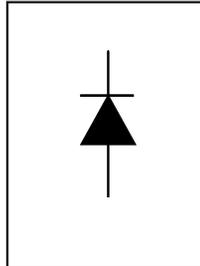


### FAST SOFT RECOVERY RECTIFIER DIODE Lead-Free ("PbF" suffix)



$$V_F < 1.2V @ 30A$$

$$t_{rr} = 95 \text{ ns}$$

$$V_{RRM} = 1000 \text{ to } 1200V$$

#### Description/ Features

The 60EPF...PbF & 60CPF...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.

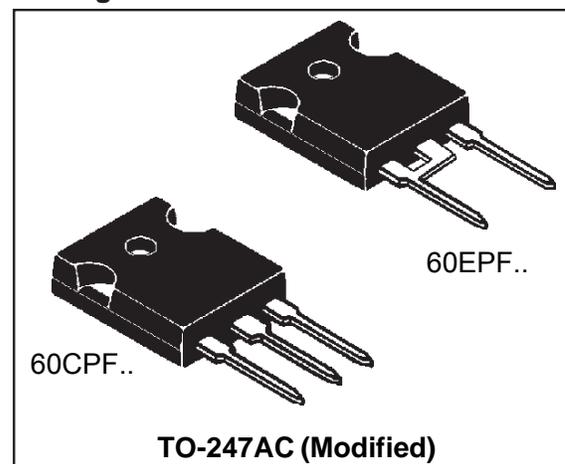
Typical applications are both:

- 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	60	A
$V_{RRM}$	1000-1200	V
$I_{FSM}$	700	A
$V_F$ @30A, $T_J=25^\circ\text{C}$	1.2	V
$t_{rr}$ @1A, -100A/ $\mu\text{s}$	95	ns
$T_J$ range	-40to150	$^\circ\text{C}$

#### 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
60EPF10PbF, 60CPF10PbF	1000	1100	8
60EPF12PbF, 60CPF12PbF	1200	1300	8

**Absolute Maximum Ratings**

Parameters	60.PF..	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	60	A	@ $T_C = 103^\circ\text{C}$ , 180° conduction half sine wave
$I_{FSM}$ Max. Peak One Cycle Non-Repetitive Surge Current	700	A	10ms Sine pulse, rated $V_{RRM}$ applied
	830		10ms Sine pulse, no voltage reapplied
$I^2t$ Max. $I^2t$ for fusing	2450	$A^2s$	10ms Sine pulse, rated $V_{RRM}$ applied
	3460		10ms Sine pulse, no voltage reapplied
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	34600	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reapplied

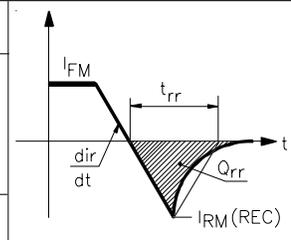
**Electrical Specifications**

Parameters	60.PF..	Units	Conditions
$V_{FM}$ Max. Forward Voltage Drop	1.4	V	@ 60A, $T_J = 25^\circ\text{C}$
$r_t$ Forward slope resistance	4.6	$m\Omega$	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold voltage	0.9	V	
$I_{RM}$ Max. Reverse Leakage Current	0.1	mA	$T_J = 25^\circ\text{C}$
	8		$T_J = 150^\circ\text{C}$

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

**Recovery Characteristics**

Parameters	60.PF..	Units	Conditions
$t_{rr}$ Reverse Recovery Time	480	ns	$I_F @ 60\text{Apk}$ @ 25A/ $\mu\text{s}$
$I_{rr}$ Reverse Recovery Current	8	A	
$Q_{rr}$ Reverse Recovery Charge	2.7	$\mu\text{C}$	@ 25°C
S Snap Factor	0.6		



