



# HiPerFRED

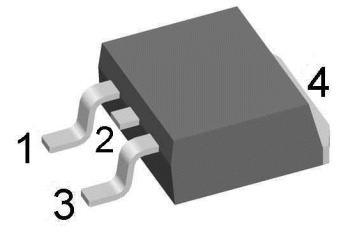
$V_{RRM}$	=	300 V
$I_{FAV}$	=	40 A
$t_{rr}$	=	35 ns

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

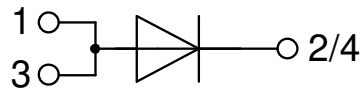
Part number

**DSEP40-03AS**

Marking on Product: DSEP40-03AS



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)

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

### Disclaimer Notice

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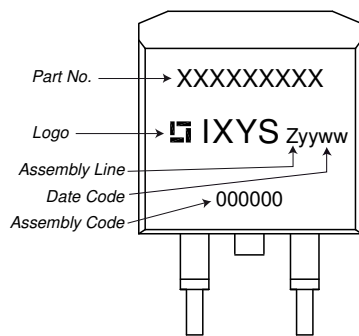
Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					300	V
$I_R$	reverse current, drain current	$V_R = 300\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		5	$\mu\text{A}$
		$V_R = 300\text{ V}$		$T_{VJ} = 150^\circ\text{C}$		0.1	mA
$V_F$	forward voltage drop	$I_F = 40\text{ A}$		$T_{VJ} = 25^\circ\text{C}$		1.46	V
		$I_F = 80\text{ A}$				1.85	V
		$I_F = 40\text{ A}$		$T_{VJ} = 150^\circ\text{C}$		1.20	V
		$I_F = 80\text{ A}$				1.63	V
$I_{FAV}$	average forward current	$T_C = 120^\circ\text{C}$	rectangular	$T_{VJ} = 175^\circ\text{C}$		40	A
$V_{FO}$	threshold voltage	} for power loss calculation only		$T_{VJ} = 175^\circ\text{C}$		0.72	V
$r_F$	slope resistance					10.7	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					0.85	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.25		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		175	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		340	A
$C_J$	junction capacitance	$V_R = 150\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		50	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 30\text{ A}; V_R = 200\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		3.5	A
				$T_{VJ} = 125^\circ\text{C}$		7	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		35	ns
				$T_{VJ} = 125^\circ\text{C}$		55	ns



Package TO-263 (D2Pak)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal <sup>1)</sup>			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>				2		g
$F_C$	mounting force with clip		20		60	N

<sup>1)</sup>  $I_{RMS}$  is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.

**Product Marking**

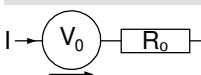


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEP40-03AS-TRL	DSEP40-03AS	Tape & Reel	800	501174
Alternative	DSEP40-03AS-TUB	DSEP40-03AS	Tube	50	525191

