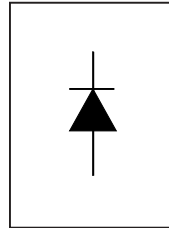


**FAST SOFT RECOVERY  
 RECTIFIER DIODE  
 Lead-Free ("PbF" suffix)**



$$V_F < 1V @ 10A$$

$$t_{rr} = 60ns$$

$$V_{RRM} = 600V$$

**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.

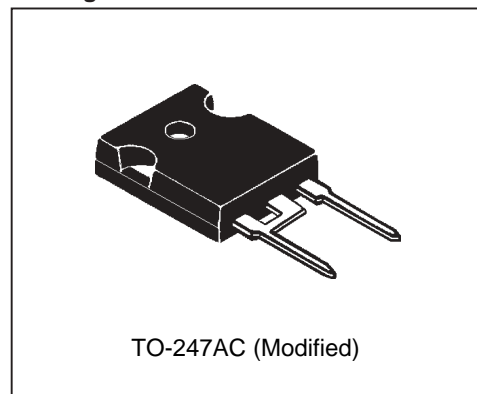
Typical applications are both:

- 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
$t_{rr}$ @ 1 A, - 100A/ $\mu s$	60	ns
$T_J$	-40 to 150	$^\circ C$

**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
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 reapplied
$I^2t$ Max. $I^2t$ for fusing	800	$A^2s$	10ms Sine pulse, rated $V_{RRM}$ applied
	1131		10ms Sine pulse, no voltage reapplied
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for fusing	11310	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reapplied

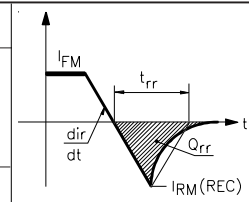
Electrical Specifications

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	$m\Omega$	$T_J = 125^\circ\text{C}$
$V_{F(TO)}$ 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/ $\mu\text{s}$ @ 25°C
$I_{rr}$ Reverse Recovery Current	3.2	A	
$Q_{rr}$ Reverse Recovery Charge	0.5	$\mu\text{C}$	@ 25°C
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		

