

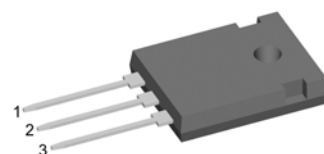
HiPerFRED

$$\begin{aligned} V_{RRM} &= 600\text{ V} \\ I_{FAV} &= 2 \times 15\text{ A} \\ t_{rr} &= 35\text{ ns} \end{aligned}$$

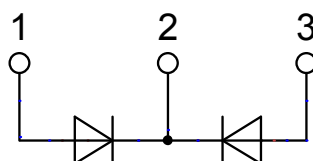
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Common Cathode

Part number

DSEC30-06A



Backside: cathode



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I_{rm} -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I_{rm} reduces:
 - Power dissipation within the diode
 - Turn-on loss in the commutating switch

Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

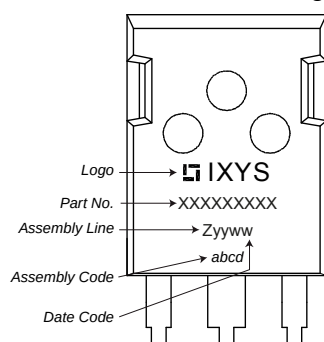
Package: TO-247

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

Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				600	V
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				600	V
I _R	reverse current, drain current	V _R = 600 V	T _{VJ} = 25°C			100	μA
		V _R = 600 V	T _{VJ} = 150°C			0.5	mA
V _F	forward voltage drop	I _F = 15 A	T _{VJ} = 25°C			2.03	V
		I _F = 30 A				2.24	V
		I _F = 15 A	T _{VJ} = 150°C			1.34	V
		I _F = 30 A				1.57	V
I _{FAV}	average forward current	T _C = 140°C rectangular d = 0.5	T _{VJ} = 175°C			15	A
V _{F0}	threshold voltage	} for power loss calculation only				0.99	V
r _F	slope resistance					14.3	mΩ
R _{thJC}	thermal resistance junction to case					1.6	K/W
R _{thCH}	thermal resistance case to heatsink				0.25		K/W
P _{tot}	total power dissipation	T _C = 25°C				95	W
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V	T _{VJ} = 45°C			110	A
C _J	junction capacitance	V _R = 400 V f = 1 MHz	T _{VJ} = 25°C		12		pF
I _{RM}	max. reverse recovery current	I _F = 15 A; V _R = 300 V -di _F /dt = 200 A/μs	T _{VJ} = 25°C		5		A
			T _{VJ} = 100°C		7		A
t _{rr}	reverse recovery time		T _{VJ} = 25°C		35		ns
			T _{VJ} = 100°C		95		ns
E _{AS}	non-repetitive avalanche energy	I _{AS} = 1 A L = 180 μH	T _{VJ} = 25°C			0.1	mJ
I _{AR}	repetitive avalanche current	V _A = 1.5·V _R typ.: f = 10 kHz				0.1	A

Package TO-247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			50	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				6		g
M_D	mounting torque		0.8		1.2	Nm
F_C	mounting force with clip		20		120	N

Product Marking



Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEC30-06A	DSEC30-06A	Tube	30	473502

Similar Part	Package	Voltage class
DSEC30-06B	TO-247AD (3)	600
DSEC29-06AC	ISOPLUS220AB (3)	600

