

# HiPerFRED

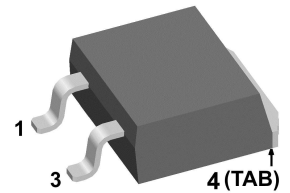
$V_{RRM} = 1200\text{ V}$   
 $I_{FAV} = 12\text{ A}$   
 $t_{rr} = 35\text{ ns}$

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

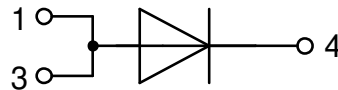
**Part number**

**DSEP12-12BZ**

Marking on Product: DSEP12-12BZ



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

### Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).



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	$V_R = 1200\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		100	$\mu\text{A}$
		$V_R = 1200\text{ V}$		$T_{VJ} = 150^\circ\text{C}$		0.5	mA
$V_F$	forward voltage drop	$I_F = 15\text{ A}$		$T_{VJ} = 25^\circ\text{C}$		3.25	V
		$I_F = 30\text{ A}$				3.96	V
		$I_F = 15\text{ A}$		$T_{VJ} = 150^\circ\text{C}$		2.06	V
		$I_F = 30\text{ A}$				2.89	V
$I_{FAV}$	average forward current	$T_C = 130^\circ\text{C}$		$T_{VJ} = 175^\circ\text{C}$		12	A
		rectangular	$d = 0.5$				
$V_{FO}$	threshold voltage			$T_{VJ} = 175^\circ\text{C}$		1.00	V
$r_F$	slope resistance	} for power loss calculation only				55	m $\Omega$
$R_{thJC}$	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			$T_C = 25^\circ\text{C}$		95	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		90	A
$C_J$	junction capacitance	$V_R = 600\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		5	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 15\text{ A}; V_R = 800\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		14	A
				$T_{VJ} = 125^\circ\text{C}$		23	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 500\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		70	ns
				$T_{VJ} = 125^\circ\text{C}$		300	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
<b>Weight</b>				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	DSEP12-12BZ-TRL	DSEP12-12BZ	Tape & Reel	800	514454
Alternative	DSEP12-12BZ-TUB	DSEP12-12BZ	Tube	50	523901

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

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 175\text{°C}$



**Fast Diode**

$V_{0\ max}$	threshold voltage	1	V
$R_{0\ max}$	slope resistance *	52	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.*