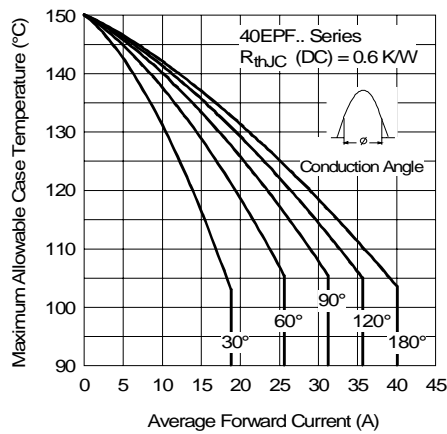


Fig. 1 - Current Rating Characteristics

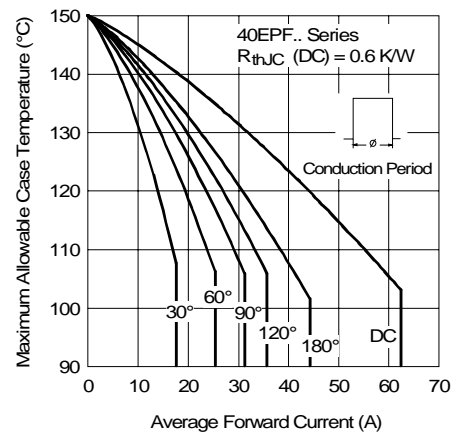


Fig. 2 - Current Rating Characteristics

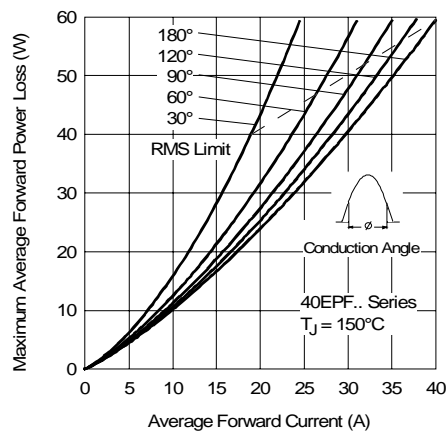


Fig. 3 - Forward Power Loss Characteristics

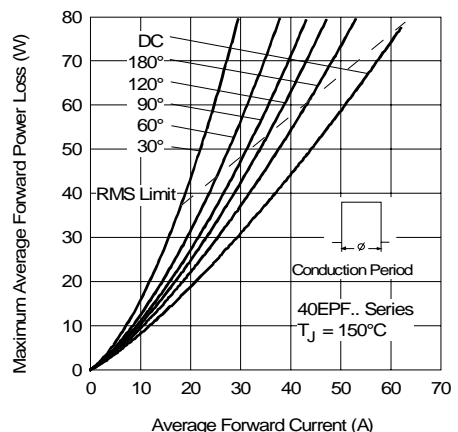


Fig. 4 - Forward Power Loss Characteristics

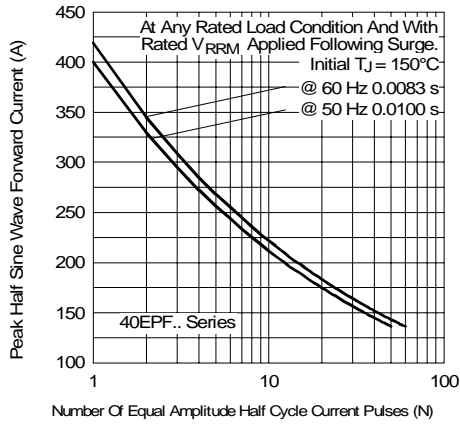


Fig. 5 - Maximum Non-Repetitive Surge Current

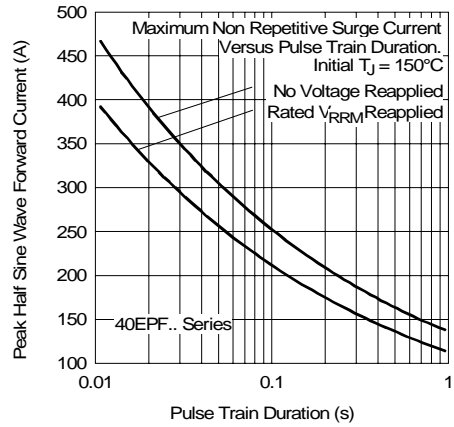


Fig. 6 - Maximum Non-Repetitive Surge Current

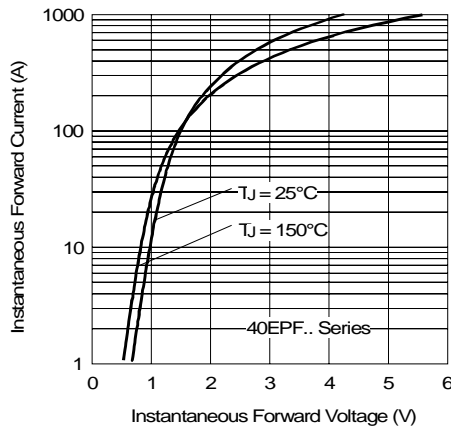


Fig. 7 - Forward Voltage Drop Characteristics

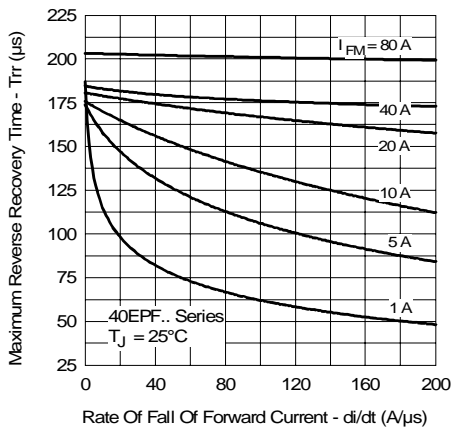


