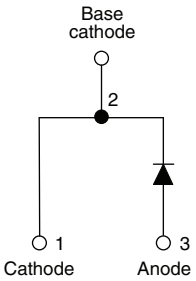
Fast Soft Recovery Rectifier Diode, 40 A

TO-247AC 2L



FEATURES

- Glass passivated pellet chip junction
- 150 °C max. operating junction temperature
- 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 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-40EPF006-M3 and VS-40APF006-M3 fast 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	
$I_{F(AV)}$	40 A
V_R	200 V, 400 V, 600 V
V_F at I_F	1.25 V
I_{FSM}	475 A
t_{rr}	60 ns
T_J max.	150 °C
Package	TO-247AC 2L
Circuit configuration	Single
Snap factor	0.5

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	40	A
V_{RRM}		200 to 600	V
I_{FSM}		475	A
V_F	10 A, T_J = 25 °C	1	V
t_{rr}	1 A, - 100 A/µs	60	ns
T_J		-40 to +150	°C

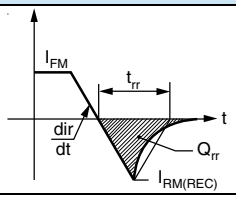
VOLTAGE RATINGS			
PART NUMBER	V_{RRM}, MAXIMUM PEAK REVERSE VOLTAGE V	V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} AT 150 °C mA
VS-40EPF02-M3	200	300	8
VS-40EPF04-M3	400	500	
VS-40EPF06-M3	600	700	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	T_C = 105 °C, 180° conduction half sine wave	40	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied	400	
		10 ms sine pulse, no voltage reapplied	475	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	800	A^2s
		10 ms sine pulse, no voltage reapplied	1131	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied	11 310	$A^2\sqrt{s}$

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	40 A, T_J = 25 °C		1.25	V
Forward slope resistance	r_t	T_J = 150 °C		4.4	mΩ
Threshold voltage	$V_{F(TO)}$			1.1	V
Maximum reverse leakage current	I_{RM}	T_J = 25 °C	V_R = Rated V_{RRM}	0.1	mA
		T_J = 150 °C		8.0	

RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	t_{rr}	I_F at 40 A_{pk} 25 A/µs 25 °C	180	ns	
Reverse recovery current	I_{rr}		3.2	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	0.6	°C/W
Maximum thermal resistance, junction to ambient		R_{thJA}		40	
Typical thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased	0.2	
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 2L	40EPF02	
				40EPF04	
				40EPF06	

