

FRED

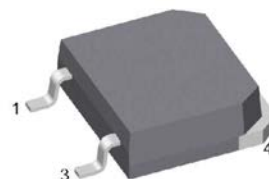
$$\begin{aligned} V_{RRM} &= 1200\text{ V} \\ I_{FAV} &= 109\text{ A} \\ t_{rr} &= 40\text{ ns} \end{aligned}$$

Fast Recovery Epitaxial Diode Single Diode

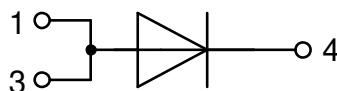
Part number

DSEI120-12AZ

Marking on Product: DSEI120-12AZ



Backside: cathode



Features / Advantages:

- Planar passivated chips
- 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

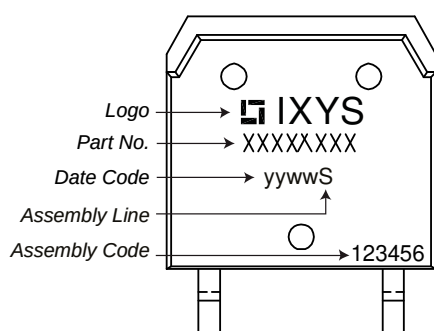
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Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
I_R	reverse current, drain current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			300	μA
		$V_R = 960\text{ V}$	$T_{VJ} = 125^{\circ}\text{C}$			20	mA
V_F	forward voltage drop	$I_F = 70\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1,80	V
		$I_F = 140\text{ A}$					V
		$I_F = 70\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$			1,55	V
		$I_F = 140\text{ A}$					V
I_{FAV}	average forward current	$T_C = 60^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$			109	A
V_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		1,20	V
r_F	slope resistance					4,6	m Ω
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	$T_C = 25^{\circ}\text{C}$				357	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^{\circ}\text{C}$			600	A
C_J	junction capacitance	$V_R = 600\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		56		pF
I_{RM}	max. reverse recovery current	$I_F = 75\text{ A}; V_R = 350\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^{\circ}\text{C}$		tbd	A
				$T_{VJ} = 100^{\circ}\text{C}$		25	A
t_{rr}	reverse recovery time			$T_{VJ} = 25^{\circ}\text{C}$		40	ns
				$T_{VJ} = 100^{\circ}\text{C}$		tbd	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		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		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



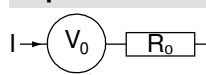
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEI120-12AZ-TUB	DSEI120-12AZ	Tube	30	520332

Similar Part	Package	Voltage class
DSEP90-12AZ	TO-268AA (D3Pak) (2HV)	1200
DSEP60-12AZ	TO-268AA (D3Pak) (2HV)	1200

