

# Fast Recovery Epitaxial Diode (FRED)

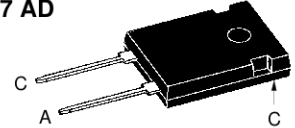
**DSEI 60**

**$I_{FAVM} = 60 \text{ A}$   
 $V_{RRM} = 600 \text{ V}$   
 $t_{rr} = 35 \text{ ns}$**

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



TO-247 AD



A = Anode, C = Cathode

Symbol	Test Conditions	Maximum Ratings	
$I_{FRMS}$	$T_{VJ} = T_{VJM}$	100	A
$I_{FAVM}$ ①	$T_C = 70^\circ\text{C}$ ; rectangular, $d = 0.5$	60	A
$I_{FRM}$	$t_p < 10 \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$	800	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	550	A
		600	A
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	480	A
		520	A
$I^2t$	$T_{VJ} = 45^\circ\text{C}$ $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	1510	$\text{A}^2\text{s}$
		1490	$\text{A}^2\text{s}$
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine $t = 8.3 \text{ ms}$ (60 Hz), sine	1150	$\text{A}^2\text{s}$
		1120	$\text{A}^2\text{s}$
$T_{VJ}$		-40...+150	$^\circ\text{C}$
$T_{VJM}$		150	$^\circ\text{C}$
$T_{stg}$		-40...+150	$^\circ\text{C}$
$P_{tot}$	$T_C = 25^\circ\text{C}$	166	W
$M_d$	Mounting torque	0.8...1.2	Nm
Weight		6	g

## Features

- International standard package JEDEC TO-247 AD
- 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
- Anti saturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating and melting
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

## Advantages

- High reliability circuit operation
- Low voltage peaks for reduced protection circuits
- Low noise switching
- Low losses
- Operating at lower temperature or space saving by reduced cooling

Symbol	Test Conditions	Characteristic Values	
		typ.	max.
$I_R$	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$		200 $\mu\text{A}$
	$T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$		100 $\mu\text{A}$
	$T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$		14 mA
$V_F$	$I_F = 70 \text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$		1.5 V
			1.8 V
$V_{T0}$	For power-loss calculations only		1.13 V
$r_T$	$T_{VJ} = T_{VJM}$		4.7 $\text{m}\Omega$
$R_{thJC}$	0.25		0.75 K/W
$R_{thCK}$			K/W
$R_{thJA}$			35 K/W
$t_{rr}$	$I_F = 1 \text{ A}$ ; $-di/dt = 200 \text{ A}/\mu\text{s}$ ; $V_R = 30 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$	35	50 ns
$I_{RM}$	$V_R = 350 \text{ V}$ ; $I_F = 60 \text{ A}$ ; $-di_F/dt = 480 \text{ A}/\mu\text{s}$ $L \leq 0.05 \mu\text{H}$ ; $T_{VJ} = 100^\circ\text{C}$	19	21 A

①  $I_{FAVM}$  rating includes reverse blocking losses at  $T_{VJM}$ ,  $V_R = 0.8 V_{RRM}$ , duty cycle  $d = 0.5$   
Data according to IEC 60747

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

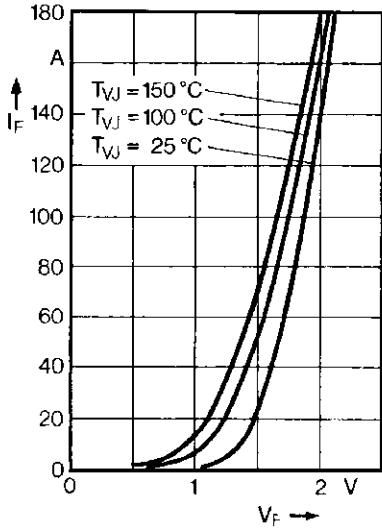


Fig. 1 Forward current versus voltage drop.

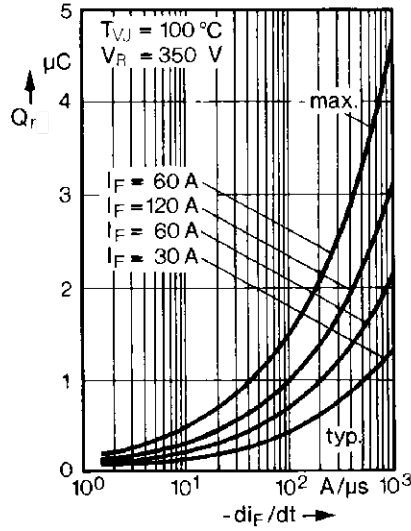


Fig. 2 Recovery charge versus  $-di_F/dt$ .

