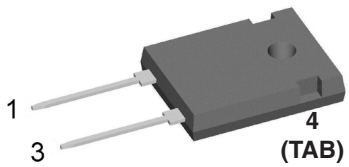
Fast Recovery Epitaxial Diode (FRED)

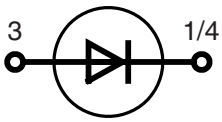
I_{FAV} = 109 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

Part number

DSEI 120-12A

TO-247AD





Features / Advantages:

- Planar passivated chips
- Low leakage current
- Very short recovery time
- Improved thermal behaviour
- Extremely low switching losses
- Low I_{RM}-values
- Soft recovery behaviour
- 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

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 and melting
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

Package: TO-247AD

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

Symbol	Conditions	Maximum Ratings	
I_{FRMS}	$T_{VJ} = T_{VJM}$	100	A
I_{FAVM} ①	T_C = 60°C; rectangular, d = 0.5	109	A
I_{FAV} ②	T_C = 95°C; rectangular, d = 0.5	75	A
I_{FRM}	t_P < 10 s; rep. rating, pulse width limited by T_{VJM}	1200	A
I_{FSM}	T_{VJ} = 45°C; t = 10 ms (50 Hz), sine	600	A
	t = 8.3 ms (60 Hz), sine	660	A
	T_{VJ} = 150°C; t = 10 ms (50 Hz), sine	540	A
	t = 8.3 ms (60 Hz), sine	600	A
I^2t	T_{VJ} = 45°C; t = 10 ms (50 Hz), sine	1800	A^2s
	t = 8.3 ms (60 Hz), sine	1800	A^2s
	T_{VJ} = 150°C; t = 10 ms (50 Hz), sine	1450	A^2s
	t = 8.3 ms (60 Hz), sine	1500	A^2s
P_{tot}	T_C = 25°C	357	W

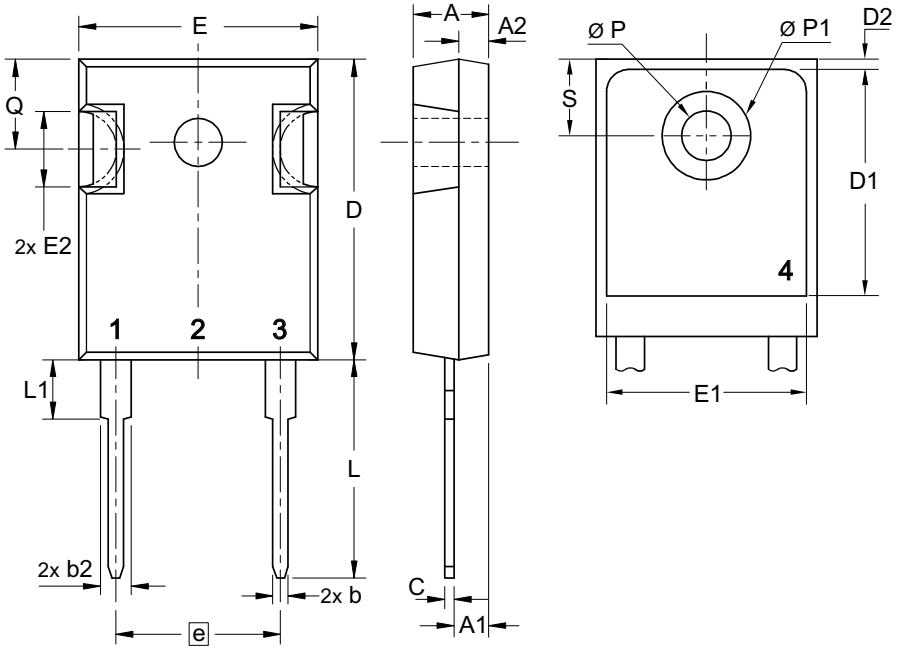
Symbol	Conditions	Characteristic Values typ.	max.	
I_R	$V_R = V_{RRM}$ T_{VJ} = 25°C		3	mA
	$V_R = 0.8 \cdot V_{RRM}$ T_{VJ} = 25°C		1.5	mA
	$V_R = 0.8 \cdot V_{RRM}$ T_{VJ} = 125°C		20	mA
V_F	I_F = 70 A T_{VJ} = 150°C		1.55	V
	T_{VJ} = 25°C		1.80	V
V_{T0}	For power-loss calculations only		1.2	V
r_T	$T_{VJ} = T_{VJM}$		4.6	mΩ
R_{thJC}			0.35	K/W
R_{thCH}		0.25		K/W
R_{thJA}			35	K/W
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V; T_{VJ} = 25°C	40	60	ns
I_{RM}	V_R = 350 V; I_F = 75 A; $-di_F/dt$ = 200 A/µs; L ≤ 0.05 µH; T_{VJ} = 100°C	25	30	A

