

Fast Recovery Epitaxial Diode (FRED)

DSEI 120

$$I_{FAVM} = 109 \text{ A}$$

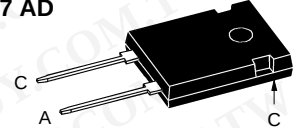
$$V_{RRM} = 1200 \text{ V}$$

$$t_{rr} = 40 \text{ ns}$$

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} ①	$T_{VJ} = T_{VJM}$	100	A
I_{FAVM} ②	$T_C = 60^\circ\text{C}$; 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
	$T_{VJ} = 150^\circ\text{C}$; $t = 10 \text{ ms}$ (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^2s
	$t = 8.3 \text{ ms}$ (60 Hz), sine	1800	A^2s
	$T_{VJ} = 150^\circ\text{C}$; $t = 10 \text{ ms}$ (50 Hz), sine	1450	A^2s
	$t = 8.3 \text{ ms}$ (60 Hz), sine	1500	A^2s
T_{VJ}		-40...+150	$^\circ\text{C}$
T_{VJM}		150	$^\circ\text{C}$
T_{stg}		-40...+150	$^\circ\text{C}$
P_{tot}	$T_C = 25^\circ\text{C}$	357	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

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	$I_F = 70 \text{ A}$; $T_{VJ} = 150^\circ\text{C}$		1.55 V
	$T_{VJ} = 25^\circ\text{C}$		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

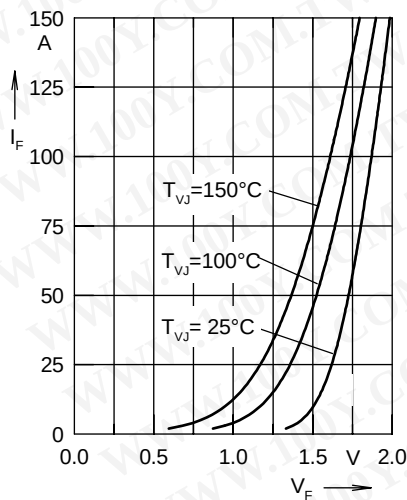


Fig. 1 Forward current I_F versus V_F

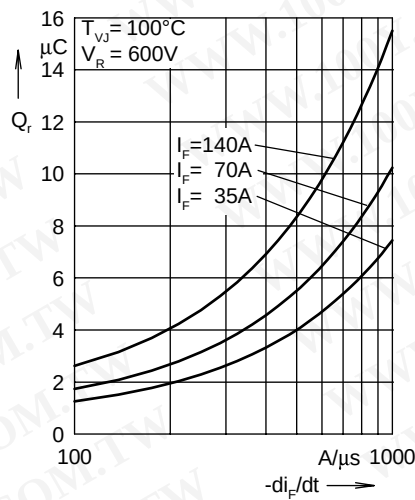


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

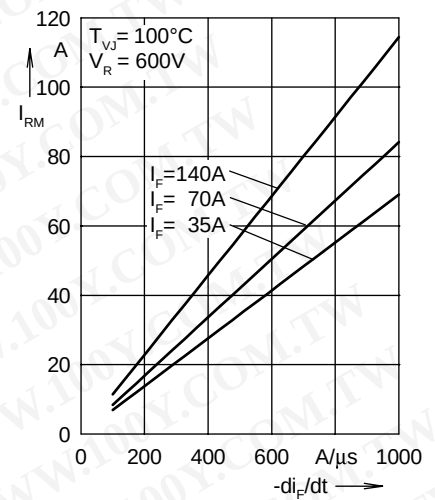


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

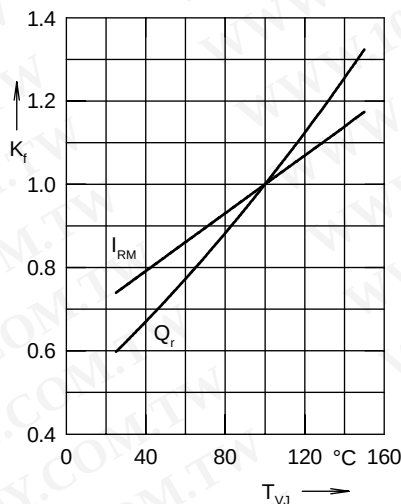


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

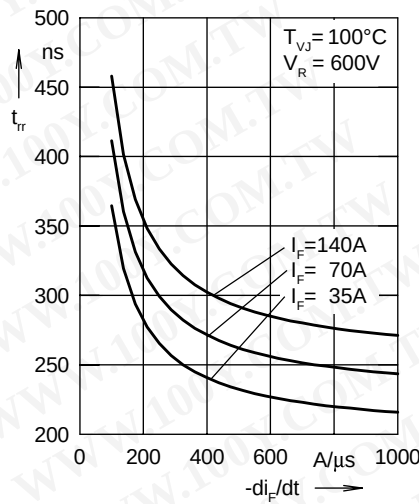


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

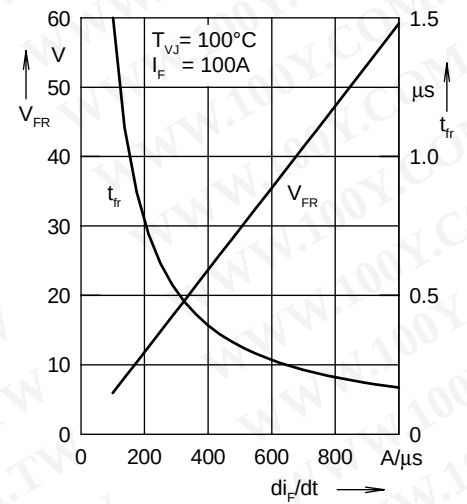


Fig. 6 Peak forward voltage V_{FR} and t_{rr} versus di_F/dt

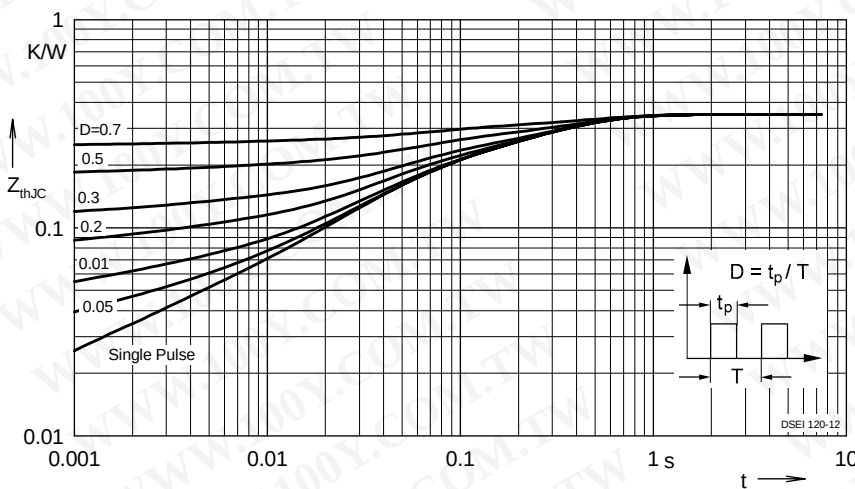


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

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