

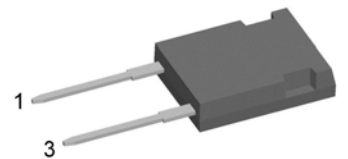
HiPerFRED

$V_{RRM} = 1200V$
 $I_{FAV} = 60A$
 $t_{rr} = 40ns$

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

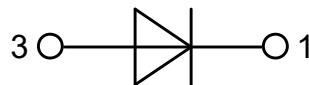
Part number

DSEP60-12AR



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

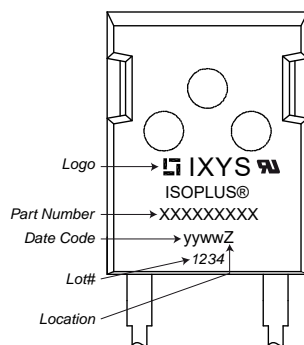
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Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
I_R	reverse current, drain current	$V_R = 1200 V$	$T_{VJ} = 25^{\circ}C$		650	μA	
		$V_R = 1200 V$	$T_{VJ} = 150^{\circ}C$		2,5	mA	
V_F	forward voltage drop	$I_F = 60 A$	$T_{VJ} = 25^{\circ}C$		2,66	V	
		$I_F = 120 A$			3,18	V	
		$I_F = 60 A$	$T_{VJ} = 150^{\circ}C$		1,81	V	
		$I_F = 120 A$			2,40	V	
I_{FAV}	average forward current	$T_c = 85^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}C$		60	A	
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		1,08	V	
r_F	slope resistance				9,4	m Ω	
R_{thJC}	thermal resistance junction to case				0,65	K/W	
R_{thCH}	thermal resistance case to heatsink			0,25		K/W	
P_{tot}	total power dissipation		$T_c = 25^{\circ}C$		230	W	
I_{FSM}	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		500	A	
C_J	junction capacitance	$V_R = 600V$ $f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		30	pF	
I_{RM}	max. reverse recovery current	} $I_F = 60 A; V_R = 600 V$	$T_{VJ} = 25^{\circ}C$		13	A	
			$T_{VJ} = 100^{\circ}C$		20	A	
t_{rr}	reverse recovery time	} $-di_F/dt = 200 A/\mu s$	$T_{VJ} = 25^{\circ}C$		80	ns	
			$T_{VJ} = 100^{\circ}C$		220	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
Weight				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
		50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA				

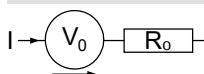
Product Marking


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP60-12AR	DSEP60-12AR	Tube	30	481939

Similar Part	Package	Voltage class
DSEP60-12A	TO-247AD (2)	1200
DHG60I1200HA	TO-247AD (2)	1200
DSEP60-12B	TO-247AD (2)	1200

Equivalent Circuits for Simulation

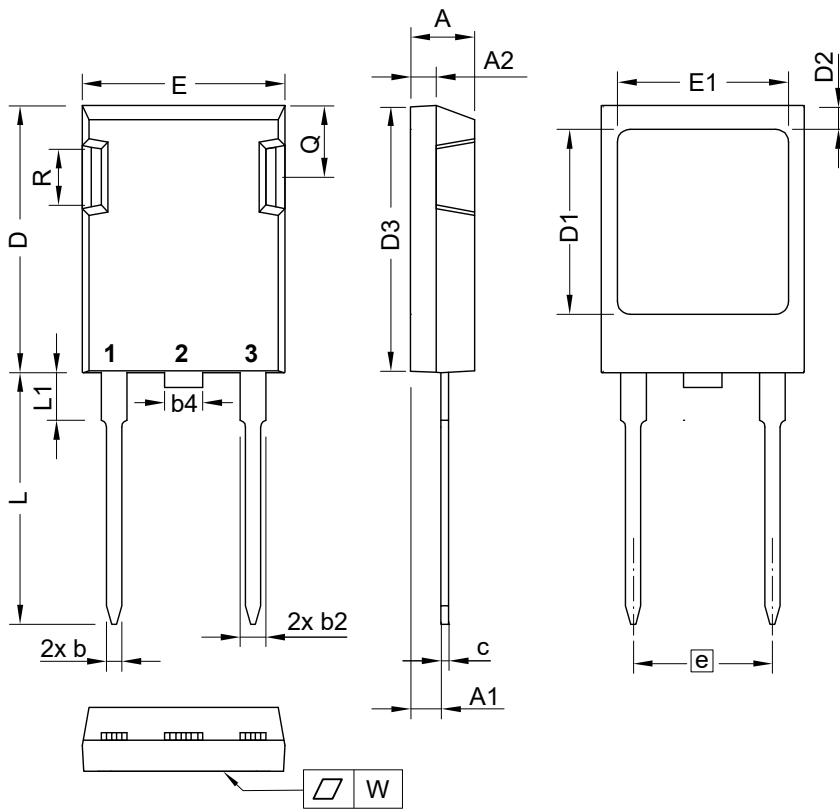
* on die level

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

Fast Diode

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



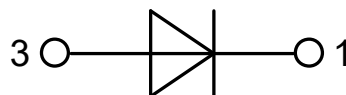
Outlines ISOPLUS247



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} .



