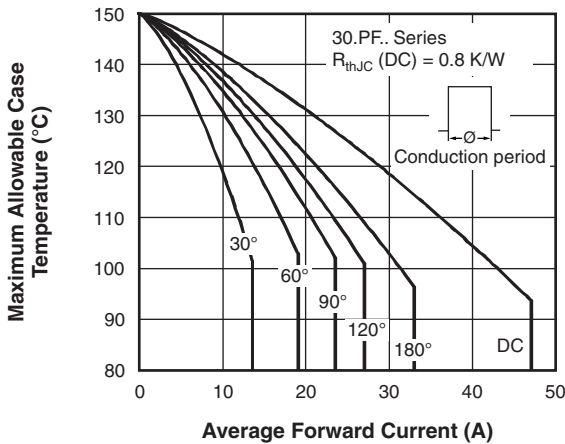


Fig. 2 - Current Rating Characteristics

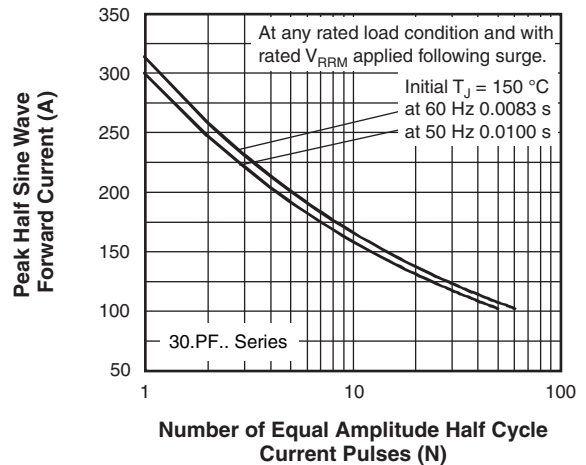


Fig. 5 - Maximum Non-Repetitive Surge Current

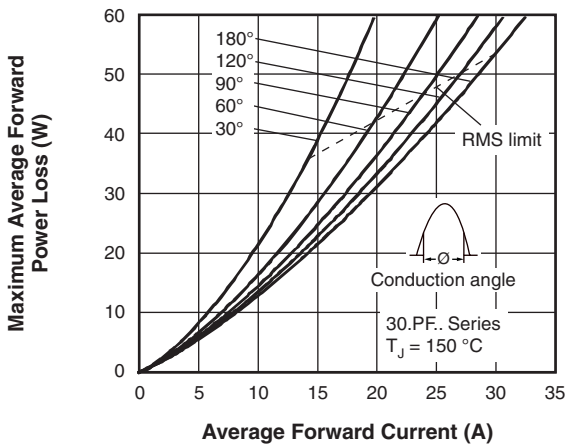


Fig. 3 - Forward Power Loss Characteristics

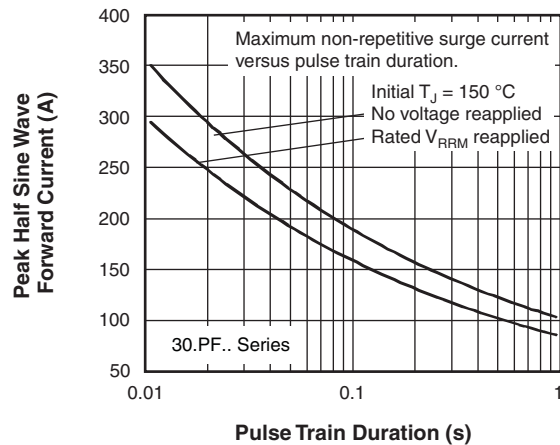


Fig. 6 - Maximum Non-Repetitive Surge Current

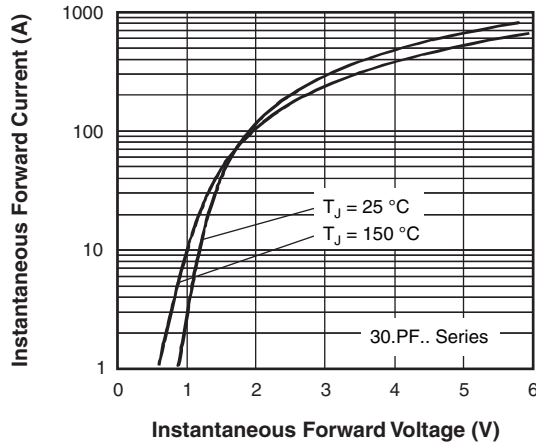


Fig. 7 - Forward Voltage Drop Characteristics

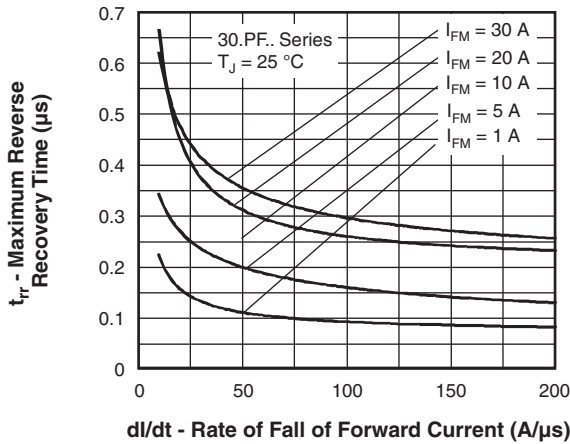


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

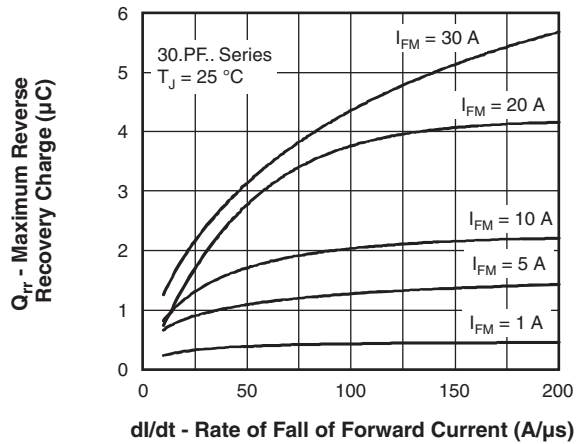


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

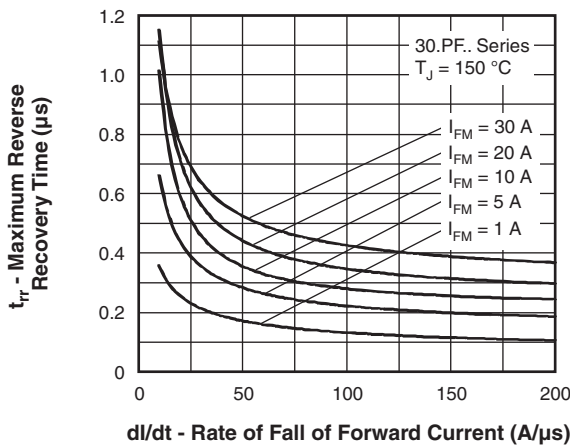


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

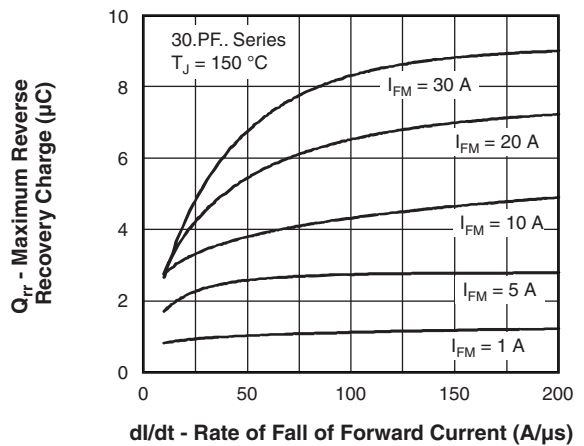


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

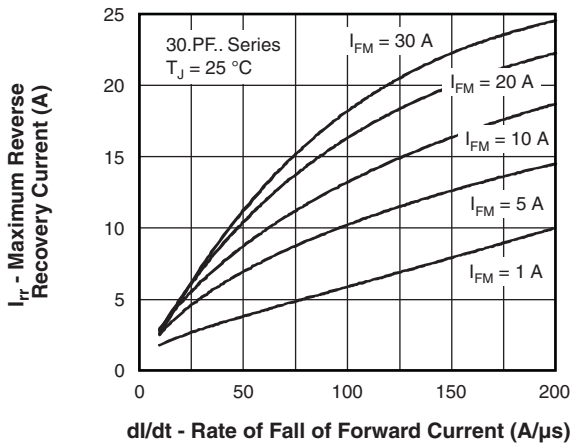


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

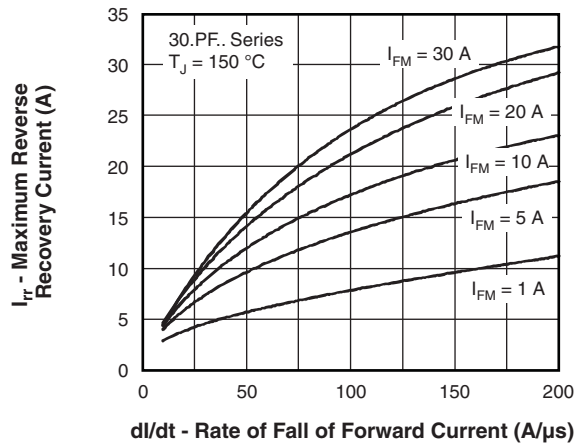


