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# HiPerFRED™ Epitaxial Diode

## with soft recovery

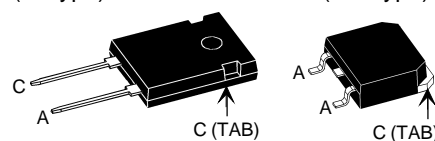
$$I_{FAV} = 60 \text{ A}$$

$$V_{RRM} = 600 \text{ V}$$

$$t_{rr} = 35 \text{ ns}$$

$V_{RSM}$ V	$V_{RRM}$ V	Type
600	600	DSEP 60-06A      DSEP 60-06AT


**TO-247 AD**  
(A-Type)

**TO-268 AA**  
(AT-Type)


A = Anode, C = Cathode, TAB = Cathode

Symbol	Conditions	Maximum Ratings	
$I_{FRMS}$	$T_{VJ} = T_{VJM}$	70	A
$I_{FAVM}$	$T_C = 110^\circ\text{C}$ ; rectangular, $d = 0.5$	60	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t_p = 10 \text{ ms}$ (50 Hz), sine	600	A
$E_{AS}$	$T_{VJ} = 25^\circ\text{C}$ ; non-repetitive $I_{AS} = 1.6 \text{ A}$ ; $L = 180 \mu\text{H}$	0.3	mJ
$I_{AR}$	$V_A = 1.5 \cdot V_R$ typ.; $f = 10 \text{ kHz}$ ; repetitive	0.2	A
$T_{VJ}$		-55...+175	$^\circ\text{C}$
$T_{VJM}$		175	$^\circ\text{C}$
$T_{stg}$		-55...+150	$^\circ\text{C}$
$P_{tot}$	$T_C = 25^\circ\text{C}$	230	W
$M_d$	mounting torque	0.8...1.2	Nm
Weight	typical	6	g

### Features

- International standard package
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour
- Epoxy meets UL 94V-0

### Applications

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

### Advantages

- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low  $I_{RM}$  reduces:
  - Power dissipation within the diode
  - Turn-on loss in the commutating switch

Symbol	Conditions	Characteristic Values	
		typ.	max.
$I_R$ ①	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$ $T_{VJ} = 150^\circ\text{C}$ $V_R = V_{RRM}$	650	$\mu\text{A}$
		2.5	mA
$V_F$ ②	$I_F = 60 \text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$	1.39	V
		2.04	V
$R_{thJC}$		0.65	K/W
$R_{thCH}$		0.25	K/W
$t_{rr}$	$I_F = 1 \text{ A}$ ; $-di/dt = 300 \text{ A}/\mu\text{s}$ ; $V_R = 30 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$	35	ns
$I_{RM}$	$V_R = 100 \text{ V}$ ; $I_F = 130 \text{ A}$ ; $-di_f/dt = 100 \text{ A}/\mu\text{s}$ $T_{VJ} = 100^\circ\text{C}$	8.3	A

 Pulse test: ① Pulse Width = 5 ms, Duty Cycle < 2.0 %  
 ② Pulse Width = 300  $\mu\text{s}$ , Duty Cycle < 2.0 %

Data according to IEC 60747 and per diode unless otherwise specified

IXYS reserves the right to change limits, test conditions and dimensions.