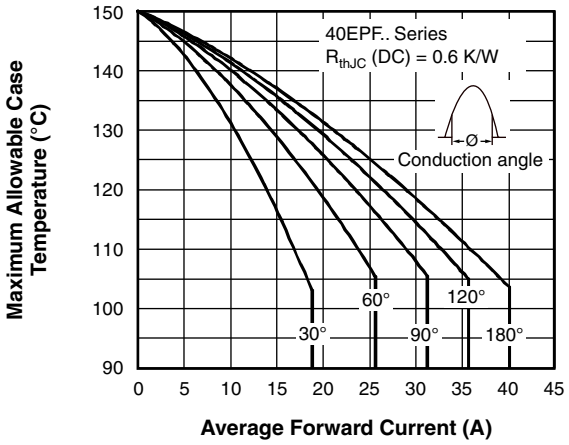


Fig. 1 - Current Rating Characteristics

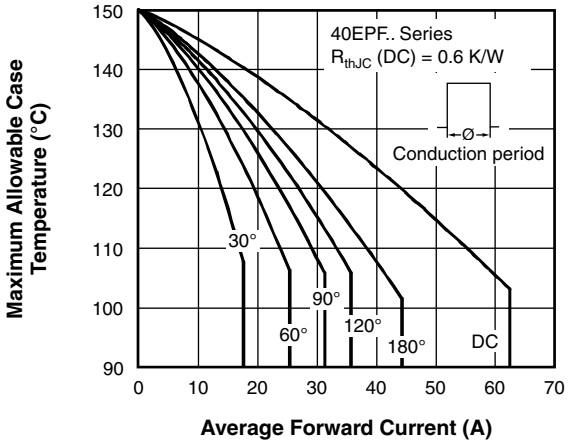


Fig. 2 - Current Rating Characteristics

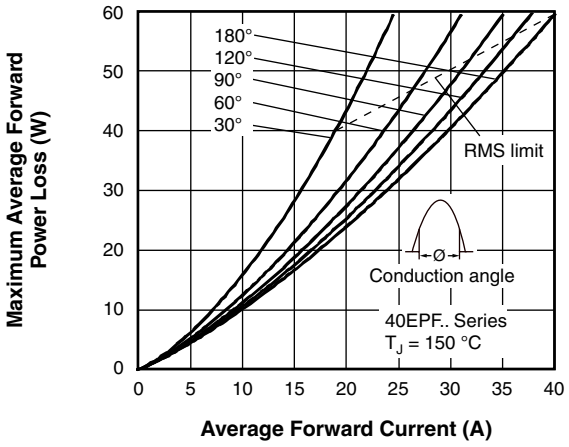


Fig. 3 - Forward Power Loss Characteristics

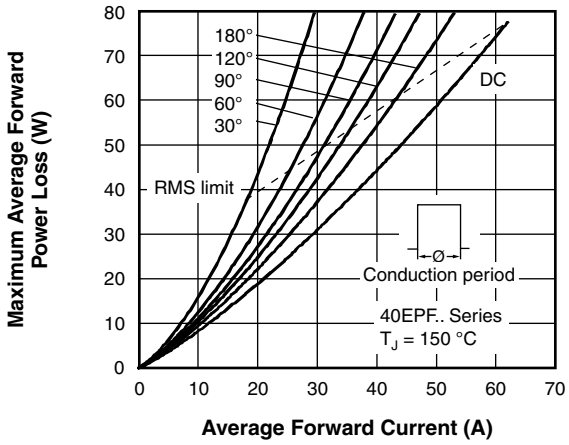


Fig. 4 - Forward Power Loss Characteristics

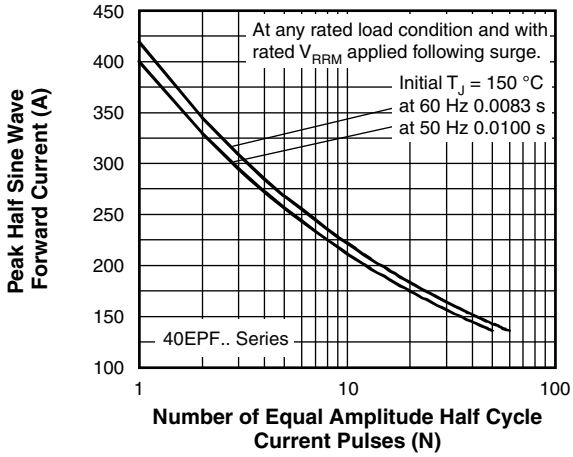


Fig. 5 - Maximum Non-Repetitive Surge Current

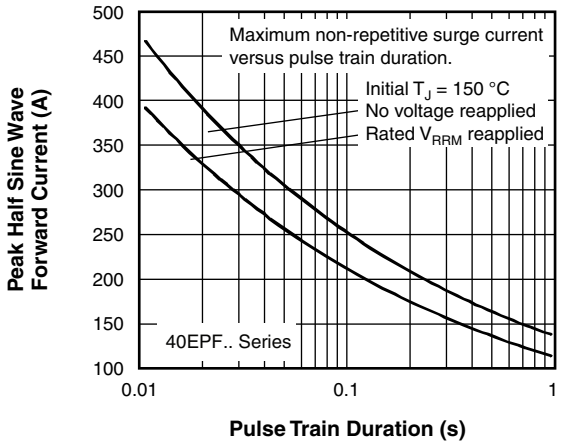


Fig. 6 - Maximum Non-Repetitive Surge Current

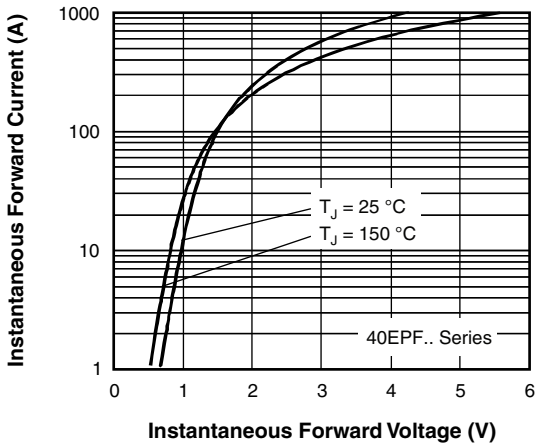


Fig. 7 - Forward Voltage Drop Characteristics

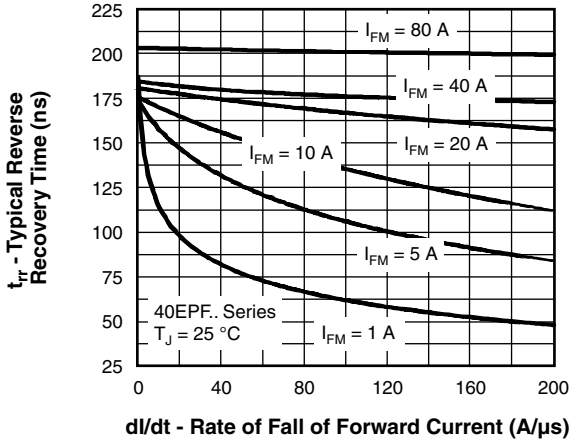


