

HiPerFRED

$$V_{RRM} = 1200V$$

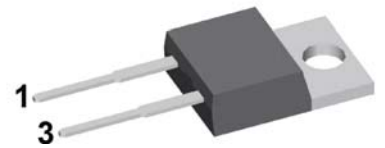
$$I_{FAV} = 12A$$

$$t_{rr} = 40ns$$

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

Part number

DSEP12-12A



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:

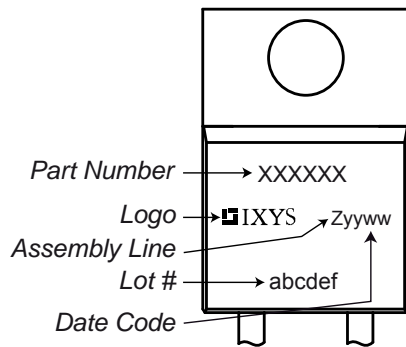
- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package: TO-220

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

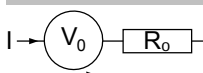
Fast Diode				Ratings		
Symbol	Definition	Conditions	min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V
I_R	reverse current, drain current	$V_R = 1200 V$	$T_{VJ} = 25^{\circ}C$		100	μA
		$V_R = 1200 V$	$T_{VJ} = 150^{\circ}C$		0.5	mA
V_F	forward voltage drop	$I_F = 15 A$	$T_{VJ} = 25^{\circ}C$		2.62	V
		$I_F = 30 A$			3.19	V
		$I_F = 15 A$	$T_{VJ} = 150^{\circ}C$		1.87	V
		$I_F = 30 A$			2.56	V
I_{FAV}	average forward current	$T_C = 135^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 175^{\circ}C$		12	A
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		1.03	V
r_F	slope resistance				46	m Ω
R_{thJC}	thermal resistance junction to case				1.6	K/W
R_{thCH}	thermal resistance case to heatsink			0.50		K/W
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		95	W
I_{FSM}	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		90	A
C_J	junction capacitance	$V_R = 600 V \quad f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		5	pF
I_{RM}	max. reverse recovery current	} $I_F = 15 A; V_R = 600 V$	$T_{VJ} = 25^{\circ}C$		6	A
			$T_{VJ} = 100^{\circ}C$		9	A
t_{rr}	reverse recovery time	} $-di_F/dt = 200 A/\mu s$	$T_{VJ} = 25^{\circ}C$		40	ns
			$T_{VJ} = 100^{\circ}C$		140	ns

Package TO-220			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			35	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				2		g
M_D	mounting torque		0.4		0.6	Nm
F_C	mounting force with clip		20		60	N

Product Marking


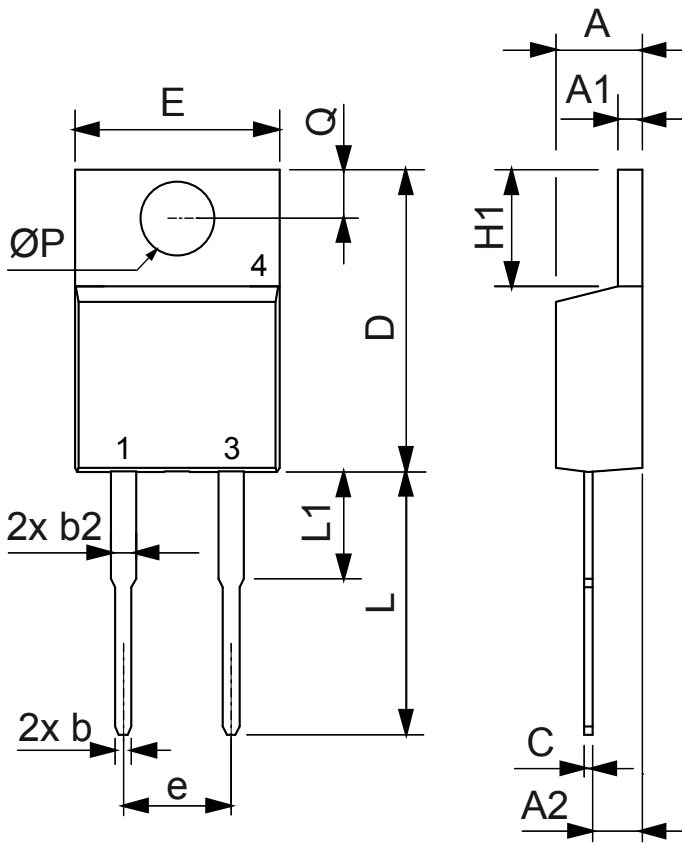
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP12-12A	DSEP12-12A	Tube	50	470465