① Chip capability; ② limited to 70 A by leads

Data according to IEC 60747

Outline Drawing TO-247AD

Dimensions in mm (1 mm = 0.0394“)



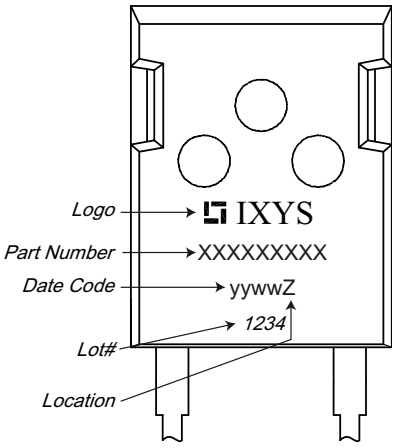
Sym.	Inches min.	Inches max.	Millimeter min.	Millimeter max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819	0.845	20.79	21.45
E	0.610	0.640	15.48	16.24
E2	0.170	0.216	4.31	5.48
e	0.430 BSC		10.92 BSC	
L	0.780	0.800	19.80	20.30
L1	-	0.177	-	4.49
Ø P	0.140	0.144	3.55	3.65
Q	0.212	0.244	5.38	6.19
S	0.242 BSC		6.14 BSC	
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	-	13.07	-
D2	0.020	0.053	0.51	1.35
E1	0.530	-	13.45	-
Ø P1	-	0.29	-	7.39

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

20220615b

Package TO-247AD			Ratings			
Symbol	**Definitions**	**Conditions**	**min.**	**typ.**	**max.**	
T_{VJ}	*virtual junction temperature*		-40		150	°C
T_{stg}	*storage temperature*		-40		150	°C
Weight				6		g
M_D	*mounting torque*		0.8		1.2	Nm

Product Marking



Ordering	Part Number	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	DSEI120-12A	DSEI120-12A	Tube	30	467731

