

FRED

$$V_{RRM} = 1200 \text{ V}$$

$$I_{FAV} = 20 \text{ A}$$

$$t_{rr} = 50 \text{ ns}$$

Fast Recovery Epitaxial Diode Single Diode

Part number

DSEI20-12A



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-220

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

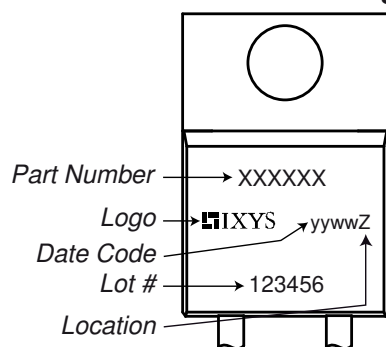
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Fast Diode				Ratings				
Symbol	Definition	Conditions		min.	typ.	max.	Unit	
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V	
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V	
I _R	reverse current, drain current	V _R = 1200 V	T _{VJ} = 25°C			750	μA	
		V _R = 960 V	T _{VJ} = 125°C			7	mA	
V _F	forward voltage drop	I _F = 20 A	T _{VJ} = 25°C			2.38	V	
		I _F = 40 A				2.72	V	
		I _F = 20 A	T _{VJ} = 150°C			1.99	V	
		I _F = 40 A				2.43	V	
I _{FAV}	average forward current	T _C = 110°C rectangular d = 0.5	T _{VJ} = 150°C			20	A	
V _{F0}	threshold voltage	} for power loss calculation only		T _{VJ} = 150°C		1.69	V	
r _F	slope resistance					20.2	mΩ	
R _{thJC}	thermal resistance junction to case					0.8	K/W	
R _{thCH}	thermal resistance case to heatsink				0.50		K/W	
P _{tot}	total power dissipation	T _C = 25°C				155	W	
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V		T _{VJ} = 45°C		200	A	
C _J	junction capacitance	V _R = 600 V f = 1 MHz		T _{VJ} = 25°C	14		pF	
I _{RM}	max. reverse recovery current	} I _F = 15 A; V _R = 540 V -di _F /dt = 200 A/μs		T _{VJ} = 25 °C	8		A	
				T _{VJ} = 100 °C	12		A	
t _{rr}	reverse recovery time			T _{VJ} = 25 °C	125		ns	
				T _{VJ} = 100 °C	250		ns	

Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{VJ}	virtual junction temperature		-40		150	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		150	°C
Weight				2		g
M_D	mounting torque		0.4		0.6	Nm
F_C	mounting force with clip		20		60	N

Product Marking



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEI20-12A	DSEI20-12A	Tube	50	463191

Equivalent Circuits for Simulation

* on die level

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

			Fast Diode	
$V_{0\max}$	threshold voltage	1.69		V
$R_{0\max}$	slope resistance *	17		mΩ

Outlines TO-220


Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
C	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
e	5.08	BSC	0.200	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
ØP	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



