



**DSEC60-12A**

**High  
Performance  
Fast Recovery  
Diode**



# IXYS DSEC60-12A High Performance Fast Recovery Diode Owner's Manual

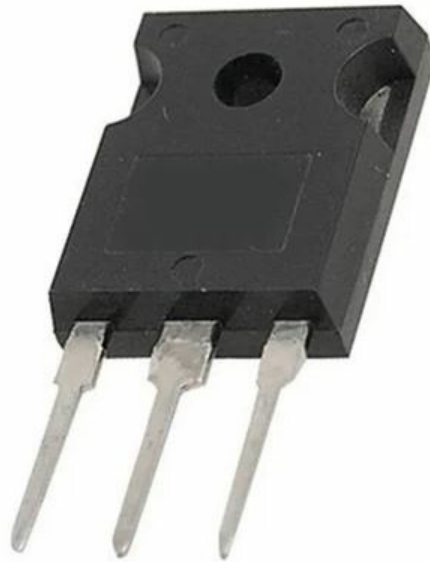
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**IXYS DSEC60-12A High Performance Fast Recovery Diode**



## Product Information

### Specifications:

- **Part Number:** DSEC60-12A
- **VRSM:** 1,12 V
- **VRRM:** 16 mV
- **IR:** 0,25 A
- **VF:** 12 V
- **IFAV:** 200 A
- **RMS Current:** 70 A
- **Virtual Junction Temperature:** -55 to 150°C
- **Operation Temperature:** -55 to 150°C
- **Storage Temperature:** -55 to 150°C

### Features:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behavior
- Low I<sub>rm</sub>-values
- Soft recovery behavior
- Avalanche voltage rated for reliable operation

### 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-247
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

**Product Usage Instructions****Mounting Instructions:**

1. Ensure proper heat dissipation by mounting on a suitable heatsink.
2. Use the recommended mounting torque of 0.8-1.2 Nm.
3. Avoid applying excessive force during mounting to prevent damage.

**Circuit Connection:**

Connect the diode according to the application requirements, ensuring correct polarity and connections.

**Operating Conditions:**

- Operate within the specified temperature range of -55 to 150°C.
- Avoid exceeding the maximum RMS current rating of 70 A.

**FAQ (Frequently Asked Questions)**

- **What are the key features of the DSEC60-12A diode?**

The key features include planar passivated chips, very low leakage current, very short recovery time, improved thermal behavior, and soft recovery behavior.

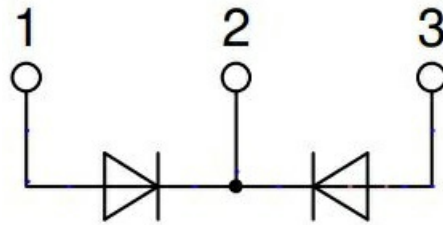
- **What applications is the DSEC60-12A diode suitable for?**

The diode is suitable for use as an antiparallel diode for high frequency switching devices, antisaturation diode, snubber diode, free-wheeling diode, rectifiers in switch mode power supplies (SMPS), and uninterruptible power supplies (UPS).

- **What is the recommended mounting torque for the TO-247 package?**

The recommended mounting torque is between 0.8 and 1.2 Nm.

**CIRCUIT DIAGRAM**



## 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-247

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

## Disclaimer Notice

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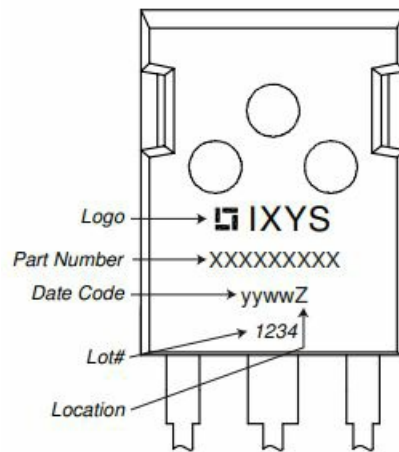
## Fast Diode

Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V <sub>RSM</sub>	max. non-repetitive reverse blocking voltage	T <sub>VJ</sub> = 25°C			1200	V	
V <sub>RRM</sub>	max. repetitive reverse blocking voltage	T <sub>VJ</sub> = 25°C			1200	V	
I <sub>R</sub>	reverse current, drain current	V <sub>R</sub> = 1200 V T <sub>VJ</sub> = 25°C V <sub>R</sub> = 1200 V T <sub>VJ</sub> = 150°C			250 1	μA mA	
V <sub>F</sub>	forward voltage drop	I <sub>F</sub> = 30 A T <sub>VJ</sub> = 25°C I <sub>F</sub> = 60 A T <sub>VJ</sub> = 150°C I <sub>F</sub> = 30 A T <sub>VJ</sub> = 150°C I <sub>F</sub> = 60 A T <sub>VJ</sub> = 150°C			2,74 3,27 1,79 2,30	V V V V	
I <sub>FAV</sub>	average forward current	T <sub>C</sub> = 120°C rectangular d = 0.5 T <sub>VJ</sub> = 175°C			30	A	
V <sub>F0</sub>	threshold voltage	for power loss calculation only T <sub>VJ</sub> = 175°C			1,12	V	
r <sub>F</sub>	slope resistance				16	mΩ	
R <sub>thJC</sub>	thermal resistance junction to case				0,9	K/W	
R <sub>thCH</sub>	thermal resistance case to heatsink			0,25		K/W	
P <sub>tot</sub>	total power dissipation	T <sub>C</sub> = 25°C			165	W	
I <sub>FSM</sub>	max. forward surge current	t = 10 ms; (50 Hz), sine; V <sub>R</sub> = 0 V T <sub>VJ</sub> = 45°C			200	A	
C <sub>J</sub>	junction capacitance	V <sub>R</sub> = 600V f = 1 MHz T <sub>VJ</sub> = 25°C		12		pF	
I <sub>RM</sub>	max. reverse recovery current	I <sub>F</sub> = 30 A; V <sub>R</sub> = 600 V -di <sub>F</sub> /dt = 200 A/μs		8,5		A	
t <sub>rr</sub>	reverse recovery time		T <sub>VJ</sub> = 25°C		13		A
			T <sub>VJ</sub> = 100°C				
			T <sub>VJ</sub> = 25°C		60		ns
		T <sub>VJ</sub> = 100°C		170		ns	

## SYMBOLS IDENTIFICATION

Package	TO-247		Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal <b>1)</b>			70	A
$T_{VJ}$	virtual junction temperature		-55		175	$^{\circ}\text{C}$
<b>Top</b>	operation temperature		-55		150	$^{\circ}\text{C}$
<b>Tstg</b>	storage temperature		-55		150	$^{\circ}\text{C}$
<b>Weight</b>				6		g
<b>MD</b>	mounting torque		0,8		1,2	N m
<b>F</b> <b>C</b>	mounting force with clip		20		120	N

