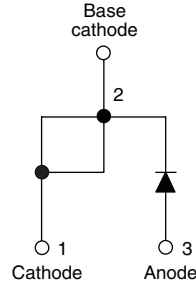


## Fast Soft Recovery Rectifier Diode, 10 A



TO-220AC FULL-PAK



### FEATURES/DESCRIPTION

The 10ETF...FPPbF 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.

The fully isolated package ( $V_{INS} = 2500 V_{RMS}$ ) is UL E78996 approved.

This product series has been designed and qualified for industrial level and lead (Pb)-free.



RoHS\*  
COMPLIANT

### APPLICATIONS

- Output rectification and freewheeling in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met

### PRODUCT SUMMARY

$V_F$ at 10 A	< 1.33 V
$t_{rr}$	80 ns
$V_{RRM}$	1000 to 1200 V

### MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Sinusoidal waveform	10	A
$V_{RRM}$		1000 to 1200	V
$I_{FSM}$		160	A
$V_F$	10 A, $T_J = 25^\circ C$	1.33	V
$t_{rr}$	1 A, 100 A/ $\mu s$	80	ns
$T_J$		- 40 to 150	$^\circ C$

### VOLTAGE RATINGS

PART NUMBER	$V_{RRM}$ , MAXIMUM PEAK REVERSE VOLTAGE V	$V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	$I_{RRM}$ AT 150 $^\circ C$ mA
10ETF10FPPbF	1000	1100	4
10ETF12FPPbF	1200	1300	

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 95^\circ C$ , 180 $^\circ$ conduction half sine wave	10	A
Maximum peak one cycle non-repetitive surge current	$I_{FSM}$	10 ms sine pulse, rated $V_{RRM}$ applied	160	
		10 ms sine pulse, no voltage reapplied	185	
Maximum $I^2t$ for fusing	$I^2t$	10 ms sine pulse, rated $V_{RRM}$ applied	128	$A^2s$
		10 ms sine pulse, no voltage reapplied	180	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ to 10 ms, no voltage reapplied	1800	$A^2\sqrt{s}$

\* Pb containing terminations are not RoHS compliant, exemptions may apply

# 10ETF..FPPbF Soft Recovery Series

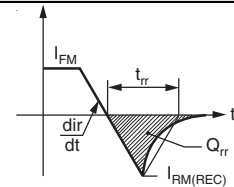


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Fast Soft Recovery  
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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	$V_{FM}$	10 A, $T_J = 25\text{ }^\circ\text{C}$		1.33	V
Forward slope resistance	$r_t$	$T_J = 150\text{ }^\circ\text{C}$		22.9	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$			0.96	V
Maximum reverse leakage current	$I_{RM}$	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^\circ\text{C}$		4	

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	$t_{rr}$	$I_F$ at 10 Apk 25 A/ $\mu\text{s}$ 25 $^\circ\text{C}$	310	ns
Reverse recovery current	$I_{rr}$		4.7	A
Reverse recovery charge	$Q_{rr}$		1.05	$\mu\text{C}$
Typical snap factor	S		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	2.5	$^\circ\text{C/W}$
Maximum thermal resistance, junction to ambient	$R_{thJA}$		62	
Typical thermal resistance, case to heatsink	$R_{thCS}$	Mounting surface, smooth and greased	0.5	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum		6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style TO-220AC FULL-PAK (JEDEC)	10ETF12FP	

