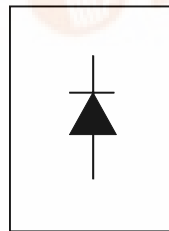


Bulletin I2114 rev. B 07/01

International **IR** Rectifier

QUIETIR Series 40EPF..

FAST SOFT RECOVERY RECTIFIER DIODE



$$\begin{aligned} V_F &< 1V @ 10A \\ t_{rr} &= 60ns \\ V_{RRM} &200 \text{ to } 600V \end{aligned}$$

Description/Features

The 40EPF.. 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.

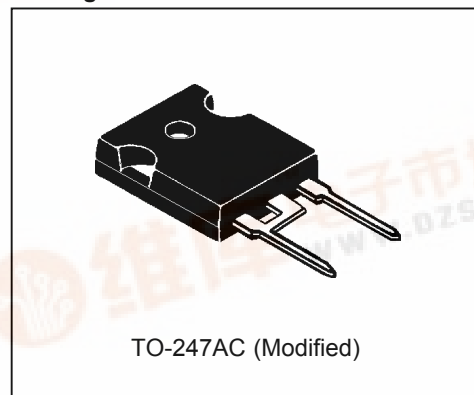
Typical applications are both:

- 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	40EPF..	Units
$I_{F(AV)}$ Sinusoidal waveform	40	A
V_{RRM}	200 to 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



40EPF.. QUIETIR Series

Bulletin I2114 rev. B 07/01

International
IR Rectifier

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
40EPF02	200	300	7
40EPF04	400	500	
40EPF06	600	700	

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

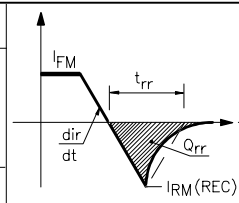
Electrical Specifications

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	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	$I_F @ 40\text{Apk}$ $@ 25\text{A}/\mu\text{s}$ $@ 25^\circ\text{C}$
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)