Equivalent Circuits for Simulation

* on die level

$T_{VJ} = 150^{\circ}\text{C}$



Fast Diode

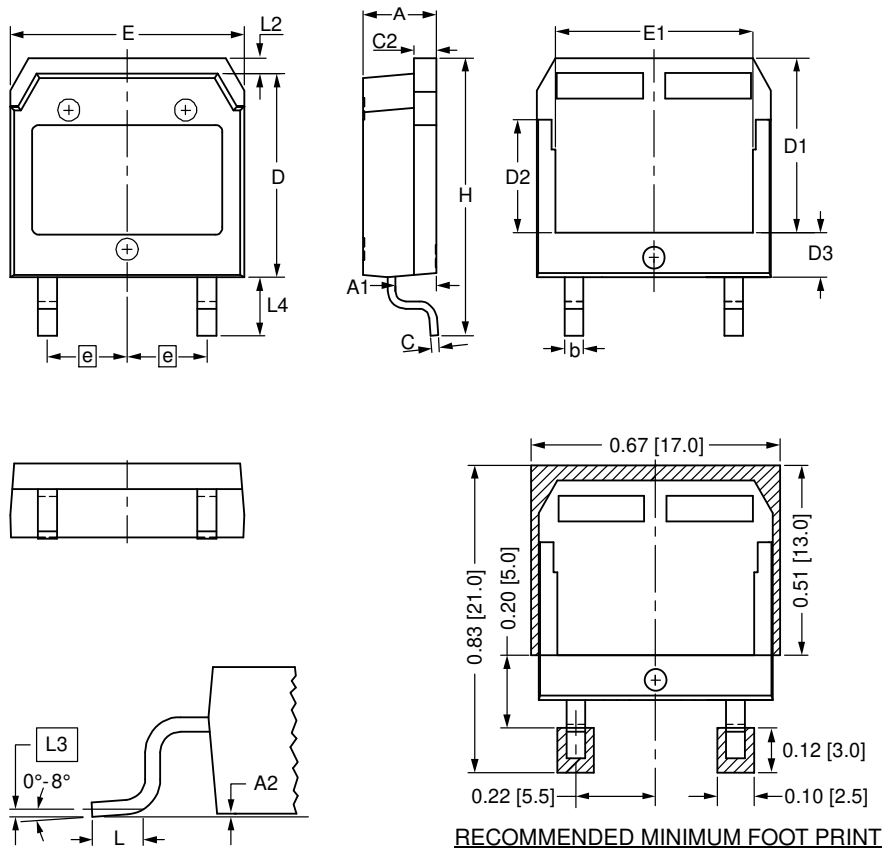
$V_{0 \max}$ threshold voltage

1,2

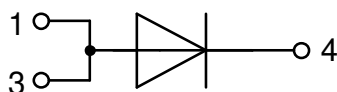
V

$R_{0 \max}$ slope resistance *

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



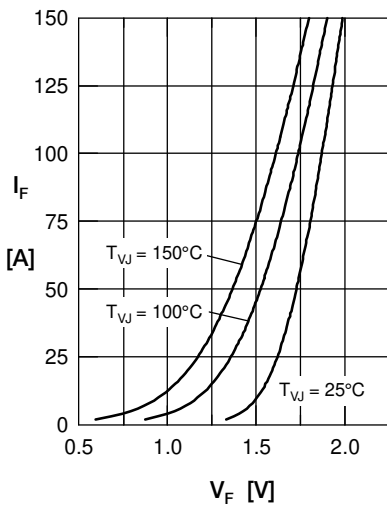
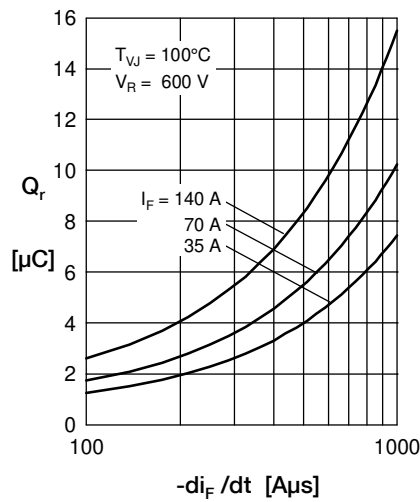
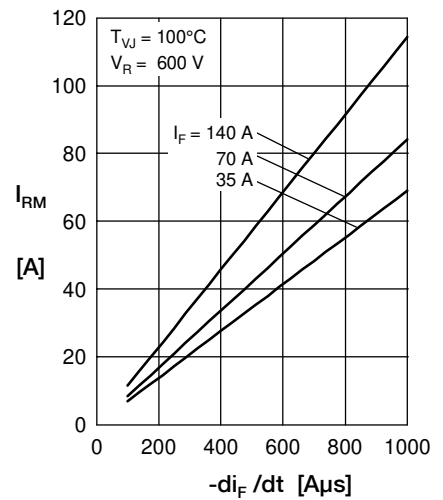
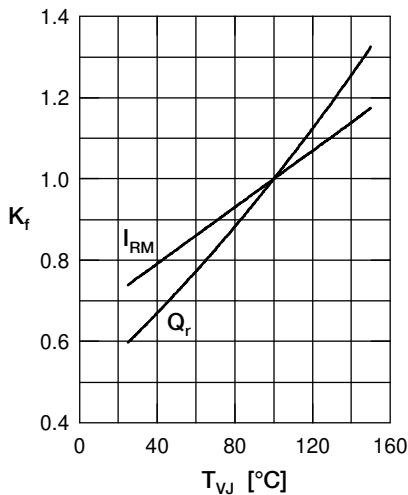
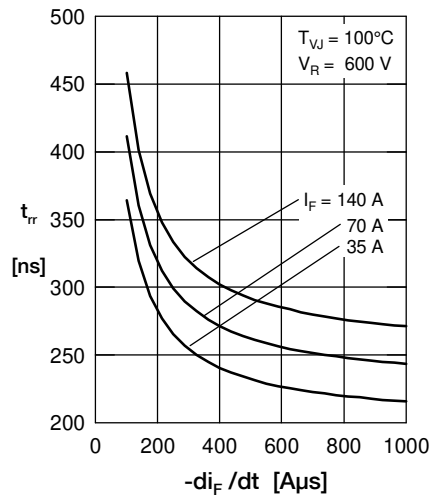
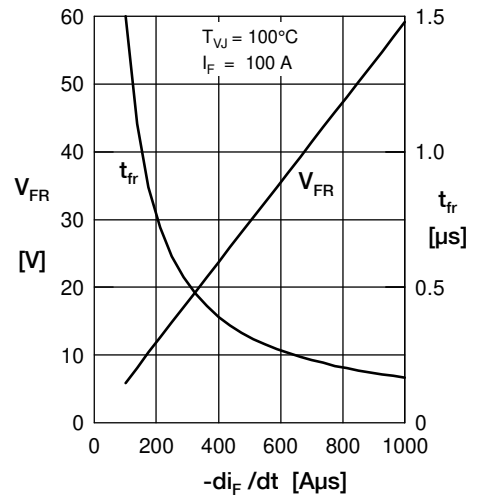
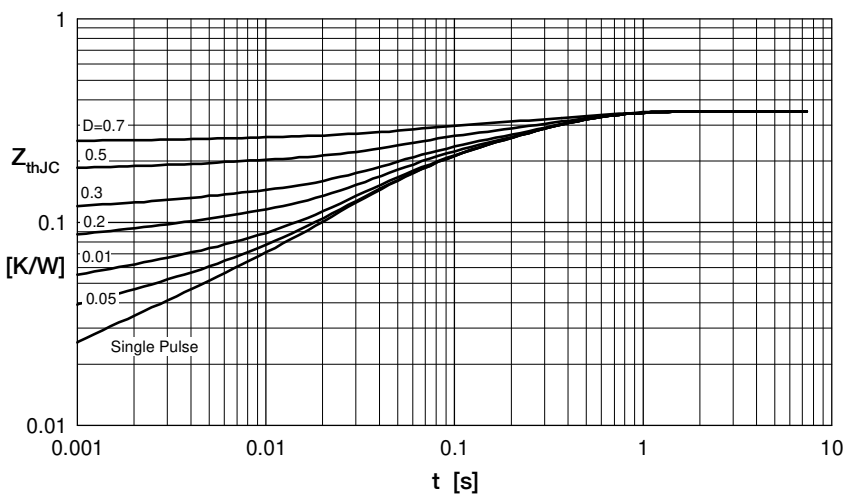
Fast Diode

 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