**Equivalent Circuits for Simulation**

\* on die level

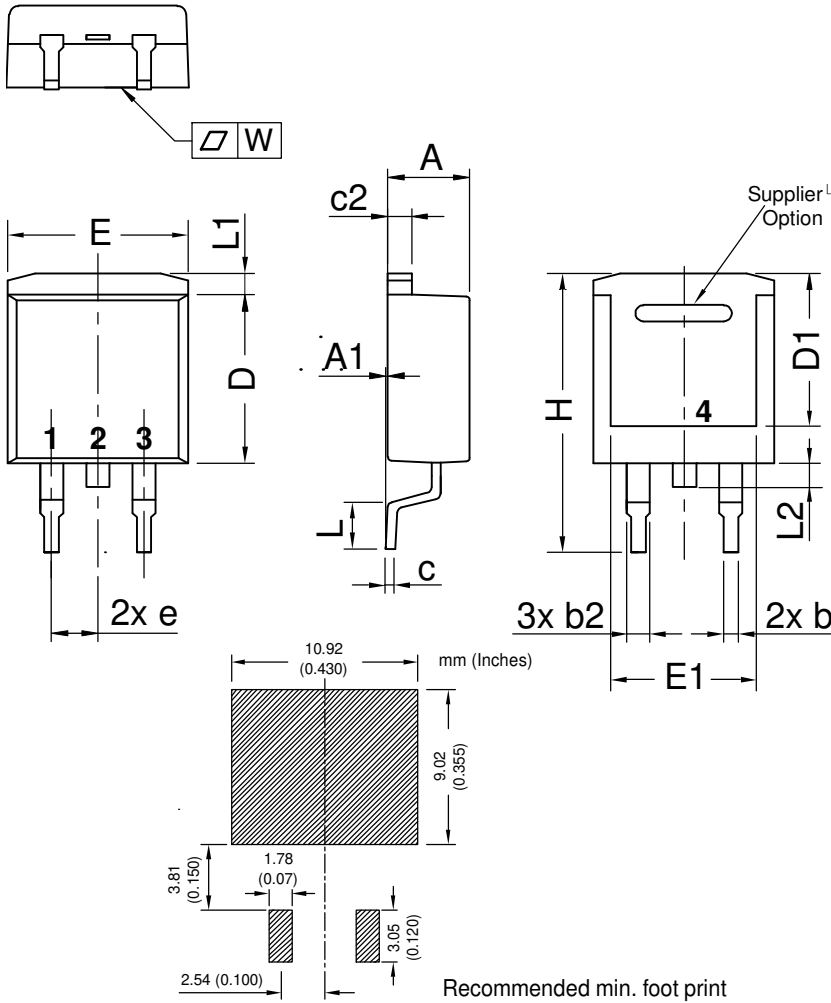
$T_{VJ} = 175\text{ °C}$



Symbol	Definition	Value	Unit
$V_{0\ max}$	threshold voltage	0.72	V
$R_{0\ max}$	slope resistance *	7.5	mΩ

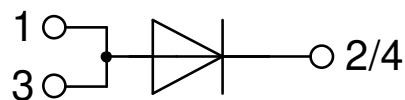


**Outlines TO-263 (D2Pak)**



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	2.5		0.098	
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.*



