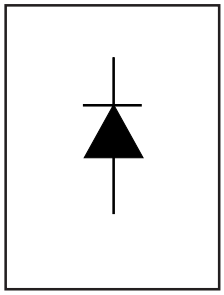
International
IOR Rectifier

*QUIET**IR*** Series
10ETF...PbF

FAST SOFT RECOVERY RECTIFIER DIODE
Lead-Free ("PbF" suffix)



V_F < 1.33V @ 10A
t_{rr} = 80ns
V_{RRM} = 1000 - 1200V

Description/ Features

The 10ETF...PbF fast soft recovery *QUIET**IR*** 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.

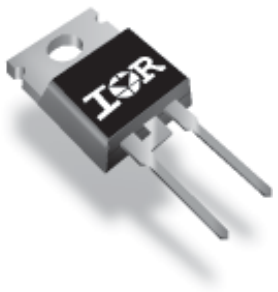
Typical applications are both:

- output rectification and freewheeling in inverters, choppers and converters
- and input rectifications where severe restrictions on conducted EMI should be met.

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{F(AV)}$ Sinusoidal waveform	10	A
V_{RRM}	1000-1200	V
I_{FSM}	160	A
V_F @10A, T_J=25°C	1.33	V
t_{rr} @1A, 100A/µs	80	ns
T_J	-40 to 150	°C

Package Outline



TO-220AC

Voltage Ratings

Part Number	V_{RRM} , maximum peak reverse voltage V	V_{RSM} , maximum non repetitive peak reverse voltage V	I_{RRM} 150°C mA
10ETF10	1000	1100	4
10ETF12	1200	1200	4

Absolute Maximum Ratings

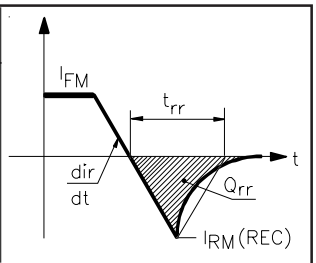
	Parameters	10ETF..	Units	Conditions
$I_{F(AV)}$	Max. Average Forward Current	10	A	@ T_C = 125° C, 180° conduction half sine wave
I_{FSM}	Max. Peak One Cycle Non-Repetitive	160	A	10ms Sine pulse, rated V_{RRM} applied
	Surge Current	185		10ms Sine pulse, no voltage reapplied
I^2t	Max. I^2t for fusing	128	A^2s	10ms Sine pulse, rated V_{RRM} applied
		180		10ms Sine pulse, no voltage reapplied
$I^2\sqrt{t}$	Max. $I^2\sqrt{t}$ for fusing	1800	$A^2\sqrt{s}$	t = 0.1 to 10ms, no voltage reapplied

Electrical Specifications

	Parameters	10ETF..	Units	Conditions	
V_{FM}	Max. Forward Voltage Drop	1.33	V	@ 10A, T_J = 25°C	
r_t	Forward slope resistance	22.9	mΩ	T_J = 150°C	
$V_{F(TO)}$	Threshold voltage	0.96	V		
I_{RM}	Max. Reverse Leakage Current	0.1	mA	T_J = 25 °C	V_R = rated V_{RRM}
		4		T_J = 150 °C	

Recovery Characteristics

	Parameters	10ETF..	Units	Conditions
t_{rr}	Reverse Recovery Time	310	ns	I_F @ 10Apk
I_{rr}	Reverse Recovery Current	4.7	A	@ 25A/ µs
Q_{rr}	Reverse Recovery Charge	1.05	µC	@ 25°C
S	Typical Snap Factor	0.6		



