

# FRED

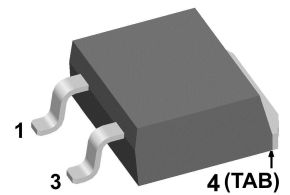
$V_{RRM} = 1200\text{ V}$   
 $I_{FAV} = 12\text{ A}$   
 $t_{rr} = 50\text{ ns}$

## Fast Recovery Epitaxial Diode Single Diode

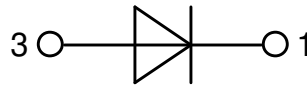
### Part number

**DSEI12-12AZ**

Marking on Product: DSEI12-12AZ



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-263 (D2Pak-HV)

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

### Disclaimer Notice

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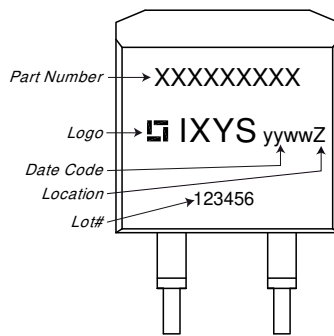


Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					1200	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1200	V
$I_R$	reverse current, drain current	$V_R = 1200\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		250	$\mu\text{A}$
		$V_R = 960\text{ V}$		$T_{VJ} = 125^\circ\text{C}$		4	mA
$V_F$	forward voltage drop	$I_F = 12\text{ A}$		$T_{VJ} = 25^\circ\text{C}$		2,58	V
		$I_F = 24\text{ A}$				2,94	V
		$I_F = 12\text{ A}$		$T_{VJ} = 150^\circ\text{C}$		2,23	V
		$I_F = 24\text{ A}$				2,72	V
$I_{FAV}$	average forward current	$T_C = 100^\circ\text{C}$ rectangular	$d = 0.5$	$T_{VJ} = 150^\circ\text{C}$		12	A
$V_{FO}$	threshold voltage	} for power loss calculation only				1,77	V
$r_F$	slope resistance					38	m $\Omega$
$R_{thJC}$	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			$T_C = 25^\circ\text{C}$		78	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		75	A
$C_J$	junction capacitance	$V_R = 600\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		6	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 11\text{ A}; V_R = 540\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		4	A
				$T_{VJ} = 100^\circ\text{C}$		6	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 100\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		150	ns
				$T_{VJ} = 100^\circ\text{C}$		300	ns



Package TO-263 (D2Pak-HV)		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			25	A
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		150	°C
<b>Weight</b>				1,5		g
$F_C$	mounting force with clip		20		60	N
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	4,2			mm
$d_{Spb/Apb}$		terminal to backside	4,7			mm

**Product Marking**



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEI12-12AZ-TRL	DSEI12-12AZ	Tape & Reel	800	515338
Alternative	DSEI12-12AZ-TUB	DSEI12-12AZ	Tube	50	525375

