

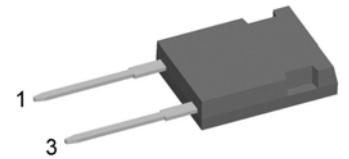
# HiPerFRED

$V_{RRM}$	=	<b>1200 V</b>
$I_{FAV}$	=	<b>30 A</b>
$t_{rr}$	=	<b>40 ns</b>

High Performance Fast Recovery Diode  
 Low Loss and Soft Recovery  
 Single Diode

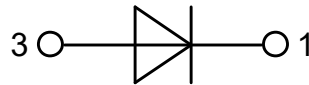
Part number

**DSEP30-12AR**



Backside: isolated

 E72873



### 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: ISOPLUS247

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

### Disclaimer Notice

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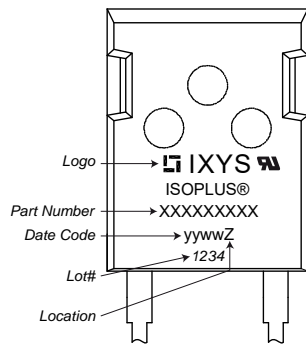


Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					1200	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1200	V
$I_R$	reverse current, drain current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^\circ\text{C}$			250	$\mu\text{A}$
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^\circ\text{C}$			1	mA
$V_F$	forward voltage drop	$I_F = 30\text{ A}$	$T_{VJ} = 25^\circ\text{C}$			2,74	V
						3,27	V
		$I_F = 60\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1,79	V
						2,30	V
$I_{FAV}$	average forward current	$T_C = 105^\circ\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 175^\circ\text{C}$			30	A
$V_{F0}$	threshold voltage	} for power loss calculation only				1,12	V
$r_F$	slope resistance					16	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					1,1	K/W
$R_{thCH}$	thermal resistance case to heatsink				0,25		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		135	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		200	A
$C_J$	junction capacitance	$V_R = 600\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		12	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 30\text{ A}; V_R = 600\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		8,5	A
				$T_{VJ} = 100^\circ\text{C}$		13	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		60	ns
				$T_{VJ} = 100^\circ\text{C}$		170	ns



Package ISOPLUS247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			70	A
$T_{VJ}$	virtual junction temperature		-55		175	°C
$T_{op}$	operation temperature		-55		150	°C
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				6		g
$F_C$	mounting force with clip		20		120	N
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	5,4			mm
$d_{Spb/Apb}$		terminal to backside	4,1			mm
$V_{ISOL}$	isolation voltage	t = 1 second	3600			V
		t = 1 minute	3000			V

**Product Marking**



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP30-12AR	DSEP30-12AR	Tube	30	481920

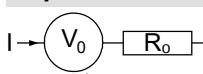
Similar Part	Package	Voltage class
DSEP30-12A	TO-247AD (2)	1200
DSEP29-12A	TO-220AC (2)	1200
DHG30I1200HA	TO-247AD (2)	1200
DSEP30-12CR	ISOPLUS247 (2)	1200

DSEP30-12B	TO-247AD (2)	1200
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**Equivalent Circuits for Simulation**

