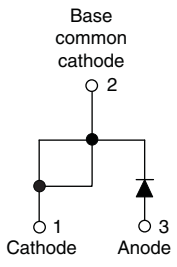
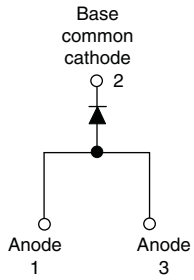
Fast Soft Recovery Rectifier Diode, 30 A

TO-247AC modified

TO-247AC



VS-30EPF0...



VS-30APF0...

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)

Pb e3 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-30EPF0... and VS-30APF0... 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	200 V, 400 V, 600 V
V_F at I_F	1.41 V
I_{FSM}	350 A
t_{rr}	60 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}		200 to 600	V
I_{FSM}		350	A
V_F	10 A, T_J = 25 °C	1.2	V
t_{rr}	1 A, 100 A/µs	60	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-30EPF02PbF, VS-30APF02PbF VS-30EPF02-M3, VS-30APF02-M3	200	300	2
VS-30EPF04PbF, VS-30APF04PbF VS-30EPF04-M3, VS-30APF04-M3	400	500	
VS-30EPF06PbF, VS-30APF06PbF VS-30EPF06-M3, VS-30APF06-M3	600	700	

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ABSOLUTE MAXIMUM RATINGS

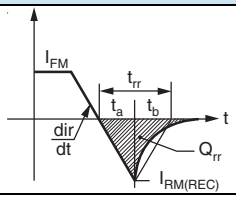
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 98 °C, 180° conduction half sine wave	30	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied	300	
		10 ms sine pulse, no voltage reapplied	350	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	450	A^2s
		10 ms sine pulse, no voltage reapplied	636	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied	6360	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	30 A, T_J = 25 °C		1.41	V
Forward slope resistance	r_t	T_J = 150 °C		12.5	mΩ
Threshold voltage	$V_{F(TO)}$			0.9	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_{RRM}	0.1	mA
		T_J = 150 °C		2.0	

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	t_{rr}	I_F at 20 A_{pk} 100 A/µs 25 °C	160	ns
Reverse recovery current	I_{rr}		10	A
Reverse recovery charge	Q_{rr}		1.25	µC
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	°C
Maximum thermal resistance, junction to case		R_{thJC}	DC operation	0.8	°C/W
Maximum thermal resistance, junction to ambient		R_{thJA}		40	
Maximum 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)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style TO-247AC modified	30EPF02	
				30EPF04	
				30EPF06	
			Case style TO-247AC	30APF02	
				30APF04	
				30APF06	

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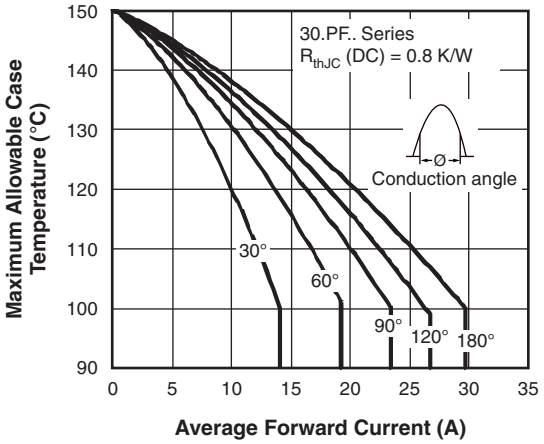