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

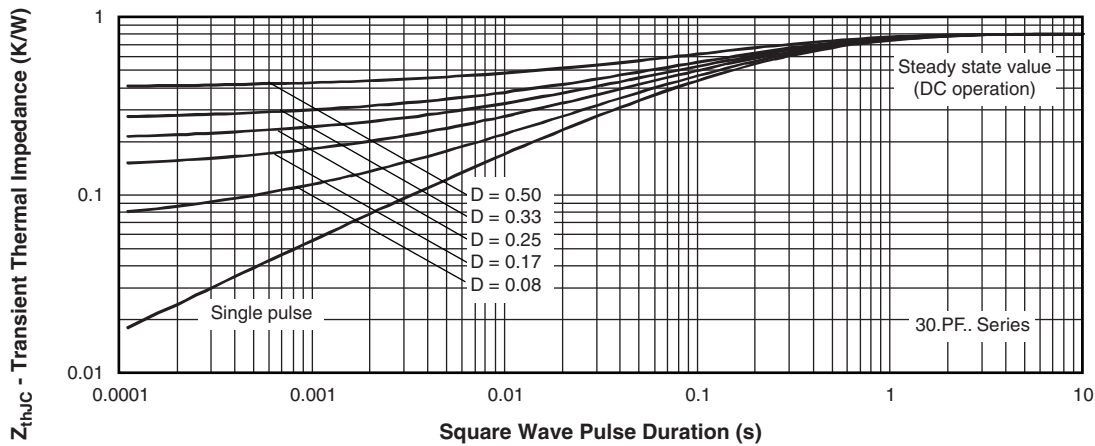
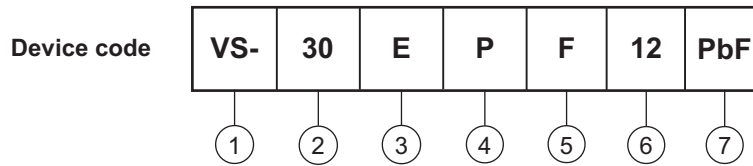


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics



**ORDERING INFORMATION TABLE**



- 1** - Vishay Semiconductors product
- 2** - Current rating (30 = 30 A)
- 3** - Circuit configuration:  
E = Single diode  
A = Single diode, 3 pins
- 4** - Package:  
P = TO-247AC/TO-247AC modified
- 5** - Type of silicon:  
F = Fast recovery
- 6** - Voltage code x 100 =  $V_{RRM}$ 

10 = 1000 V
12 = 1200 V
- 7** - Environmental digit:
  - PbF = Lead (Pb)-free and RoHS compliant
  - -M3 = Halogen-free, RoHS compliant and terminations lead (Pb)-free

<b>ORDERING INFORMATION (Example)</b>			
<b>PREFERRED P/N</b>	<b>QUANTITY PER T/R</b>	<b>MINIMUM ORDER QUANTITY</b>	<b>PACKAGING DESCRIPTION</b>
VS-30EPF10PbF	25	500	Antistatic plastic tubes
VS-30EPF10-M3	25	500	Antistatic plastic tubes
VS-30APF10PbF	25	500	Antistatic plastic tubes
VS-30APF10-M3	25	500	Antistatic plastic tubes
VS-30EPF12PbF	25	500	Antistatic plastic tubes
VS-30EPF12-M3	25	500	Antistatic plastic tubes
VS-30APF12PbF	25	500	Antistatic plastic tubes
VS-30APF12-M3	25	500	Antistatic plastic tubes

<b>LINKS TO RELATED DOCUMENTS</b>		
Dimensions	TO-247AC modified	<a href="http://www.vishay.com/doc?95253">www.vishay.com/doc?95253</a>
	TO-247AC	<a href="http://www.vishay.com/doc?95223">www.vishay.com/doc?95223</a>
Part marking information	TO-247AC modified PbF	<a href="http://www.vishay.com/doc?95255">www.vishay.com/doc?95255</a>
	TO-247AC modified -M3	<a href="http://www.vishay.com/doc?95442">www.vishay.com/doc?95442</a>
	TO-247AC PbF	<a href="http://www.vishay.com/doc?95226">www.vishay.com/doc?95226</a>
	TO-247AC -M3	<a href="http://www.vishay.com/doc?95007">www.vishay.com/doc?95007</a>
SPICE model		<a href="http://www.vishay.com/doc?95184">www.vishay.com/doc?95184</a>



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**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**