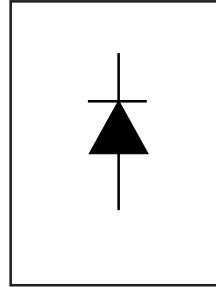


FAST SOFT RECOVERY RECTIFIER DIODE Lead-Free ("PbF" suffix)



$$V_F < 1.33V @ 10A$$

$$t_{rr} = 80ns$$

$$V_{RRM} = 1000 - 1200V$$

Description/ Features

The 10ETF...PbF fast soft recovery *QUIETIR* 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.

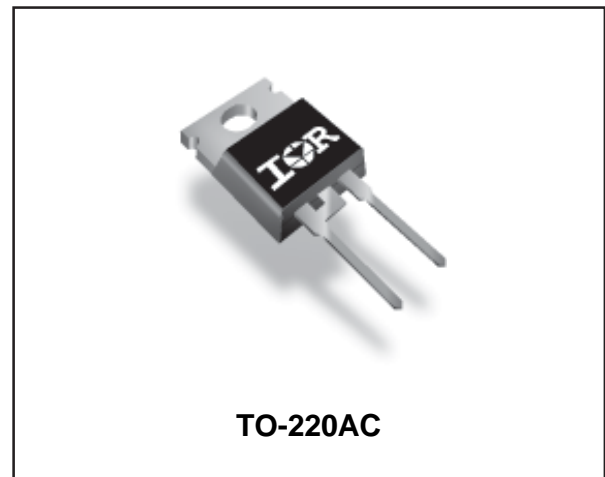
Typical applications are both:

- 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, $T_J=25^\circ C$	1.33	V
t_{rr} @1A, 100A/ μs	80	ns
T_J	-40to150	$^\circ C$

Package Outline



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	@ $T_C = 125^\circ\text{C}$, 180° conduction half sine wave
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current	160	A	10ms Sine pulse, rated V_{RRM} applied
	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

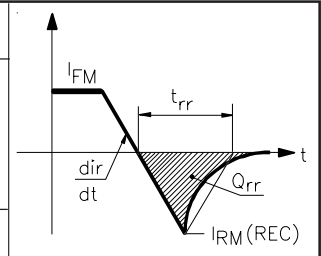
Electrical Specifications

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

$V_R = \text{rated } V_{RRM}$

Recovery Characteristics

Parameters	10ETF..	Units	Conditions
t_{rr} Reverse Recovery Time	310	ns	$I_F @ 10\text{Apk}$ @ 25A/ μs @ 25°C
I_{rr} Reverse Recovery Current	4.7	A	
Q_{rr} Reverse Recovery Charge	1.05	μC	
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	

