

HiPerFRED

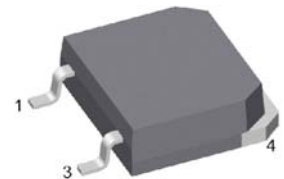
$$\begin{aligned} V_{RRM} &= 1200 \text{ V} \\ I_{FAV} &= 90 \text{ A} \\ t_{rr} &= 40 \text{ ns} \end{aligned}$$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Single Diode

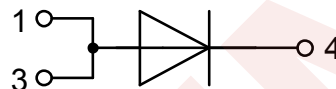
Part number

DSEP90-12AZ

Marking on Product: DSEP90-12AZ



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-268AA (D3Pak-HV)

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

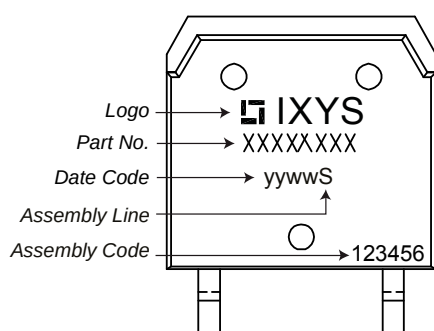
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Fast Diode				Ratings					
Symbol	Definition	Conditions		min.	typ.	max.	Unit		
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V		
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V		
I _R	reverse current, drain current	V _R = 1200 V	T _{VJ} = 25°C			1	mA		
		V _R = 1200 V	T _{VJ} = 150°C			4	mA		
V _F	forward voltage drop	I _F = 90 A	T _{VJ} = 25°C			2,69	V		
		I _F = 180 A				3,27	V		
		I _F = 90 A	T _{VJ} = 150°C			1,79	V		
		I _F = 180 A				2,37	V		
I _{FAV}	average forward current	T _C = 105°C rectangular d = 0.5	T _{VJ} = 175°C			90	A		
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 175°C		1,05	V		
r _F	slope resistance					6,2	mΩ		
R _{thJC}	thermal resistance junction to case					0,35	K/W		
R _{thCH}	thermal resistance case to heatsink				0,15		K/W		
P _{tot}	total power dissipation	T _C = 25°C				430	W		
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		800	A		
C _J	junction capacitance	V _R = 600 V f = 1 MHz		T _{VJ} = 25°C	48		pF		
I _{RM}	max. reverse recovery current	} I _F = 60 A; V _R = 600 V -di _F /dt = 200 A/μs		T _{VJ} = 25°C	13		A		
				T _{VJ} = 100°C	20		A		
t _{rr}	reverse recovery time			T _{VJ} = 25°C	85		ns		
				T _{VJ} = 100°C	250		ns		

Package TO-268AA (D3Pak-HV)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			70	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				4		g
F_c	mounting force with clip		20		120	N
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	9,4			mm
$d_{Spb/Apb}$		terminal to backside	5,6			mm

Product Marking



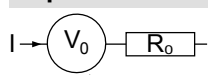
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP90-12AZ-TUB	DSEP90-12AZ	Tube	30	521355

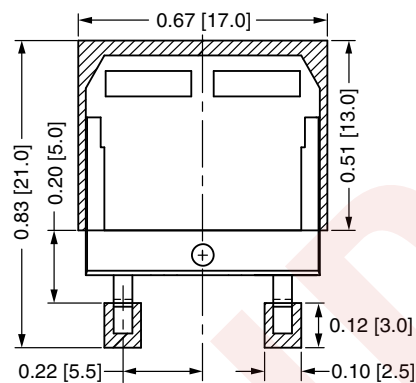
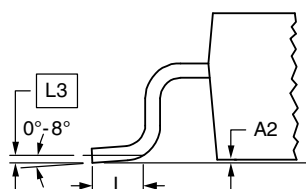
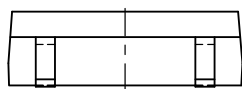
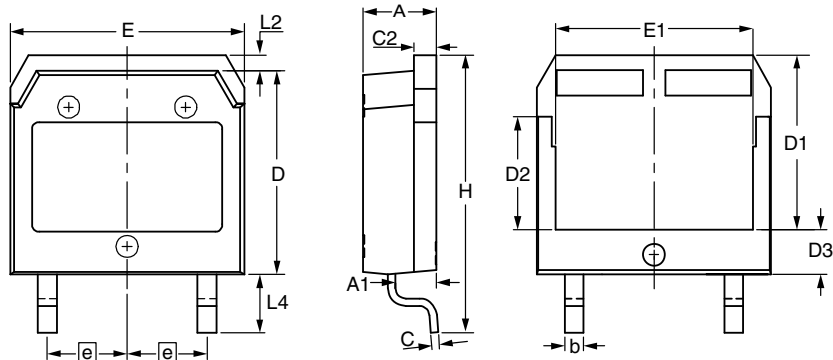
Similar Part	Package	Voltage class
DSEP60-12AZ	TO-268AA (D3Pak) (2HV)	1200
DSEI120-12AZ	TO-268AA (D3Pak) (2HV)	1200

