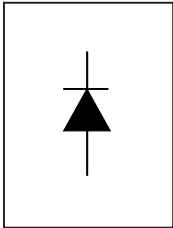


International
IR Rectifier

QUIETIR Series
40EPF06PbF

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



$$\begin{aligned} V_F &< 1V @ 10A \\ t_{rr} &= 60ns \\ V_{RRM} &= 600V \end{aligned}$$

Description/ Features

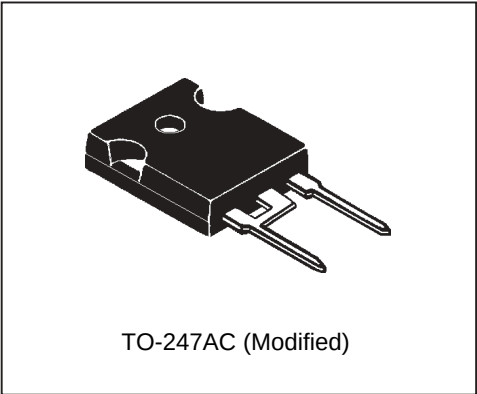
The 40EPF06PbF fast soft recovery **QUIETIR** rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.
The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

- 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	40	A
V_{RRM}	600	V
I_{FSM}	475	A
V_F @ 10 A, $T_J = 25^\circ C$	1	V
t_{rr} @ 1A, - 100A/ μs	60	ns
T_J	- 40 to 150	$^\circ C$

Package Outline



TO-247AC (Modified)

40EPF06PbF *QUIETIR* Series

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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
40EPF06PbF	600	700	7

Absolute Maximum Ratings

Parameters	40EPF..	Units	Conditions
$I_{F(AV)}$ Max. Average Forward Current	40	A	@ $T_C = 105^\circ\text{C}$, 180° conduction half sine wave
I_{FSM} Max. Peak One Cycle Non-Repetitive Surge Current	400	A	10ms Sine pulse, rated V_{RRM} applied
	475		10ms Sine pulse, no voltage reappplied
I^2t Max. I^2t for fusing	800	A^2s	10ms Sine pulse, rated V_{RRM} applied
	1131		10ms Sine pulse, no voltage reappplied
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	11310	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reappplied

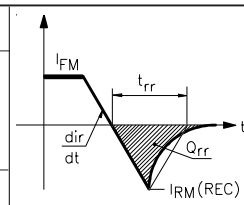
Electrical Specifications

Parameters	40EPF..	Units	Conditions
V_{FM} Max. Forward Voltage Drop	1.25	V	@ 40A, $T_J = 25^\circ\text{C}$
r_t Forward slope resistance	4.4	mΩ	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ Threshold voltage	1.1	V	
I_{RM} Max. Reverse Leakage Current	0.1	mA	$T_J = 25^\circ\text{C}$
	7.0		$T_J = 150^\circ\text{C}$

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

Recovery Characteristics

Parameters	40EPF..	Units	Conditions
t_{rr} Reverse Recovery Time	180	ns	$I_F @ 40\text{Apk}$ @ 25A/ μs @ 25°C
I_{rr} Reverse Recovery Current	3.2	A	
Q_{rr} Reverse Recovery Charge	0.5	μC	
S Snap Factor	0.5		



Thermal-Mechanical Specifications

Parameters			40EPF..	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		0.6	°C/W	DC operation
R _{thJA}	Max. Thermal Resistance Junction to Ambient		40	°C/W	
R _{thCS}	Typical Thermal Resistance, Case to Heatsink		0.2	°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)
Marking Device			40EPF06		