Fig. 8 - Recovery Time Characteristics,  $T_J = 25^\circ\text{C}$

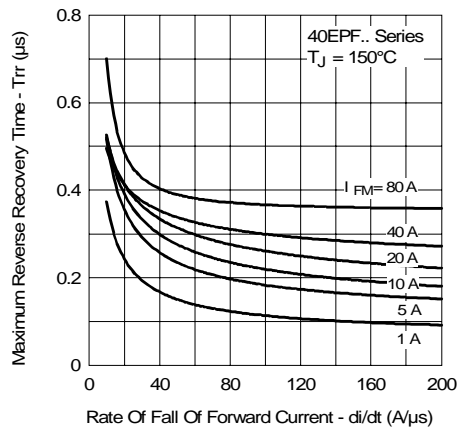


Fig. 9 - Recovery Time Characteristics,  $T_J = 150^\circ\text{C}$

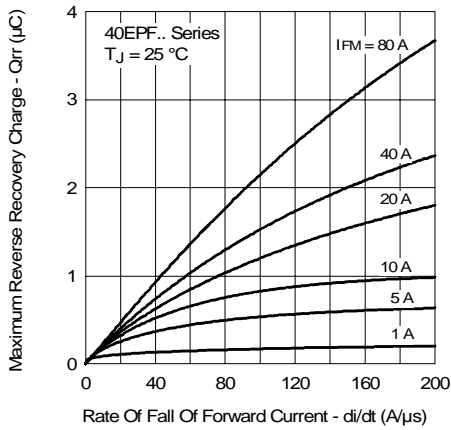


Fig. 10 - Recovery Charge Characteristics,  $T_J = 25^\circ\text{C}$

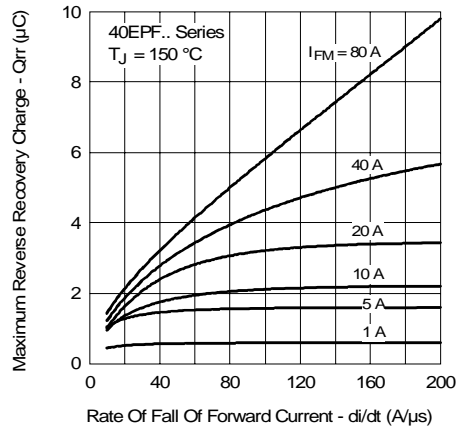


Fig. 11 - Recovery Charge Characteristics,  $T_J = 150^\circ\text{C}$

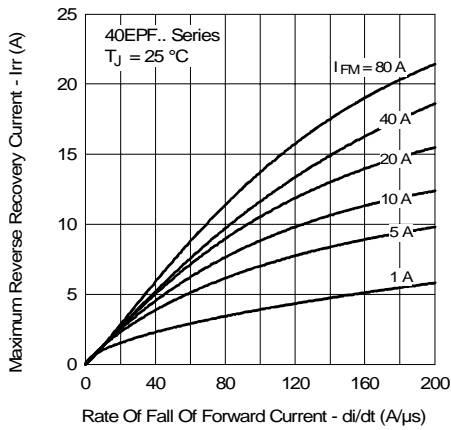


Fig. 12 - Recovery Current Characteristics,  $T_J = 25^\circ\text{C}$

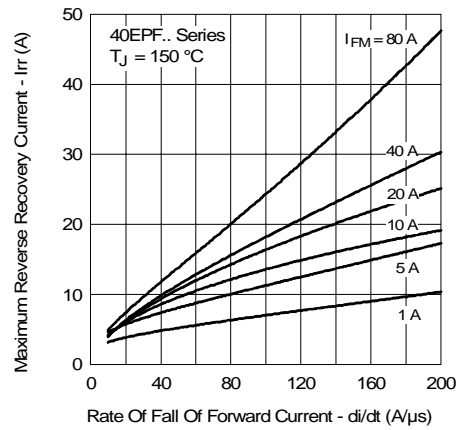


Fig. 13 - Recovery Current Characteristics,  $T_J = 150^\circ\text{C}$

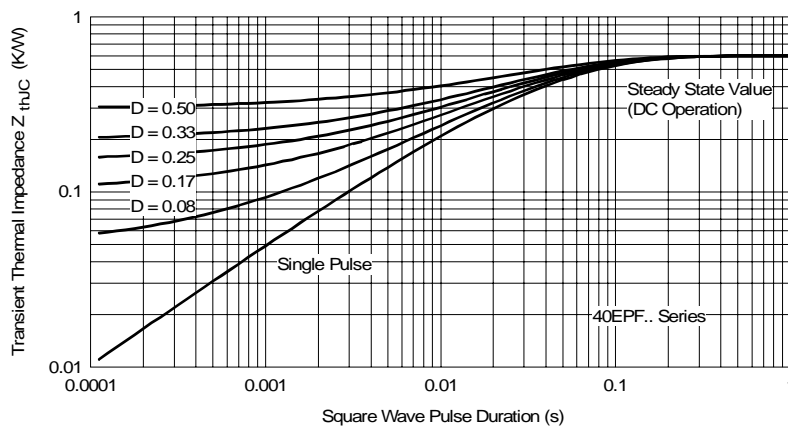
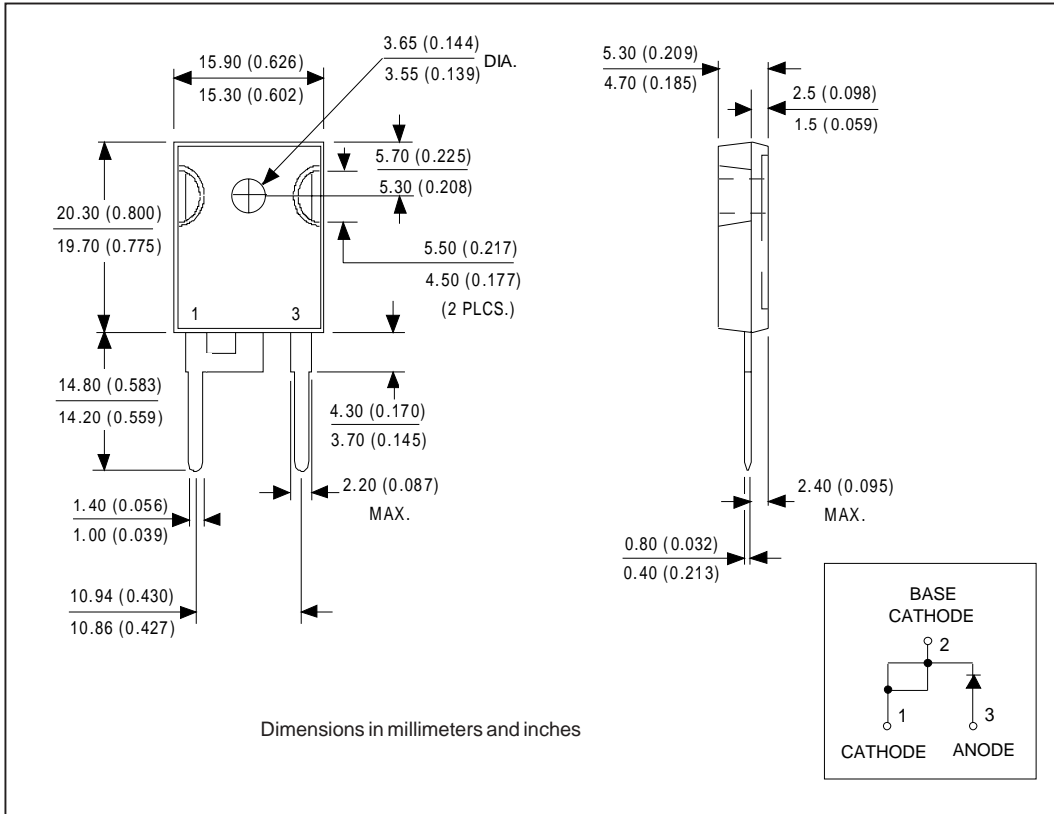