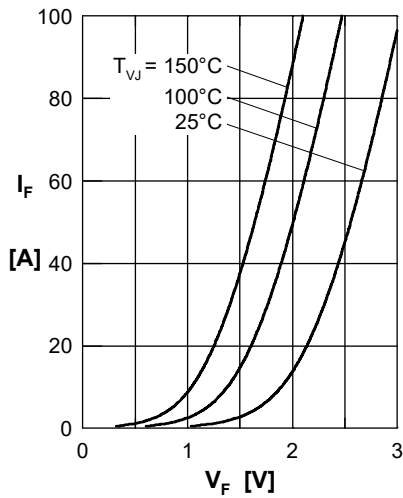
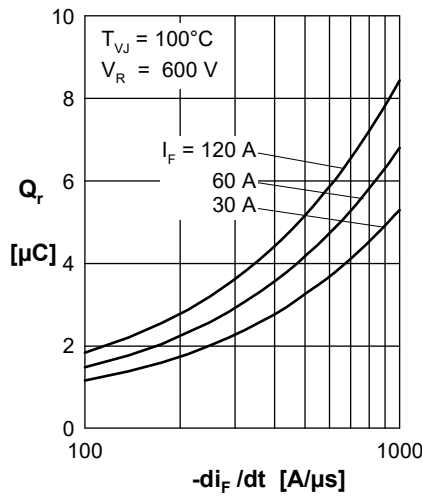
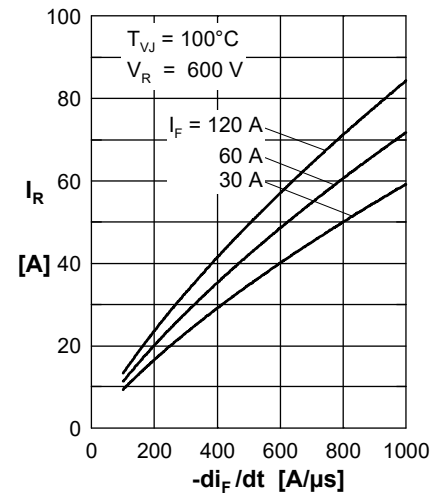
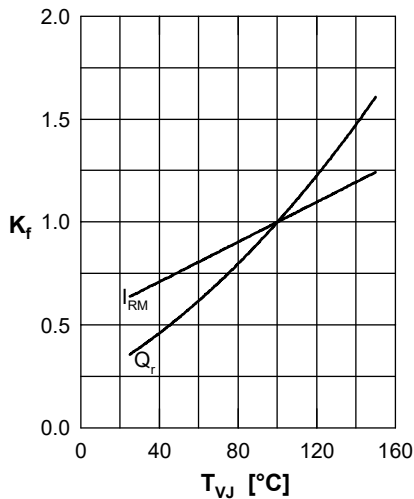
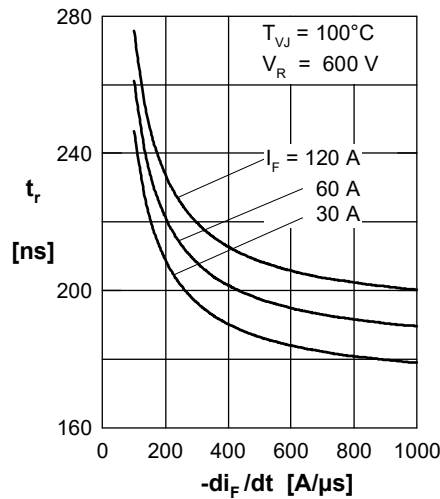
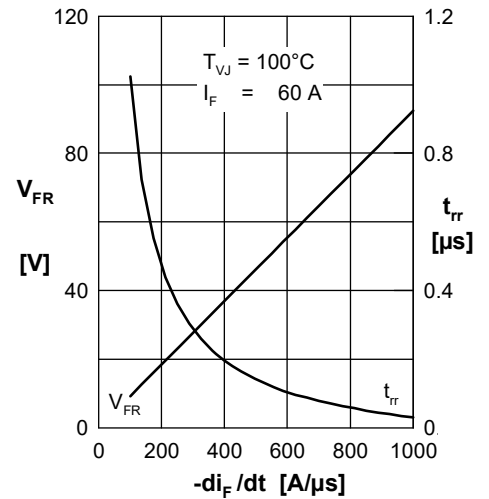
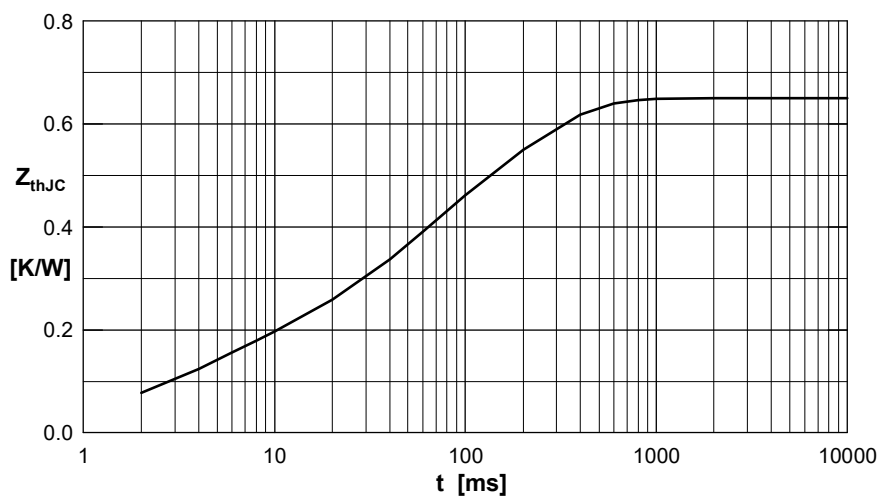
Fast Diode

 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_r 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	0.0500	0.0020
2	0.1000	0.0050
3	0.2000	0.0400
4	0.3000	0.1800