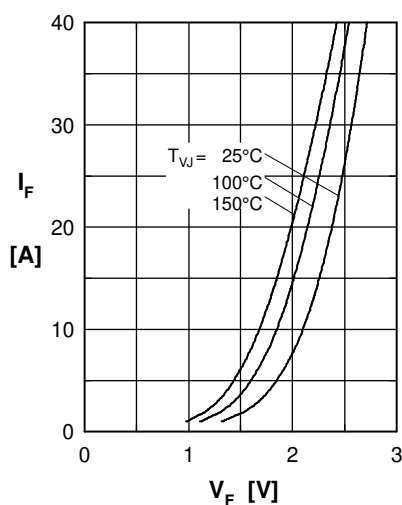
Fast Diode


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

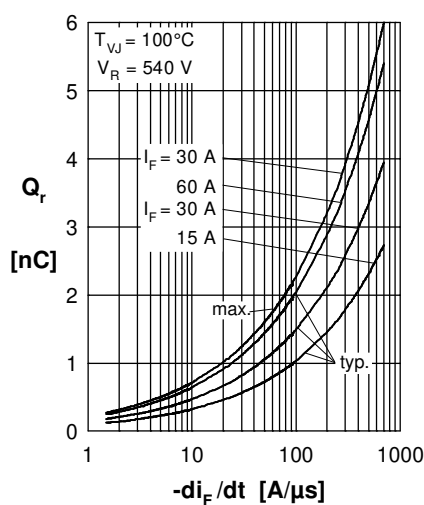


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

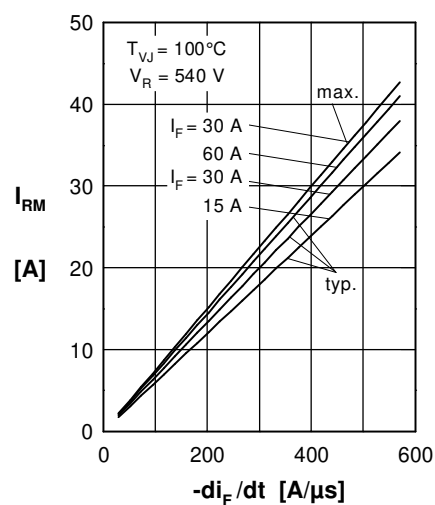


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

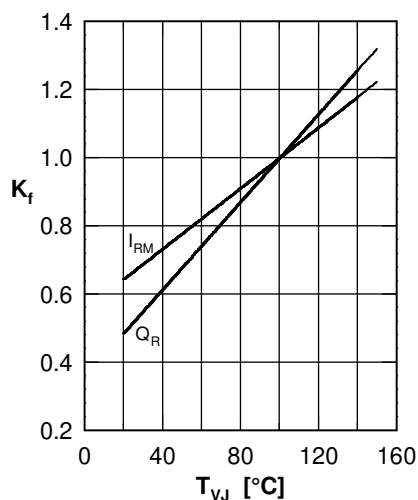


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

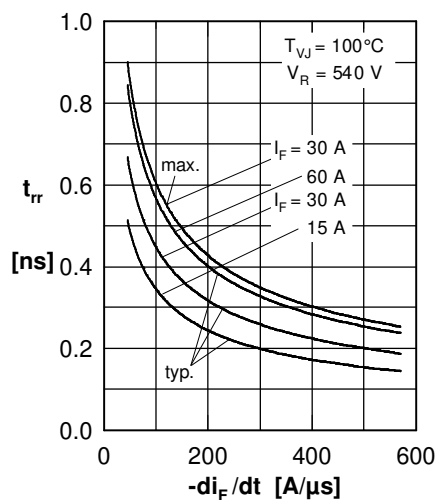


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

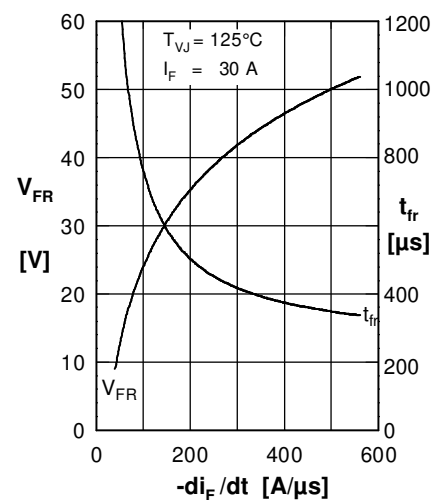


Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

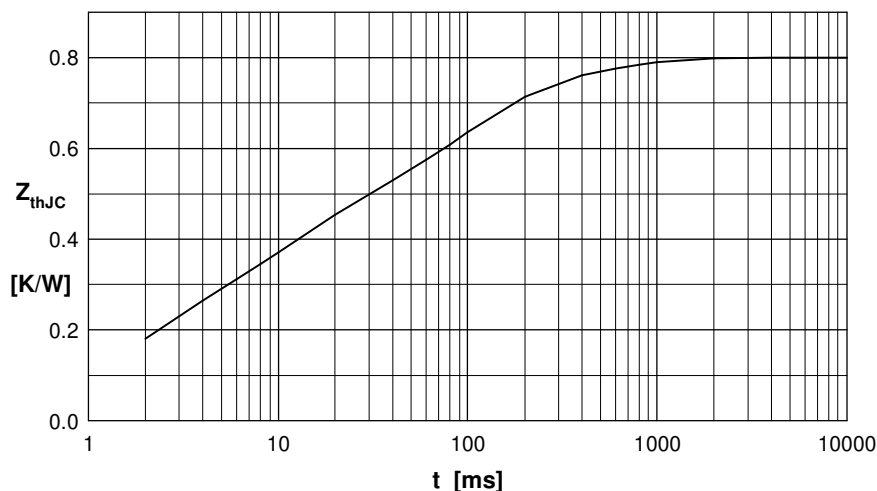


Fig. 7 Transient thermal impedance junction to case

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