



HiPerFRED

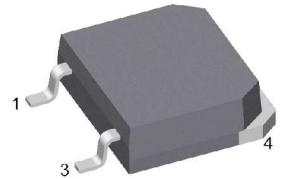
$V_{RRM} = 1200\text{ V}$
 $I_{FAV} = 90\text{ A}$
 $t_{rr} = 40\text{ ns}$

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

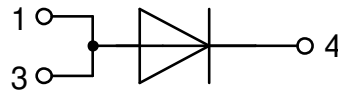
Part number

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

Disclaimer Notice

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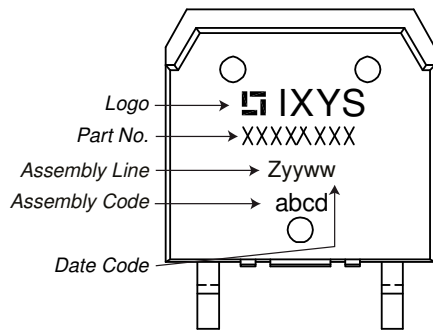


Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
I_R	reverse current, drain current	$V_R = 1200 V$	$T_{VJ} = 25^{\circ}C$		1	mA	
		$V_R = 1200 V$	$T_{VJ} = 150^{\circ}C$		4	mA	
V_F	forward voltage drop	$I_F = 90 A$	$T_{VJ} = 25^{\circ}C$		2.69	V	
		$I_F = 180 A$			3.27	V	
		$I_F = 90 A$	$T_{VJ} = 150^{\circ}C$		1.79	V	
		$I_F = 180 A$			2.37	V	
I_{FAV}	average forward current	$T_C = 105^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}C$		90	A	
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		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		$T_C = 25^{\circ}C$		430	W	
I_{FSM}	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		800	A	
C_J	junction capacitance	$V_R = 600 V$ $f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		48	pF	
I_{RM}	max. reverse recovery current	} $I_F = 60 A; V_R = 600 V$ $-di_F / dt = 200 A/\mu s$	$T_{VJ} = 25^{\circ}C$		13	A	
			$T_{VJ} = 100^{\circ}C$		20	A	
t_{rr}	reverse recovery time		$T_{VJ} = 25^{\circ}C$		85	ns	
			$T_{VJ} = 100^{\circ}C$		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

$T_{VJ} = 175\text{ °C}$

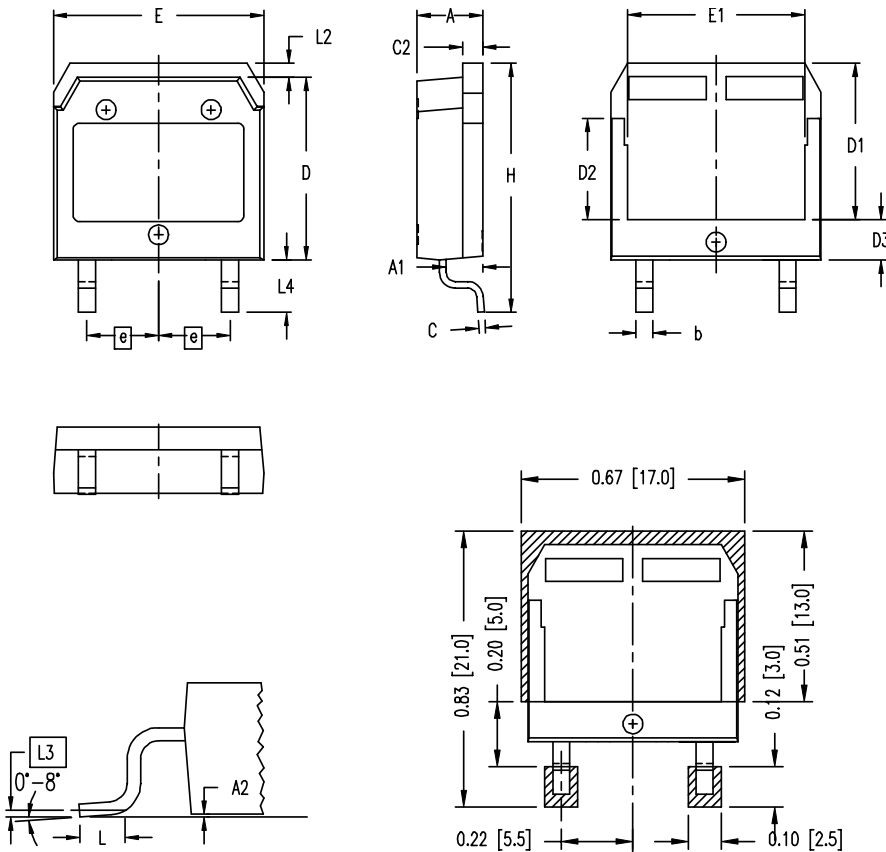


Fast Diode

$V_{0\ max}$	threshold voltage	1.05	V
$R_{0\ max}$	slope resistance *	6.8	mΩ



Outlines TO-268AA (D3Pak-HV)