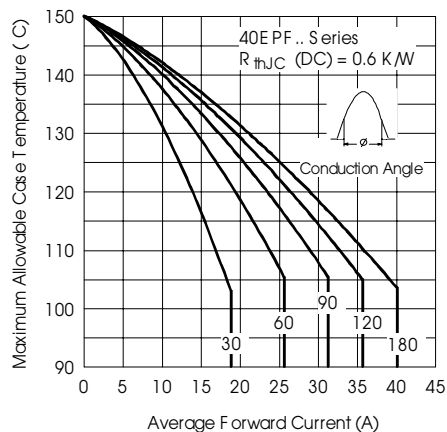


Fig. 1 - Current Rating Characteristics

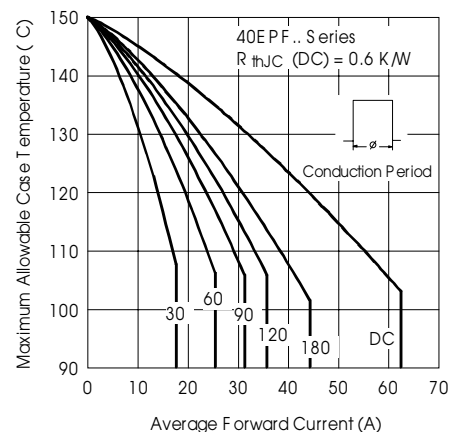


Fig. 2 - Current Rating Characteristics

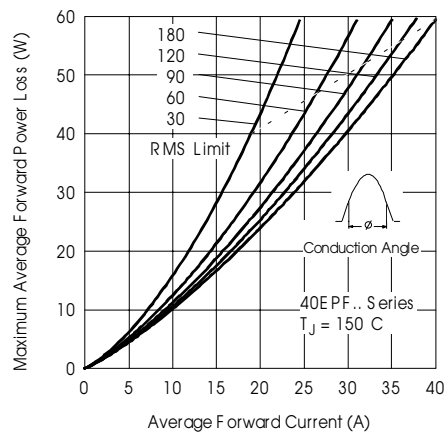


Fig. 3 - Forward Power Loss Characteristics

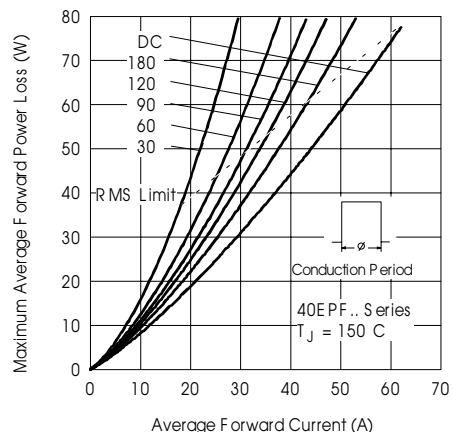


Fig. 4 - Forward Power Loss Characteristics

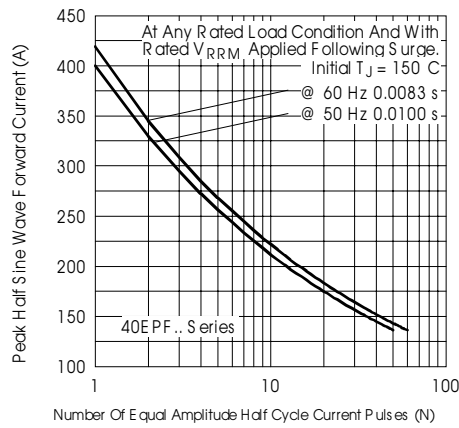


Fig. 5 - Maximum Non-Repetitive Surge Current

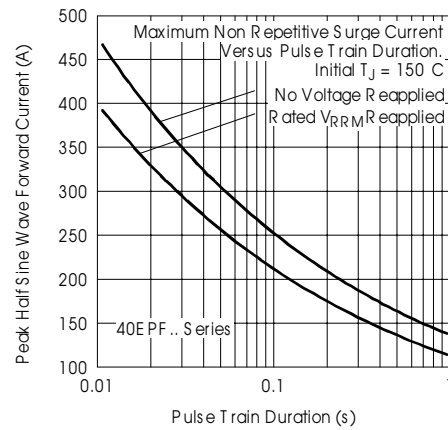


Fig. 6 - Maximum Non-Repetitive Surge Current

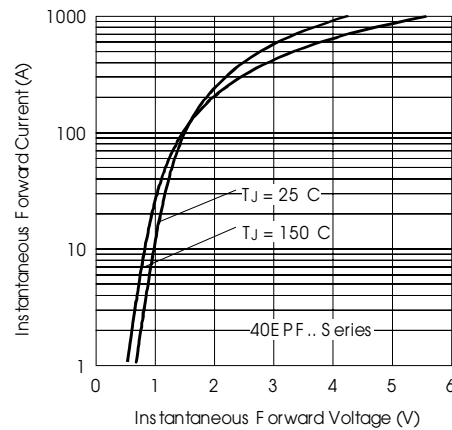


Fig. 7 - Forward Voltage Drop Characteristics

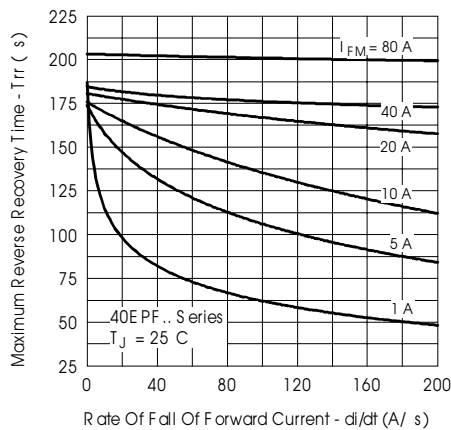