**Thermal-Mechanical Specifications**

Parameters	60.PF..	Units	Conditions
$T_J$ Max. Junction Temperature Range	-40 to 150	$^\circ\text{C}$	
$T_{stg}$ Max. Storage Temperature Range	-40 to 150	$^\circ\text{C}$	
$R_{thJC}$ Max. Thermal Resistance Junction to Case	0.4	$^\circ\text{C/W}$	DC operation
$R_{thJA}$ Max. Thermal Resistance Junction to Ambient	40	$^\circ\text{C/W}$	
$R_{thCS}$ Typical Thermal Resistance, Case to Heatsink	0.2	$^\circ\text{C/W}$	Mounting surface, smooth and greased
wt Approximate Weight	6 (0.21)	g (oz.)	
T Mounting Torque	Min.	6 (5)	Kg-cm (lbf-in)
	Max.	12 (10)	
Case Style	TO-247AC		JEDEC (Modified)

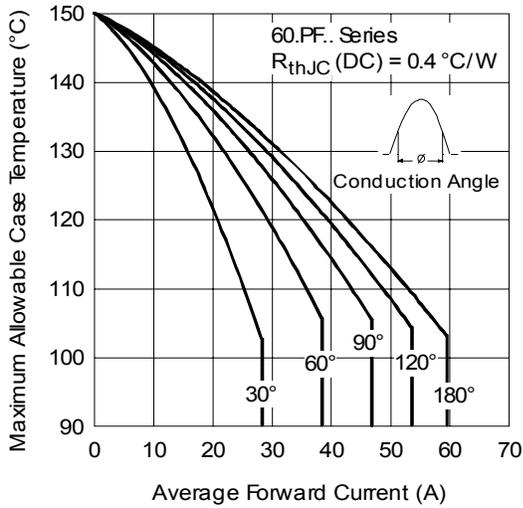


Fig. 1 - Current Rating Characteristics

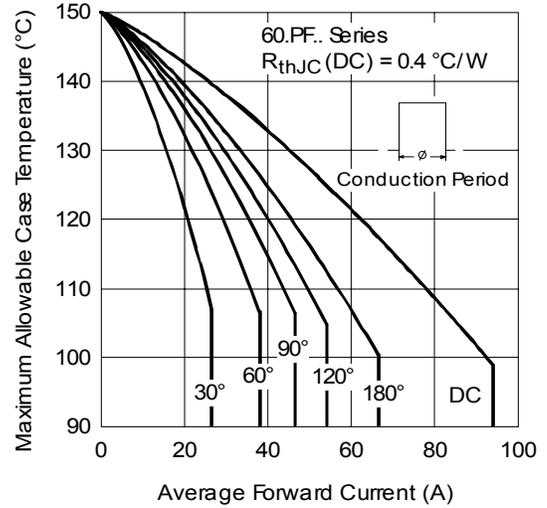


Fig. 2 - Current Rating Characteristics

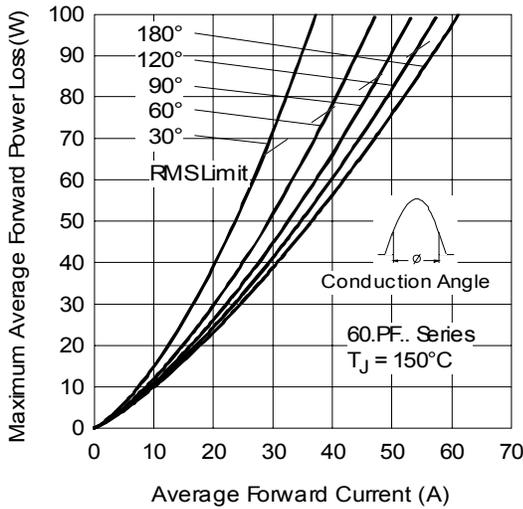


Fig. 3 - Forward Power Loss Characteristics

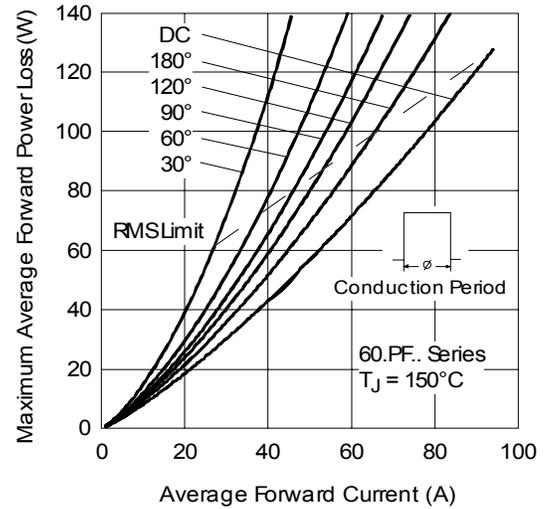


Fig. 4 - Forward Power Loss Characteristics

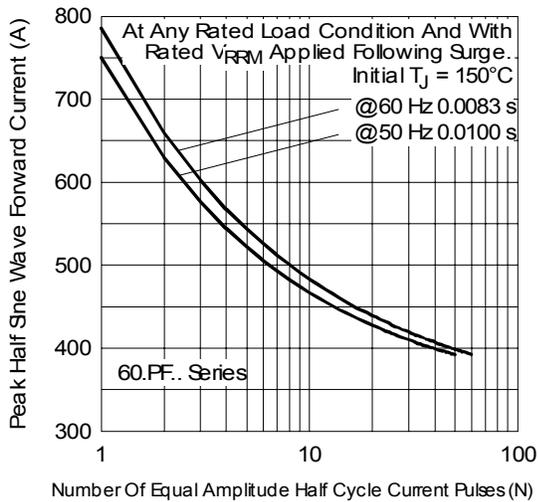