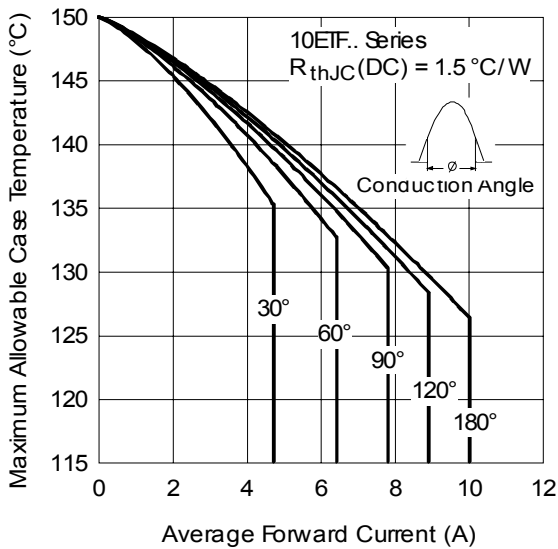


Fig. 1 - Current Rating Characteristics

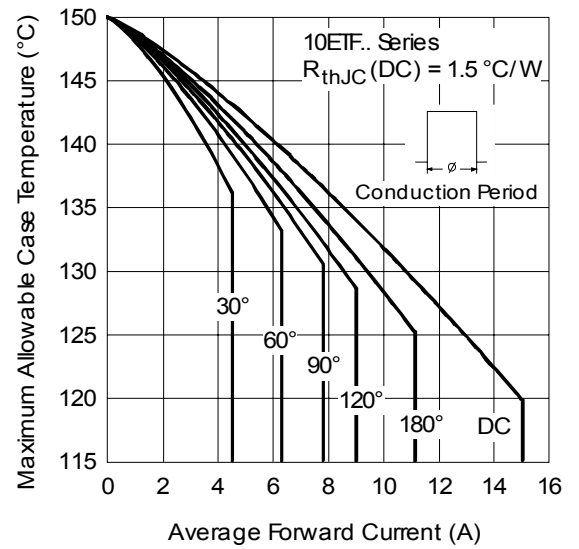


Fig. 2 - Current Rating Characteristics

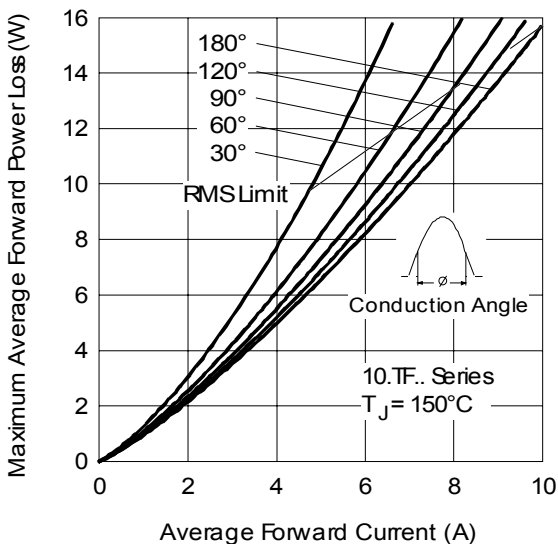


Fig. 3 - Forward Power Loss Characteristics

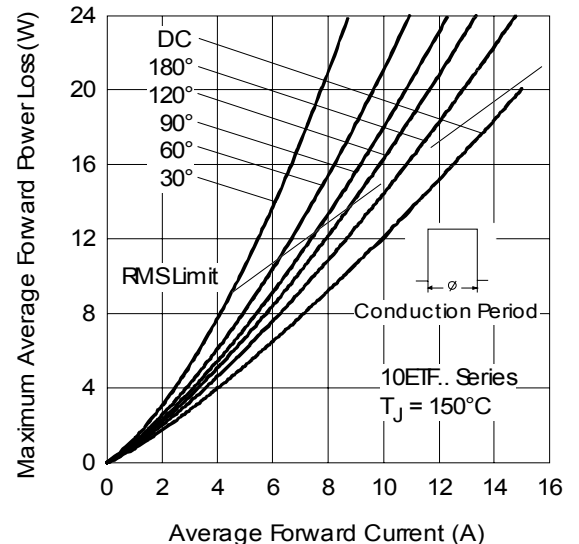


Fig. 4 - Forward Power Loss Characteristics

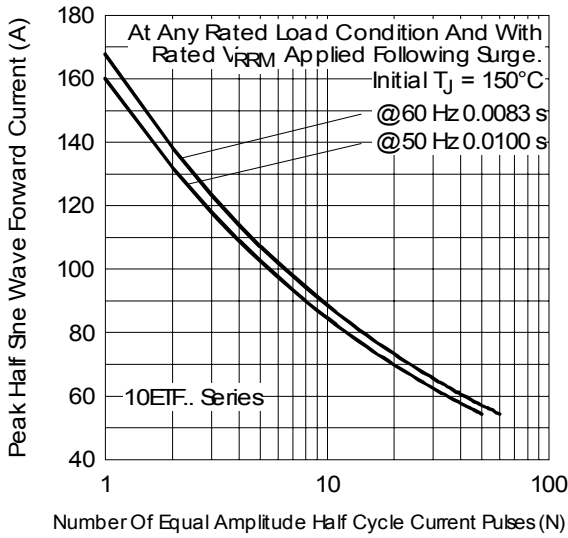


Fig. 5 - Maximum Non-Repetitive Surge Current