Fig. 8 - Recovery Time Characteristics, $T_J = 25^\circ\text{C}$

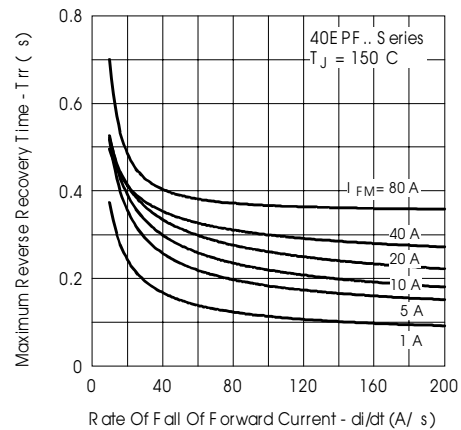


Fig. 9 - Recovery Time Characteristics, $T_J = 150^\circ\text{C}$

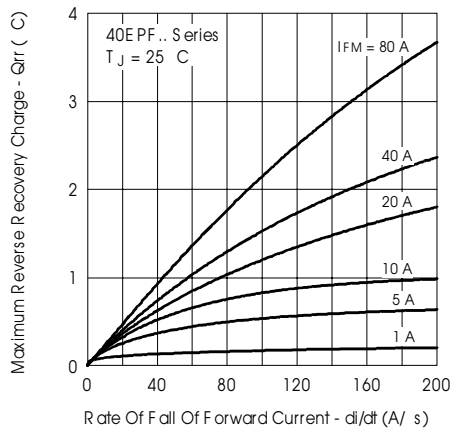


Fig. 10 - Recovery Charge Characteristics, $T_J = 25^\circ\text{C}$

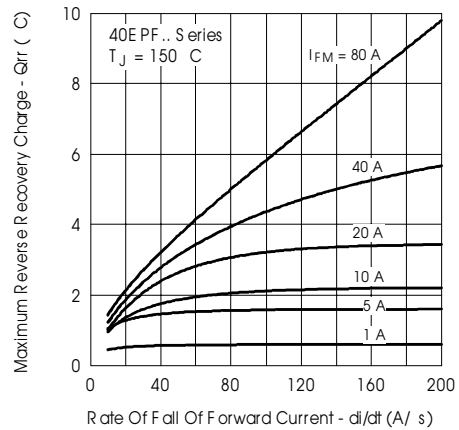


Fig. 11 - Recovery Charge Characteristics, $T_J = 150^\circ\text{C}$

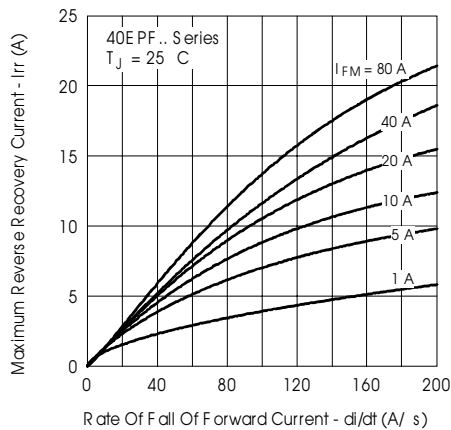


Fig. 12 - Recovery Current Characteristics, $T_J = 25^\circ\text{C}$

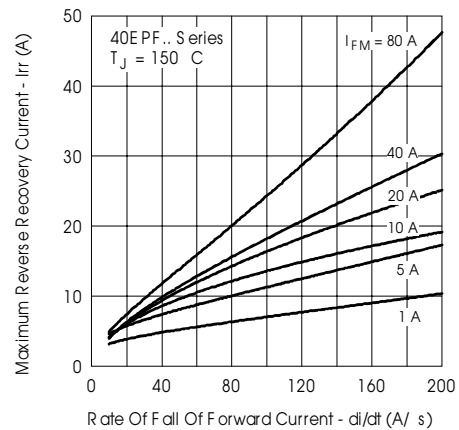


Fig. 13 - Recovery Current Characteristics, $T_J = 150^\circ\text{C}$