Fig. 1 - Current Rating Characteristics

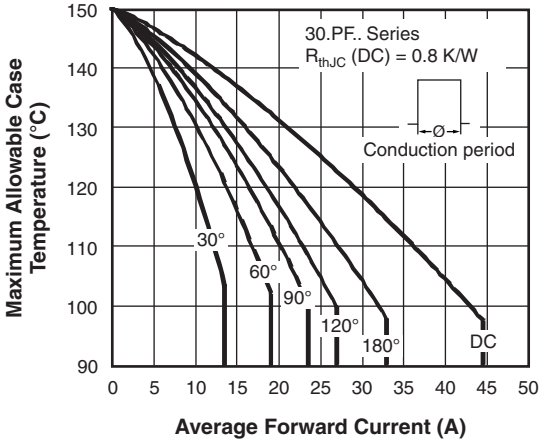

Fig. 2 - Current Rating Characteristics

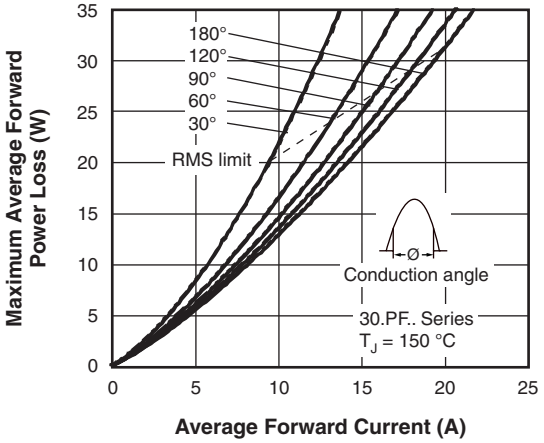

Fig. 3 - Forward Power Loss Characteristics

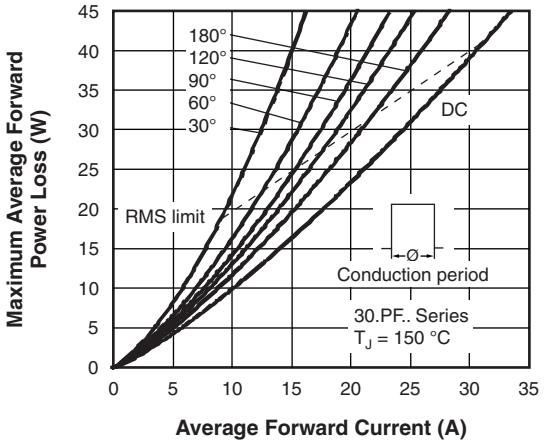

Fig. 4 - Forward Power Loss Characteristics

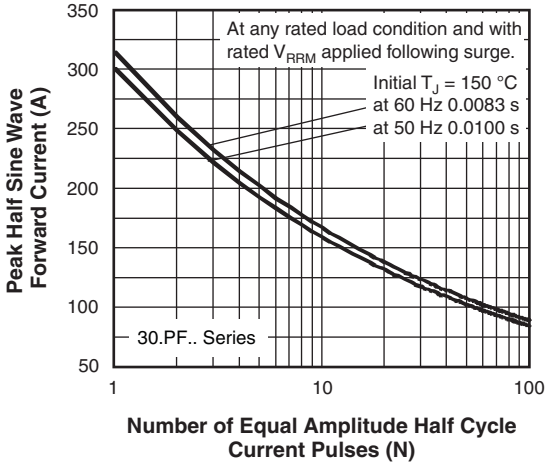

Fig. 5 - Maximum Non-Repetitive Surge Current

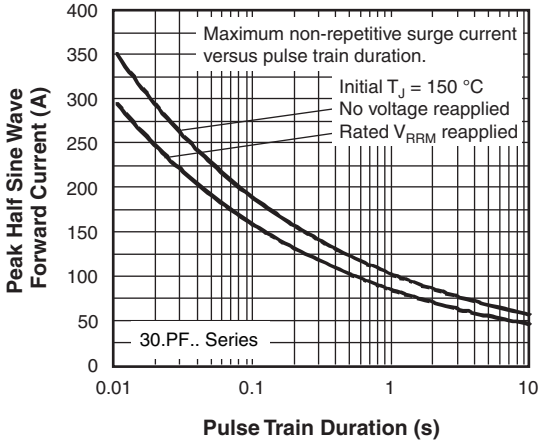

Fig. 6 - Maximum Non-Repetitive Surge Current

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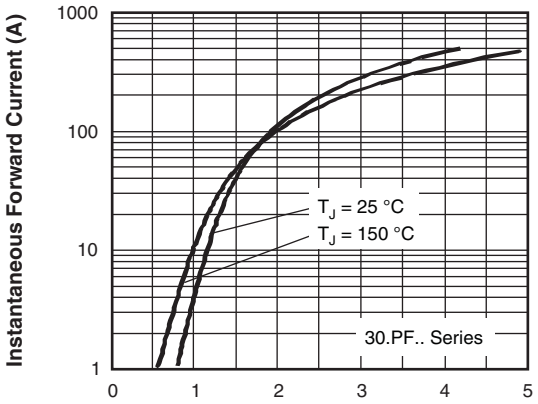