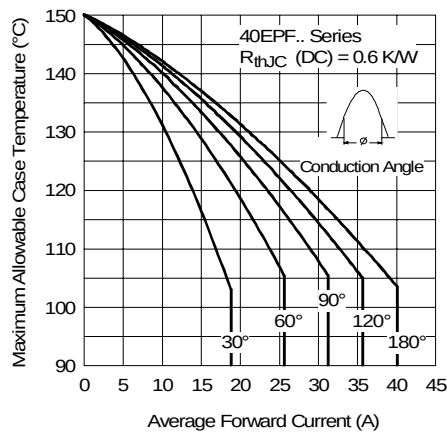


Fig. 1 - Current Rating Characteristics

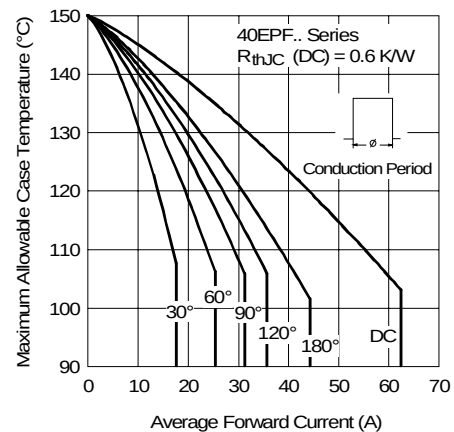


Fig. 2 - Current Rating Characteristics

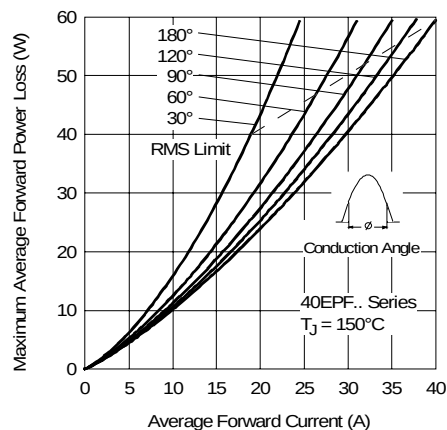


Fig. 3 - Forward Power Loss Characteristics

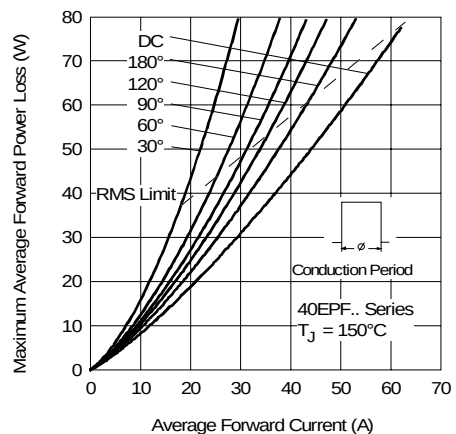


Fig. 4 - Forward Power Loss Characteristics

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IR Rectifier

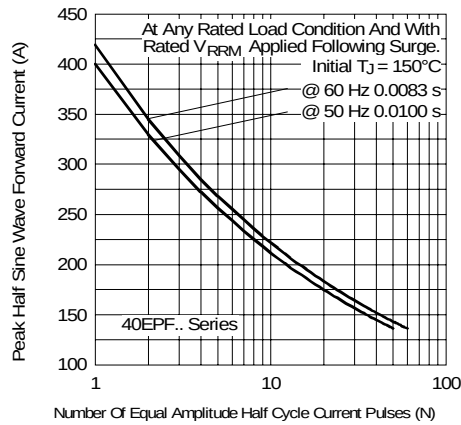


Fig. 5 - Maximum Non-Repetitive Surge Current

