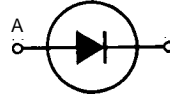


# Fast Recovery Epitaxial Diode (FRED)

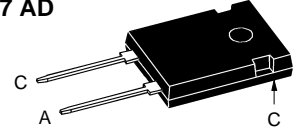
**DSEI 120**

**$I_{FAVM} = 109\text{ A}$**   
 **$V_{RRM} = 1200\text{ V}$**   
 **$t_{rr} = 40\text{ ns}$**

$V_{RSM}$	$V_{RRM}$	Type
V	V	
1200	1200	DSEI 120-12A



**TO-247 AD**



A = Anode, C = Cathode

Symbol	Test Conditions	Maximum Ratings	
$I_{FRMS}$	$T_{VJ} = T_{VJM}$	100	A
$I_{FAVM}$ ①	$T_C = 60^\circ\text{C}$ ; rectangular, $d = 0.5$	109	A
$I_{FAV}$ ②	$T_C = 95^\circ\text{C}$ ; rectangular, $d = 0.5$	75	A
$I_{FRM}$	$t_p < 10\ \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$	tbd	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	600	A
	$t = 8.3\text{ ms}$ (60 Hz), sine	660	A
$I_{FSM}$	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	540	A
	$t = 8.3\text{ ms}$ (60 Hz), sine	600	A
$I^2t$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	1800	A <sup>2</sup> s
	$t = 8.3\text{ ms}$ (60 Hz), sine	1800	A <sup>2</sup> s
$I^2t$	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine	1450	A <sup>2</sup> s
	$t = 8.3\text{ ms}$ (60 Hz), sine	1500	A <sup>2</sup> s
$T_{VJ}$		-40...+150	°C
$T_{VJM}$		150	°C
$T_{stg}$		-40...+150	°C
$P_{tot}$	$T_C = 25^\circ\text{C}$	357	W
$M_d$	Mounting torque	0.8...1.2	Nm
<b>Weight</b>		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

## Dimensions

See DSEI 60-12 on page D5 - 27

Symbol	Test Conditions	Characteristic Values	
		typ.	max.
$I_R$	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$		3 mA
	$T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$		1.5 mA
	$T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$		20 mA
$V_F$	$I_F = 70\text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$		1.55 V
			1.8 V
$V_{T0}$	For power-loss calculations only		1.2 V
$r_T$	$T_{VJ} = T_{VJM}$		4.6 mΩ
$R_{thJC}$	0.25		0.35 K/W
$R_{thCK}$			K/W
$R_{thJA}$			35 K/W
$t_{rr}$	$I_F = 1\text{ A}$ ; $-di/dt = 200\text{ A}/\mu\text{s}$ ; $V_R = 30\text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$	40	60 ns
$I_{RM}$	$V_R = 350\text{ V}$ ; $I_F = 75\text{ A}$ ; $-di_F/dt = 200\text{ A}/\mu\text{s}$ $L \leq 0.05\ \mu\text{H}$ ; $T_{VJ} = 100^\circ\text{C}$	25	30 A