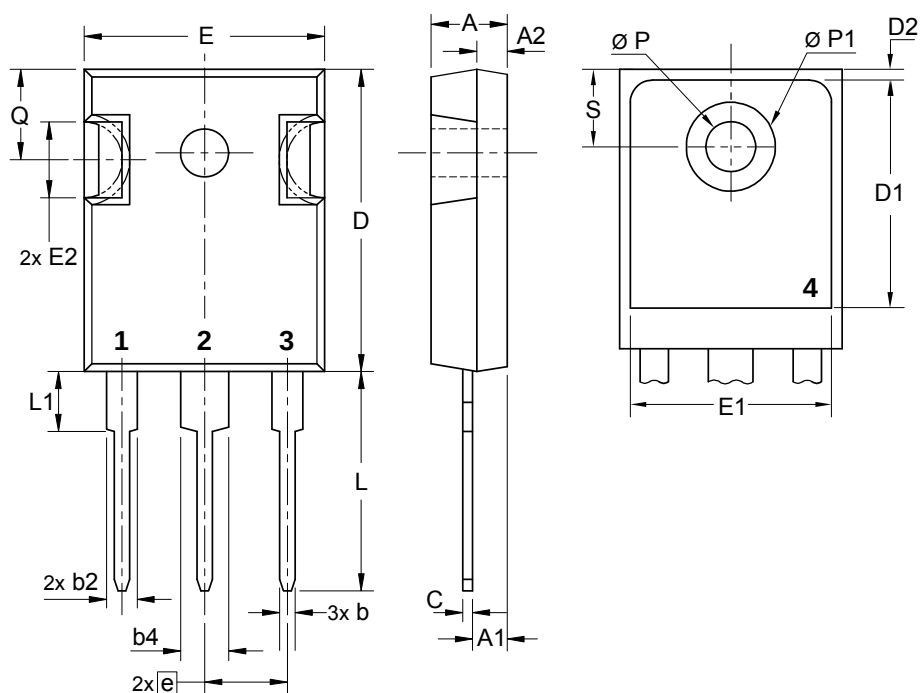
Equivalent Circuits for Simulation

* on die level

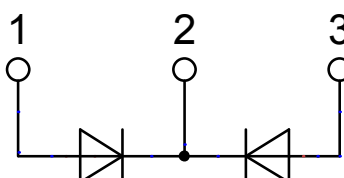
$T_{VJ} = 175^{\circ}\text{C}$

$I \rightarrow$	V_0	R_0	Fast Diode	
$V_{0\max}$	threshold voltage	0.99		V
$R_{0\max}$	slope resistance *	11.7		mΩ

Outlines TO-247



Sym.	Inches		Millimeter	
	min.	max.	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	0.215	BSC	5.46	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