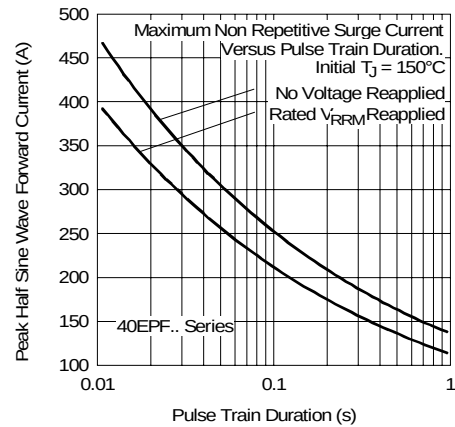


Fig. 6 - Maximum Non-Repetitive Surge Current

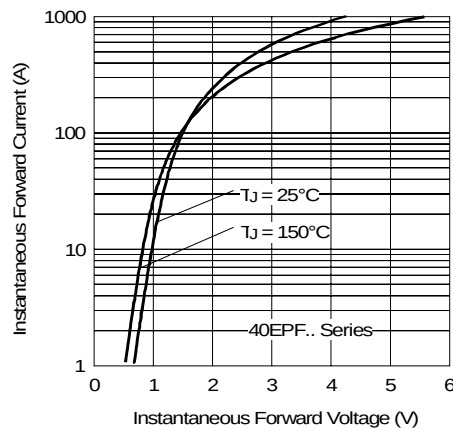


Fig. 7 - Forward Voltage Drop Characteristics

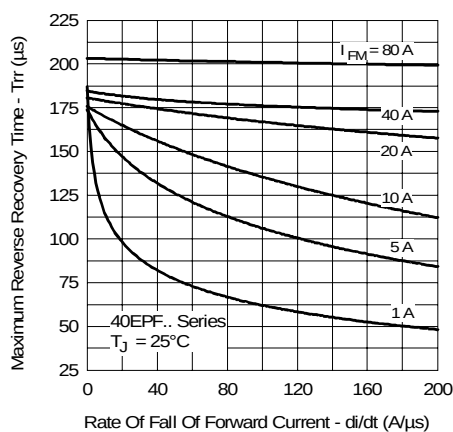


Fig. 8 - Recovery Time Characteristics, $T_J = 25^\circ\text{C}$

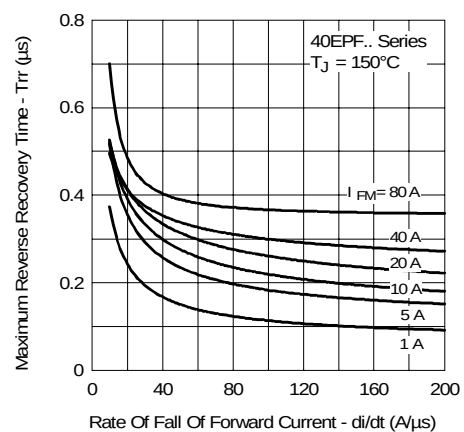


Fig. 9 - Recovery Time Characteristics, $T_J = 150^\circ\text{C}$

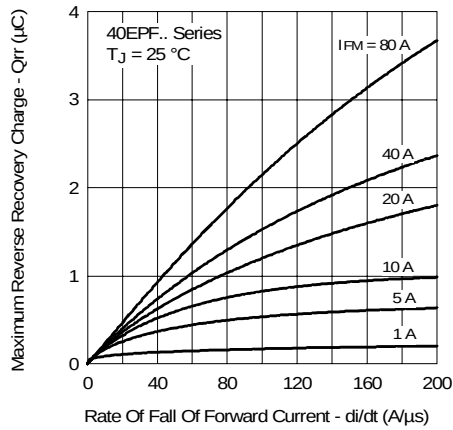


Fig. 10 - Recovery Charge Characteristics, $T_j = 25^\circ\text{C}$