Fig. 5 - Maximum Non-Repetitive Surge Current

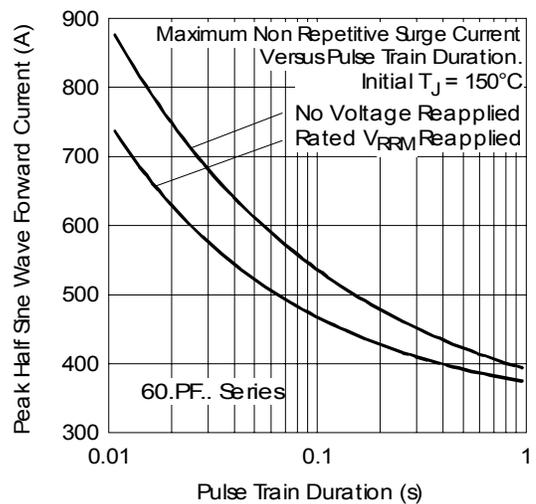


Fig. 6 - Maximum Non-Repetitive Surge Current

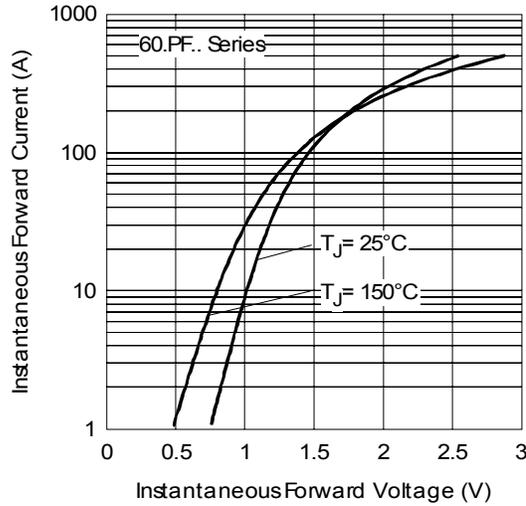


Fig. 7 - Forward Voltage Drop Characteristics

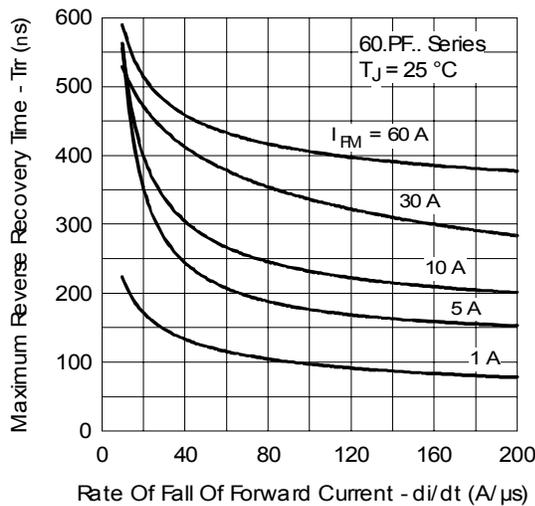


Fig. 8 - Recovery Time Characteristics,  $T_J = 25^\circ\text{C}$

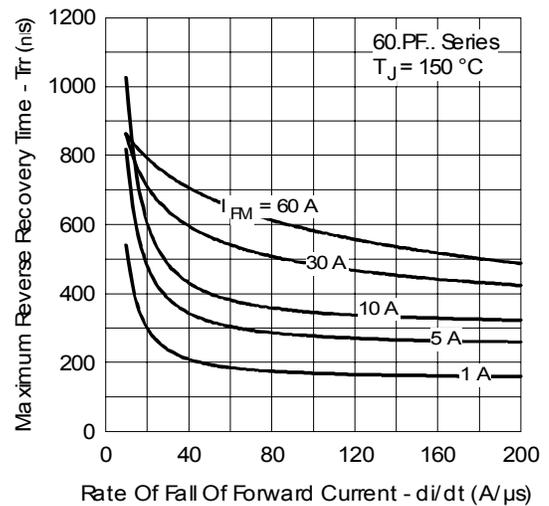


Fig. 9 - Recovery Time Characteristics,  $T_J = 150^\circ\text{C}$

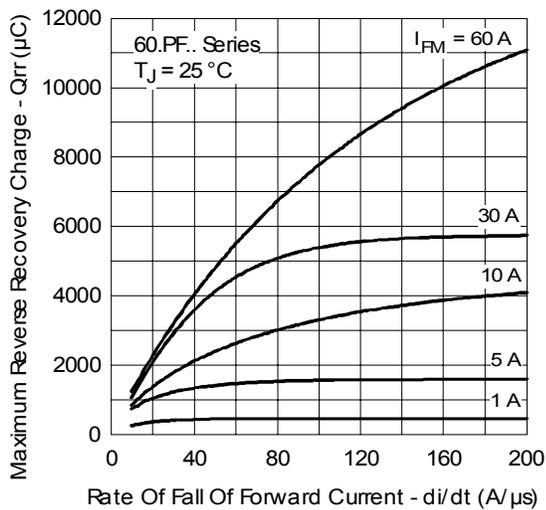


