

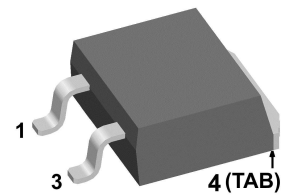
HiPerFRED

$V_{RRM} = 1200\text{ V}$
 $I_{FAV} = 12\text{ A}$
 $t_{rr} = 40\text{ ns}$

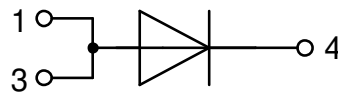
High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Single Diode

Part number

DSEP12-12AZ



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-263 (D2Pak-HV)

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

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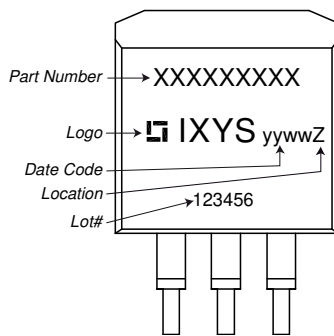


Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V	
I_R	reverse current, drain current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}C$		100	μA	
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^{\circ}C$		0.5	mA	
V_F	forward voltage drop	$I_F = 15\text{ A}$	$T_{VJ} = 25^{\circ}C$		2.62	V	
		$I_F = 30\text{ A}$			3.19	V	
		$I_F = 15\text{ A}$	$T_{VJ} = 150^{\circ}C$		1.87	V	
		$I_F = 30\text{ A}$			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			0.25		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		95	W	
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^{\circ}C$		90	A	
C_J	junction capacitance	$V_R = 600\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}C$		5	pF	
I_{RM}	max. reverse recovery current	} $I_F = 15\text{ A}; V_R = 600\text{ V}$ $-di_F/dt = 200\text{ A}/\mu s$	$T_{VJ} = 25^{\circ}C$		6	A	
			$T_{VJ} = 100^{\circ}C$		9	A	
t_{rr}	reverse recovery time		$T_{VJ} = 25^{\circ}C$		40	ns	
			$T_{VJ} = 100^{\circ}C$		140	ns	



Package TO-263 (D2Pak-HV)		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				1.5		g
F_C	mounting force with clip		20		60	N
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	4.2			mm
$d_{Spb/Apb}$		terminal to backside	4.7			mm

Product Marking



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP12-12AZ-TRL	DSEP12-12AZ-TRL	Tape & Reel	800	515345
Alternative	DSEP12-12AZ-TUB	DSEP12-12AZ	Tube	50	523894

Similar Part	Package	Voltage class
DSEP12-12BZ	TO-263AB (D2Pak) (2HV)	1200

Equivalent Circuits for Simulation

* on die level

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



Fast Diode

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



Outlines TO-263 (D2Pak-HV)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.06	4.83	0.160	0.190
A1	typ. 0.10		typ. 0.004	
A2	2.41		0.095	
b	0.51	0.99	0.020	0.039
b2	1.14	1.40	0.045	0.055
c	0.40	0.74	0.016	0.029
c2	1.14	1.40	0.045	0.055
D	8.38	9.40	0.330	0.370
D1	8.00	8.89	0.315	0.350
D2	2.3		0.091	
E	9.65	10.41	0.380	0.410
E1	6.22	8.50	0.245	0.335
e	2,54 BSC		0,100 BSC	
e1	4.28		0.169	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	1.02	1.68	0.040	0.066
W	typ. 0.02	0.040	typ. 0.0008	0.002

All dimensions conform with and/or within JEDEC standard.





