

HiPerFRED

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

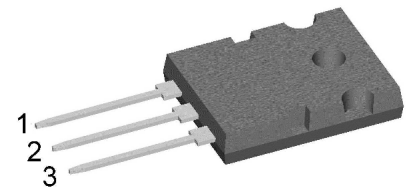
$$I_{FAV} = 2 \times 60\text{ A}$$

$$t_{rr} = 40\text{ ns}$$

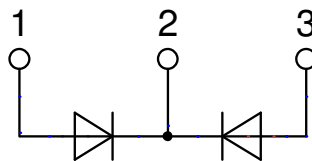
High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Common Cathode

Part number

DSEC120-12AK



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: TO-264

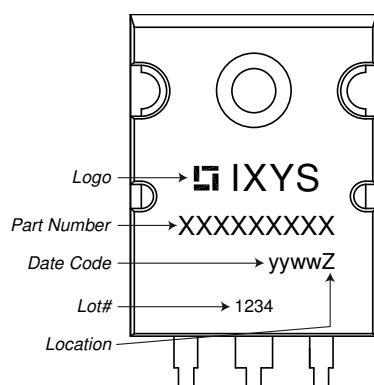
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

Disclaimer Notice

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Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
I_R	reverse current, drain current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			650	μA
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			2,5	mA
V_F	forward voltage drop	$I_F = 60\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			2,66	V
		$I_F = 120\text{ A}$				3,18	V
		$I_F = 60\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$			1,81	V
		$I_F = 120\text{ A}$				2,40	V
I_{FAV}	average forward current	$T_C = 115^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}\text{C}$			60	A
V_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 175^{\circ}\text{C}$		1,08	V
r_F	slope resistance					9,4	m Ω
R_{thJC}	thermal resistance junction to case					0,45	K/W
R_{thCH}	thermal resistance case to heatsink				0,15		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				330	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^{\circ}\text{C}$			500	A
C_J	junction capacitance	$V_R = 600\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		30		pF
I_{RM}	max. reverse recovery current	$I_F = 60\text{ A}; V_R = 600\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^{\circ}\text{C}$		13	A
				$T_{VJ} = 100^{\circ}\text{C}$		20	A
t_{rr}	reverse recovery time			$T_{VJ} = 25^{\circ}\text{C}$		80	ns
				$T_{VJ} = 100^{\circ}\text{C}$		220	ns

Package TO-264			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			70	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				10		g
M_D	mounting torque		0,8		1,2	Nm
F_C	mounting force with clip		20		120	N

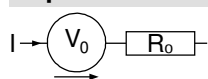


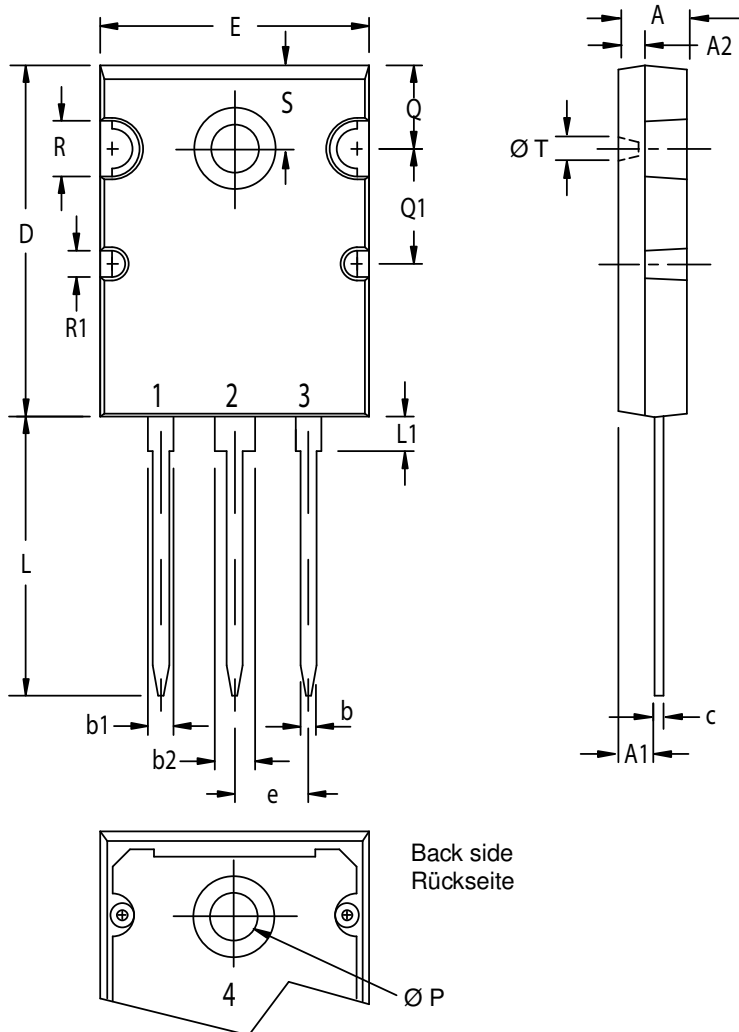
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEC120-12AK	DSEC120-12AK	Tube	25	498653

