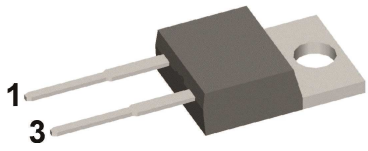
FRED

V_{RRM}	=	1000 V
I_{FAV}	=	12 A
t_{rr}	=	45 ns

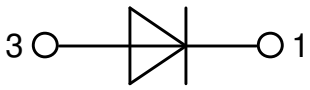
Fast Recovery Epitaxial Diode
Single Diode

Part number

DSEI12-10A



Backside: cathode



Features / Advantages:

- Planar passivated chips
- Low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm 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

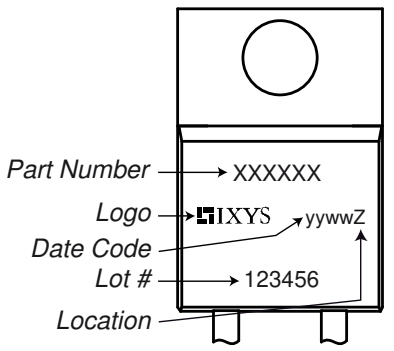
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

Fast Diode

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1000	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1000	V
I_R	*reverse current, drain current*	V_R = 1000 V	T_{VJ} = 25°C			250	µA
		V_R = 800 V	T_{VJ} = 125°C			4	mA
V_F	*forward voltage drop*	I_F = 12 A	T_{VJ} = 25°C			2.68	V
		I_F = 24 A				3.02	V
		I_F = 12 A	T_{VJ} = 150°C			2.12	V
		I_F = 24 A				2.57	V
I_{FAV}	*average forward current*	T_C = 100°C	T_{VJ} = 150°C			12	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			1.72	V
r_F	*slope resistance* }					34	mΩ
R_{thJC}	*thermal resistance junction to case*					1.6	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.50		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			78	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			75	A
C_J	*junction capacitance*	V_R = 500 V f = 1 MHz	T_{VJ} = 25°C		8		pF
I_{RM}	*max. reverse recovery current*		T_{VJ} = 25°C		4		A
		I_F = 12 A; V_R = 540 V	T_{VJ} = 100°C		7		A
t_{rr}	*reverse recovery time*	$-di_F/dt$ = 100 A/µs	T_{VJ} = 25°C		90		ns
			T_{VJ} = 100°C		150		ns

Package TO-220			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
Weight				2		g
M_D	*mounting torque*		0.4		0.6	Nm
F_C	*mounting force with clip*		20		60	N

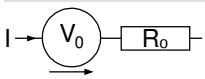
Product Marking



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEI12-10A	DSEI12-10A	Tube	50	434434

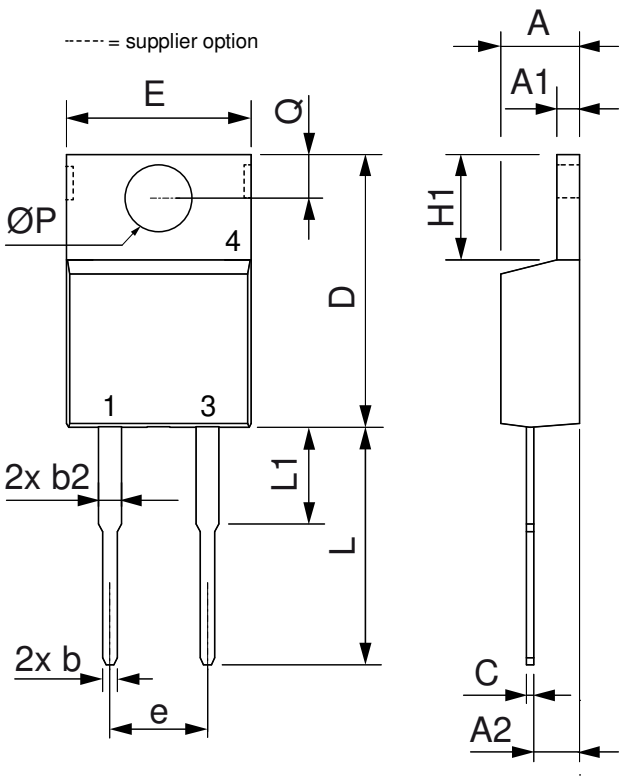
Equivalent Circuits for Simulation

** on die level* $T_{VJ} = 150°C$

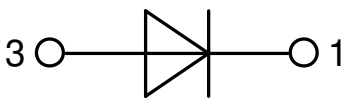


		Fast Diode	
$V_{0\,max}$	*threshold voltage*	1.72	V
$R_{0\,max}$	*slope resistance **	31	mΩ

