

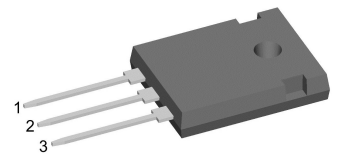
HiPerFRED

$V_{RRM} = 600\text{ V}$
 $I_{FAV} = 2 \times 15\text{ A}$
 $t_{rr} = 35\text{ ns}$

High Performance Fast Recovery Diode
 Low Loss and Soft Recovery
 Common Cathode

Part number

DSEC30-06A



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-247

- 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					600	V
V_{RRM}	max. repetitive reverse blocking voltage					600	V
I_R	reverse current, drain current	$V_R = 600\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		100	μA
		$V_R = 600\text{ V}$		$T_{VJ} = 150^\circ\text{C}$		0,5	mA
V_F	forward voltage drop	$I_F = 15\text{ A}$		$T_{VJ} = 25^\circ\text{C}$		2,03	V
		$I_F = 30\text{ A}$				2,24	V
		$I_F = 15\text{ A}$		$T_{VJ} = 150^\circ\text{C}$		1,34	V
		$I_F = 30\text{ A}$				1,57	V
I_{FAV}	average forward current	$T_C = 140^\circ\text{C}$		$T_{VJ} = 175^\circ\text{C}$		15	A
		rectangular	$d = 0.5$				
V_{FO}	threshold voltage			$T_{VJ} = 175^\circ\text{C}$		0,99	V
r_F	slope resistance	} for power loss calculation only				14,3	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			$T_C = 25^\circ\text{C}$		95	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		110	A
C_J	junction capacitance	$V_R = 400\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		12	pF
I_{RM}	max. reverse recovery current			$T_{VJ} = 25^\circ\text{C}$		5	A
				$T_{VJ} = 100^\circ\text{C}$		7	A
t_{rr}	reverse recovery time	} $I_F = 15\text{ A}; V_R = 300\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		35	ns
				$T_{VJ} = 100^\circ\text{C}$		95	ns
E_{AS}	non-repetitive avalanche energy	$I_{AS} = 1\text{ A}$	$L = 180\text{ }\mu\text{H}$	$T_{VJ} = 25^\circ\text{C}$		0,1	mJ
I_{AR}	repetitive avalanche current	$V_A = 1.5 \cdot V_R$ typ.: $f = 10\text{ kHz}$				0,1	A



Package TO-247			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal ¹⁾			50	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				6		g
M_D	mounting torque		0,8		1,2	Nm
F_C	mounting force with clip		20		120	N

Product Marking



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSEC30-06A	DSEC30-06A	Tube	30	473502

Similar Part	Package	Voltage class
DSEC30-06B	TO-247AD (3)	600
DSEC29-06AC	ISOPLUS220AB (3)	600

Equivalent Circuits for Simulation

* on die level

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



Fast Diode

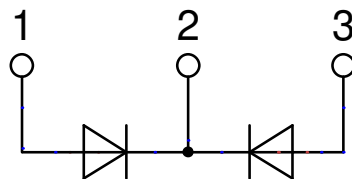
$V_{0 \max}$	threshold voltage	0,99	V
$R_{0 \max}$	slope resistance *	11,7	mΩ



Outlines TO-247



Sym.	Inches		Millimeter	
	min.	max.	min.	max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819	0.845	20.79	21.45
E	0.610	0.640	15.48	16.24
E2	0.170	0.216	4.31	5.48
e	0.215 BSC		5.46 BSC	
L	0.780	0.800	19.80	20.30
L1	-	0.177	-	4.49
Ø P	0.140	0.144	3.55	3.65
Q	0.212		5.38	
S	0.242 BSC		6.14 BSC	
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	-	13.07	-
D2	0.020	0.053	0.51	1.35
E1	0.530	-	13.45	-
Ø P1	-	0.29	-	7.39