Equivalent Circuits for Simulation

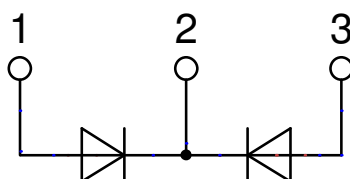
^{*} on die level

$T_{VJ} = 175^{\circ}\text{C}$

		Fast Diode	
$V_{0\ max}$	threshold voltage	1,08	V
$R_{0\ max}$	slope resistance [*]	6,8	mΩ

Outlines TO-264


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.190	0.202	4.82	5.13
A1	0.100	0.114	2.54	2.89
A2	0.079	0.083	2.00	2.10
b	0.044	0.056	1.12	1.42
b1	0.094	0.106	2.39	2.69
b2	0.114	0.122	2.90	3.09
c	0.021	0.033	0.53	0.83
D	1.020	1.030	25.91	26.16
E	0.780	0.786	19.81	19.96
e	5.46 BSC		.215 BSC	
J	0.000	0.010	0.00	0.25
K	0.000	0.010	0.00	0.25
L	0.800	0.820	20.32	20.83
L1	0.090	0.102	2.29	2.59
P	0.125	0.144	3.17	3.66
Q	0.239	0.247	6.07	6.27
Q1	0.330	0.342	8.38	8.69
R	0.150	0.170	3.81	4.32
R1	0.070	0.090	1.78	2.29
S	0.238	0.248	6.04	6.30
T	0.062	0.072	1.57	1.83