Similar Part	Package	Voltage class
DSEP12-12B	TO-220AC (2)	1200
DSEP15-12CR	ISOPLUS247 (2)	1200

Equivalent Circuits for Simulation
** on die level*
 $T_{VJ} = 175\text{ °C}$

Fast Diode

$V_{0\max}$	threshold voltage	1.03	V
$R_{0\max}$	slope resistance *	43	mΩ

Outlines TO-220



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.32	4.82	0.170	0.190
A1	1.14	1.39	0.045	0.055
A2	2.29	2.79	0.090	0.110
b	0.64	1.01	0.025	0.040
b2	1.15	1.65	0.045	0.065
C	0.35	0.56	0.014	0.022
D	14.73	16.00	0.580	0.630
E	9.91	10.66	0.390	0.420
e	5.08	BSC	0.200	BSC
H1	5.85	6.85	0.230	0.270
L	12.70	13.97	0.500	0.550
L1	2.79	5.84	0.110	0.230
ØP	3.54	4.08	0.139	0.161
Q	2.54	3.18	0.100	0.125



Fast Diode

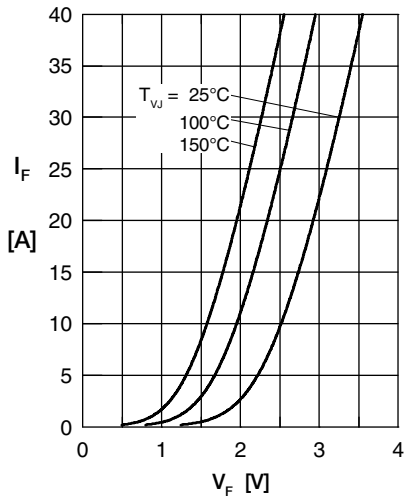


Fig. 1 Forward current I_F versus V_F

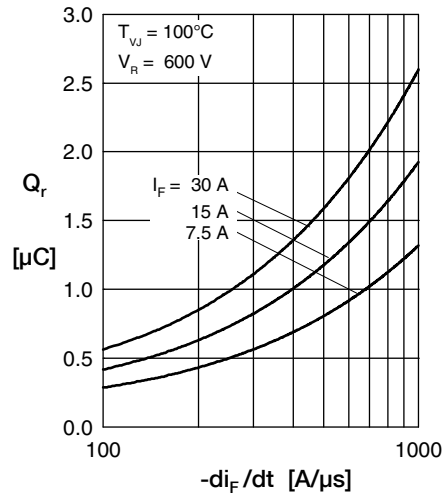


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

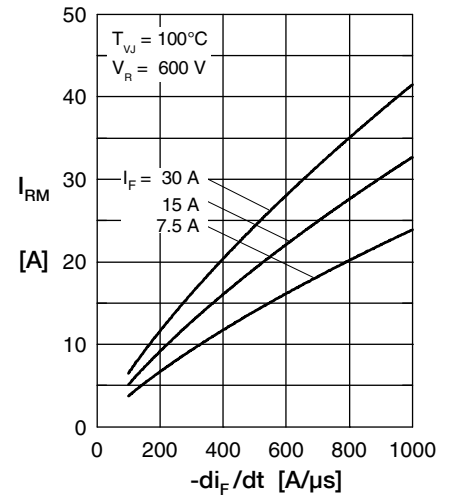


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

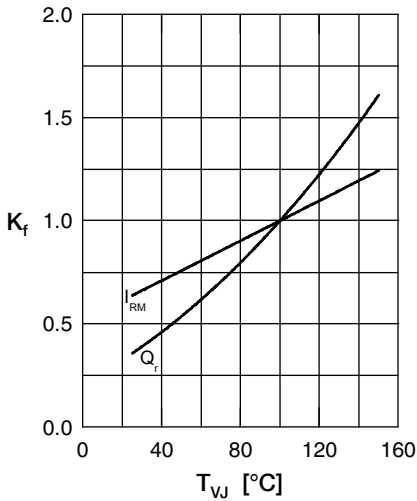


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

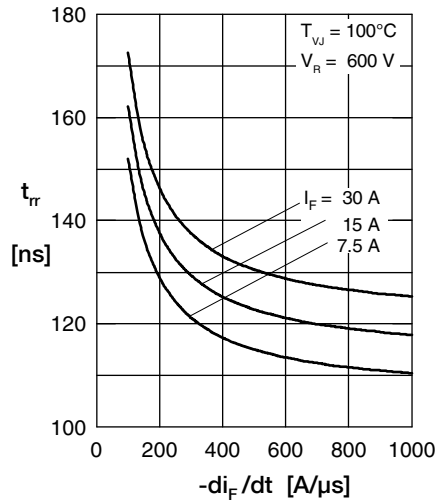


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

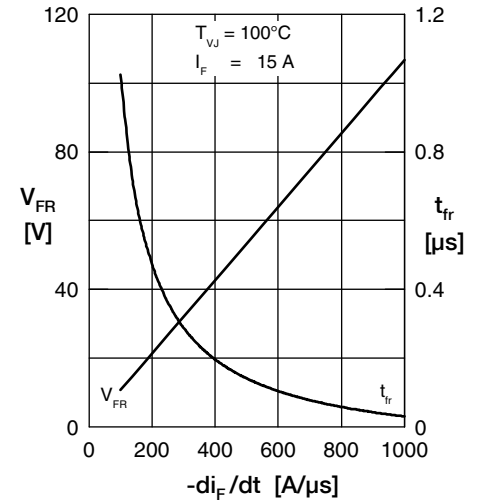


Fig. 6 Typ. peak forward voltage V_{FR} and t_{rr} versus di_F/dt

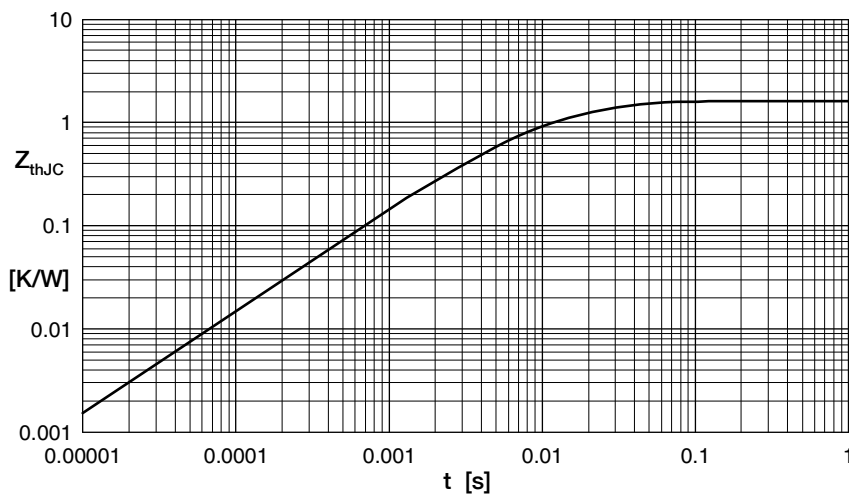


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.9084	0.0052
2	0.3497	0.0003
3	0.3419	0.0165