Thermal-Mechanical Specifications

	Parameters		10ETF..	Units	Conditions
T_J	Max. Junction Temperature Range		-40 to 150	°C	
T_{stg}	Max. Storage Temperature Range		-40 to 150	°C	
R_{thJC}	Max. Thermal Resistance Junction to Case		1.5	°C/W	DC operation
R_{thJA}	Max. Thermal Resistance Junction to Ambient		62	°C/W	
R_{thCS}	Typical Thermal Resistance, Case to Heatsink		0.5	°C/W	Mounting surface , smooth and greased
wt	Approximate Weight		2 (0.07)	g (oz.)	
T	Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)	
		Max.	12 (10)		
	Case Style		TO-220AC		JEDEC

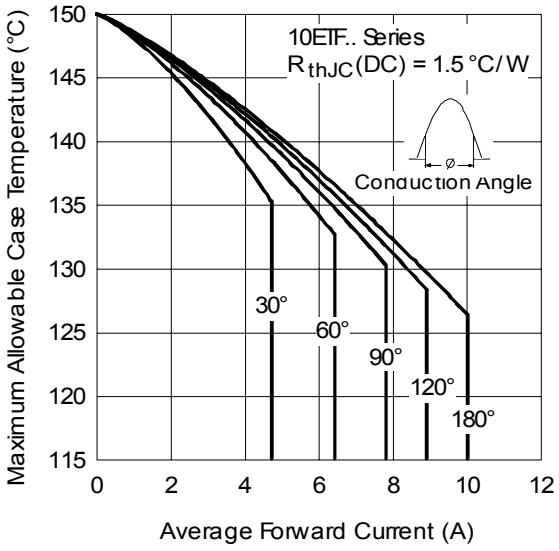


Fig. 1 - Current Rating Characteristics

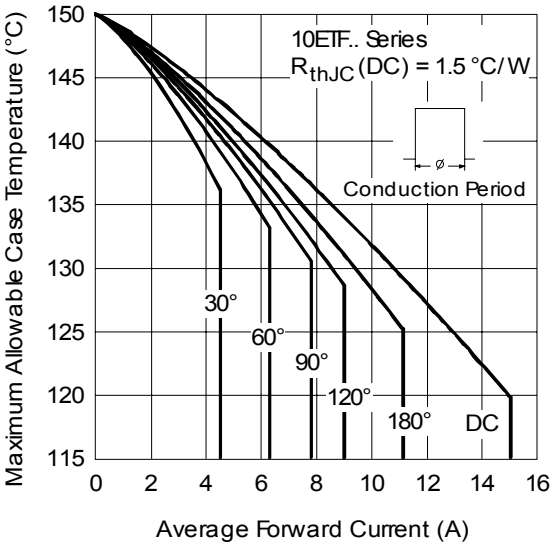


Fig. 2 - Current Rating Characteristics