Equivalent Circuits for Simulation

* on die level

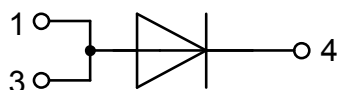
$T_{VJ} = 175^{\circ}\text{C}$

		Fast Diode	
$V_{0 \max}$	threshold voltage	1,05	V
$R_{0 \max}$	slope resistance *	6,8	mΩ

Outlines TO-268AA (D3Pak-HV)


RECOMMENDED MINIMUM FOOT PRINT

Dim.	Millimeter		Inches	
	min	max	min	max
A	4.90	5.10	0.193	0.201
A1	2.70	2.90	0.106	0.114
A2	0.02	0.25	0.001	0.010
b	1.15	1.45	0.045	0.057
C	0.40	0.65	0.016	0.026
C2	1.45	1.60	0.057	0.063
D	13.80	14.00	0.543	0.551
D1	11.80	12.10	0.465	0.476
D2	7.50	7.80	0.295	0.307
D3	2.90	3.20	0.114	0.126
E	15.85	16.05	0.624	0.632
E1	13.30	13.60	0.524	0.535
e	5.450 BSC		0.215 BSC	
H	18.70	19.10	0.736	0.752
L	1.70	2.00	0.067	0.079
L2	1.00	1.15	0.039	0.045
L3	0.250 BSC		0.010 BSC	
L4	3.80	4.10	0.150	0.161



