

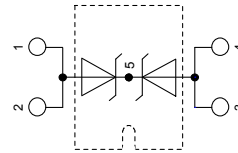
# HiPerFRED

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

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

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:**

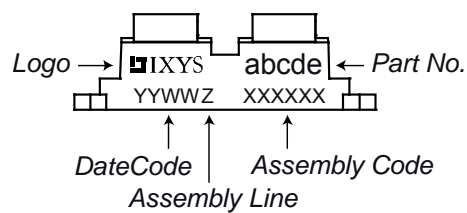
- Housing: SOT-227UI (minibloc)
- Industry standard outline
- Epoxy meets UL 94V-0
- RoHS compliant

**Ratings**

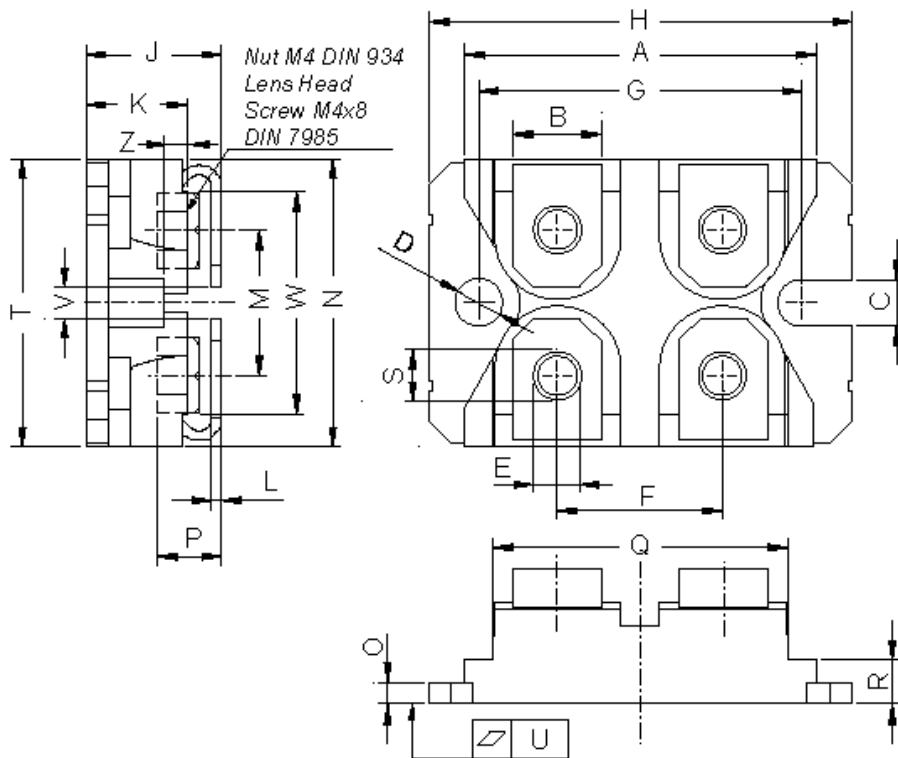
Symbol	Definition	Conditions	Ratings			Unit	
			min.	typ.	max.		
$V_{RRM}$	max. repetitive reverse voltage	$T_{VJ} = 25^\circ\text{C}$			400	V	
$I_R$	reverse current	$V_R = 400\text{ V}$			2	mA	
		$V_R = 400\text{ V}$			8	mA	
$V_F$	forward voltage	$I_F = 120\text{ A}$			1.35	V	
		$I_F = 240\text{ A}$			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	rectangular $d = 0.5$			120	A	
$V_{F0}$	threshold voltage	$T_{VJ} = 150^\circ\text{C}$			0.68	V	
$r_F$	slope resistance				2.7	mΩ	
$R_{thJC}$	thermal resistance junction to case				0.20	K/W	
$T_{VJ}$	virtual junction temperature		-55		150	°C	
$P_{tot}$	total power dissipation	$T_C = 25^\circ\text{C}$			620	W	
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}$ (50 Hz), sine			2000	A	
$I_{RM}$	max. reverse recovery current	$T_{VJ} = 25^\circ\text{C}$		20		A	
		$I_F = 120\text{ A}; V_R = 200\text{ V}$	$T_{VJ} = 100^\circ\text{C}$		35	A	
$t_{rr}$	reverse recovery time	$-di_F/dt = 600\text{ A}/\mu\text{s}$	$T_{VJ} = 25^\circ\text{C}$		30	ns	
			$T_{VJ} = 100^\circ\text{C}$		75	ns	
$C_J$	junction capacitance	$V_R = 200\text{ V}; f = 1\text{ MHz}$			364	pF	

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$I_{RMS}$	<i>RMS current</i>	per terminal			200	A
$R_{thCH}$	<i>thermal resistance case to heatsink</i>			0.10		K/W
$T_{stg}$	<i>storage temperature</i>		-40		150	°C
<b>Weight</b>				30		g
$M_D$	<i>mounting torque</i>		1.1		1.5	Nm
$M_T$	<i>terminal torque</i>		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

