HiPerFRED

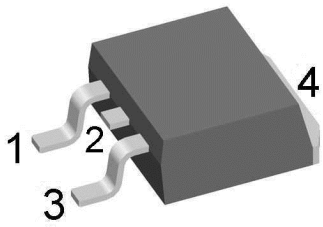
V_{RRM}	=	300 V
I_{FAV}	=	40 A
t_{rr}	=	35 ns

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

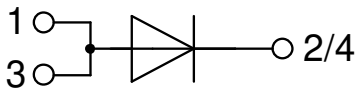
Part number

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 Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm 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

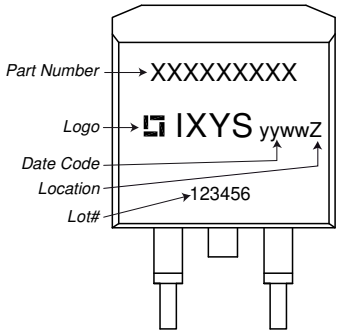
Fast Diode

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			300	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			300	V
I_R	*reverse current, drain current*	V_R = 300 V	T_{VJ} = 25°C			5	µA
		V_R = 300 V	T_{VJ} = 150°C			0.1	mA
V_F	*forward voltage drop*	I_F = 40 A	T_{VJ} = 25°C			1.46	V
		I_F = 80 A				1.85	V
		I_F = 40 A	T_{VJ} = 150°C			1.20	V
		I_F = 80 A				1.63	V
I_{FAV}	*average forward current*	T_C = 120°C	T_{VJ} = 175°C			40	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 175°C			0.72	V
r_F	*slope resistance* }					10.7	mΩ
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°C			175	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine; V_R = 0 V	T_{VJ} = 45°C			340	A
C_J	*junction capacitance*	V_R = 150 V f = 1 MHz	T_{VJ} = 25°C		50		pF
I_{RM}	*max. reverse recovery current*		T_{VJ} = 25 °C		3.5		A
		I_F = 30 A; V_R = 200 V	T_{VJ} = 125 °C		7		A
t_{rr}	*reverse recovery time*	$-di_F/dt$ = 200 A/µs	T_{VJ} = 25 °C		35		ns
			T_{VJ} = 125 °C		55		ns

Package TO-263 (D2Pak)			Ratings			
Symbol	**Definition**	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal [1]			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

[1] 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.