**Equivalent Circuits for Simulation**

\* on die level

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

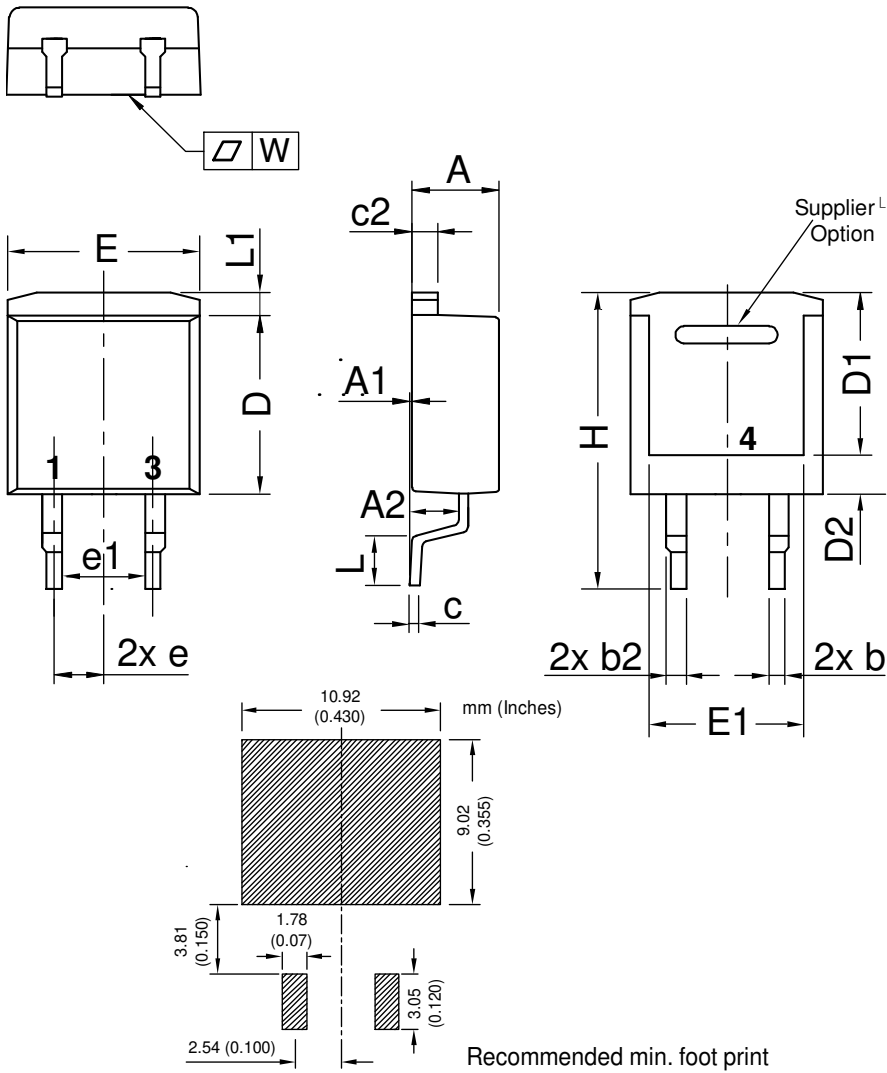


**Fast Diode**

$V_{0\ max}$	threshold voltage	1,77	V
$R_{0\ max}$	slope resistance *	35	mΩ

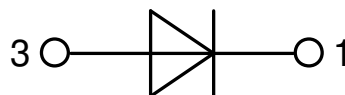


**Outlines TO-263 (D2Pak-HV)**



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.06	4.83	0.160	0.190
A1	typ. 0.10		typ. 0.004	
A2	2.41		0.095	
b	0.51	0.99	0.020	0.039
b2	1.14	1.40	0.045	0.055
c	0.40	0.74	0.016	0.029
c2	1.14	1.40	0.045	0.055
D	8.38	9.40	0.330	0.370
D1	8.00	8.89	0.315	0.350
D2	2.3		0.091	
E	9.65	10.41	0.380	0.410
E1	6.22	8.50	0.245	0.335
e	2,54 BSC		0,100 BSC	
e1	4.28		0.169	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	1.02	1.68	0.040	0.066
W	typ. 0.02	0.040	typ. 0.0008	0.002