\* on die level

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

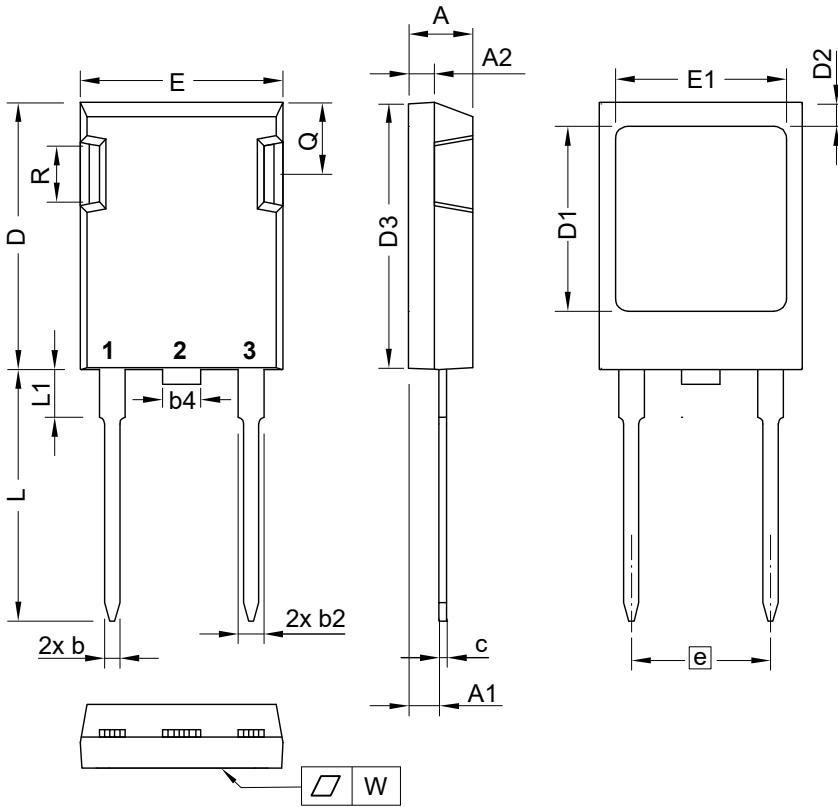


**Fast Diode**

$V_{0\ max}$	threshold voltage	1,12	V
$R_{0\ max}$	slope resistance *	13,4	mΩ



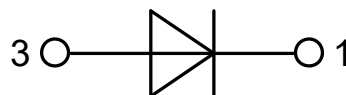
Outlines ISOPLUS247



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.14	1.40	0.045	0.055
b2	1.91	2.20	0.075	0.087
b4	2.92	3.24	0.115	0.128
c	0.61	0.83	0.024	0.033
D	20.80	21.34	0.819	0.840
D1	15.75	16.26	0.620	0.640
D2	1.65	2.15	0.065	0.085
D3	20.30	20.70	0.799	0.815
E	15.75	16.13	0.620	0.635
E1	13.21	13.72	0.520	0.540
e	10.90 BSC		0.429 BSC	
L	19.81	20.60	0.780	0.811
L1	3.81	4.38	0.150	0.172
Q	5.59	6.20	0.220	0.244
R	4.25	5.50	0.167	0.217
W	-	0.10	-	0.004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite  
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und  $L_{max}$ .  
This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except  $L_{max}$ .