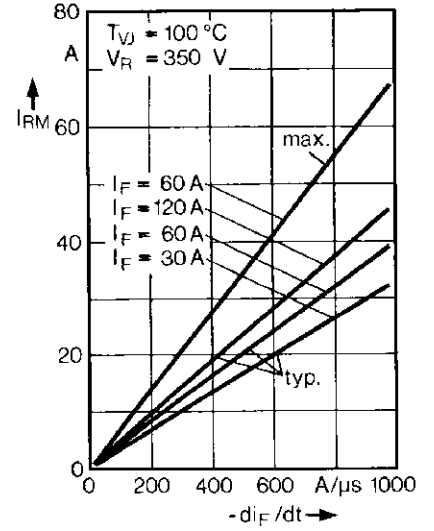


Fig. 3 Peak reverse current versus  $-di_F/dt$ .

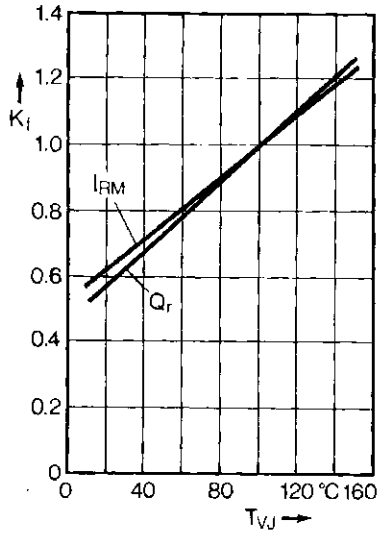


Fig. 4 Dynamic parameters versus junction temperature.

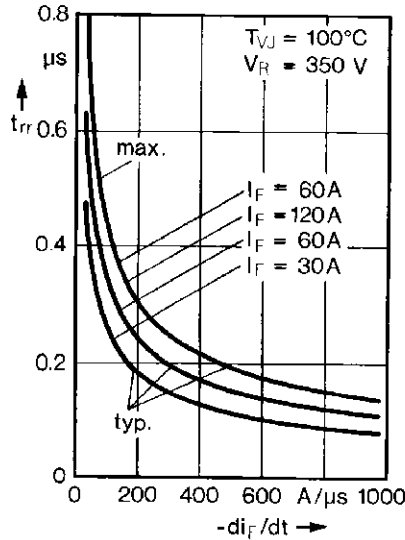


Fig. 5 Recovery time versus  $-di_F/dt$ .

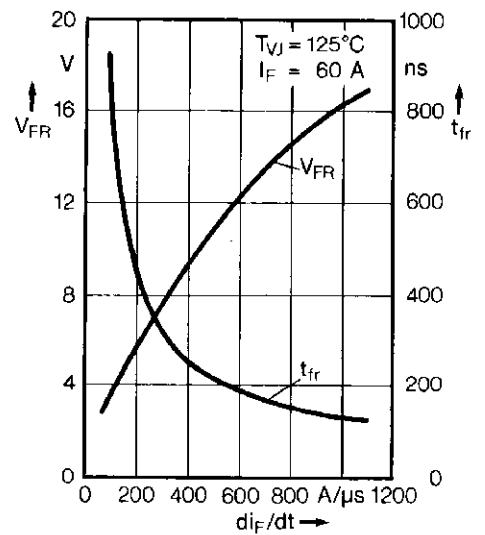


Fig. 6 Peak forward voltage versus  $di_F/dt$ .

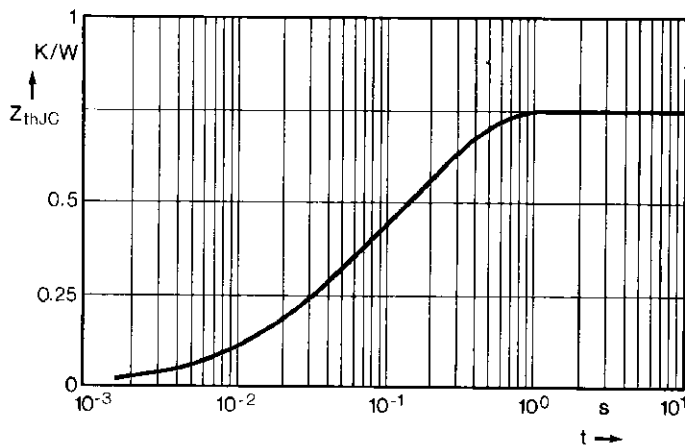
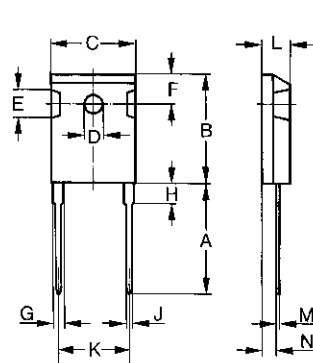


Fig. 7 Transient thermal impedance junction to case.

### Dimensions



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	2.2	2.54	0.087	0.102