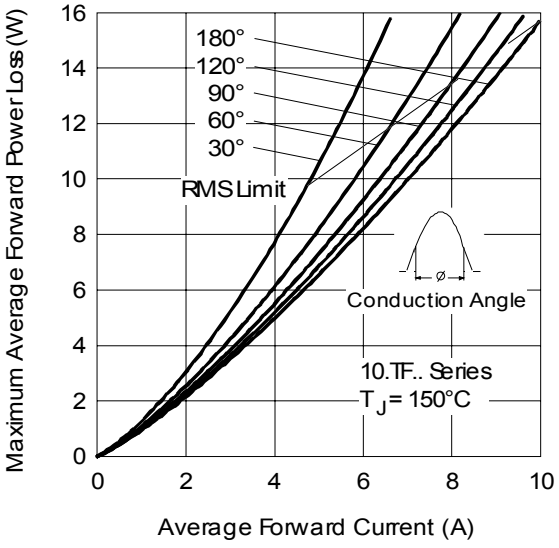


Fig. 3 - Forward Power Loss Characteristics

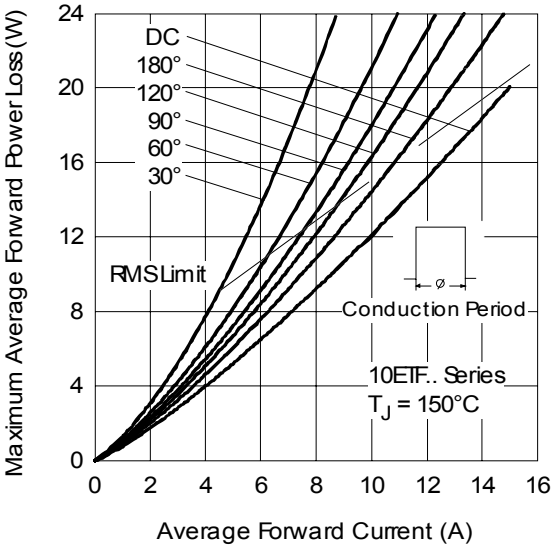


Fig. 4 - Forward Power Loss Characteristics

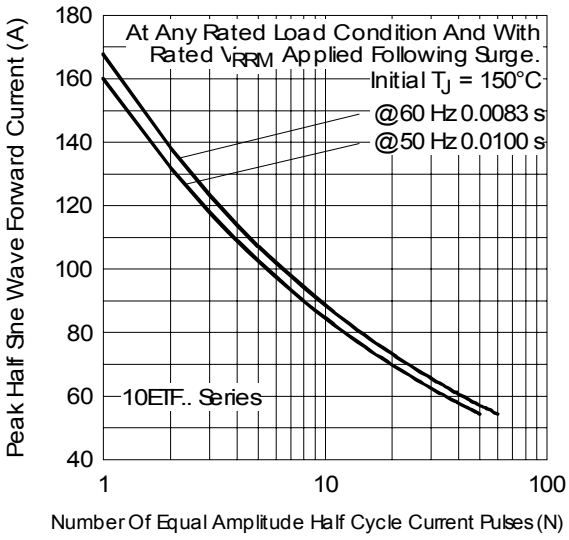


Fig. 5 - Maximum Non-Repetitive Surge Current

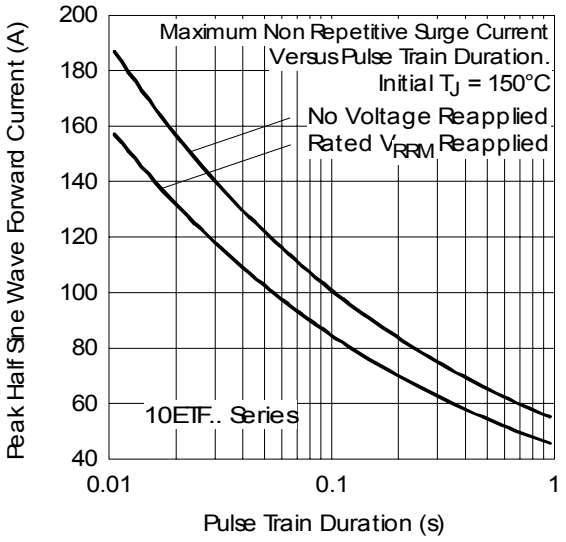


Fig. 6 - Maximum Non-Repetitive Surge Current