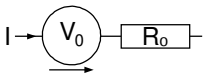
Product Marking



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

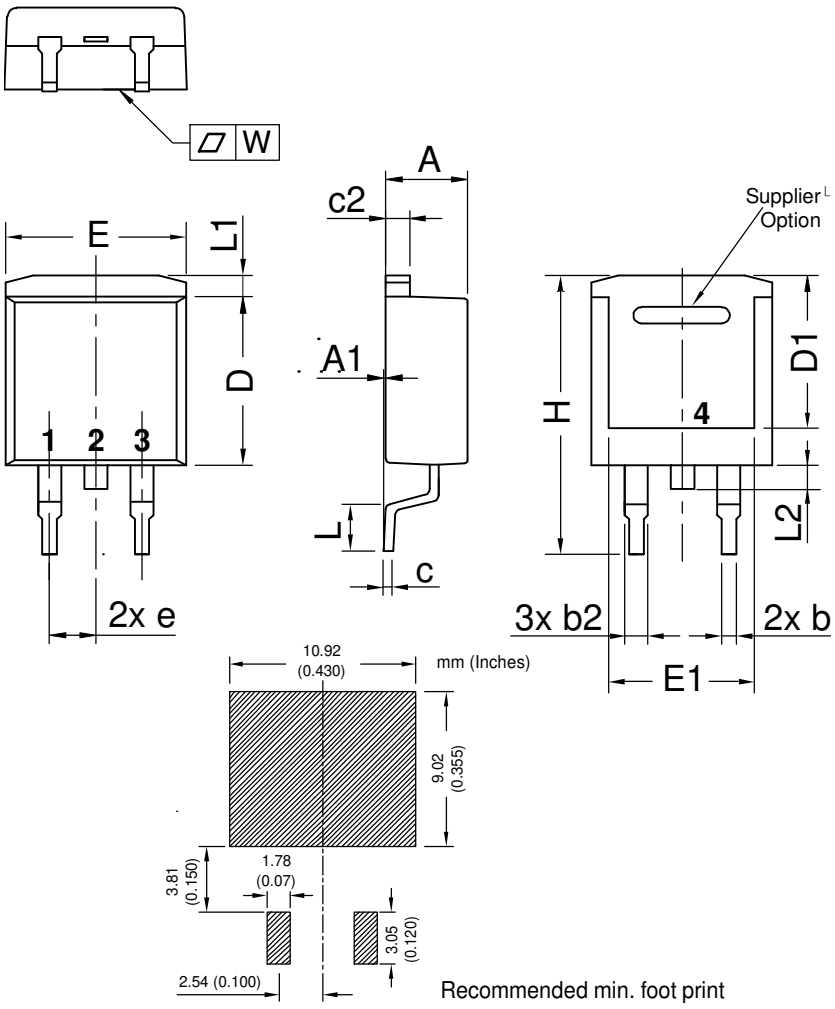
Equivalent Circuits for Simulation

** on die level* $T_{VJ} = 175°C$



		Fast Diode	
$V_{0\,max}$	*threshold voltage*	0.72	V
$R_{0\,max}$	*slope resistance **	7.5	mΩ

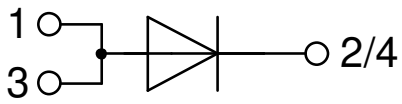
Outlines TO-263 (D2Pak)