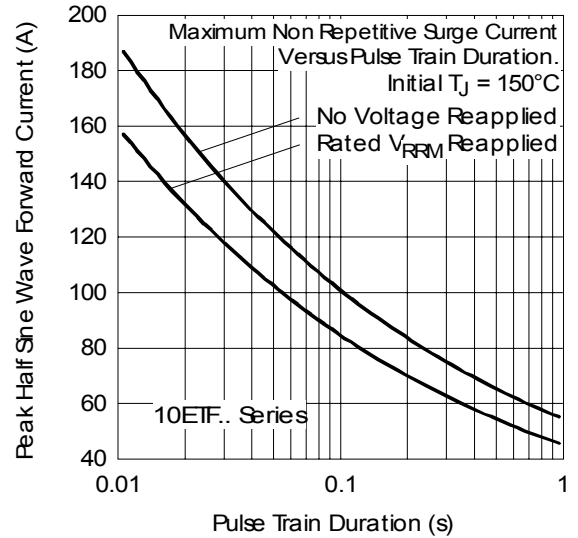


Fig. 6 - Maximum Non-Repetitive Surge Current

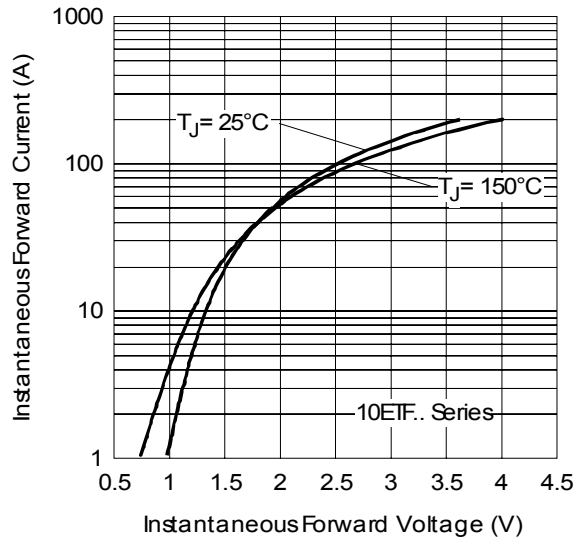


Fig. 7 - Forward Voltage Drop Characteristics

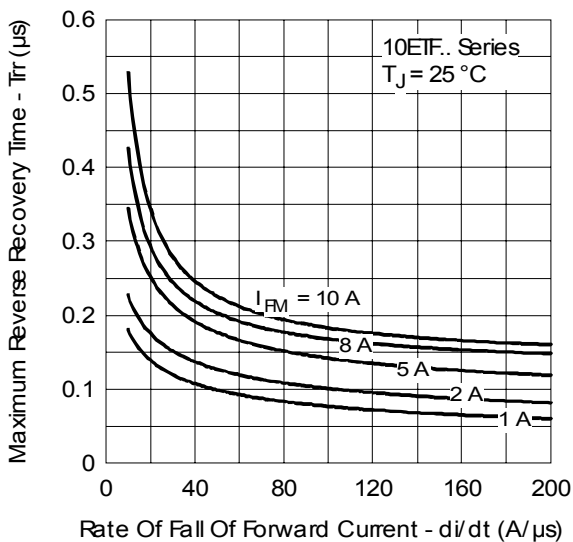


Fig. 8 - Recovery Time Characteristics, $T_J = 25^\circ\text{C}$

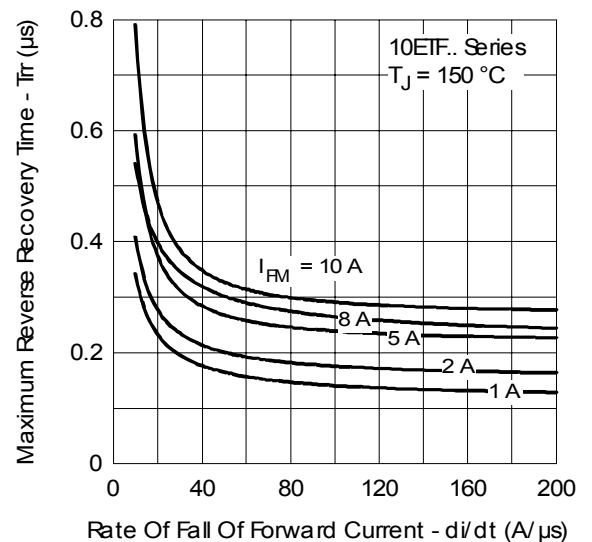


Fig. 9 - Recovery Time Characteristics, $T_J = 150^\circ\text{C}$