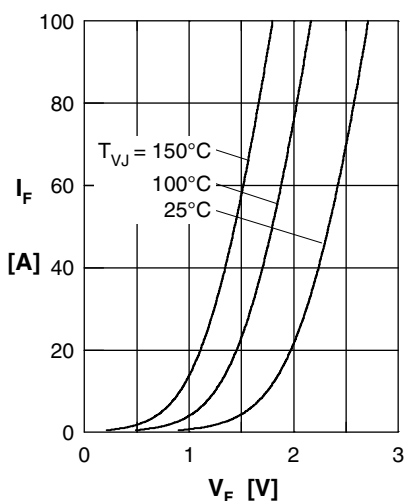
Fast Diode


Fig. 1 Forward current I_F versus V_F

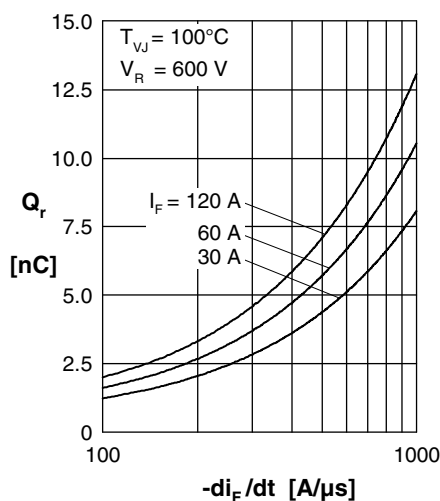


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

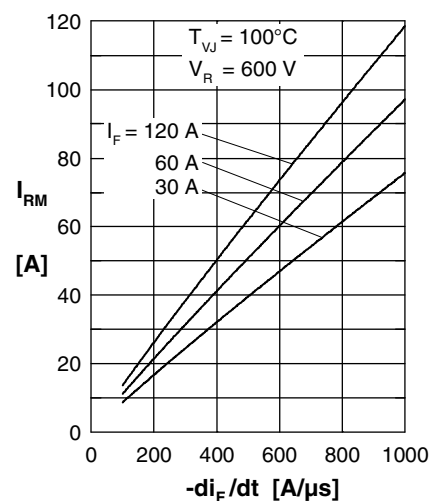


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

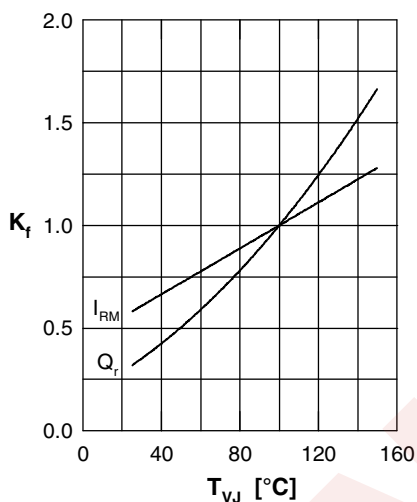


Fig. 4 Typ. dynamic parameters Q_r , I_{RM} versus T_{VJ}

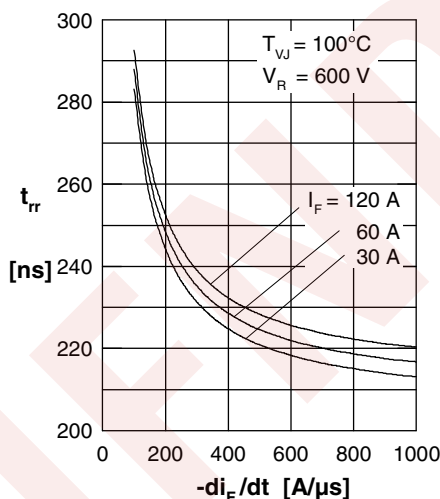


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

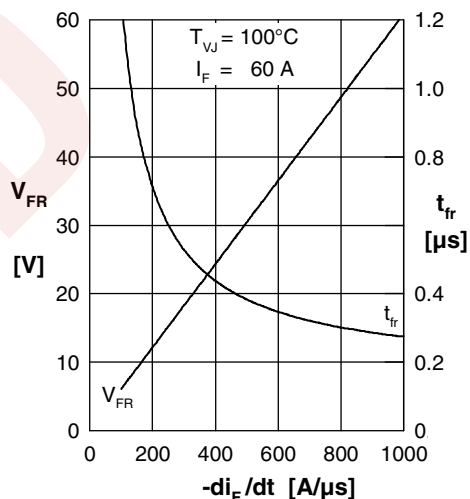


Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

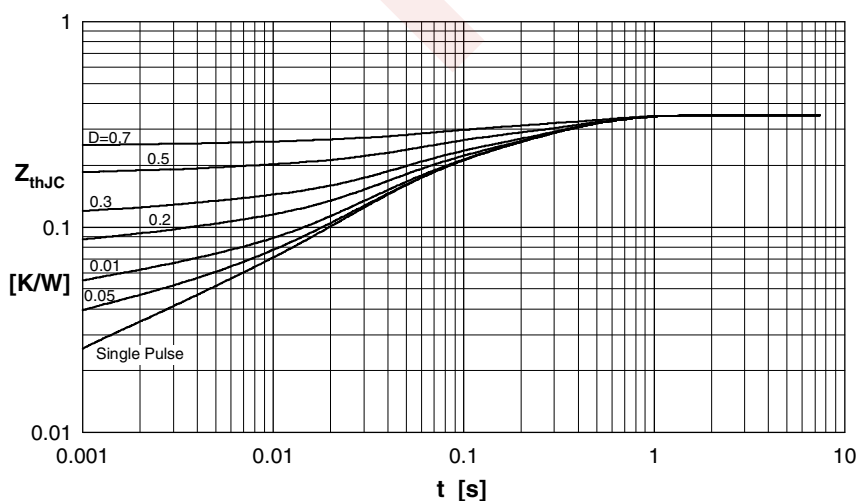


Fig. 7 Transient thermal resistance junction to case

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