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25^\circ\text{C}$

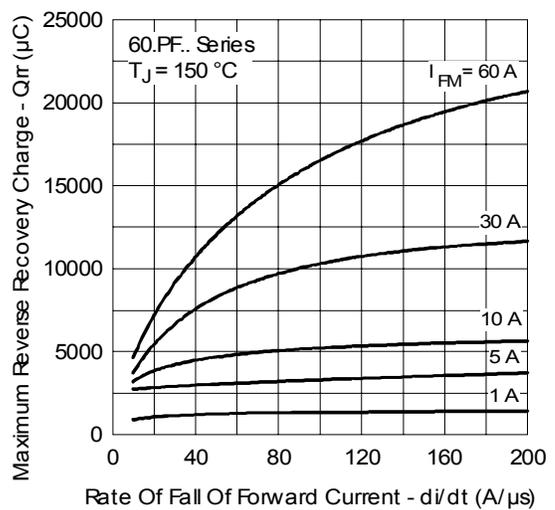


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150^\circ\text{C}$

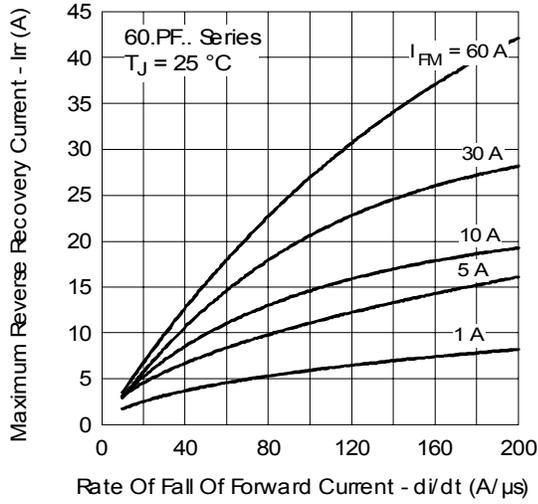


Fig. 12 - Recovery Current Characteristics,  $T_J = 25^\circ\text{C}$

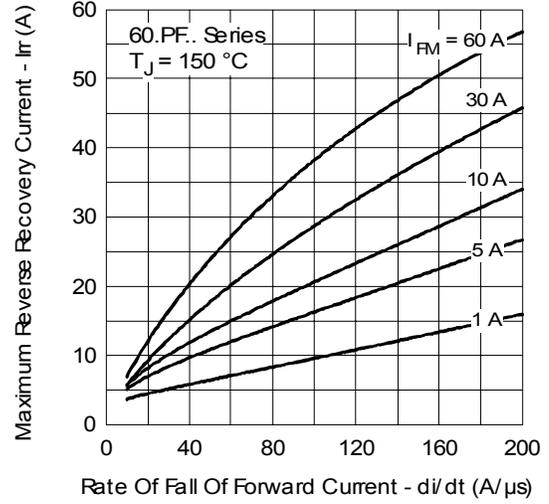


Fig. 13 - Recovery Current Characteristics,  $T_J = 150^\circ\text{C}$

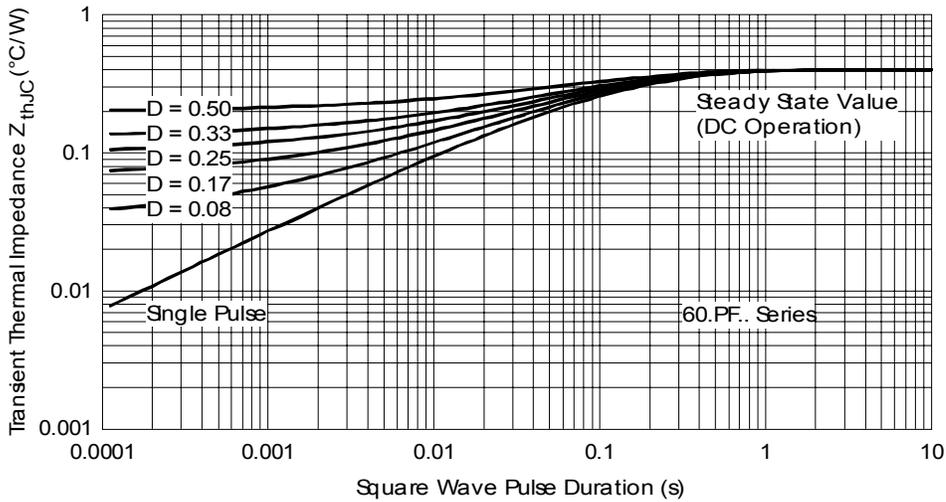
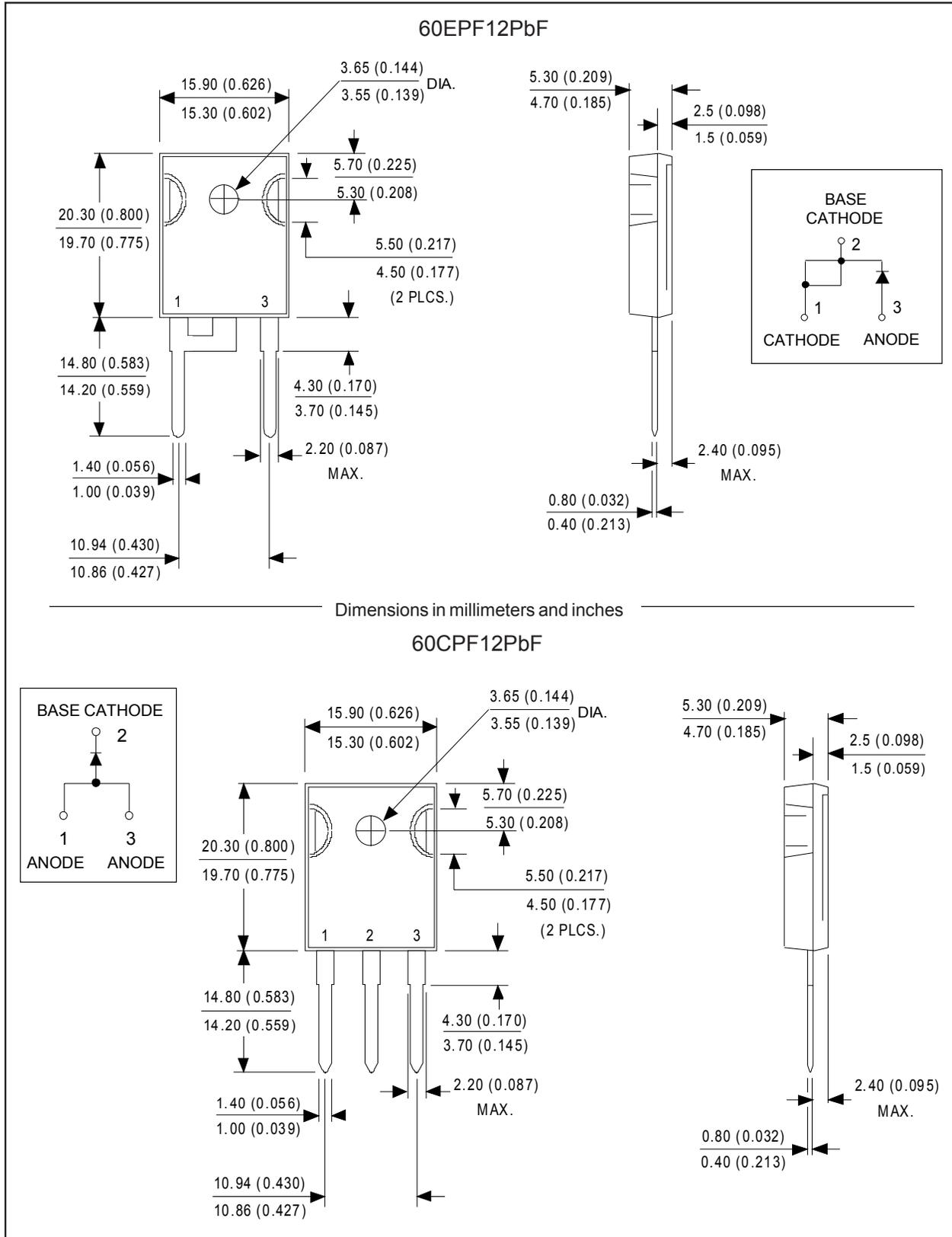


