

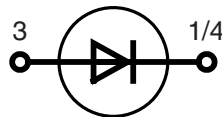
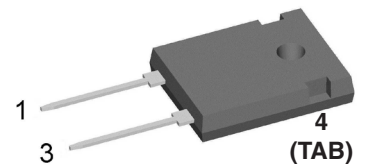
Fast Recovery Epitaxial Diode (FRED)

$$\begin{aligned} I_{\text{FAV}} &= 109 \text{ A} \\ V_{\text{RRM}} &= 1200 \text{ V} \\ t_{\text{rr}} &= 40 \text{ ns} \end{aligned}$$

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

Disclaimer Notice

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Symbol	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}	$t_p < 10$ s; rep. rating, pulse width limited by T_{VJM}	1200	A
I_{FSM}	$T_{VJ} = 45^\circ\text{C}$; $t = 10$ ms (50 Hz), sine	600	A
	$t = 8.3$ ms (60 Hz), sine	660	A
	$T_{VJ} = 150^\circ\text{C}$; $t = 10$ ms (50 Hz), sine	540	A
	$t = 8.3$ ms (60 Hz), sine	600	A
I^2t	$T_{VJ} = 45^\circ\text{C}$; $t = 10$ ms (50 Hz), sine	1800	A ² s
	$t = 8.3$ ms (60 Hz), sine	1800	A ² s
	$T_{VJ} = 150^\circ\text{C}$; $t = 10$ ms (50 Hz), sine	1450	A ² s
	$t = 8.3$ ms (60 Hz), sine	1500	A ² s
P_{tot}	$T_C = 25^\circ\text{C}$	357	W

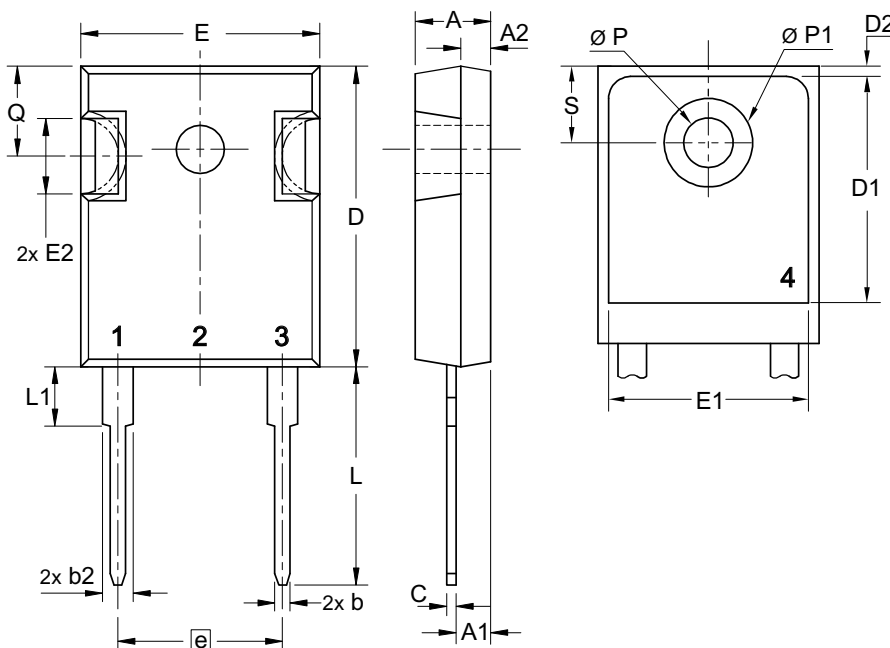
Symbol	Conditions	Characteristic Values		
		typ.	max.	
I_R	$V_R = V_{RRM}$ $T_{VJ} = 25^\circ\text{C}$		3	mA
	$V_R = 0.8 \cdot V_{RRM}$ $T_{VJ} = 25^\circ\text{C}$		1.5	mA
	$V_R = 0.8 \cdot V_{RRM}$ $T_{VJ} = 125^\circ\text{C}$		20	mA
V_F	$I_F = 70$ A $T_{VJ} = 150^\circ\text{C}$		1.55	V
	$T_{VJ} = 25^\circ\text{C}$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

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. max.	Millimeter min. 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

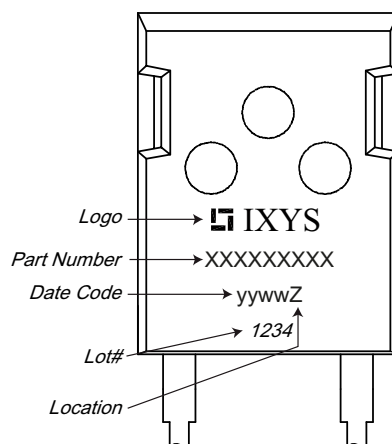
IXYS reserves the right to change limits, test conditions and dimensions.