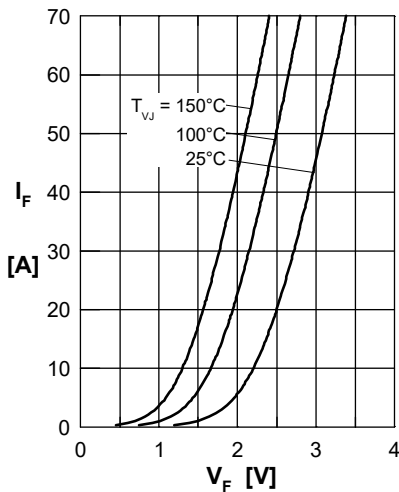
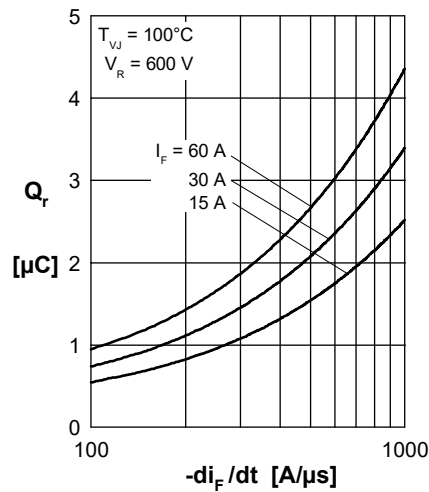
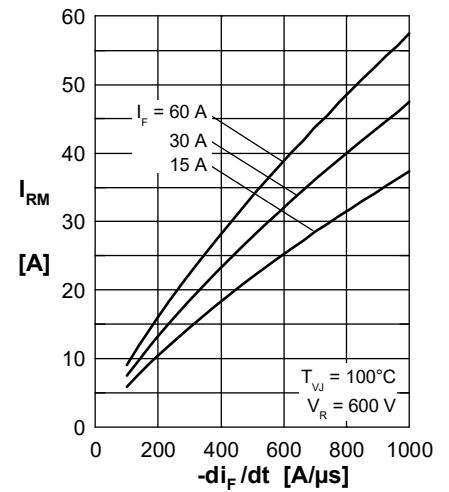
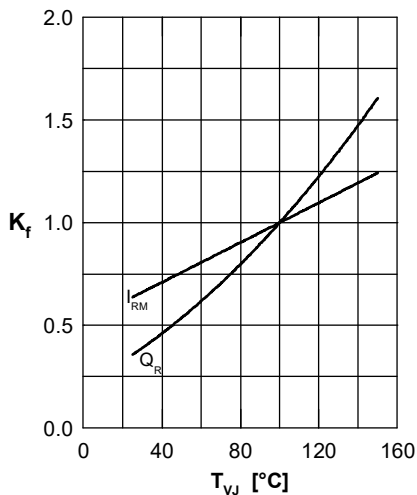
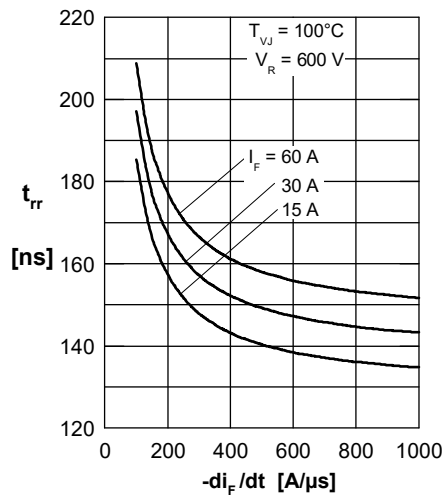
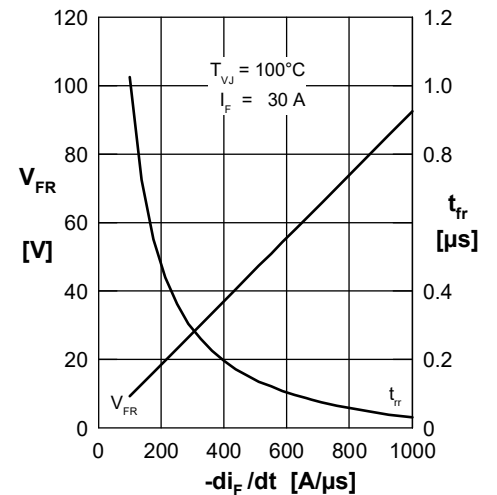
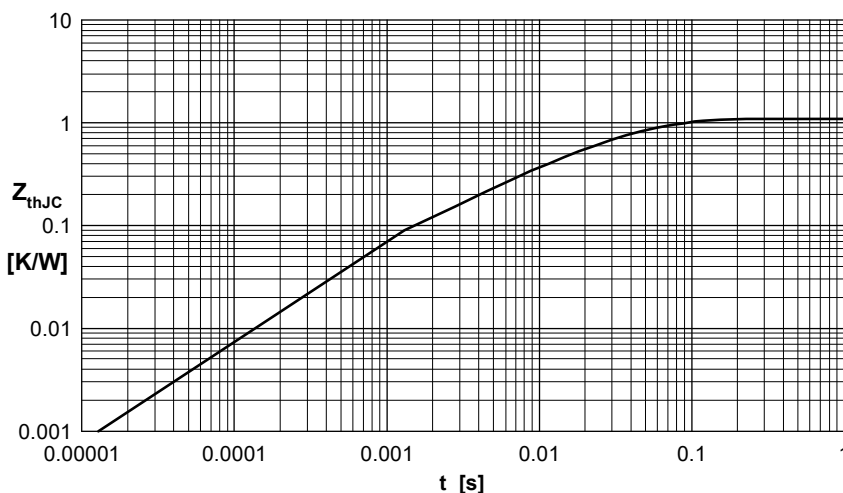
**Fast Diode**

 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  $t_{tr}$  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	0.0005
2	0.100	0.0050
3	0.360	0.0200
4	0.610	0.0500