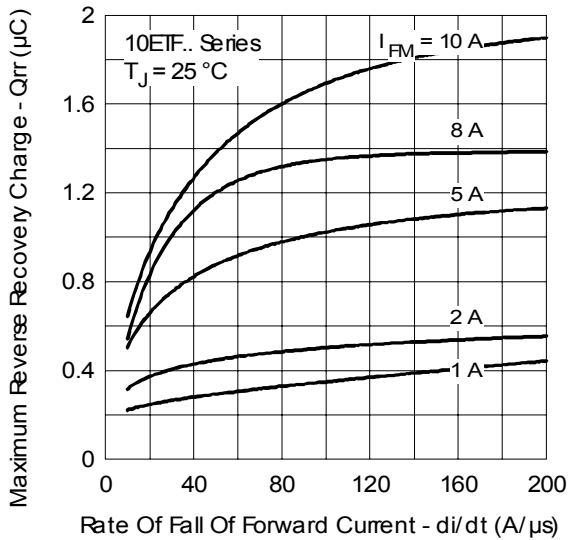


Fig. 10 - Recovery Charge Characteristics, $T_J = 25^\circ\text{C}$

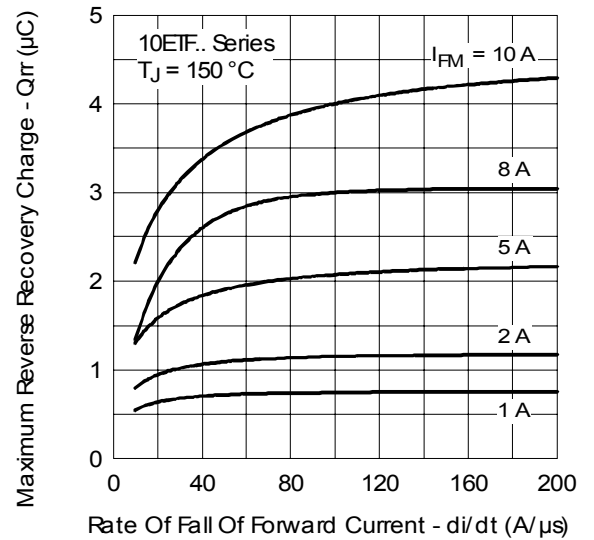


Fig. 11 - Recovery Charge Characteristics, $T_J = 150^\circ\text{C}$

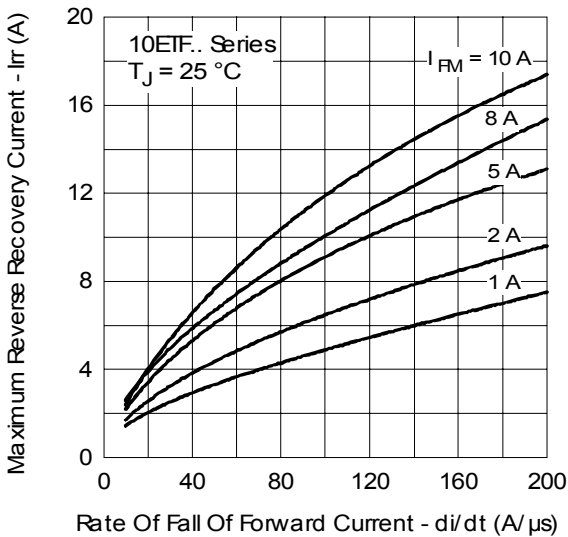


Fig. 12 - Recovery Current Characteristics, $T_J = 25^\circ\text{C}$

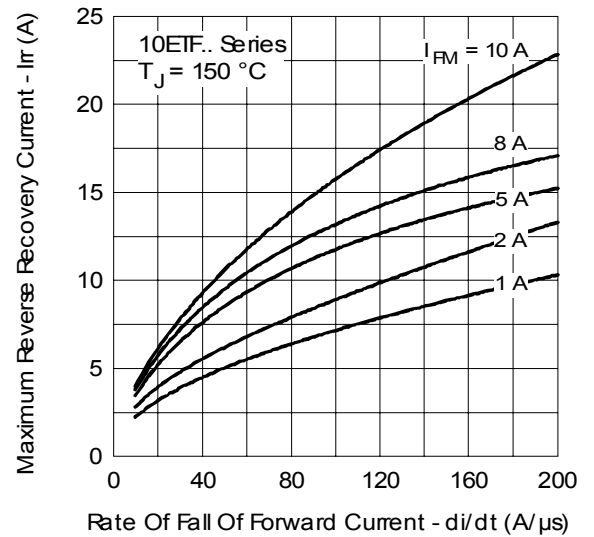