## Product Marking

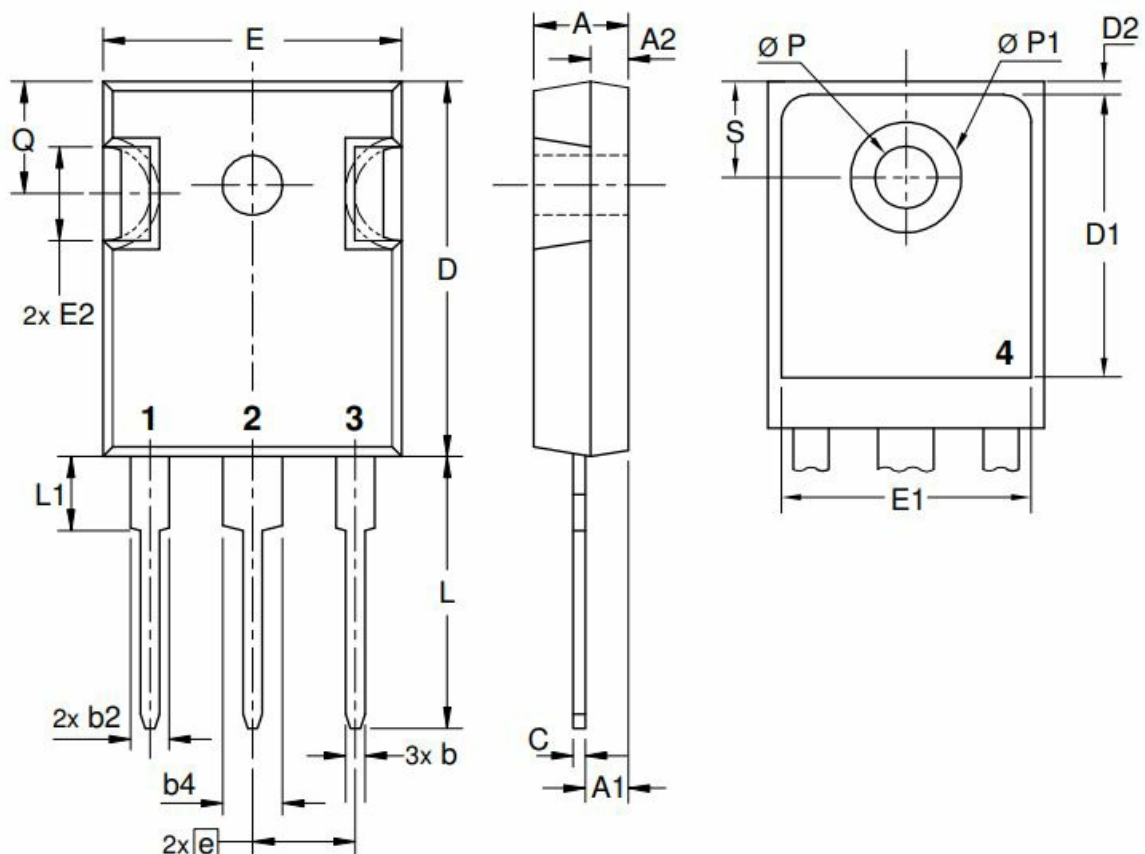


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEC60-12A	DSEC60-12A	Tube	30	476412

## Equivalent Circuits for Simulation

* on die level				$T_{VJ} = 175^{\circ}\text{C}$
	<b>Fast Diode</b>			
$V_{0\text{ max}}$	threshold voltage	1,12		V
$R_{0\text{ max}}$	slope resistance *	13,4		mΩ

## DIMENSION



Sym.	Inches		Millimeter	
	min.	max.	min.	max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819 0.845		20.79 21.45	
E	0.610 0.640		15.48 16.24	
E2	0.170 0.216		4.31 5.48	
e	0.215 BSC		5.46 BSC	
L	0.780 0.800		19.80 20.30	
L1	– 0.177		– 4.49	
Ø P	0.140 0.144		3.55 3.65	
Q	0.212 0.244		5.38 6.19	
S	0.242 BSC		6.14 BSC	
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	–	13.07	–
D2	0.020	0.053	0.51	1.35
E1	0.530	–	13.45	–
Ø P1	–	0.29	–	7.39