Fig. 8 - Recovery Time Characteristics, T_J = 25 °C

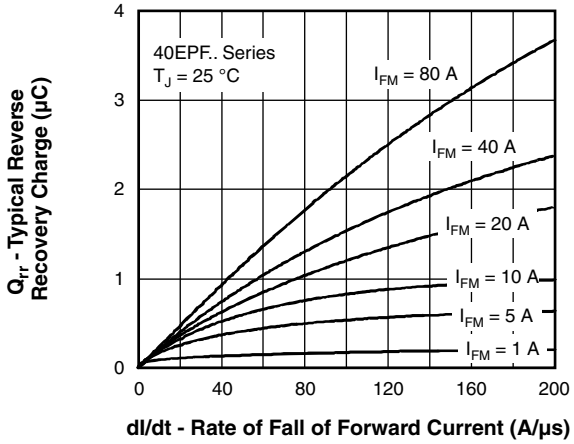


Fig. 10 - Recovery Charge Characteristics, T_J = 25 °C

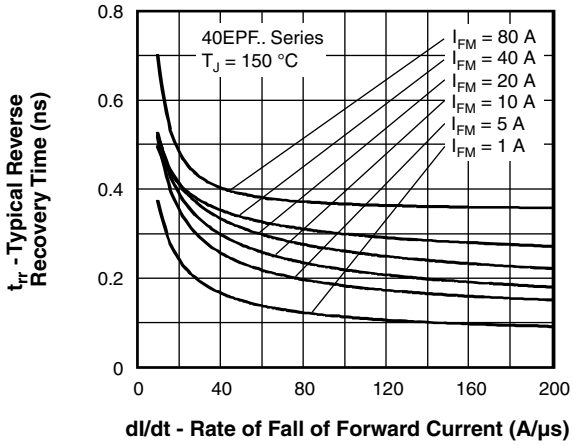


Fig. 9 - Recovery Time Characteristics, T_J = 150 °C

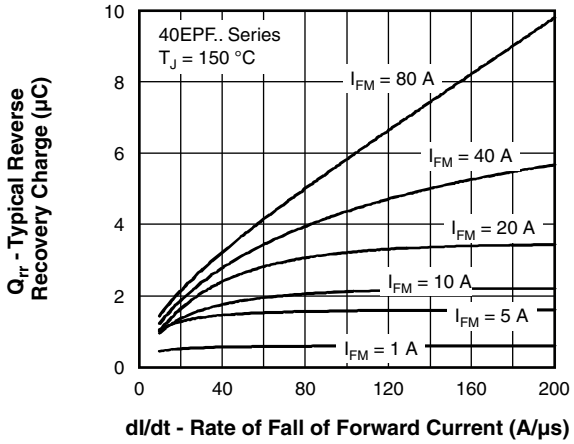


Fig. 11 - Recovery Charge Characteristics, T_J = 150 °C

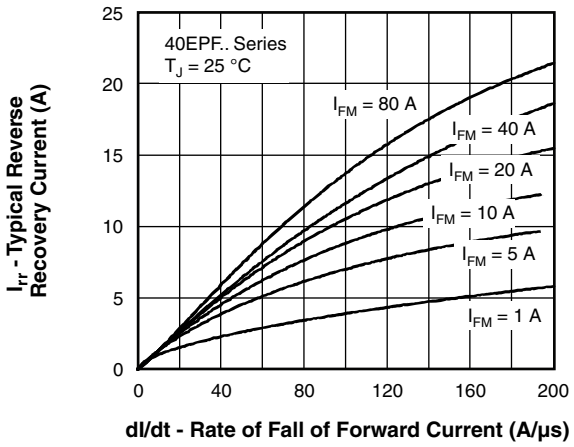


Fig. 12 - Recovery Current Characteristics, T_J = 25 °C

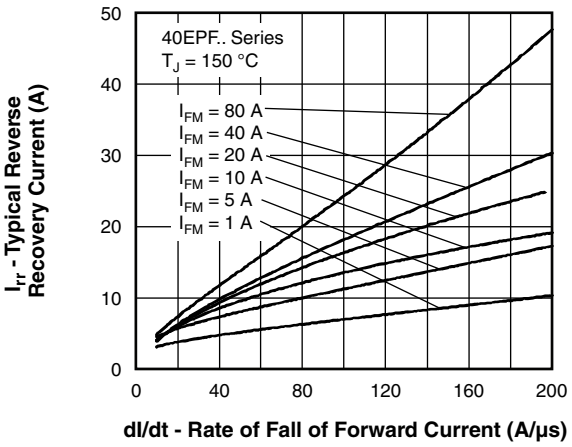


Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

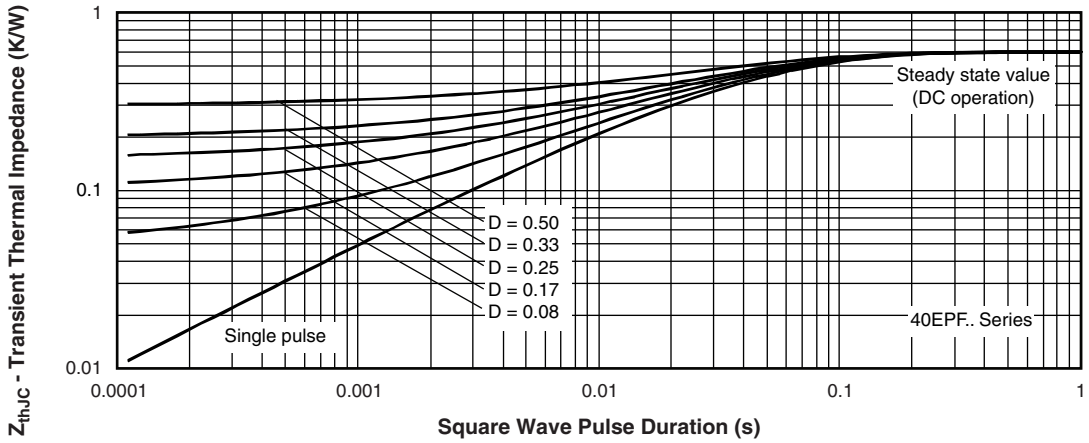


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

VS-	40	E	P	F	06	-M3
1	2	3	4	5	6	7

1 - Vishay Semiconductors product

2 - Current rating (40 = 40 A)

3 - Circuit configuration:
E = single diode

4 - Package:
P = TO-247AC 2L

5 - Type of silicon:
F = fast diode

6 - Voltage code x 100 = V_{RRM}
02 = 200 V
04 = 400 V
06 = 600 V

7 - Environmental digit:
-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-40EPF02-M3	25	500	Antistatic plastic tubes
VS-40EPF04-M3	25	500	Antistatic plastic tubes
VS-40EPF06-M3	25	500	Antistatic plastic tubes

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?96144
Part marking information	www.vishay.com/doc?95648
SPICE model	www.vishay.com/doc?95274

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