Fig. 13 - Recovery Current Characteristics, $T_J = 150^\circ\text{C}$

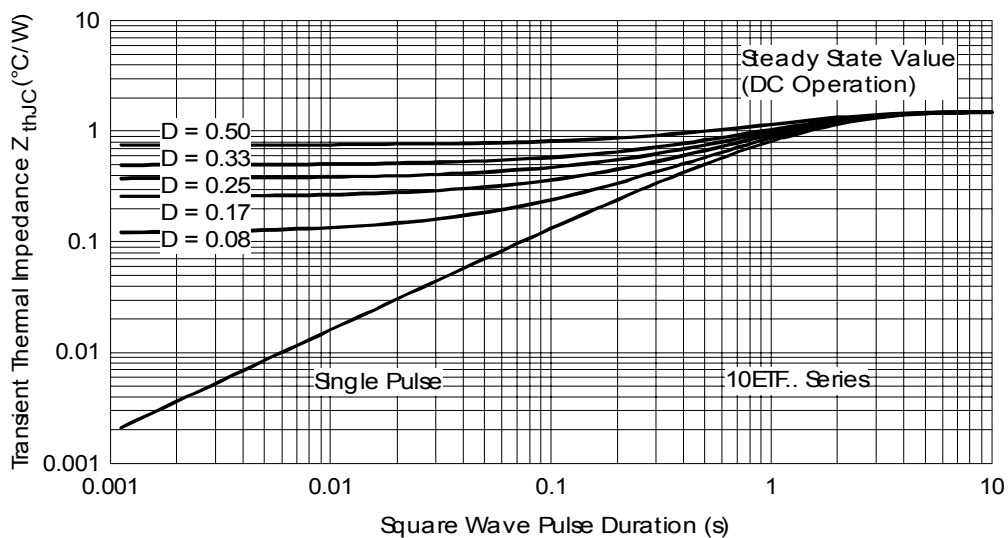
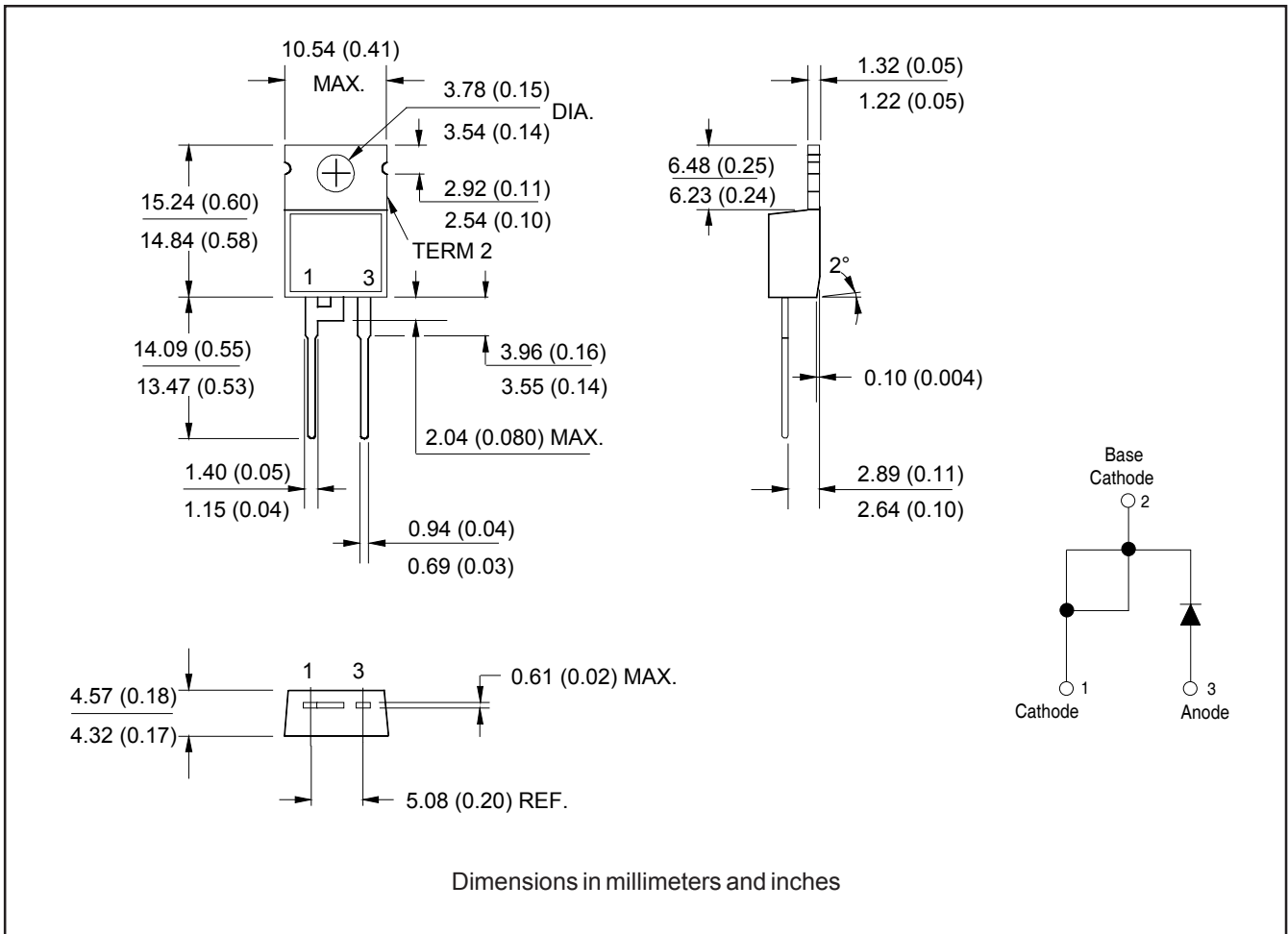
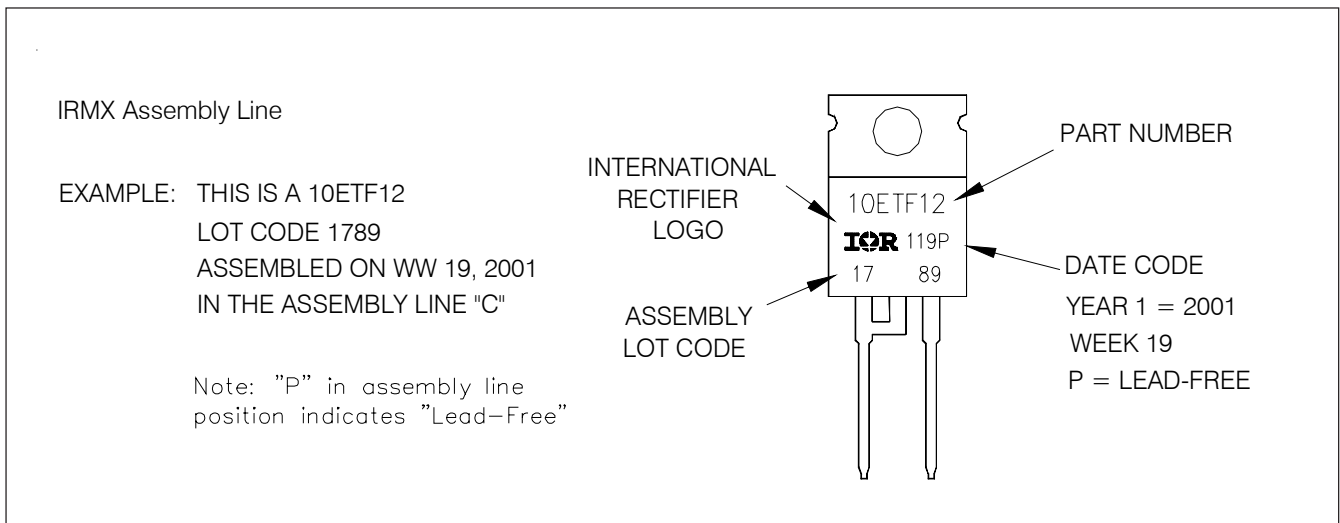


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

Outline Table



Part Marking Information



Ordering Information Table

Device Code					
10	E	T	F	12	PbF
①	②	③	④	⑤	⑥
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}				
6	- • none = Standard Production • PbF = Lead-Free				

12 = 1200V
10 = 1000V

```

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
    
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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.

International
IOR Rectifier

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TAC Fax: (310) 252-7309
08/05



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