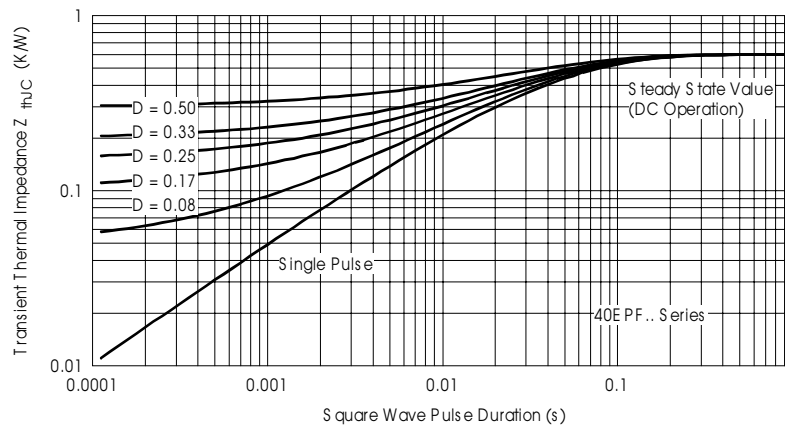


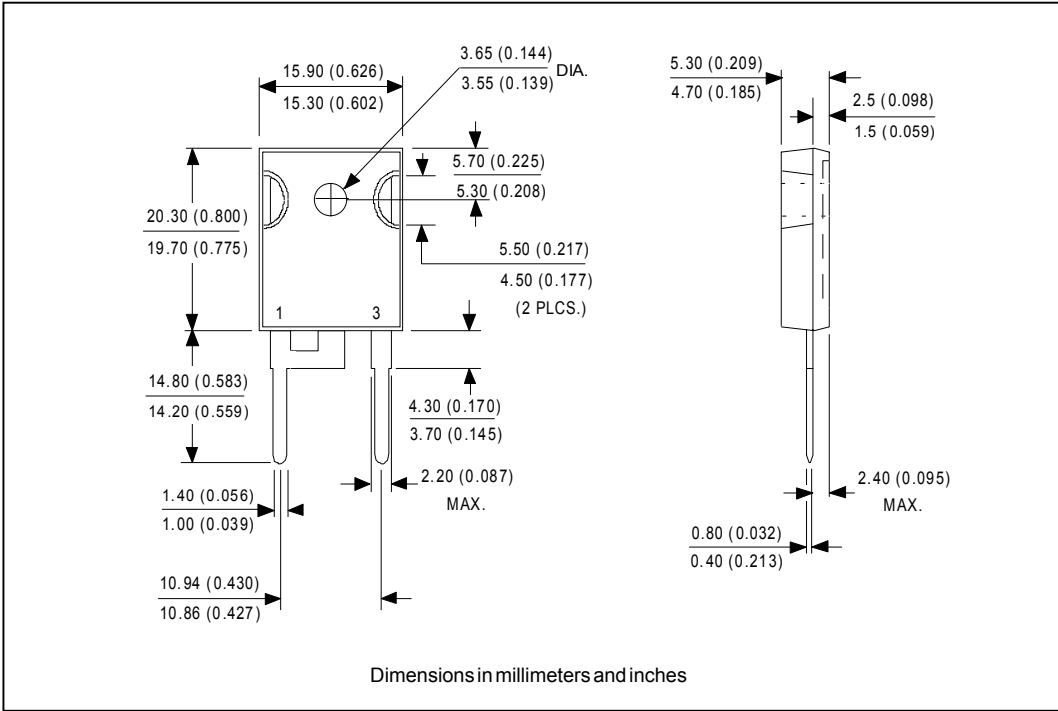
Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

40EPF.. *QUIETIR* Series

Bulletin I2114 rev. B 07/01

International
IRF Rectifier

Outline Table



Ordering Information Table

Device Code

40	E	P	F	06
①	②	③	④	⑤

1 - Current Rating

2 - Circuit Configuration:
E = Single Diode

3 - Package:
P = TO-247AC (Modified)

4 - Type of Silicon:
F = Fast diode

5 - Voltage code: Code x 100 = V_{RRM}

02 = 200V
04 = 400V
06 = 600V

```

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

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