**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

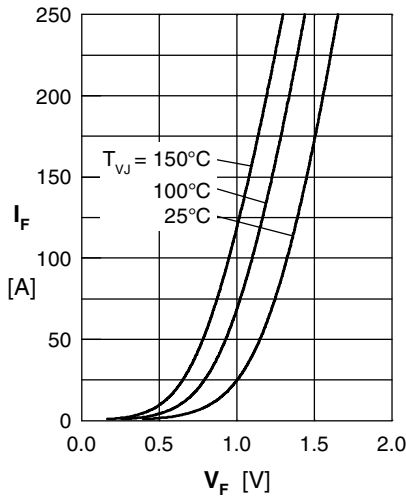


Fig. 1 Forward current  $I_F$  vs.  $V_F$

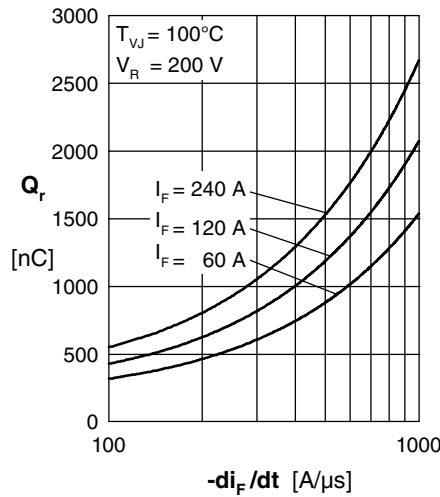


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

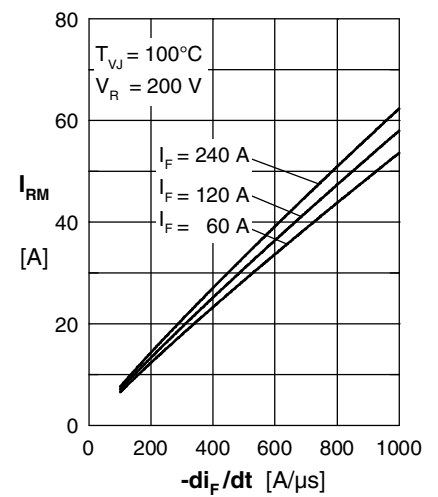


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

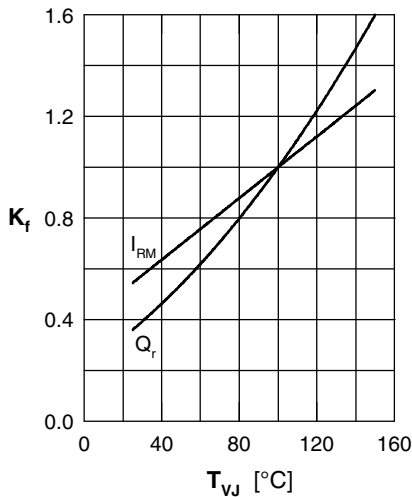


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

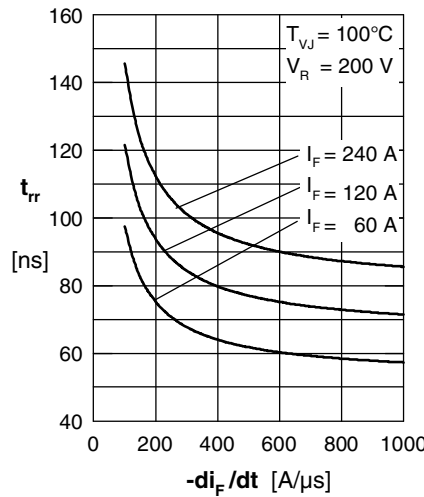


Fig. 5 Recovery time  $t_{tr}$  versus  $-di_F/dt$

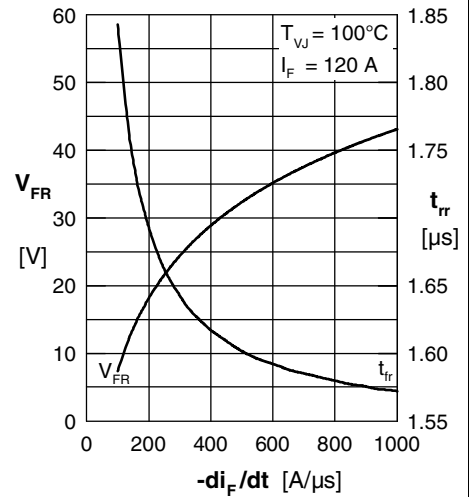


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{tr}$  versus  $di_F/dt$

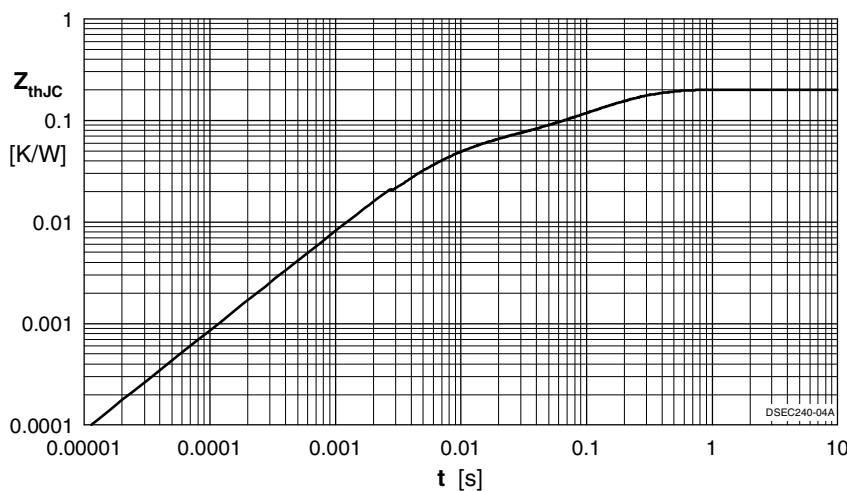


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

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