Curves

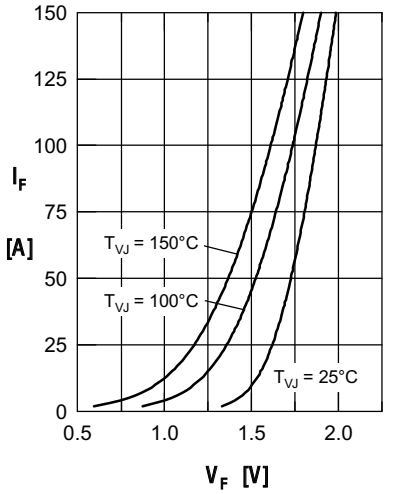


Fig. 1 Forward current I_F vs. V_F

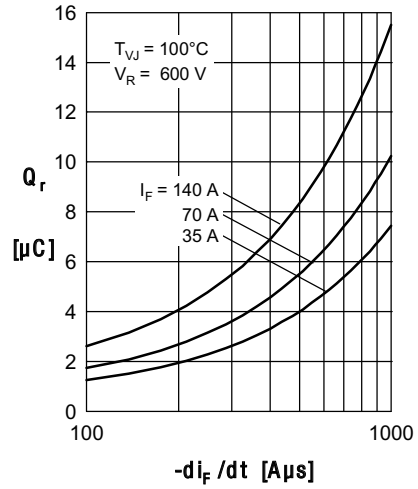


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

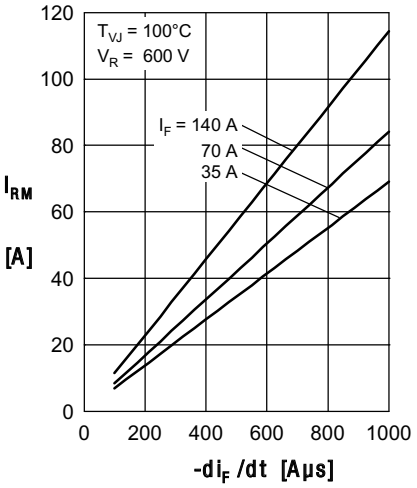


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

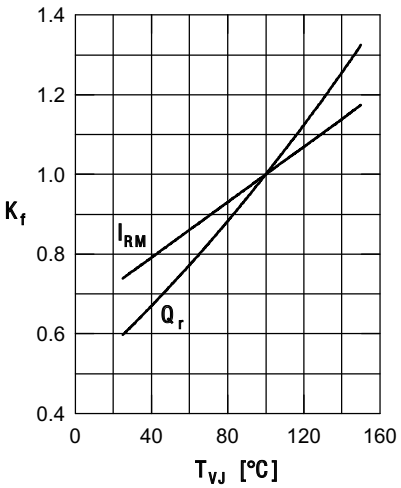


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

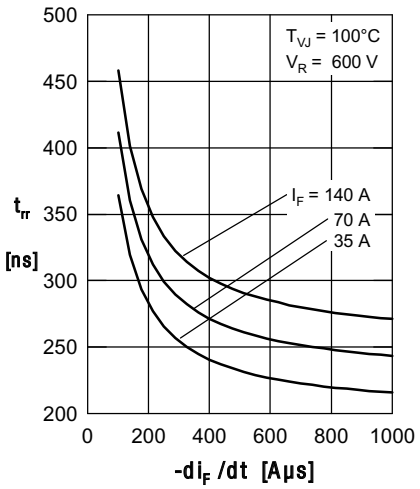


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

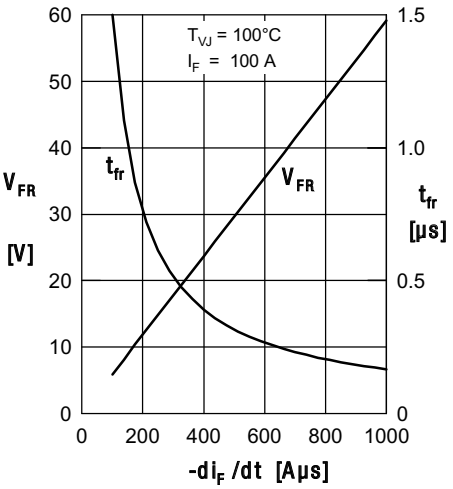


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus $-di_F/dt$

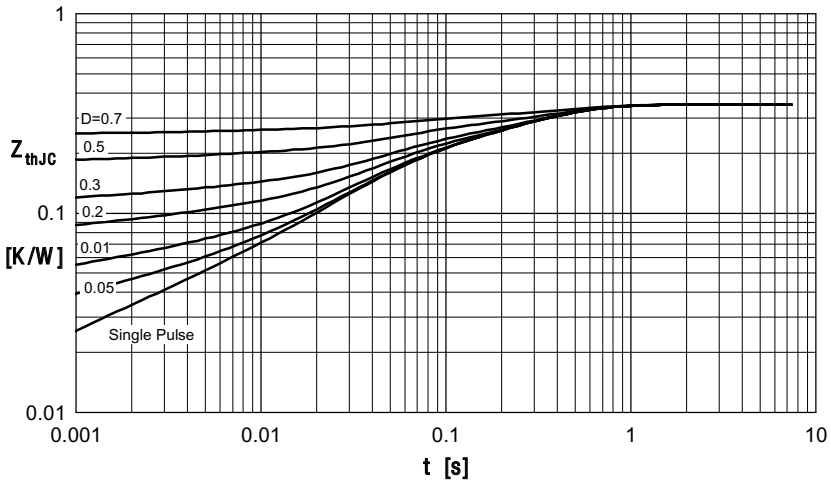


Fig. 7 Transient thermal resistance junction to case at various duty cycles

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