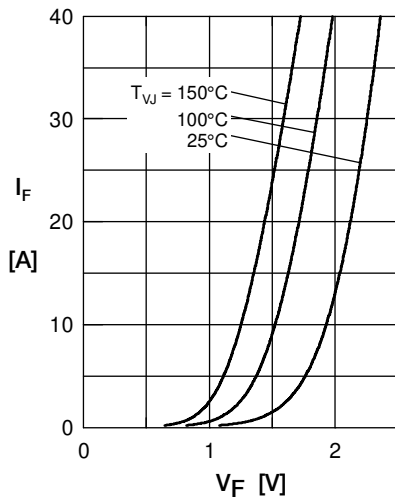
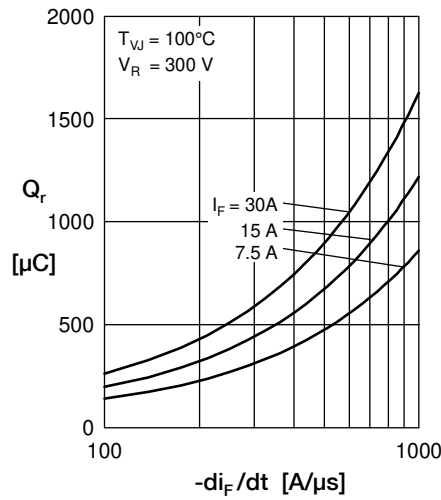
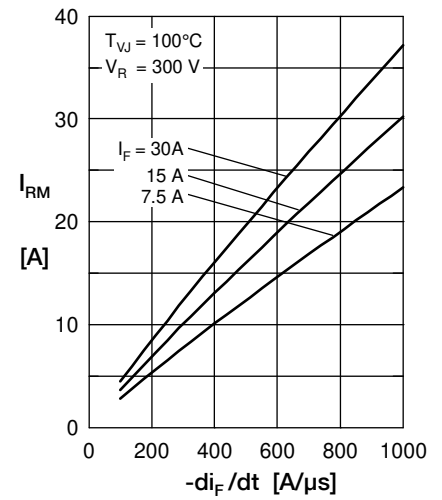
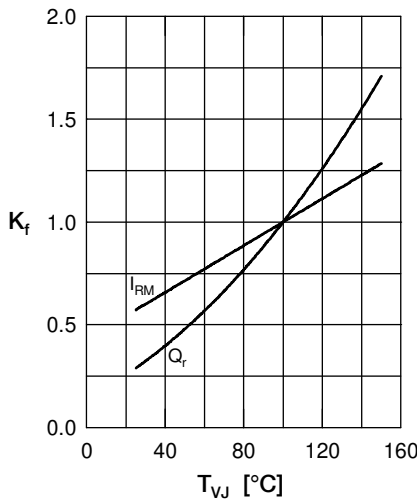
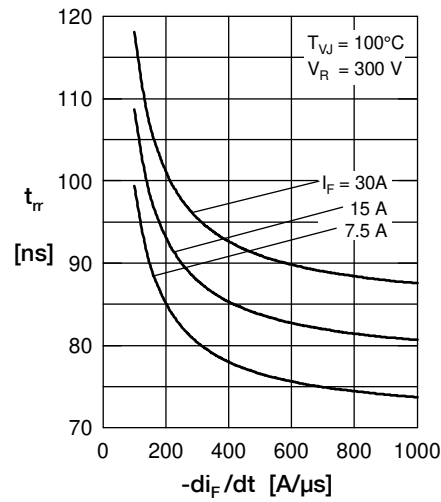
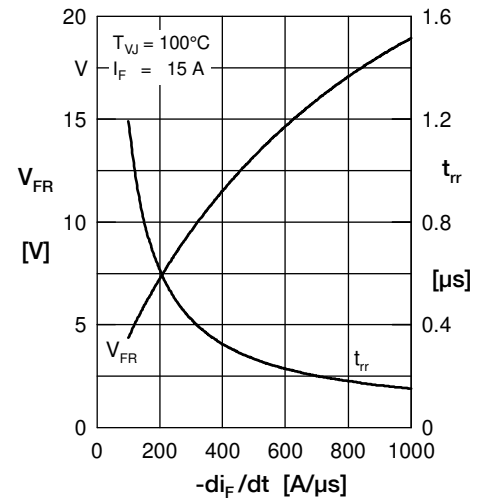
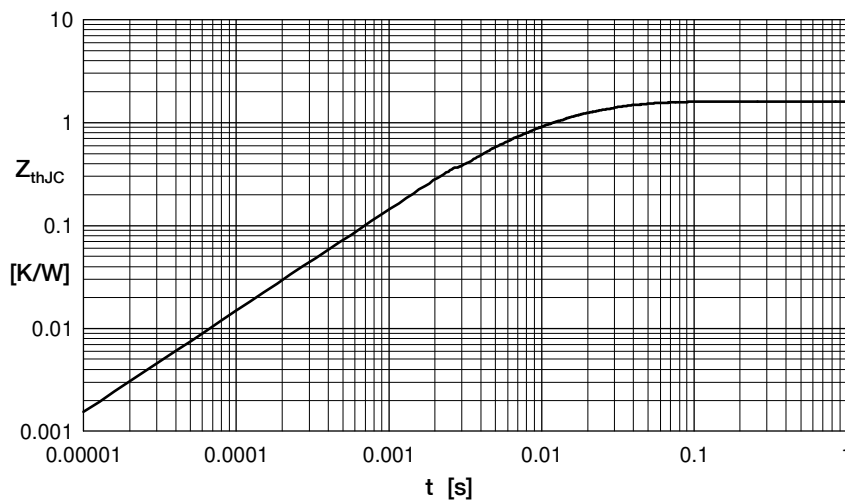
Fast Diode

 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	0.908	0.0052
2	0.350	0.0003
3	0.342	0.017