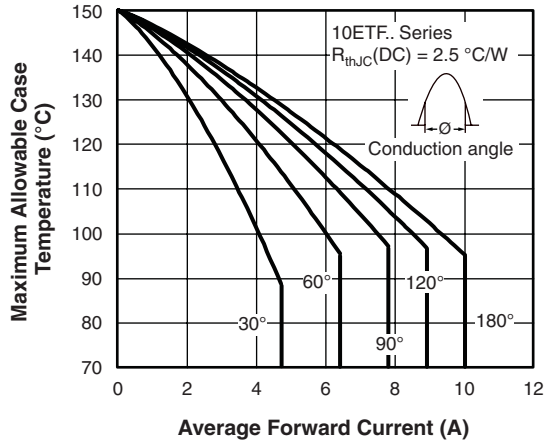


Fig. 1 - Current Rating Characteristics

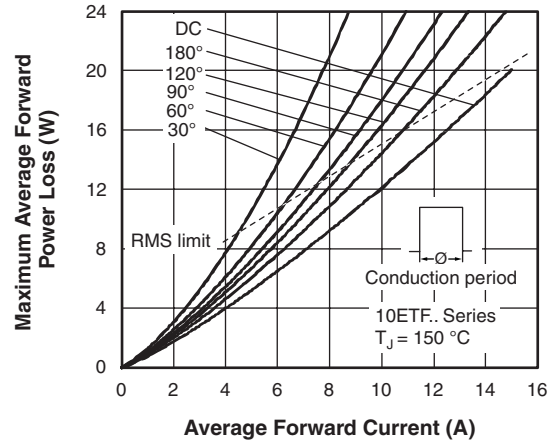


Fig. 4 - Forward Power Loss Characteristics

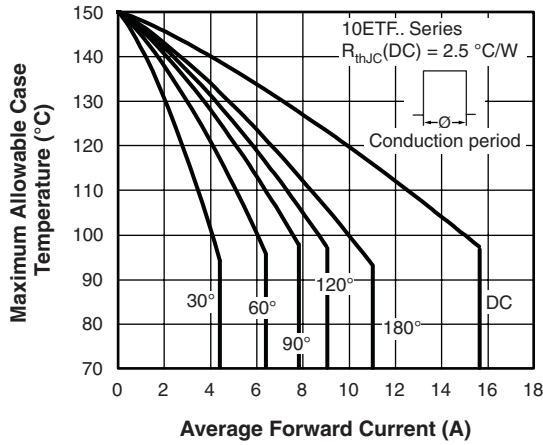


Fig. 2 - Current Rating Characteristics

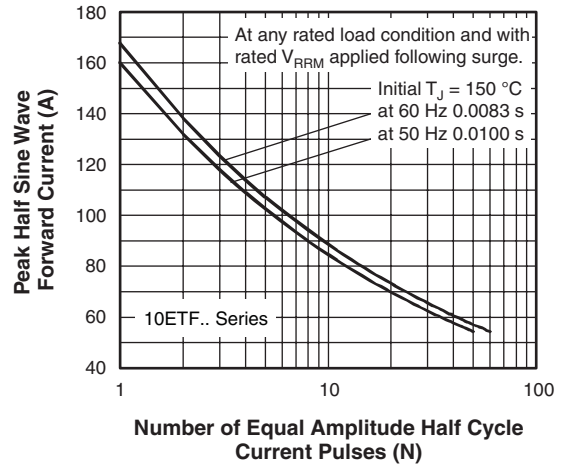


Fig. 5 - Maximum Non-Repetitive Surge Current

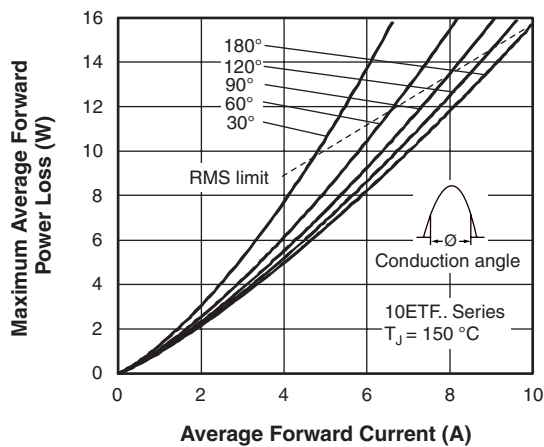


Fig. 3 - Forward Power Loss Characteristics

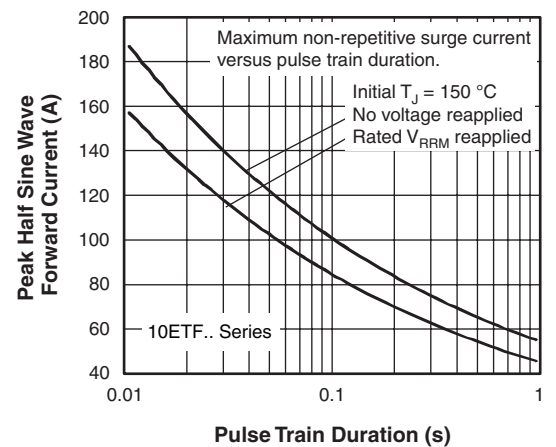


Fig. 6 - Maximum Non-Repetitive Surge Current

# 10ETF..FPPbF Soft Recovery Series



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Fast Soft Recovery Rectifier Diode, 10 A