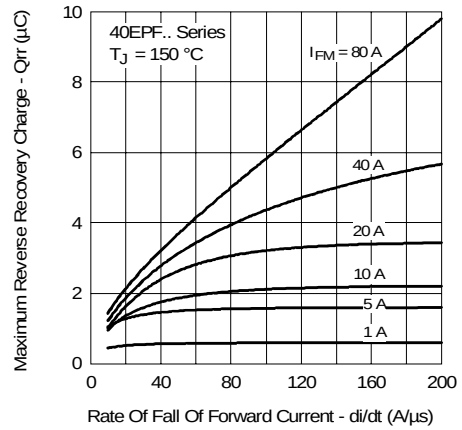


Fig. 11 - Recovery Charge Characteristics, $T_j = 150^\circ\text{C}$

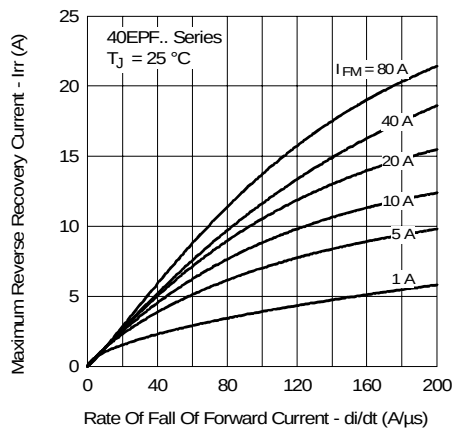


Fig. 12 - Recovery Current Characteristics, $T_j = 25^\circ\text{C}$

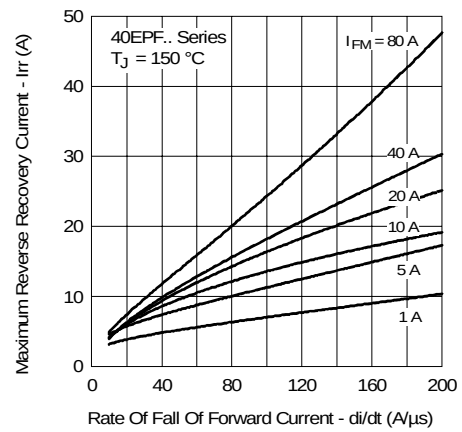


Fig. 13 - Recovery Current Characteristics, $T_j = 150^\circ\text{C}$

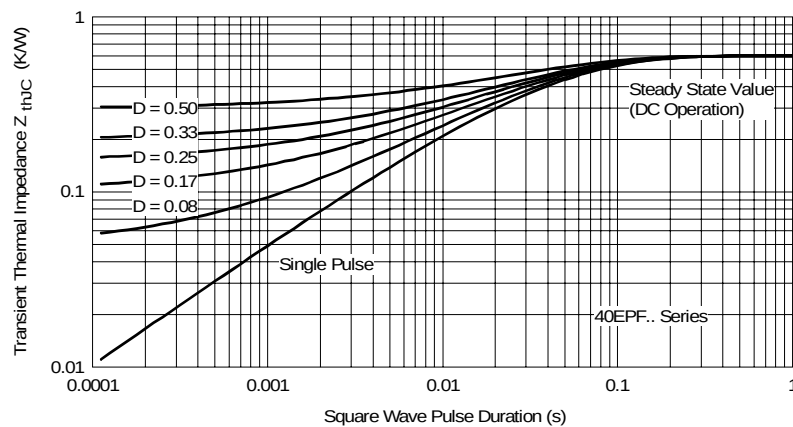


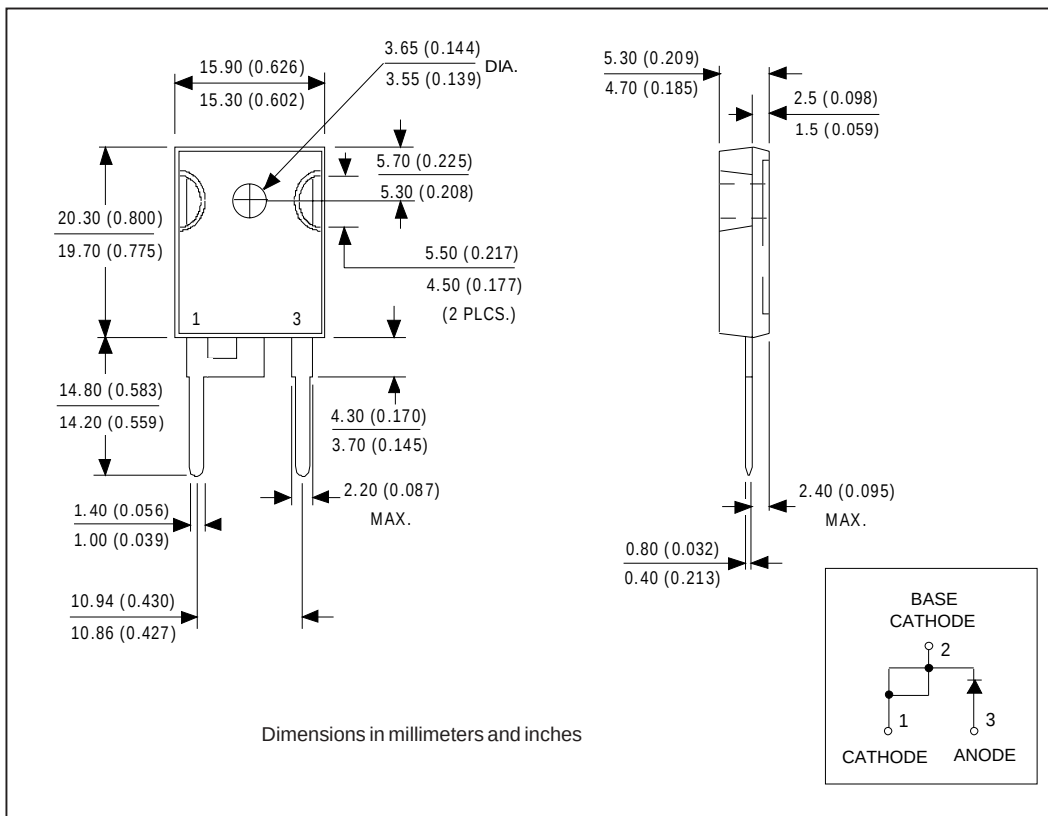
Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