*All dimensions conform with and/or within JEDEC standard.*





**Fast Diode**

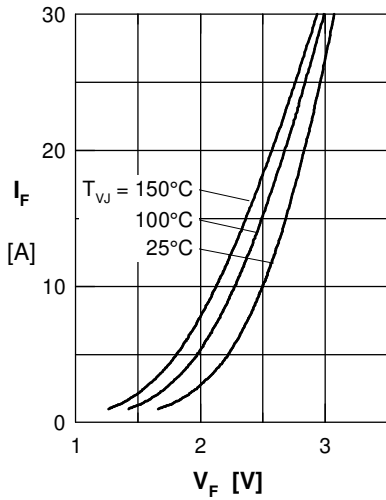


Fig. 1 Forward current  $I_F$  versus max. forward voltage drop  $V_F$

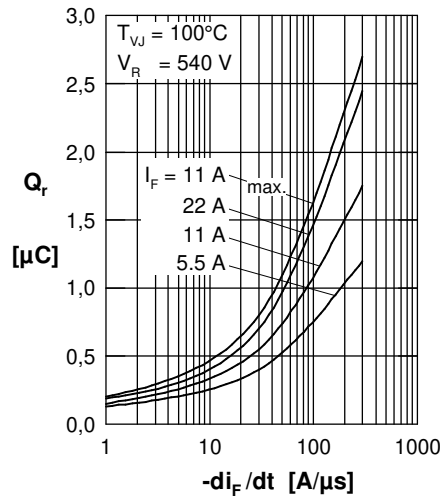


Fig. 2 Typ. reverse recov. charge  $Q_r$  versus  $-di_F/dt$

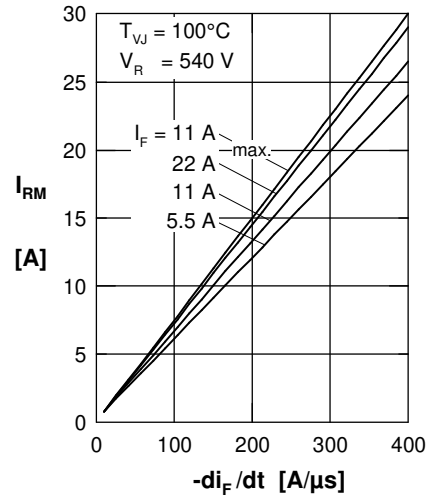


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

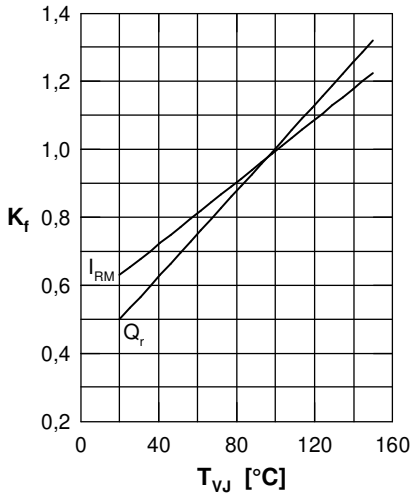


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

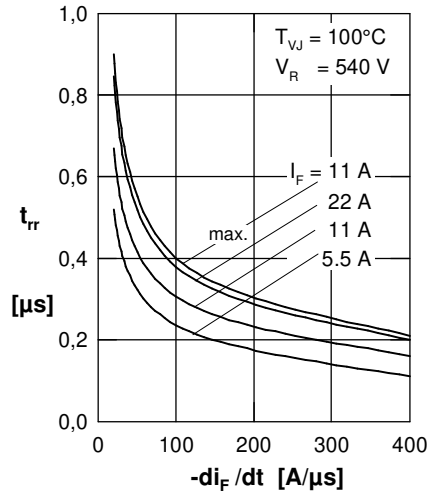


Fig. 5 Typ. recovery time  $t_{tr}$  versus  $-di_F/dt$

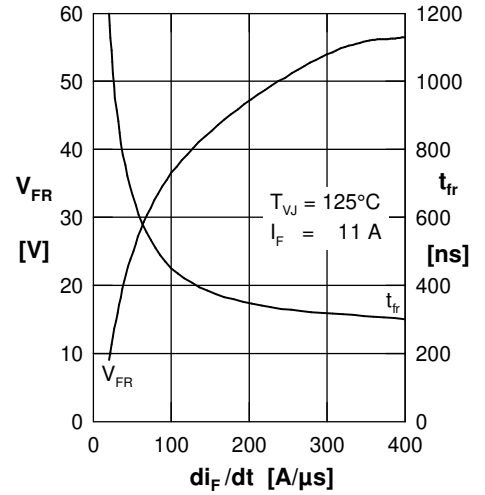


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

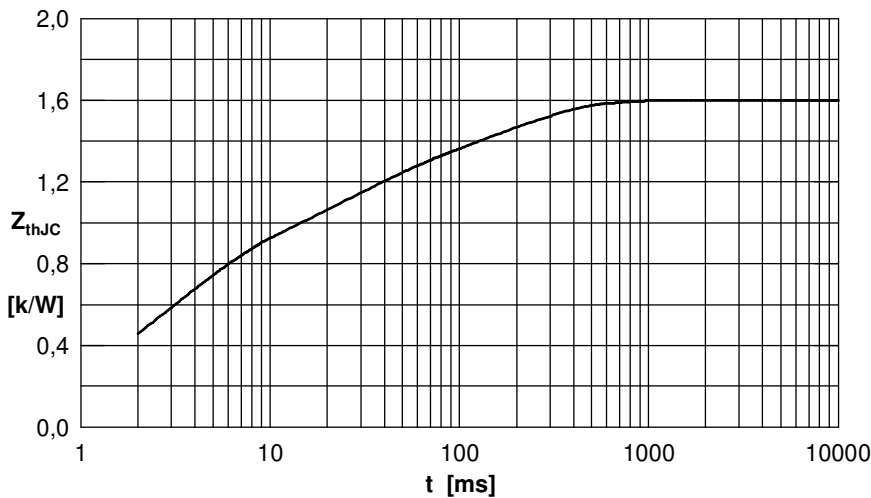


Fig. 7 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.200	0.0018
2	0.220	0.0100
3	0.080	0.5000
4	0.300	0.0900
5	0.680	0.0300