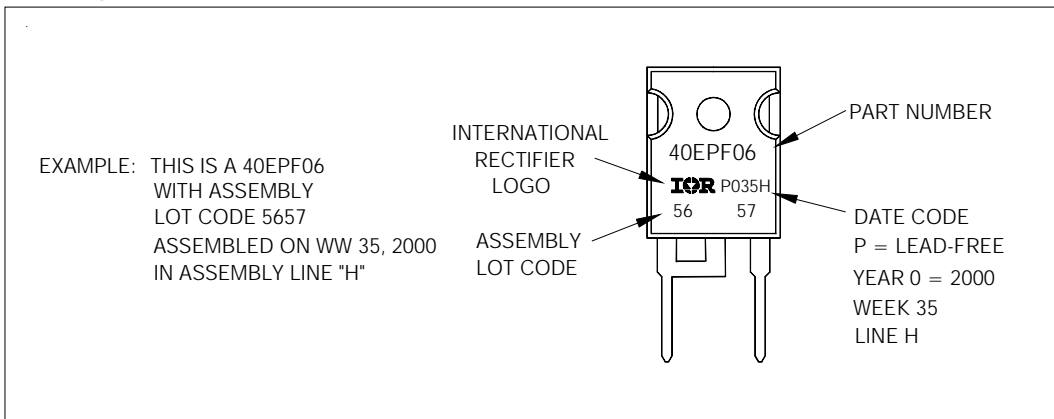


Fig. 14 - Thermal Impedance  $Z_{thJC}$  Characteristics

Outline Table



Marking Information



Ordering Information Table

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

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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 +lbv=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

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40EPF06PbF **QUIETIR** Series

Bulletin I2171 10/04

International  
**IOR** Rectifier

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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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