40EPF06PbF *QUIETIR* Series

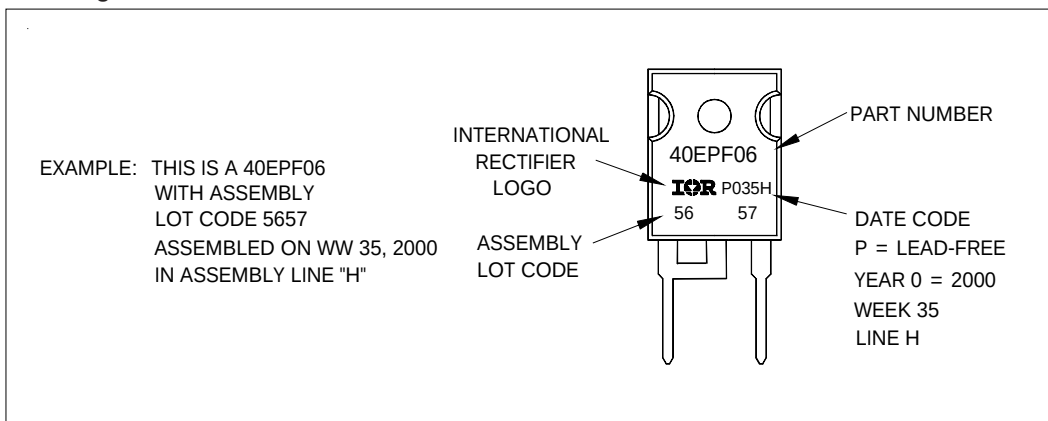
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IR Rectifier

Outline Table



Marking Information



Ordering Information Table

Device Code					
40	E	P	F	06	PbF
1	2	3	4	5	6
1	- Current Rating (40 = 40A)				
2	- Circuit Configuration: E = Single Diode				
3	- Package: P = TO-247AC (Modified)				
4	- Type of Silicon: F = Fast diode				
5	- Voltage rating (06 = 600V)				
6	- • none = Standard Production • PbF = Lead-Free				

```
40EPF06
*****
* SPICE Model Diode *
*****
.SUBCKT 40EPF06 ANO CAT
D1 ANO 1 CAT
*Define diode model
.MODEL DMOD D(Is=122.1E-06 N=3.087 Rs=2.709E-03 Ikf=9.017 Xti=3 Eg=1.11
Cjo=550.8E-12 M=.272 Vj=1.523 Fc=.5 Isr=1.92E-21 Nr=4.755 Bv=730 +Ibv=35.43E-06)
*****
.ENDS 40EPF06

Thermal Model Subcircuit
.SUBCKT 40EPF06 5 1

CTHERM1      5      4      8.75E-04
CTHERM2      4      3      6.85E+00
CTHERM3      3      2      2.07E+01
CTHERM4      2      1      7.97E+01

RTHERM1      5      4      1.00E-07
RTHERM2      4      3      3.94E-01
RTHERM1      3      2      1.81E-01
RTHERM1      2      1      2.40E-02

.ENDS 40EPF06
```

40EPF06PbF *QUIETIR* Series

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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.

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