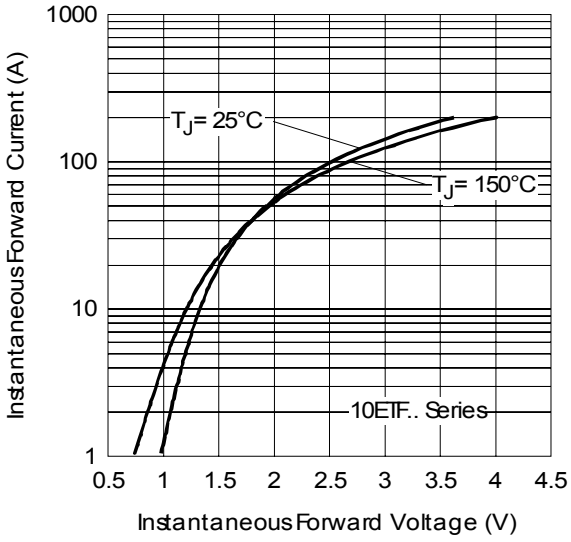


Fig. 7 - Forward Voltage Drop Characteristics

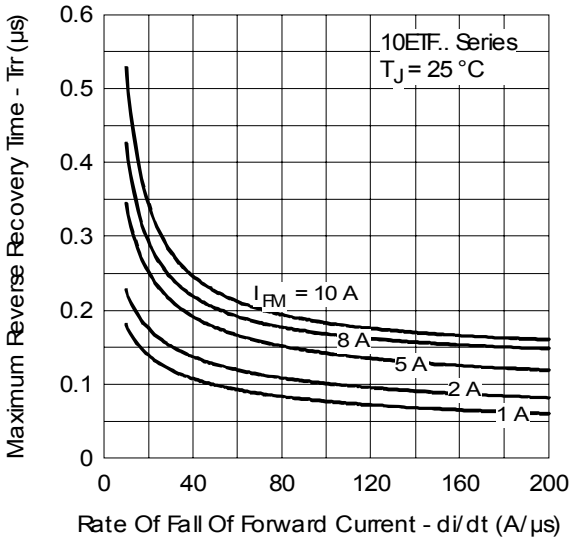


Fig. 8 - Recovery Time Characteristics, T_J = 25°C

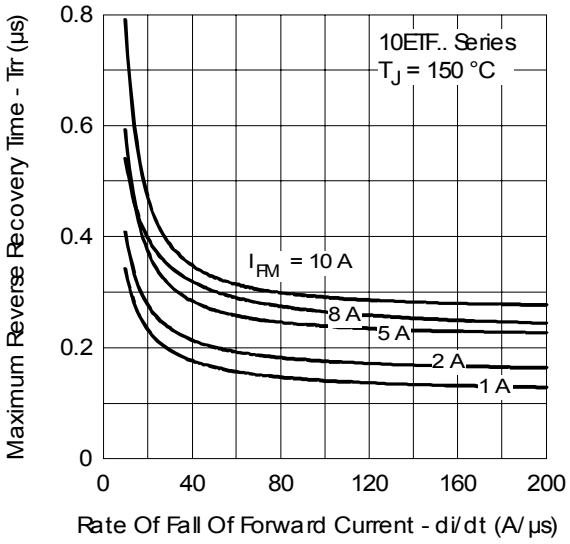


Fig. 9 - Recovery Time Characteristics, T_J = 150°C

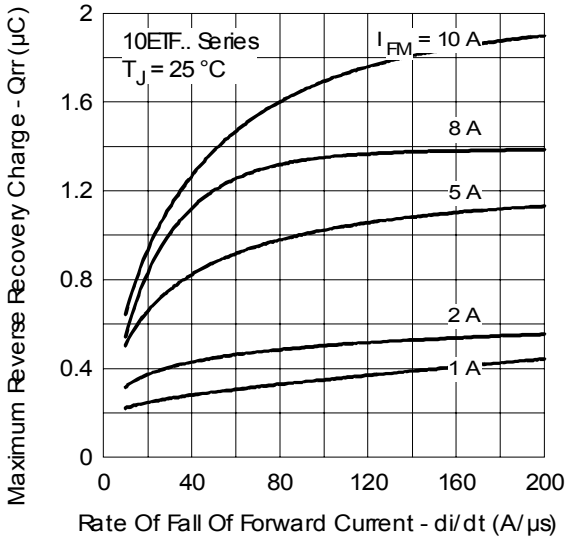


Fig. 10 - Recovery Charge Characteristics, T_J = 25°C

