

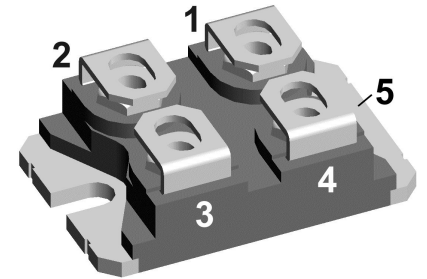
# HiPerFRED

$V_{RRM} = 400\text{ V}$   
 $I_{FAV} = 2 \times 120\text{ A}$   
 $t_{rr} = 30\text{ ns}$

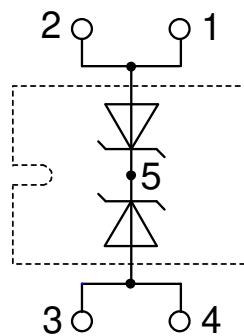
High Performance Fast Recovery Diode  
 Low Loss and Soft Recovery  
 Common Cathode

Part number

**DSEC240-04A**



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: SOT-227UI (minibloc)

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

### Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).

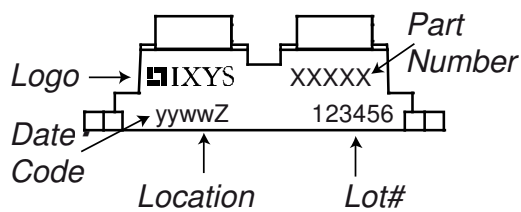


Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage				400	V	
$V_{RRM}$	max. repetitive reverse blocking voltage				400	V	
$I_R$	reverse current, drain current	$V_R = 400\text{ V}$			2	mA	
		$V_R = 400\text{ V}$			8	mA	
$V_F$	forward voltage drop	$I_F = 120\text{ A}$			1,35	V	
		$I_F = 240\text{ A}$			1,63	V	
		$I_F = 120\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1,00	V
		$I_F = 240\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1,33	V
$I_{FAV}$	average forward current	$T_C = 115^\circ\text{C}$ rectangular $d = 0.5$			120	A	
$V_{FO}$	threshold voltage	} for power loss calculation only			0,74	V	
$r_F$	slope resistance				2,8	mΩ	
$R_{thJC}$	thermal resistance junction to case				0,2	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0,1		K/W	
$P_{tot}$	total power dissipation		$T_C = 25^\circ\text{C}$		620	W	
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^\circ\text{C}$		2,00	kA	
$C_J$	junction capacitance	$V_R = 200\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		364	pF	
$I_{RM}$	max. reverse recovery current	} $I_F = 120\text{ A}; V_R = 200\text{ V}$ $-di_F/dt = 600\text{ A}/\mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$		20	A	
			$T_{VJ} = 100^\circ\text{C}$		35	A	
$t_{rr}$	reverse recovery time		$T_{VJ} = 25^\circ\text{C}$		30	ns	
			$T_{VJ} = 100^\circ\text{C}$		75	ns	



Package SOT-227UI (minibloc)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			200	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>				30		g
$M_D$	mounting torque		1,1		1,5	Nm
$M_T$	terminal torque		1,1		1,5	Nm

**Product Marking**



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEC240-04A	DSEC240-04A	Tube	10	485349

**Equivalent Circuits for Simulation**

*\* on die level*

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



**Fast Diode**

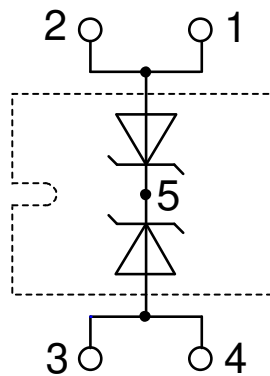
$V_{0\ max}$	threshold voltage	0,74	V
$R_{0\ max}$	slope resistance *	1,6	mΩ



**Outlines SOT-227UI (minibloc)**



Dim.	Millimeter		Inches	
	min	max	min	max
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.167
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106