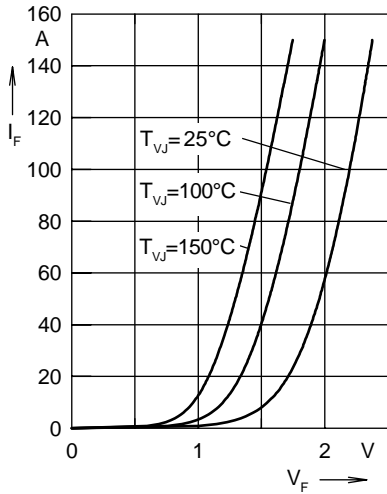


Fig. 1 Forward current  $I_F$  versus  $V_F$

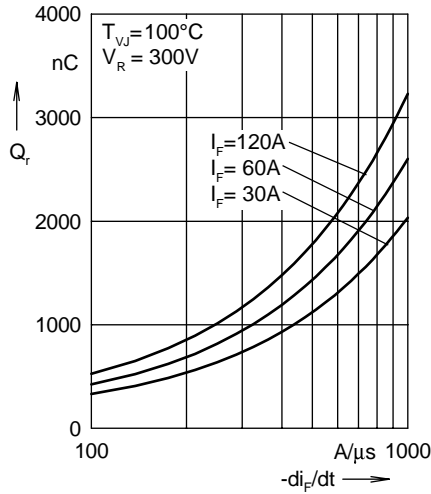


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

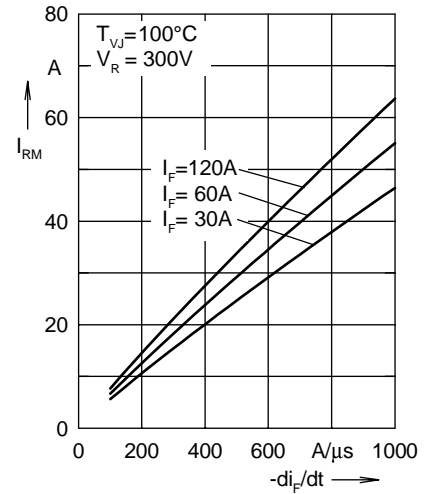


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

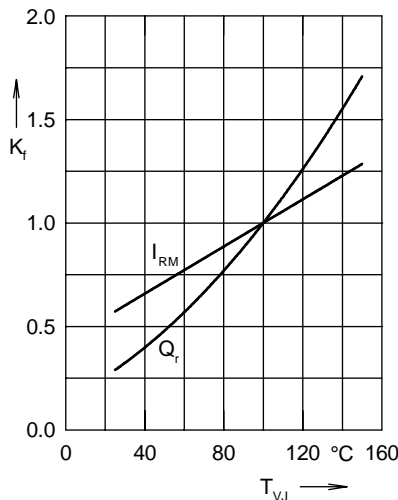


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

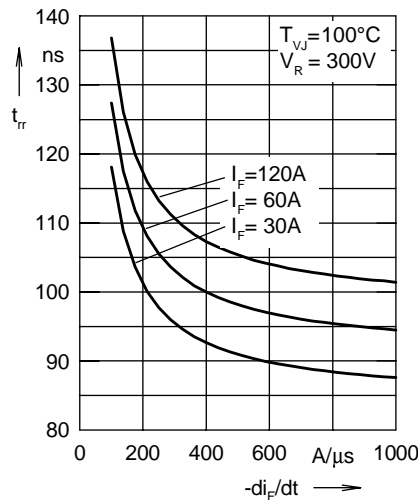


Fig. 5 Recovery time  $t_{rr}$  versus  $-di_F/dt$

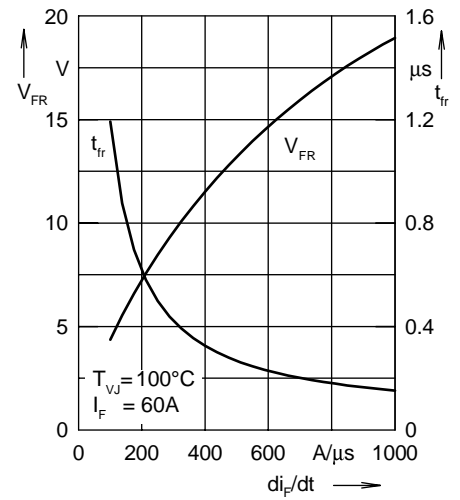


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{rr}$  versus  $di_F/dt$

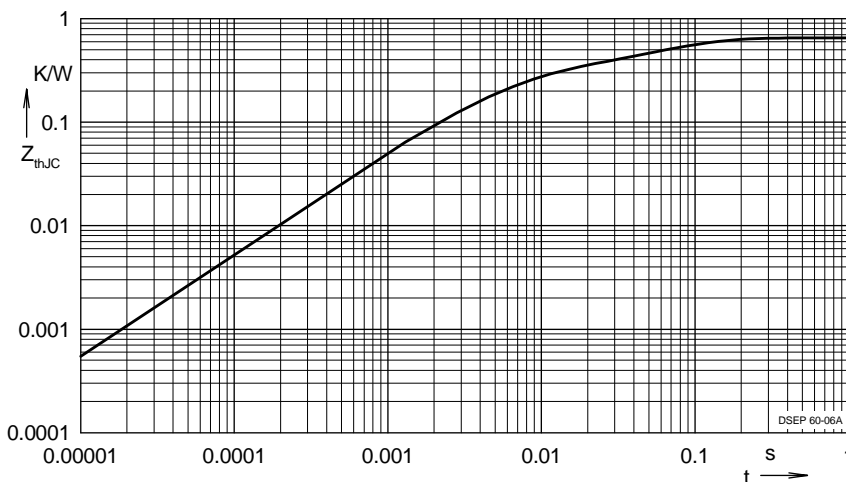


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.324	0.0052
2	0.125	0.0003
3	0.201	0.0385