Fast Diode

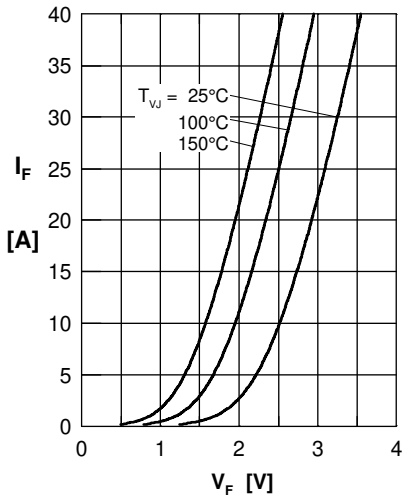


Fig. 1 Forward current I_F versus V_F

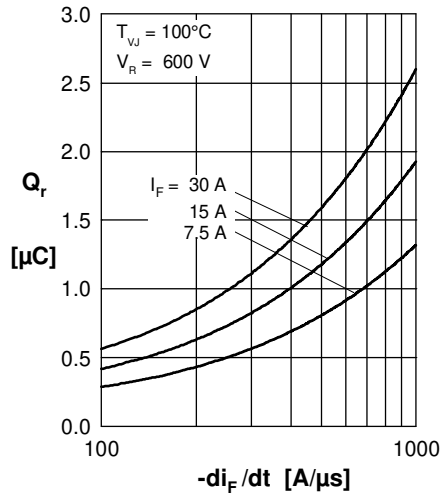


Fig. 2 Typ. reverse recov. charge Q_r versus $-di_F/dt$

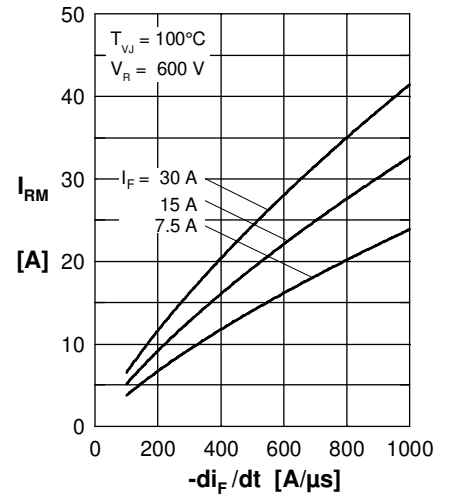


Fig. 3 Typ. peak reverse current I_{RM} versus $-di_F/dt$

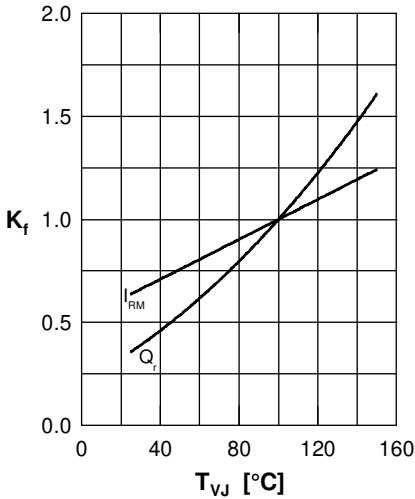


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{vj}

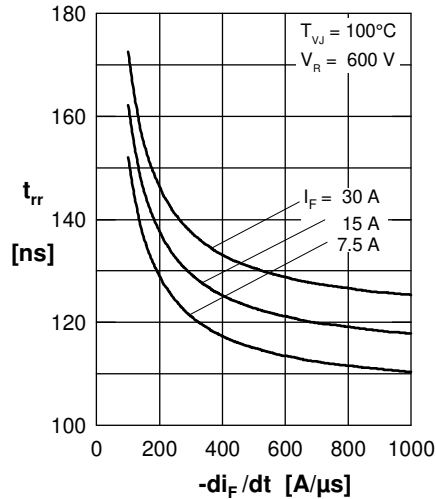


Fig. 5 Typ. recovery time t_{rr} versus $-di_F/dt$

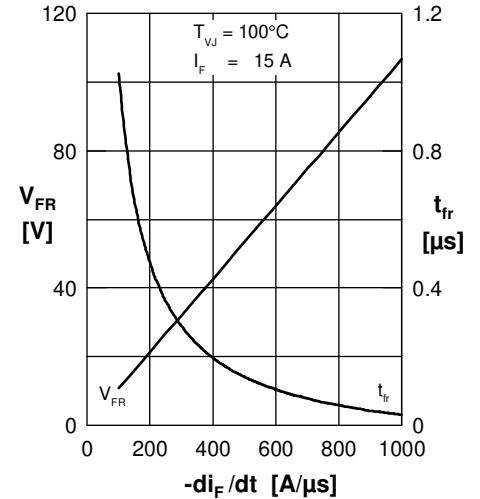


Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

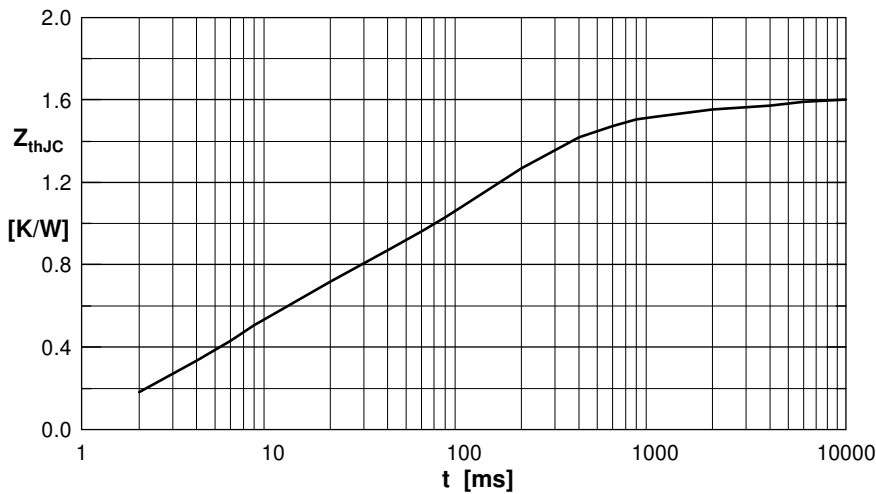


Fig. 7 Transient thermal impedance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.160	0.0010
2	0.100	0.0150
3	0.500	0.0040
4	0.840	0.1200