Fig. 7 - Forward Voltage Drop Characteristics

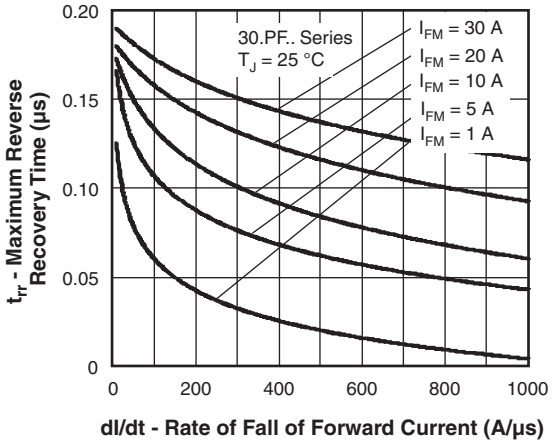

Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

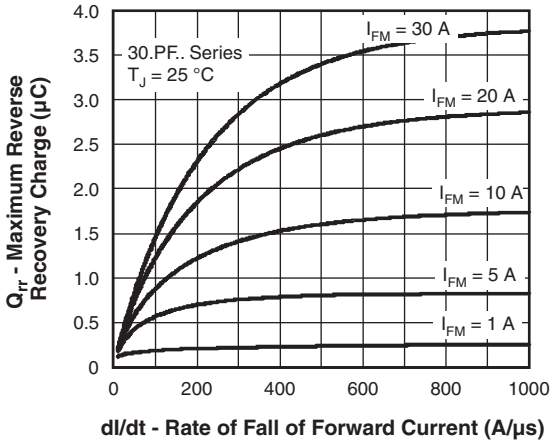

Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

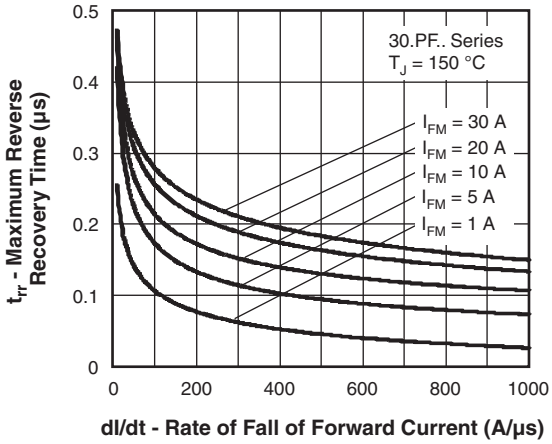

Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

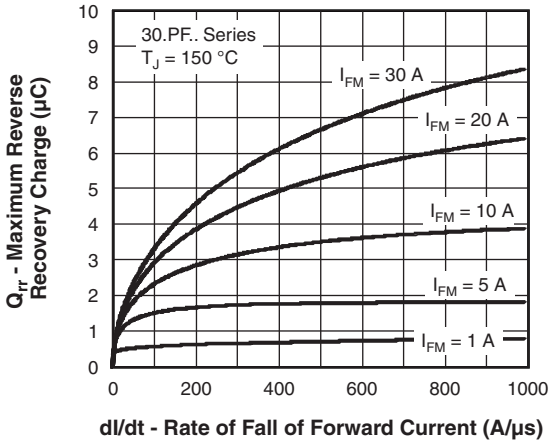

Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

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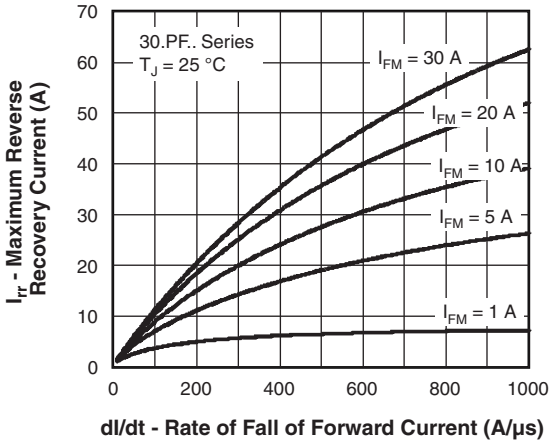

Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

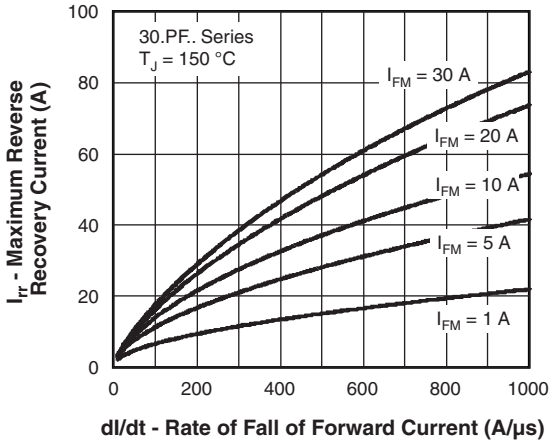

Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

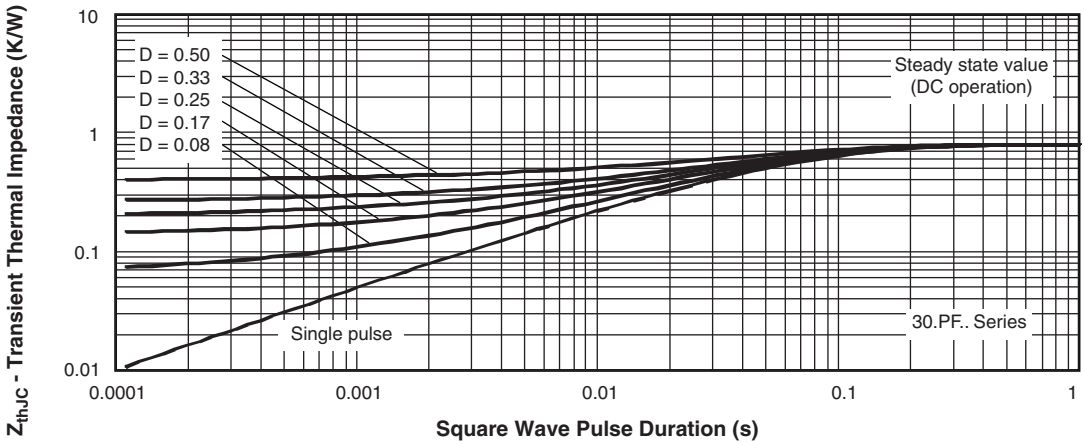

Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

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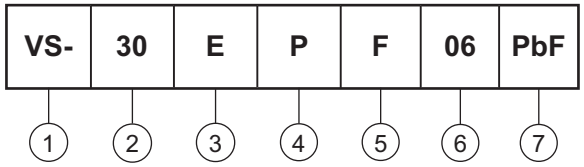
ORDERING INFORMATION TABLE

Device code



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}
02 = 200 V
04 = 400 V
06 = 600 V

7 - Environmental digit:
- PbF = Lead (Pb)-free and RoHS compliant
- -M3 = Halogen-free, RoHS compliant and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	**QUANTITY PER T/R**	**MINIMUM ORDER QUANTITY**	**PACKAGING DESCRIPTION**
VS-30EPF02PbF	25	500	Antistatic plastic tubes
VS-30EPF02-M3	25	500	Antistatic plastic tubes
VS-30APF02PbF	25	500	Antistatic plastic tubes
VS-30APF02-M3	25	500	Antistatic plastic tubes
VS-30EPF04PbF	25	500	Antistatic plastic tubes
VS-30EPF04-M3	25	500	Antistatic plastic tubes
VS-30APF04PbF	25	500	Antistatic plastic tubes
VS-30APF04-M3	25	500	Antistatic plastic tubes
VS-30EPF06PbF	25	500	Antistatic plastic tubes
VS-30EPF06-M3	25	500	Antistatic plastic tubes
VS-30APF06PbF	25	500	Antistatic plastic tubes
VS-30APF06-M3	25	500	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS		
Dimensions	TO-247AC modified	www.vishay.com/doc?95253
	TO-247AC	www.vishay.com/doc?95223
Part marking information	TO-247AC modified PbF	www.vishay.com/doc?95255
	TO-247AC modified -M3	www.vishay.com/doc?95442
	TO-247AC PbF	www.vishay.com/doc?95226
	TO-247AC -M3	www.vishay.com/doc?95007

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