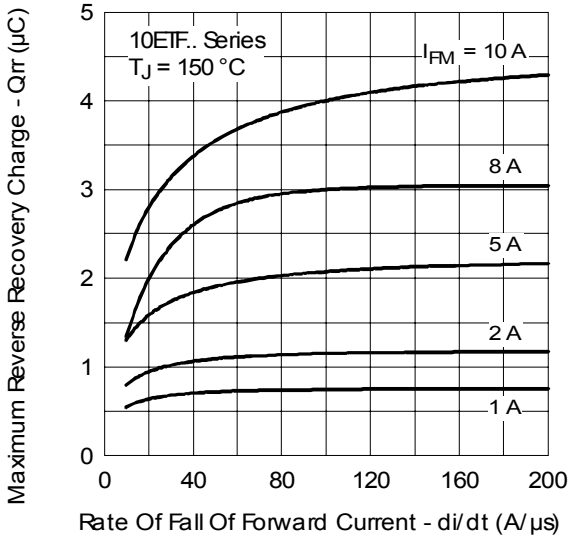


Fig. 11 - Recovery Charge Characteristics, T_J = 150°C

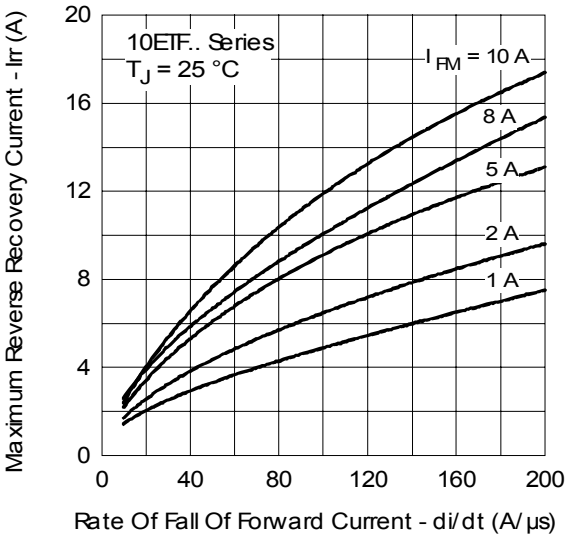


Fig. 12 - Recovery Current Characteristics, T_J = 25°C

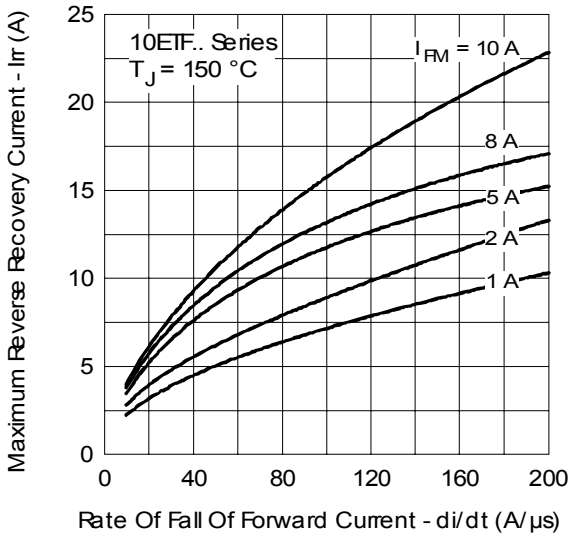


Fig. 13 - Recovery Current Characteristics, T_J = 150°C

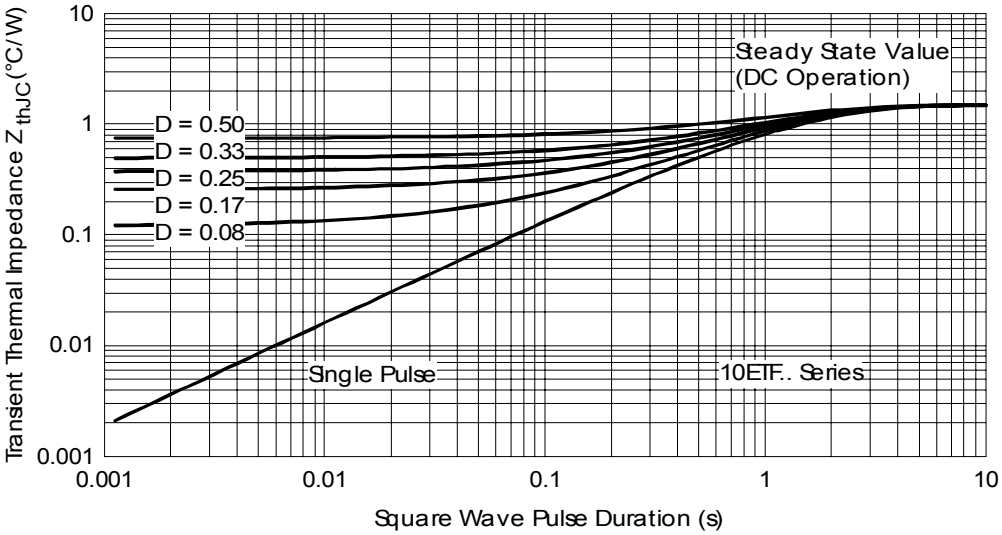
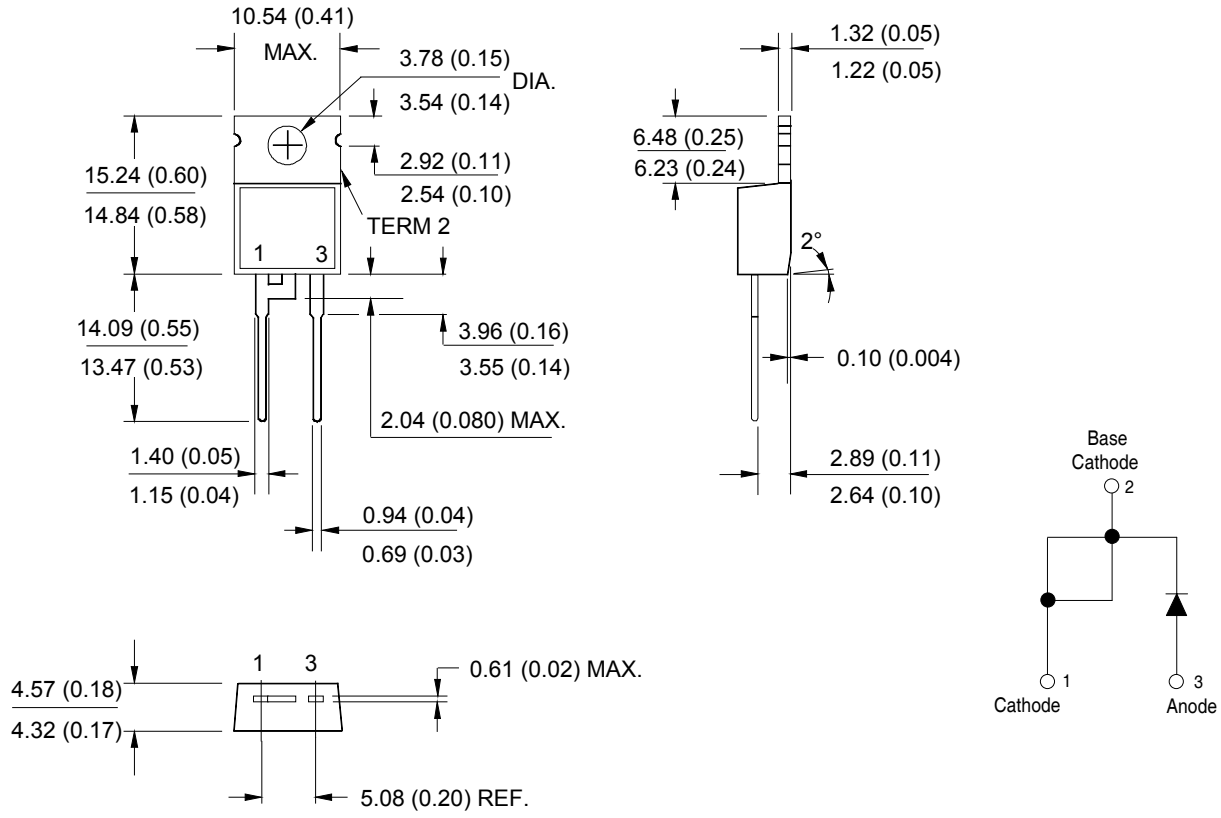