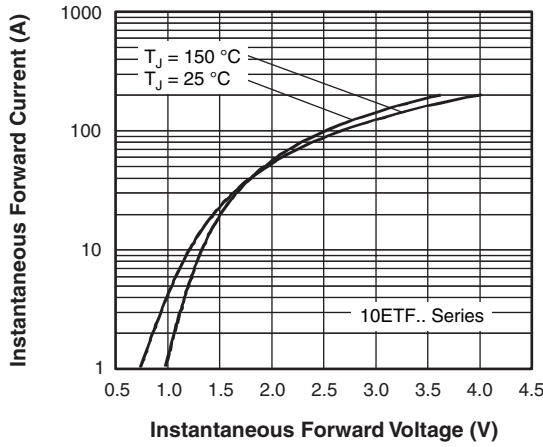


Fig. 7 - Forward Voltage Drop Characteristics

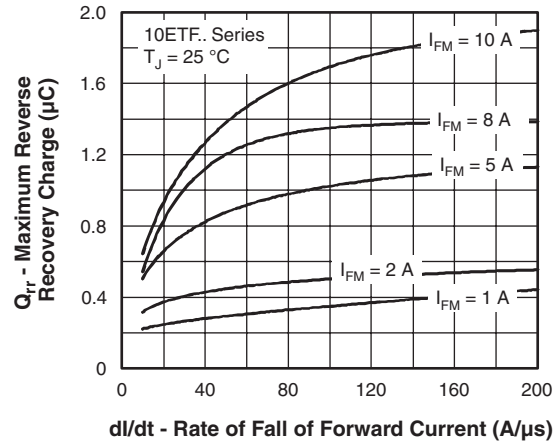


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

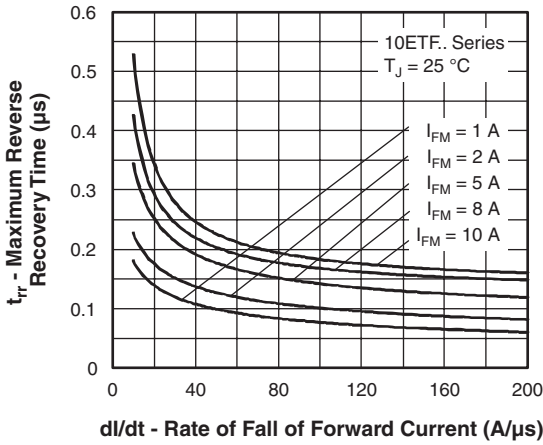


Fig. 8 - Recovery Time Characteristics,  $T_J = 25\text{ }^\circ\text{C}$

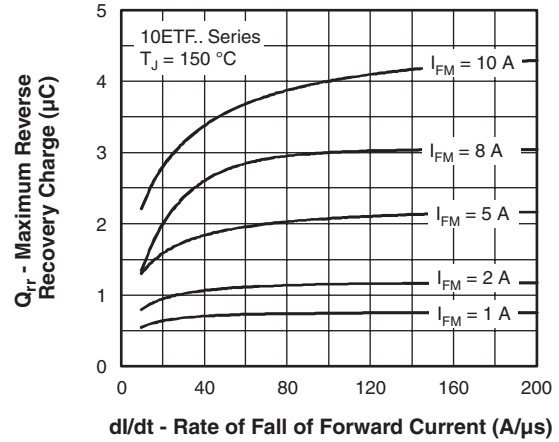


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