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

RECOMMENDED MINIMUM FOOT PRINT



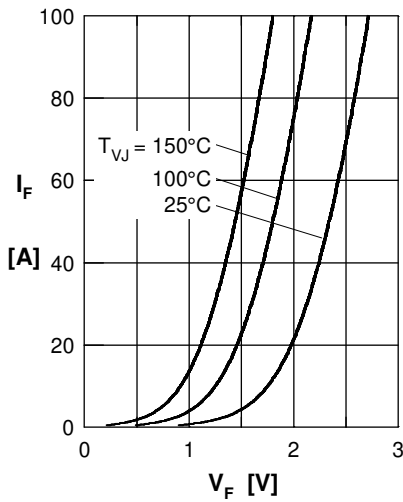
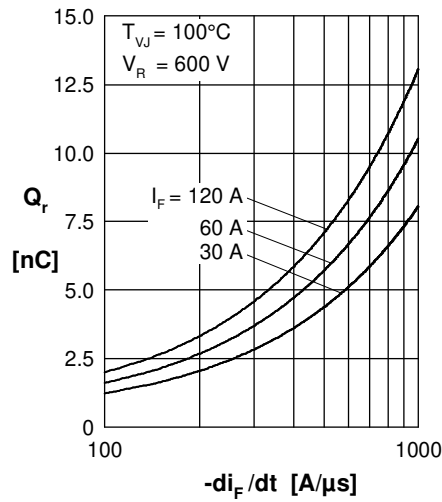
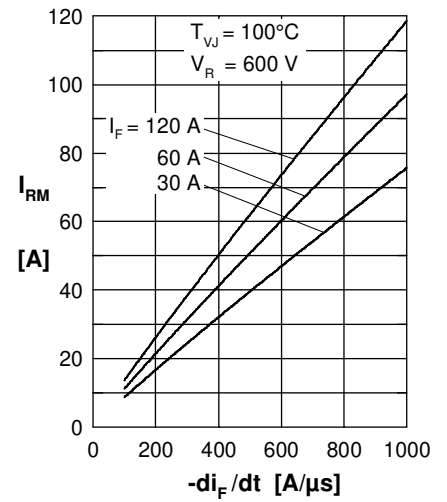
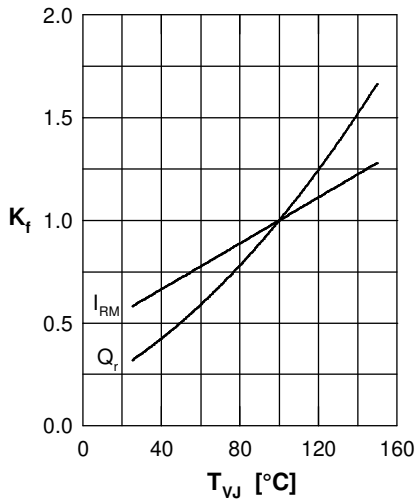
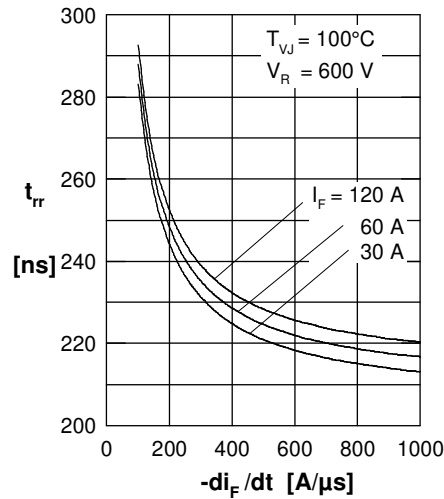
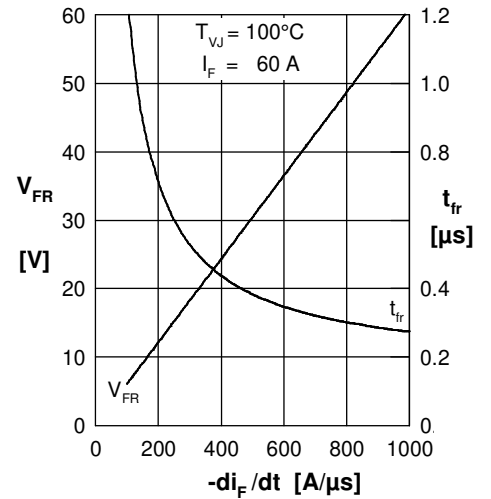
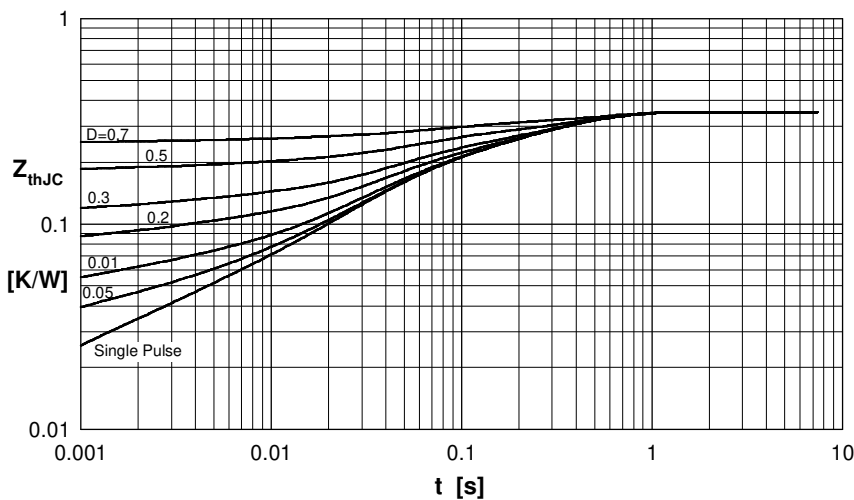
Fast Diode

 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_{tr} versus $-di_F/dt$

 Fig. 6 Typ. peak forward voltage V_{FR} and t_{tr} 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