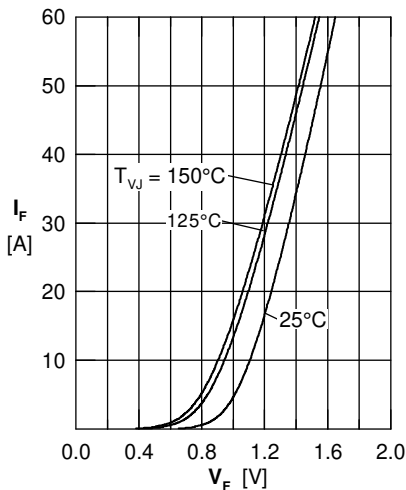
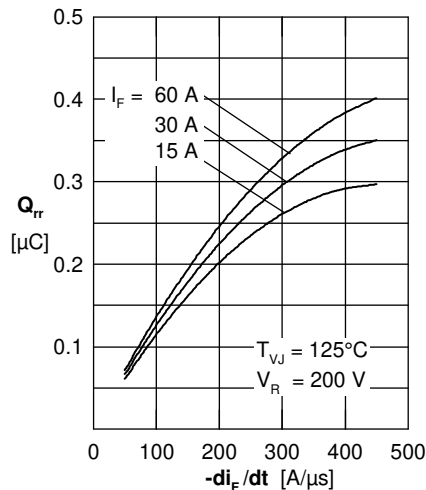
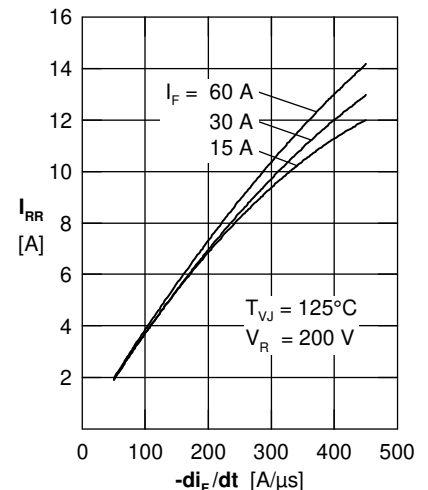
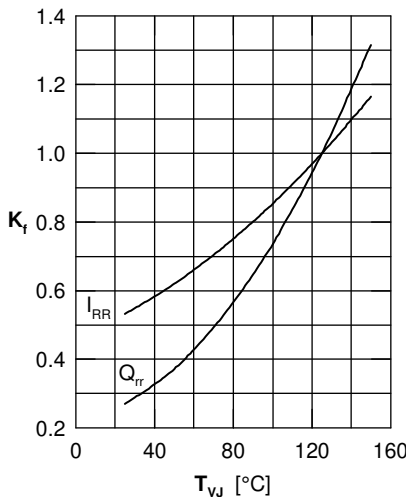
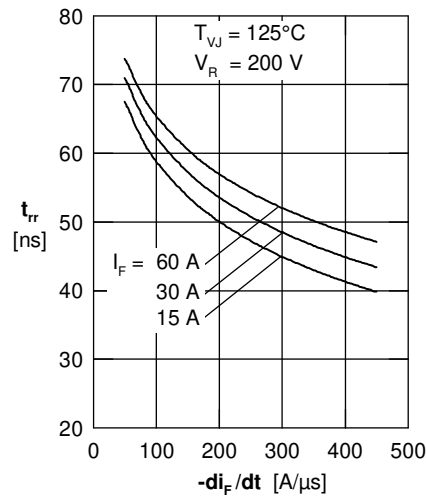
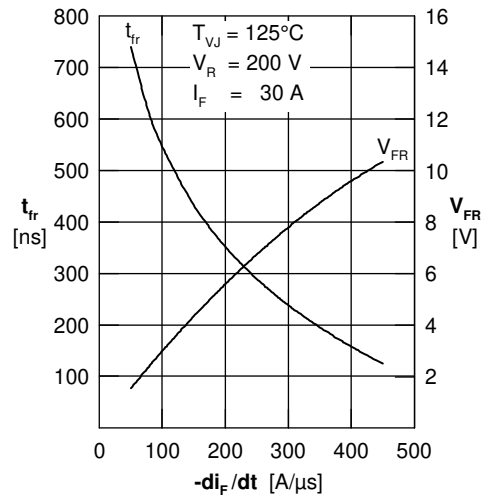
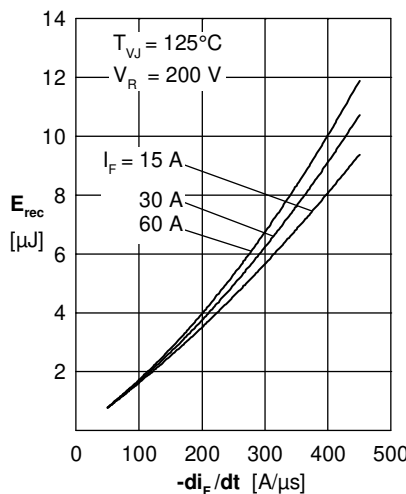
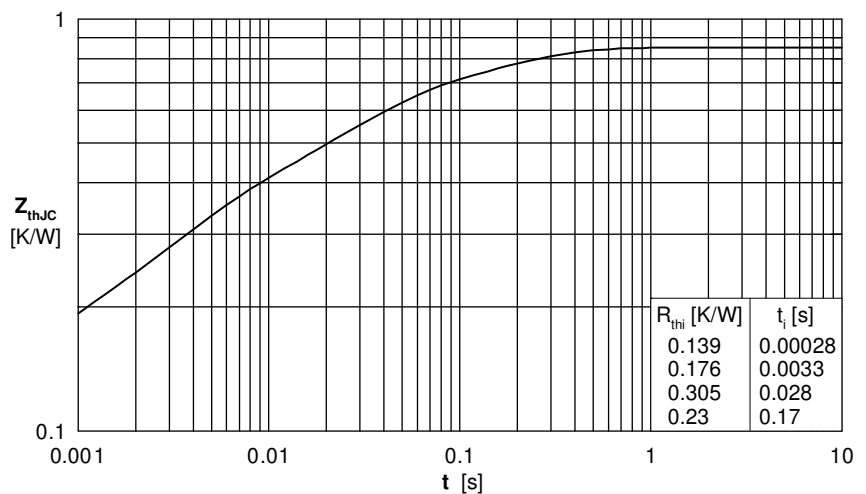
**Fast Diode**

 Fig. 1 Forward current  $I_F$  versus forward voltage  $V_F$ 

 Fig. 2 Typ. reverse recovery charge  $Q_{rr}$  versus  $-di_F/dt$ 

 Fig. 3 Typ. reverse recovery current  $I_{RR}$  versus  $-di_F/dt$ 

 Fig. 4 Dynamic parameters  $Q_{rr}$ ,  $I_{RR}$  versus  $T_{VJ}$ 

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

 Fig. 6 Typ. forward recovery voltage  $V_{FR}$  & forward recovery time  $t_{fr}$  vs.  $di_F/dt$ 

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


Fig. 8 Transient thermal impedance junction to case