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

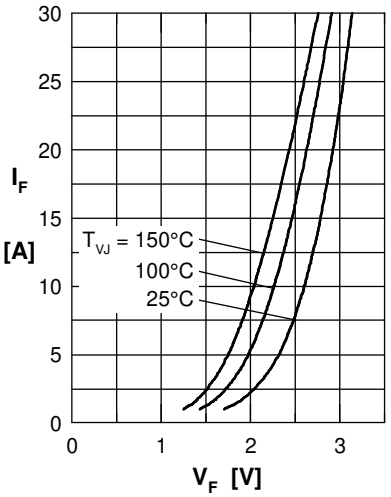


Fig. 1 Forward current I_F versus max. forward voltage drop V_F

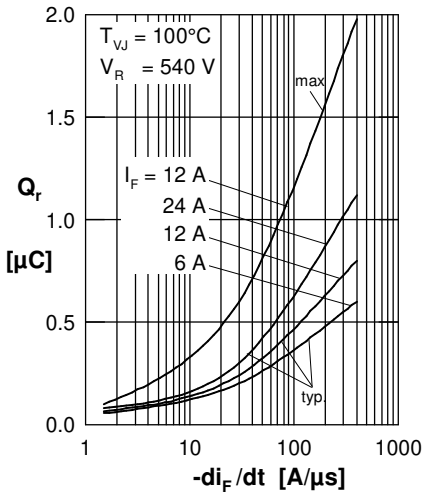


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

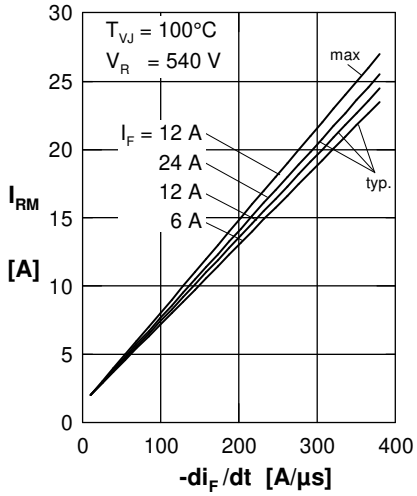


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

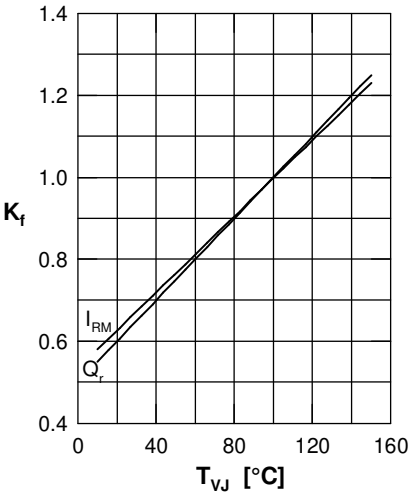


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

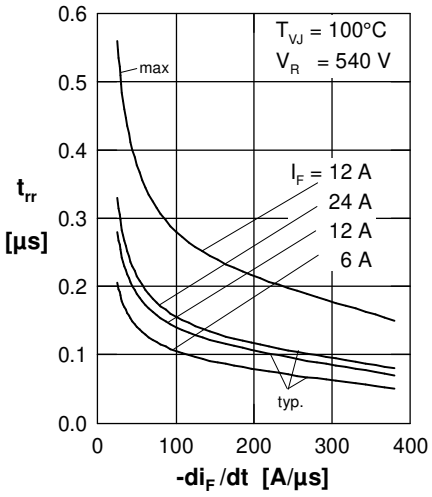


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

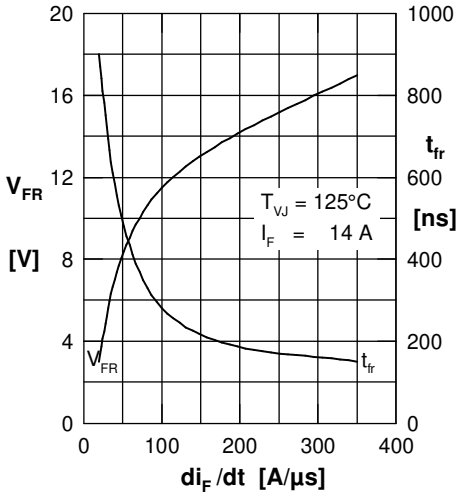


Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

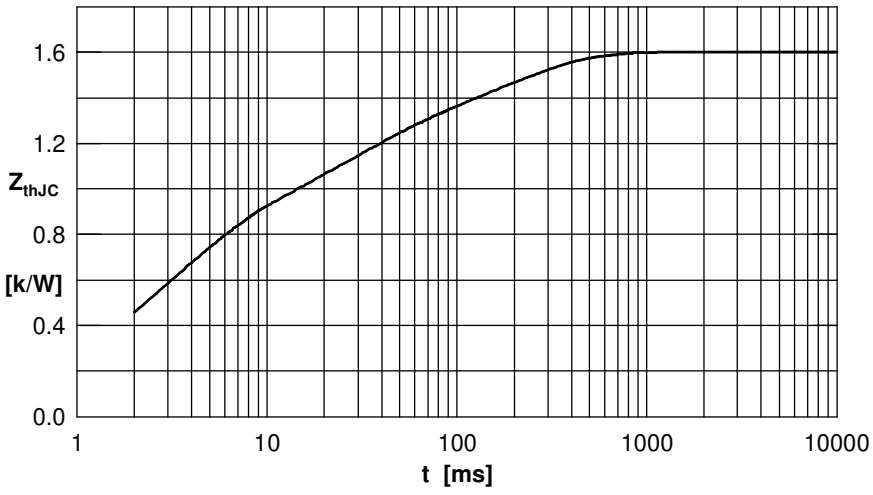


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.100	0.001
2	0.020	0.010
3	0.400	0.180
4	0.400	0.024
5	0.680	0.003