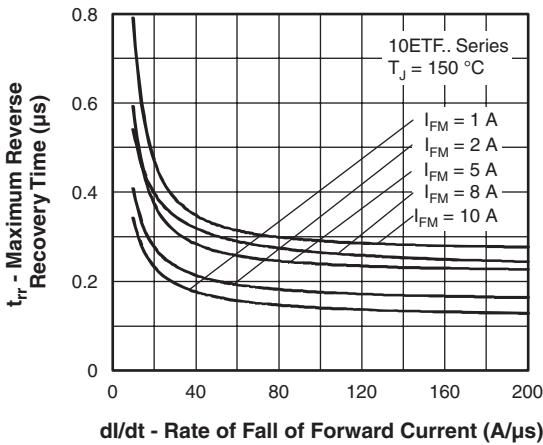


Fig. 9 - Recovery Time Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

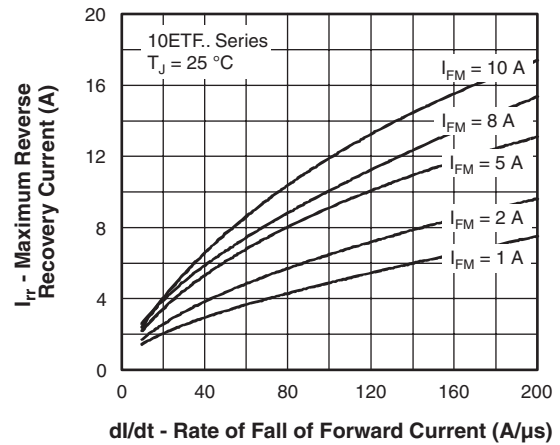


Fig. 12 - Recovery Current Characteristics,  $T_J = 25\text{ }^\circ\text{C}$



# 10ETF..FPPbF Soft Recovery Series

Fast Soft Recovery  
Rectifier Diode, 10 A

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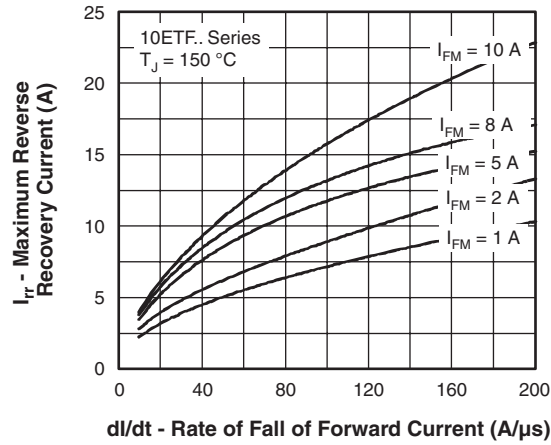