Recommended min. foot print

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

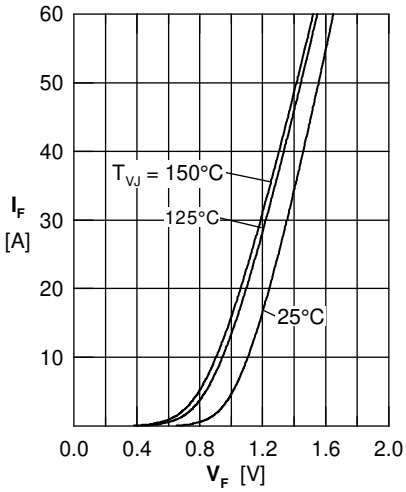


Fig. 1 Forward current I_F versus forward voltage V_F

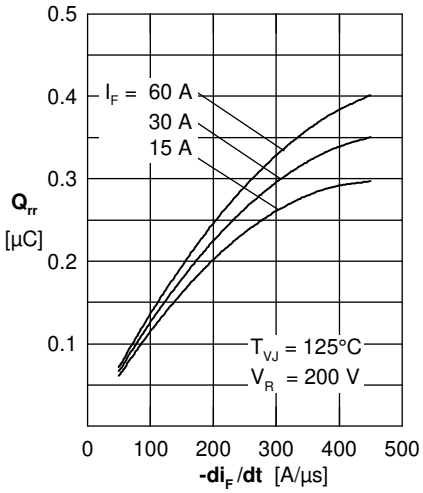


Fig. 2 Typ. reverse recovery charge Q_{rr} versus $-di_F/dt$

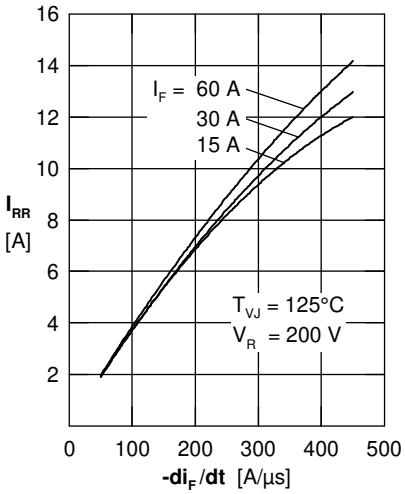


Fig. 3 Typ. reverse recovery current I_{RR} versus $-di_F/dt$

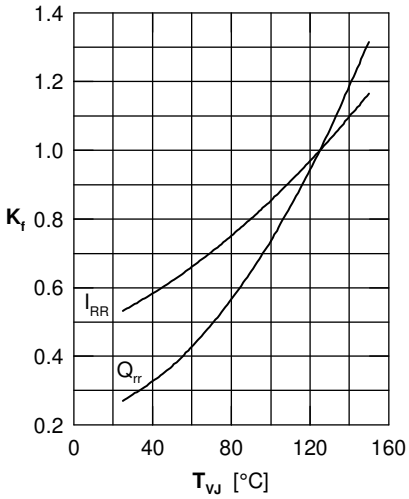


Fig. 4 Dynamic parameters Q_{rr}, I_{RR} versus T_{VJ}

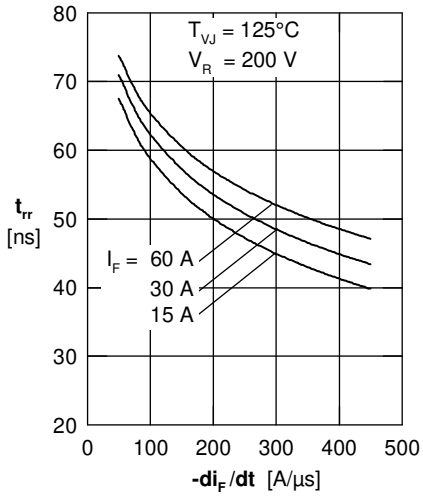


Fig. 5 Typ. reverse recovery time t_{rr} versus $-di_F/dt$

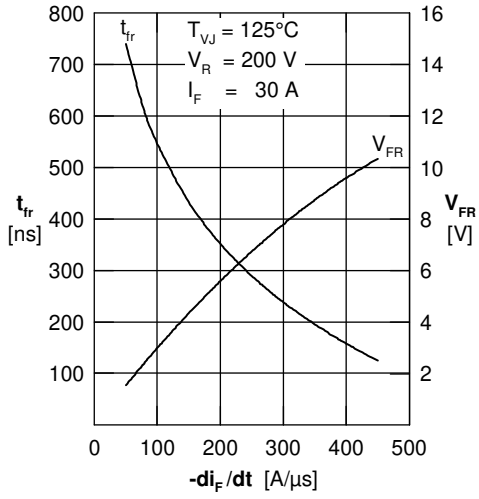


Fig. 6 Typ. forward recovery voltage V_{FR} & forward recovery time t_{fr} vs. di_F/dt

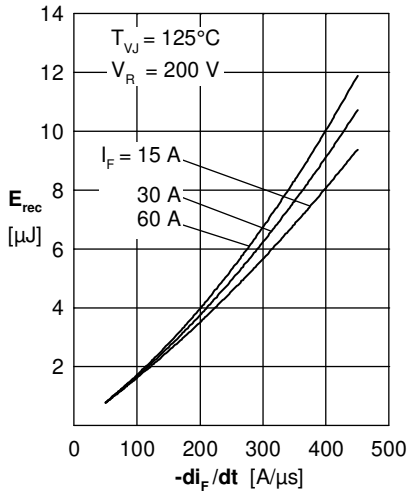


Fig. 7 Typ. recovery energy E_{rec} versus $-di_F/dt$

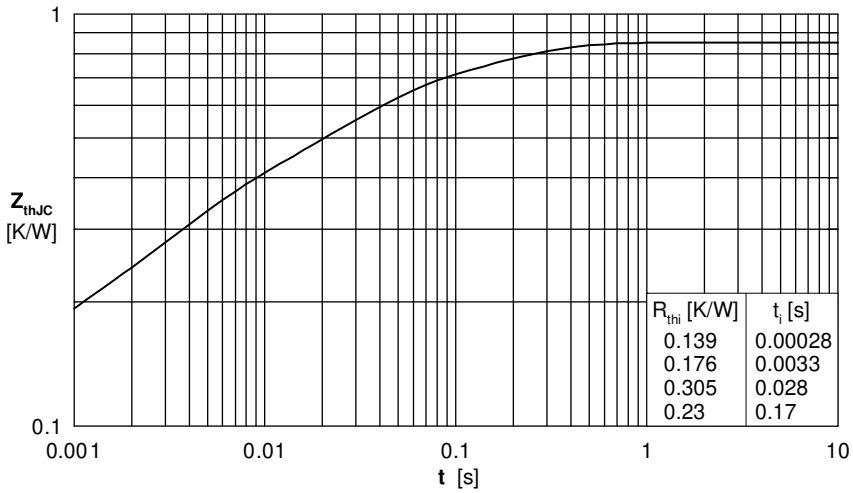


Fig. 8 Transient thermal impedance junction to case