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

Outline Table



### Marking Information

EXAMPLE: THIS IS A 60EPF12  
WITH ASSEMBLY  
LOT CODE 5657  
ASSEMBLED ON WW 35, 2000  
IN ASSEMBLY LINE "H"

PART NUMBER

DATE CODE  
P = LEAD-FREE  
YEAR 0 = 2000  
WEEK 35  
LINE H

EXAMPLE: THIS IS A 60CPF12  
WITH ASSEMBLY  
LOT CODE 5657  
ASSEMBLED ON WW 35, 2000  
IN ASSEMBLY LINE "H"

PART NUMBER

DATE CODE  
P = LEAD-FREE  
YEAR 0 = 2000  
WEEK 35  
LINE H

### Ordering Information Table

Device Code	60	E	P	F	12	PbF
	①	②	③	④	⑤	⑥
<b>1</b>	- Current Rating (60 = 60A)					
<b>2</b>	- Circuit Configuration: E = Single Diode C = Single Diode, 3 pins					
<b>3</b>	- Package: P = TO-247AC (Modified)					
<b>4</b>	- Type of Silicon: F = Fast Recovery					
<b>5</b>	- Voltage Code X 100 = $V_{RRM}$					
<b>6</b>	- • none = Standard Production • PbF = Lead-Free					

10 = 1000V  
12 = 1200V

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  
**IR** Rectifier

**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105  
TAC Fax: (310) 252-7309  
07/06



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