Fig. 13 - Recovery Current Characteristics,  $T_J = 150\text{ }^\circ\text{C}$

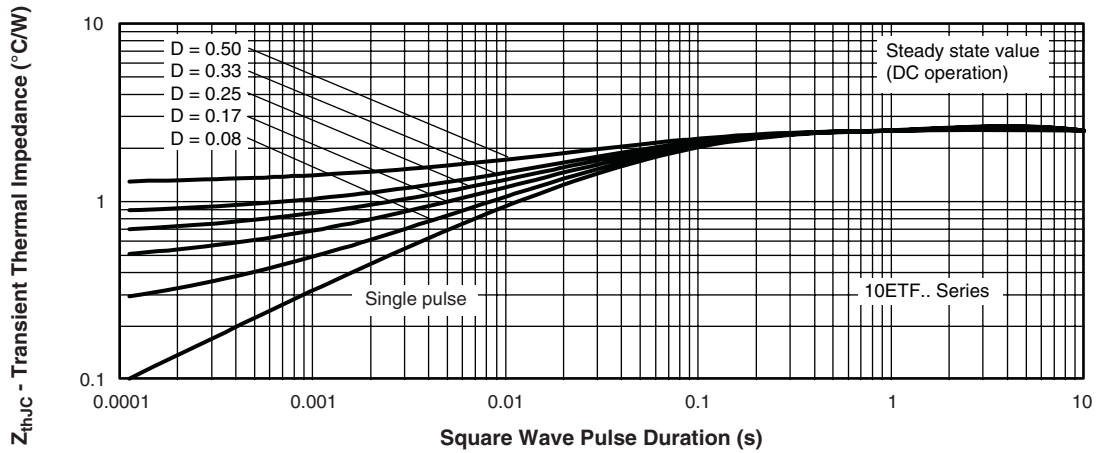


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

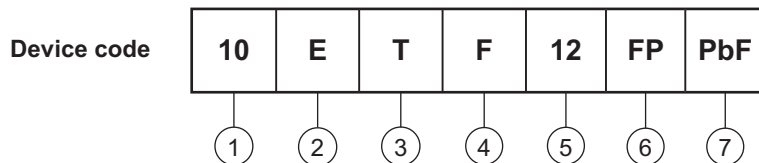
# 10ETF..FPPbF Soft Recovery Series



Vishay High Power Products

Fast Soft Recovery  
Rectifier Diode, 10 A

## ORDERING INFORMATION TABLE



**1** - Current rating (10 = 10 A)

**2** - Circuit configuration:  
E = Single diode

**3** - Package:  
T = TO-220AC

**4** - Type of silicon:  
F = Fast soft recovery rectifier

**5** - Voltage code x 100 =  $V_{RRM}$

**6** - FULL-PAK

**7** -  
• None = Standard production  
• PbF = Lead (Pb)-free

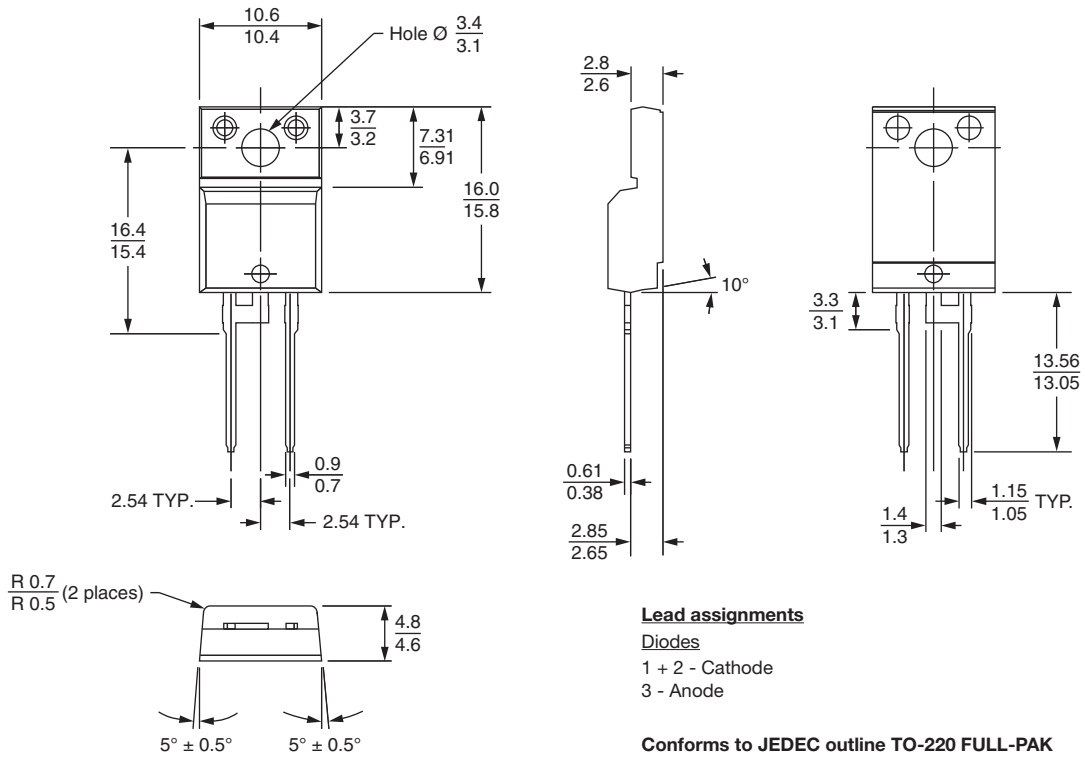
10 = 1000 V  
12 = 1200 V

### LINKS TO RELATED DOCUMENTS

Dimensions	<a href="http://www.vishay.com/doc?95005">http://www.vishay.com/doc?95005</a>
Part marking information	<a href="http://www.vishay.com/doc?95009">http://www.vishay.com/doc?95009</a>



**DIMENSIONS** in millimeters



### Lead assignments

- Diodes**
- 1 + 2 - Cathode
  - 3 - Anode

Conforms to JEDEC outline TO-220 FULL-PAK



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