① Chip capability, ② limited to 70 A by leads

Data according to IEC 60747

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

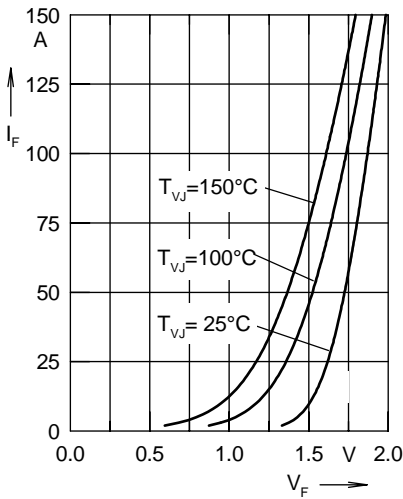


Fig. 1 Forward current  $I_F$  versus  $V_F$

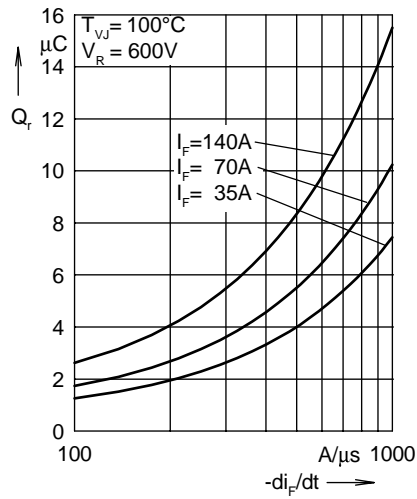


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

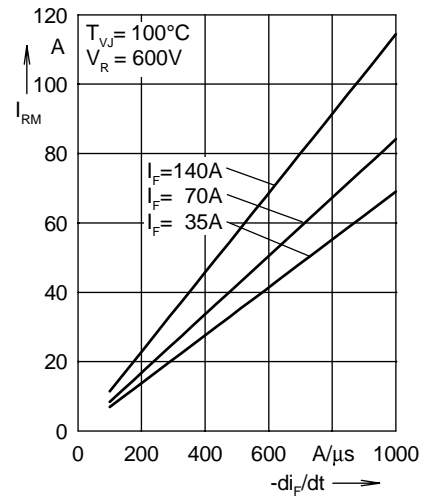


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

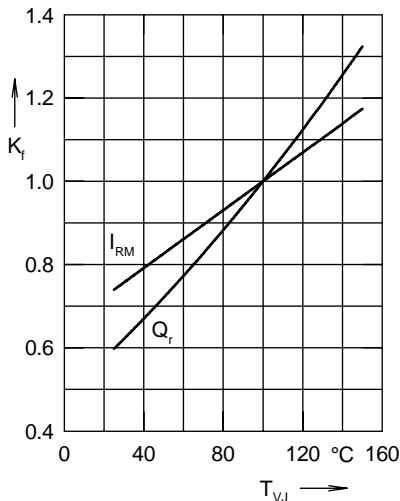


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

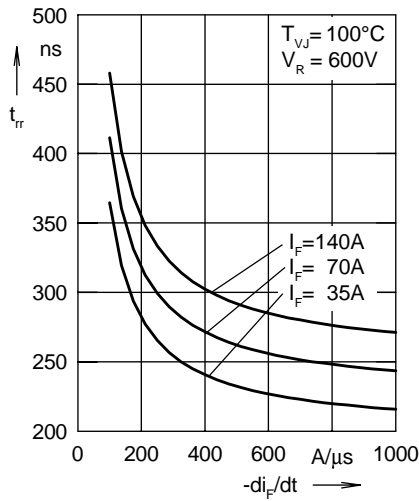


Fig. 5 Recovery time  $t_{rr}$  versus  $-di_F/dt$

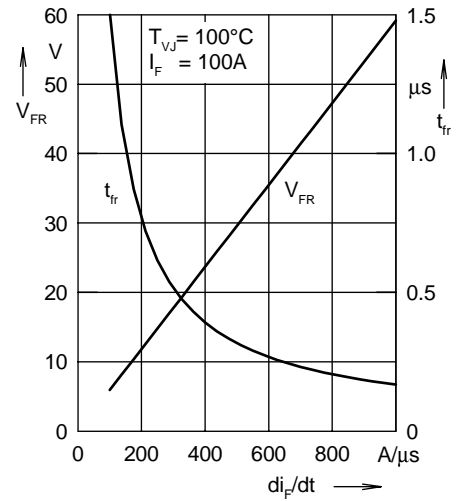


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

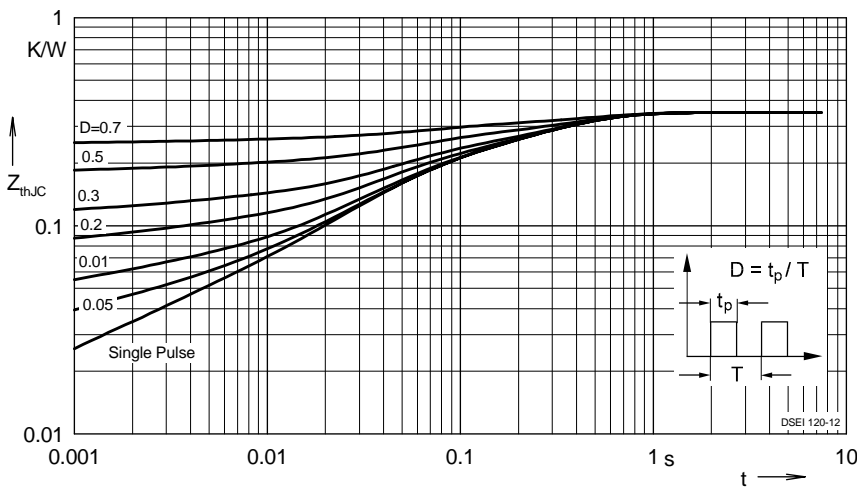


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.017	0.00038
2	0.0184	0.0026
3	0.1296	0.0387
4	0.185	0.274