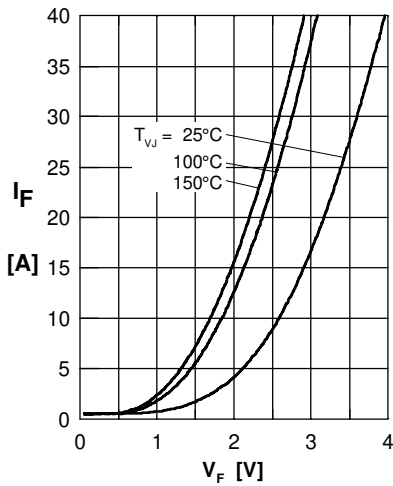
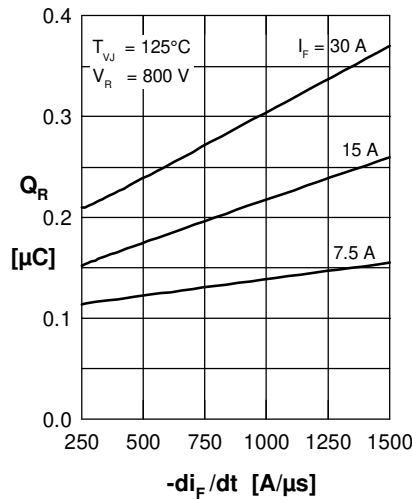
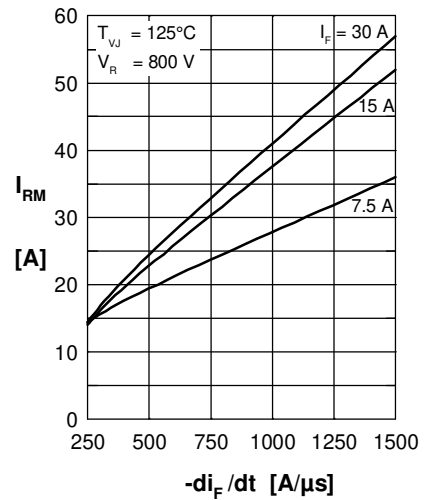
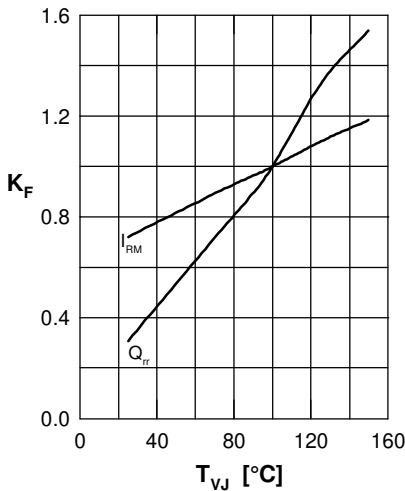
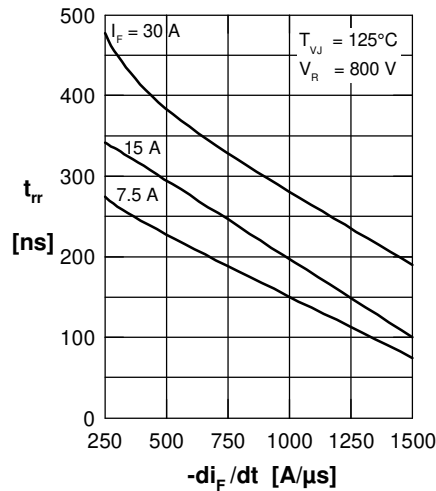
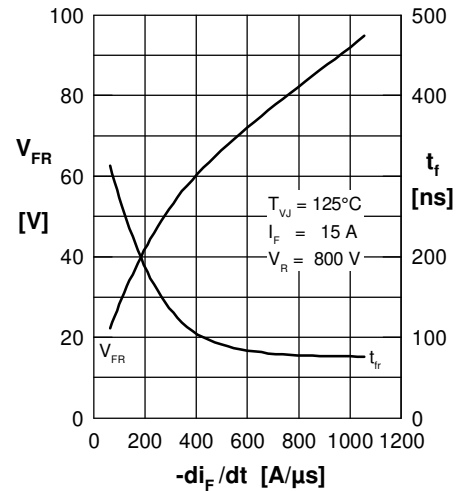
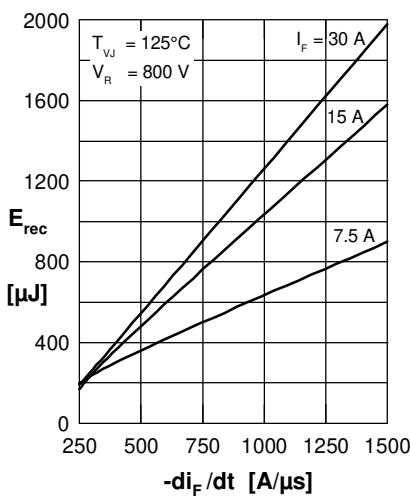
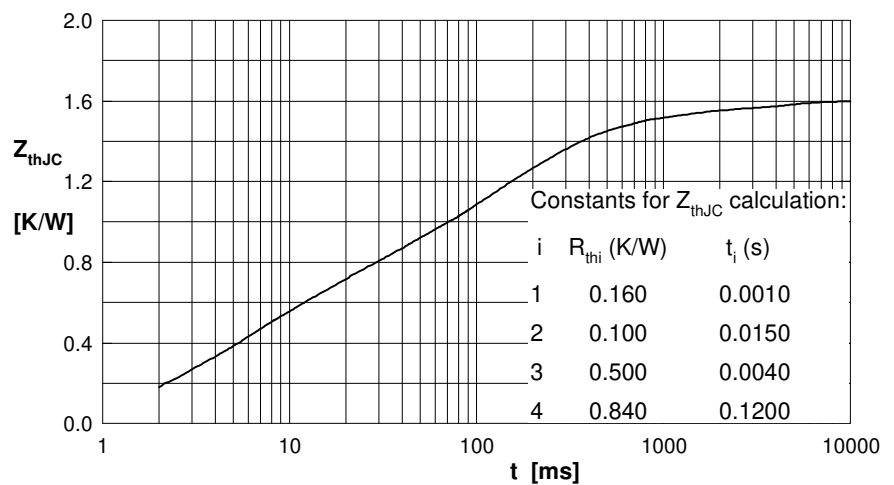
**Fast Diode**

 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 Typ. 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  $t_{tr}$  versus  $di_F/dt$ 

 Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$ 


Fig. 8 Transient thermal resistance junction to case