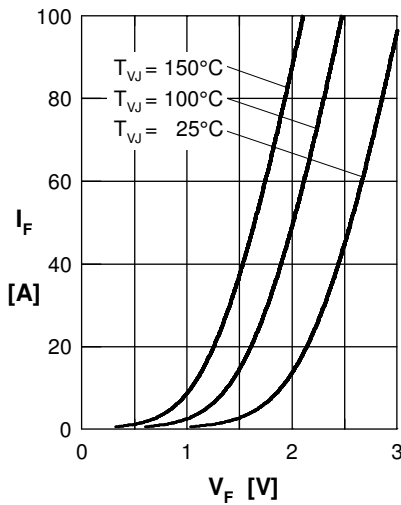
Fast Diode


Fig. 1 Forward current I_F versus V_F

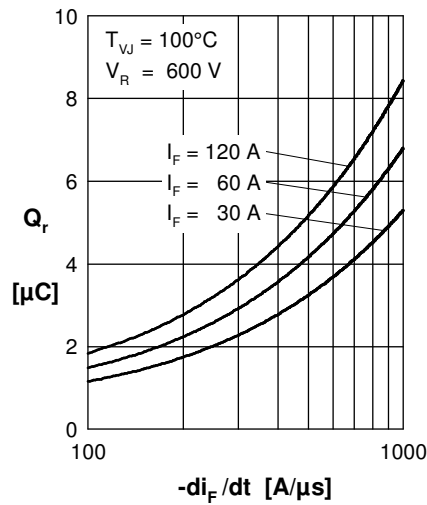


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

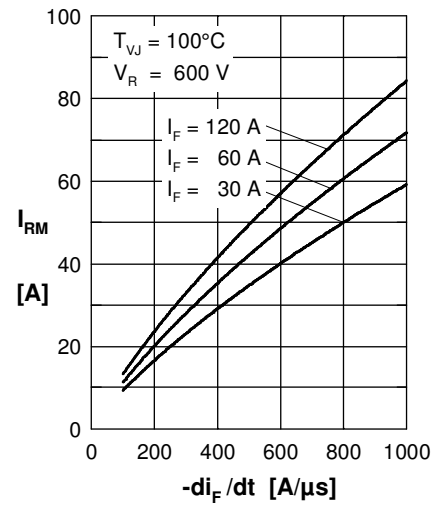


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

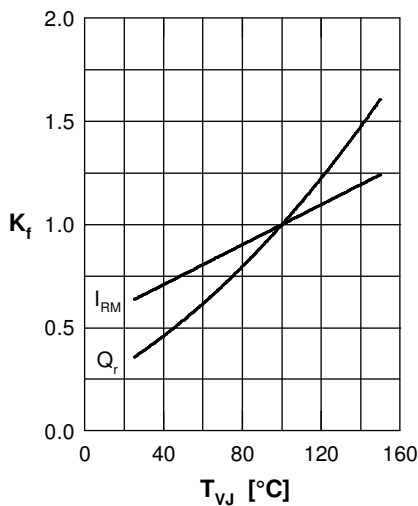


Fig. 4 Typ. dynamic parameters Q_r , I_{RM} versus T_{VJ}

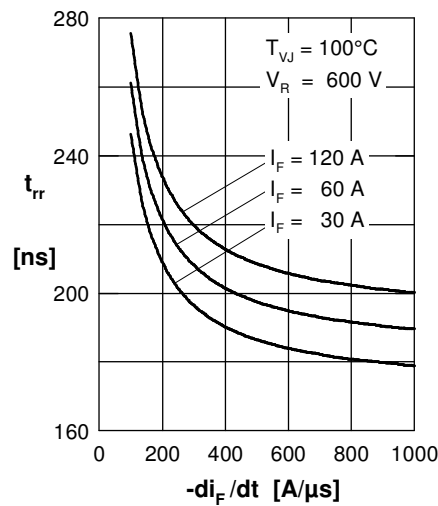


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

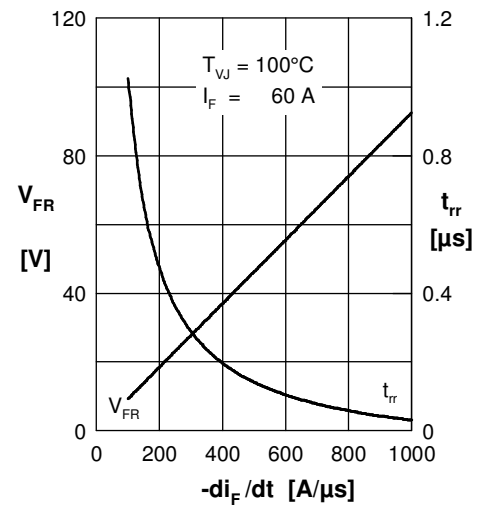


Fig. 6 Typ. peak forward voltage V_{FR} and t_{rr} versus di_F/dt

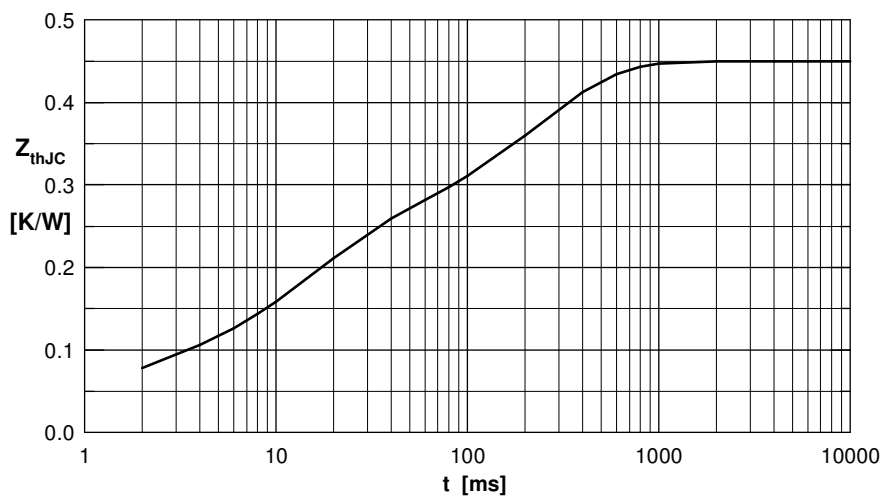


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0050	0.0001
2	0.0550	0.0010
3	0.1750	0.0140
4	0.2150	0.2300