Fast Diode

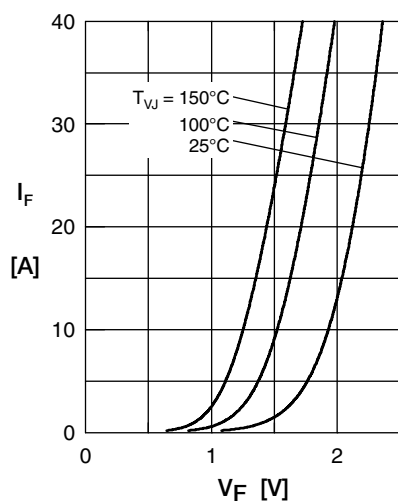


Fig. 1 Forward current I_F versus V_F

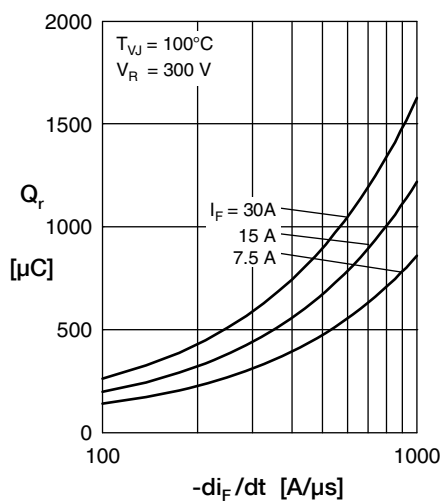


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

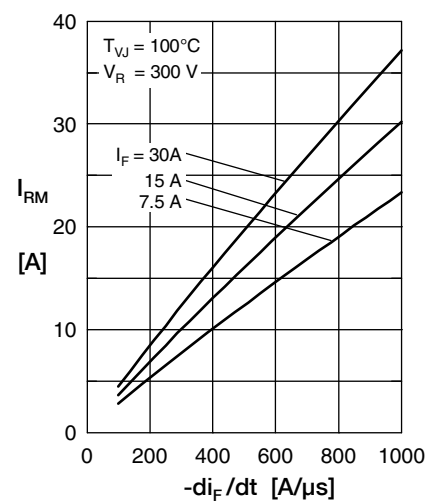


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

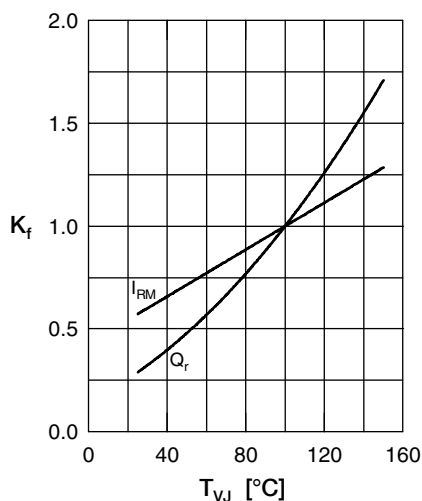


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

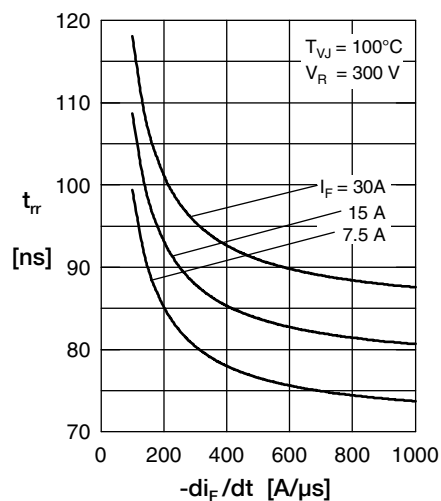


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

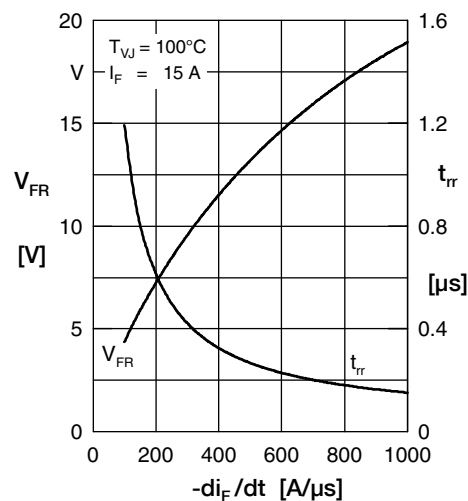


Fig. 6 Typ. peak forward voltage V_{FR} and t_{rr} versus di_F/dt

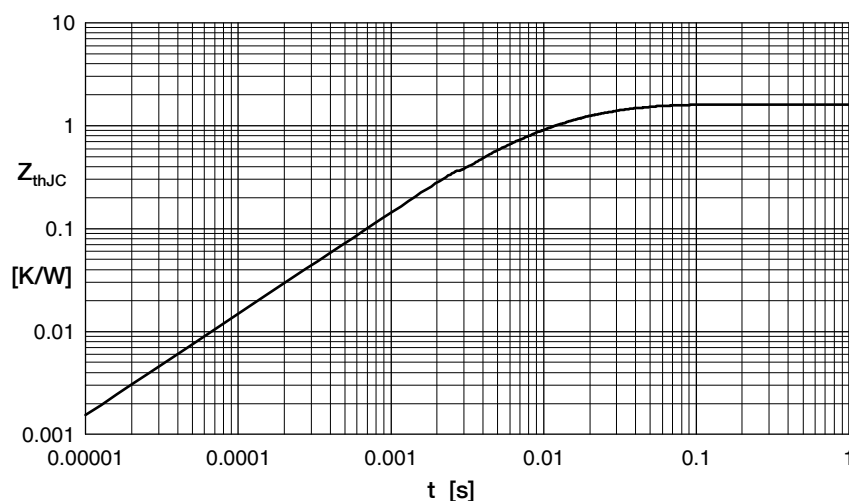


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.908	0.0052
2	0.350	0.0003
3	0.342	0.017