**Fast Diode**

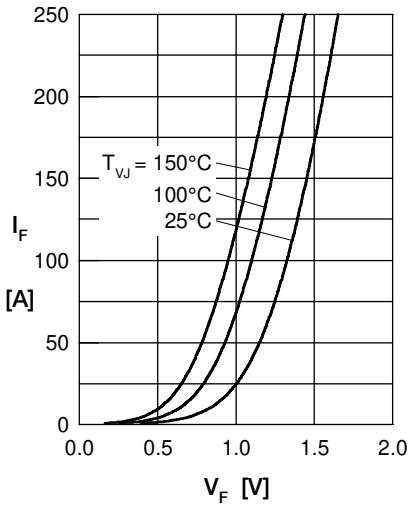


Fig. 1 Forward current  $I_F$  versus  $V_F$

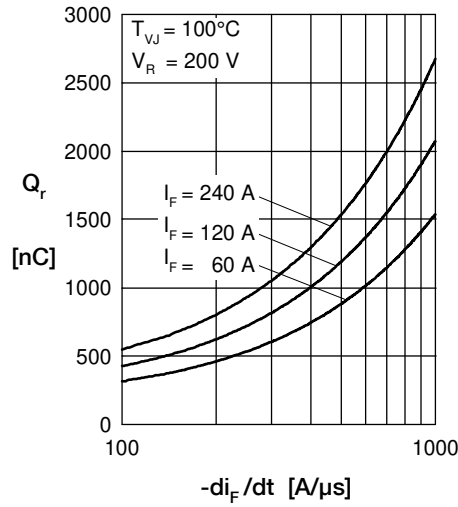


Fig. 2 Typ. reverse recov. charge  $Q_r$  versus  $-di_F/dt$

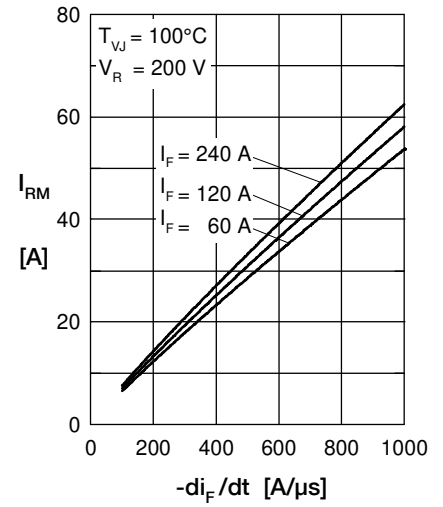


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

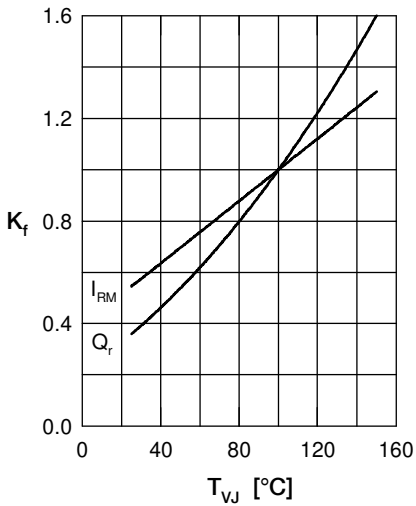


Fig. 4 Typ. dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

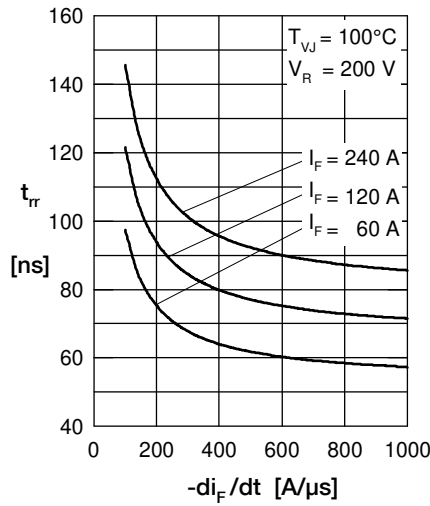


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

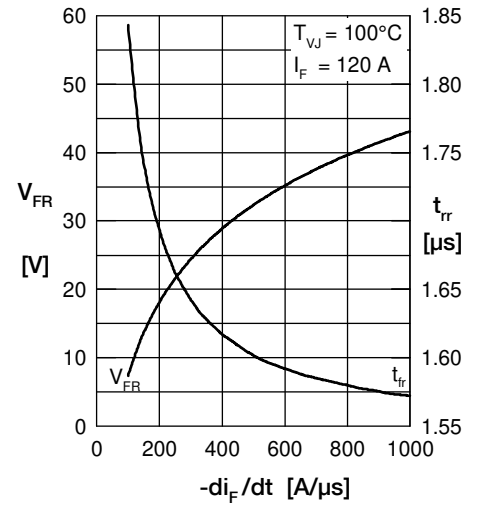


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

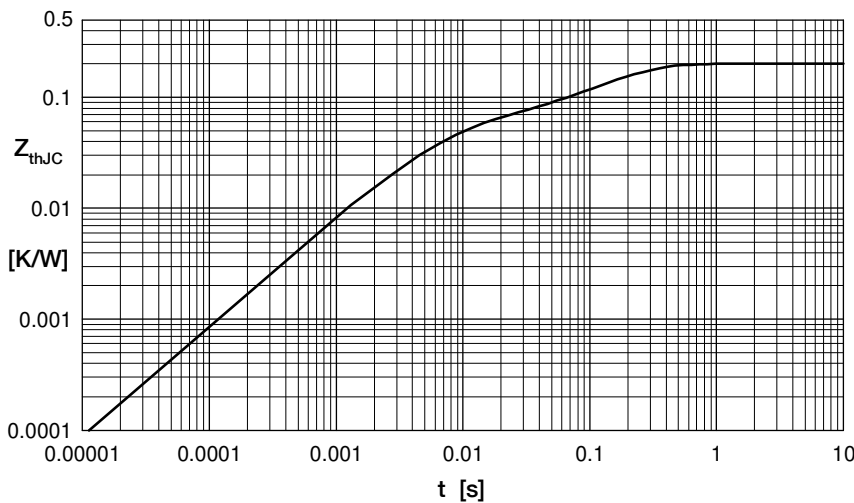


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.064	0.113
2	0.137	1.105