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

Outline Table



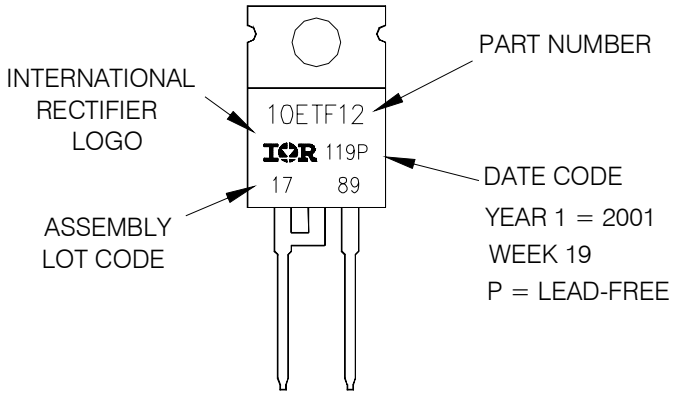
Dimensions in millimeters and inches

Part Marking Information

IRMX Assembly Line

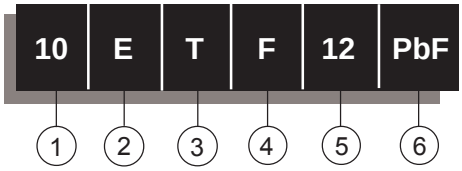
EXAMPLE: THIS IS A 10ETF12
LOT CODE 1789
ASSEMBLED ON WW 19, 2001
IN THE ASSEMBLY LINE "C"

Note: "P" in assembly line position indicates "Lead-Free"



Ordering Information Table

Device Code



1 - Current Rating (10 = 10A)

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}
12 = 1200V
10 = 1000V

6 - • none = Standard Production
• PbF = Lead-Free

```
10EPF12
*****************************************
* SPICE Model Diode                     *
*****************************************
.SUBCKT 10EPF12 ANO CAT
D1 ANO 1 CAT
*Define diode model
.MODEL DMOD D(IS=50.7233F N=1.37171 BV=1.25K IBV=100P RS=13.2169M
 CJO=56.8191P VJ=2.71808 M=361.41M EG=1.11 RL=97.7828MEG)
*****************************************

.ENDS 10EPF12


Thermal Model Subcircuit
.SUBCKT 10EPF12  5 1

CTHERM1    5   4    8.75E-04
CTHERM2    4   3    3.32E-04
CTHERM3    3   2    1.10E+00
CTHERM4    2   1    2.71E+00

RTHERM1    5   4    1.00E-07
RTHERM2    4   3    1.00E-07
RTHERM1    3   2    1.47E+00
RTHERM1    2   1    2.37E-02


.ENDS 10EPF12
```

Data and specifications subject to change without notice.
This product has been designed and qualified for Industrial Level and Lead-Free.
Qualification Standards can be found on IR's Web site.

IR WORLD HEADQUARTERS: 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105
TAC Fax: (310) 252-7309
08/05

Notice

The products described herein were acquired by Vishay Intertechnology, Inc., as part of its acquisition of International Rectifier's Power Control Systems (PCS) business, which closed in April 2007. Specifications of the products displayed herein are pending review by Vishay and are subject to the terms and conditions shown below.

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.