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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

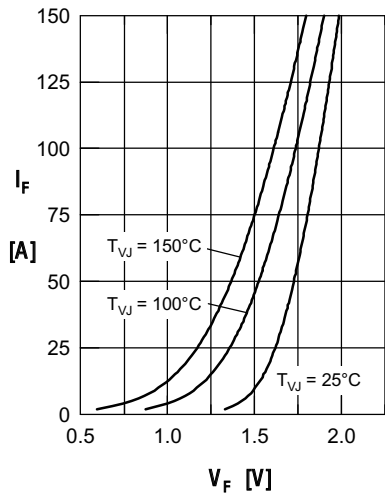
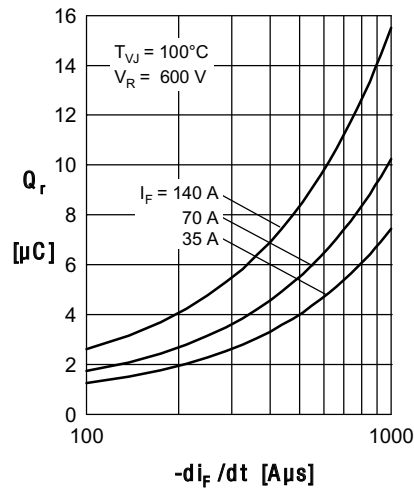
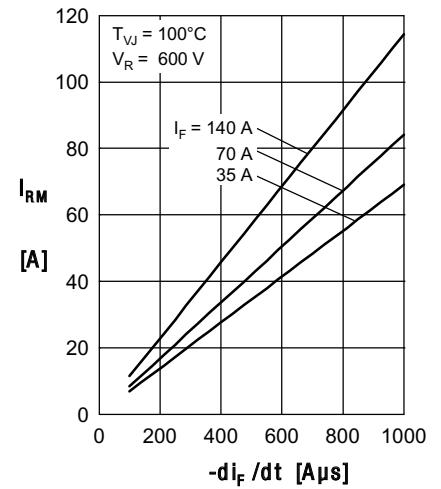
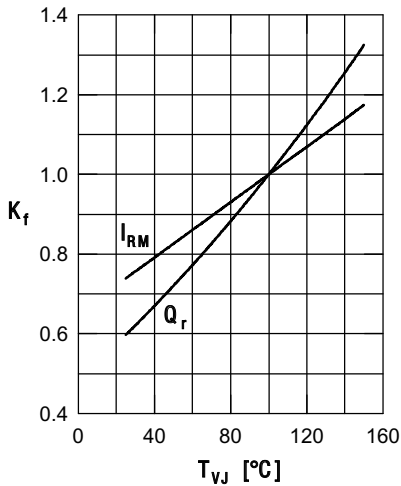
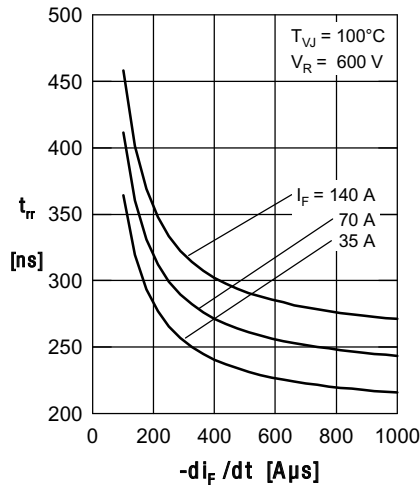
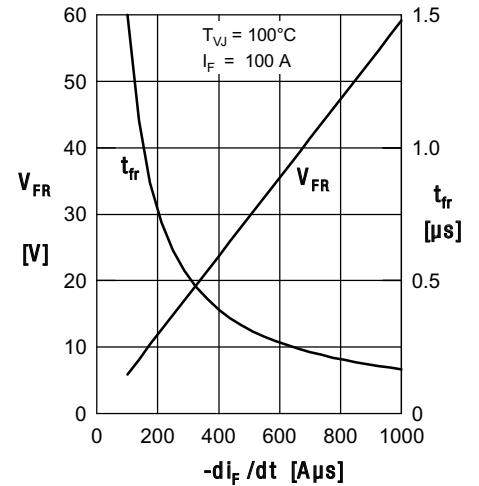
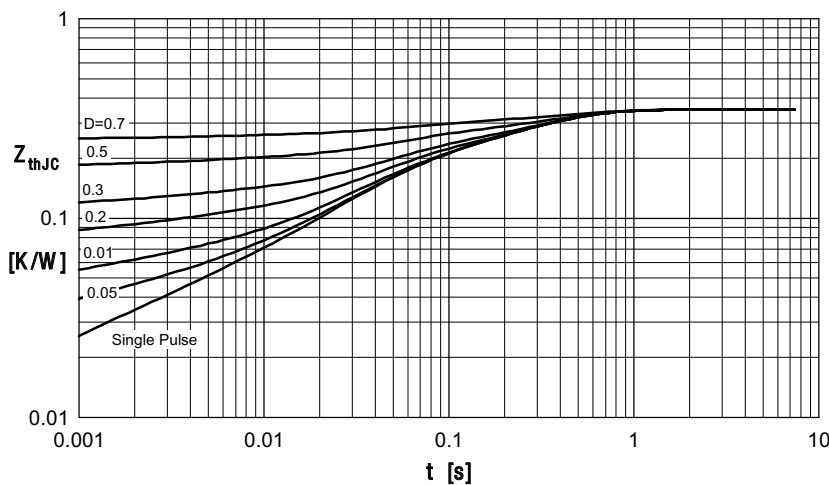
Curves

 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_{tr} 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

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 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