## Fast Diode

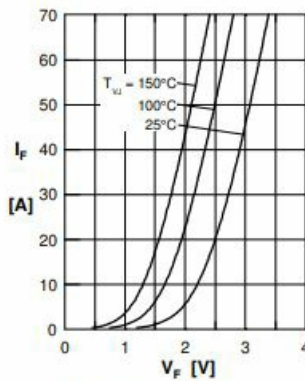


Fig. 1 Forward current  $I_F$  versus  $V_F$

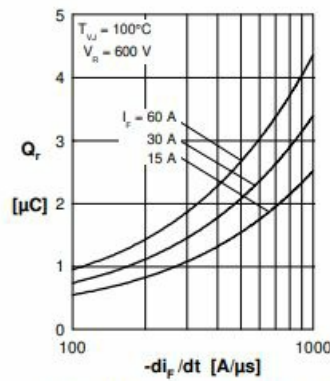


Fig. 2 Typ. reverse recov. charge  $Q_r$  versus  $-di_F/dt$

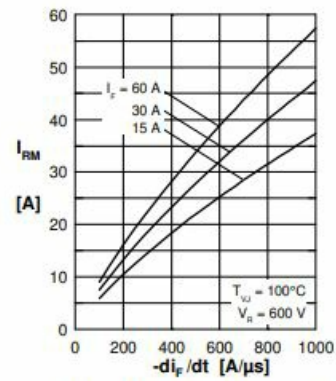


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

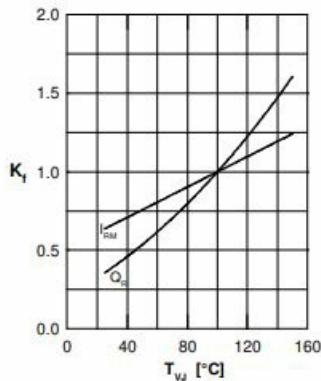


Fig. 4 Typ. dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{J,J}$

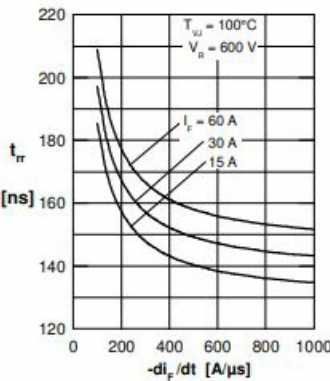


Fig. 5 Typ. recovery time  $t_{tr}$  versus  $-di_F/dt$

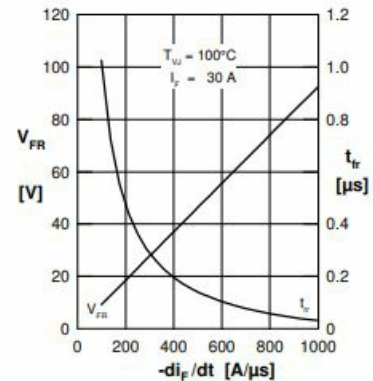


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{tr}$  versus  $di_F/dt$

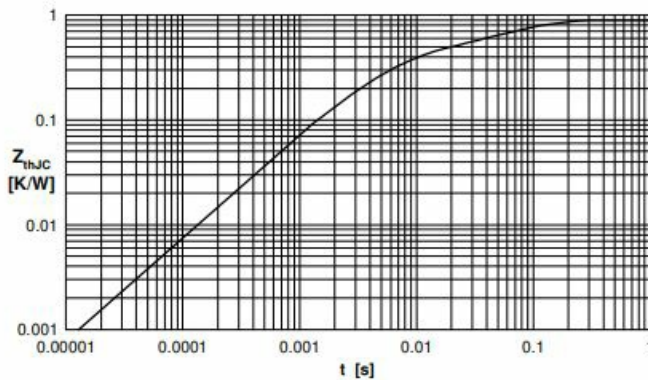
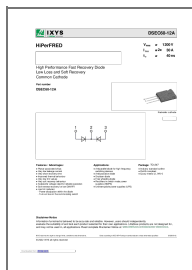


Fig. 7 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.030	0.001
2	0.080	0.030
3	0.300	0.006
4	0.490	0.060

## Documents / Resources



**IXYS DSEC60-12A High Performance Fast Recovery Diode** [pdf] Owner's Manual  
DSEC60-12A High Performance Fast Recovery Diode, DSEC60-12A, High Performance Fast R  
ecovery Diode, Performance Fast Recovery Diode, Fast Recovery Diode, Recovery Diode

## References

- [Product Disclaimer](#)
- [User Manual](#)



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