

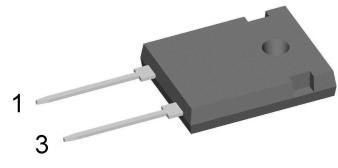
# FRED

$V_{RRM}$  = 600 V  
 $I_{FAV}$  = 25 A  
 $t_{rr}$  = 35 ns

## Fast Recovery Epitaxial Diode Single Diode

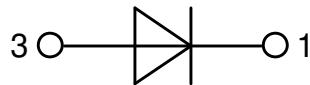
### Part number

**DFE25I600HA**



Backside: cathode

 E72873



### Features / Advantages:

- Planar passivated chips
- 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
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

### Disclaimer Notice

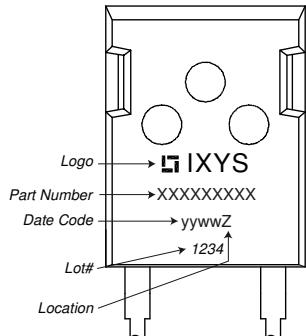
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**Fast Diode**

Symbol	Definition	Conditions	Ratings			
			min.	typ.	max.	
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^\circ C$			600	V
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^\circ C$			600	V
$I_R$	reverse current, drain current	$V_R = 600 V$ $V_R = 480 V$	$T_{VJ} = 25^\circ C$ $T_{VJ} = 125^\circ C$		100 6	$\mu A$ mA
$V_F$	forward voltage drop	$I_F = 25 A$ $I_F = 50 A$ $I_F = 25 A$ $I_F = 50 A$	$T_{VJ} = 25^\circ C$ $T_{VJ} = 150^\circ C$		1.50 1.77 1.35 1.72	V V
$I_{FAV}$	average forward current	$T_C = 100^\circ C$ rectangular $d = 0.5$	$T_{VJ} = 150^\circ C$		25	A
$V_{F0}$ $r_F$	threshold voltage slope resistance } for power loss calculation only		$T_{VJ} = 150^\circ C$		1.10 10	V $m\Omega$
$R_{thJC}$	thermal resistance junction to case				1.2	K/W
$R_{thCH}$	thermal resistance case to heatsink			0.25		K/W
$P_{tot}$	total power dissipation	$T_C = 25^\circ C$			105	W
$I_{FSM}$	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{sine}; V_R = 0 V$	$T_{VJ} = 45^\circ C$		240	A
$C_J$	junction capacitance	$V_R = 400 V$ $f = 1 \text{ MHz}$	$T_{VJ} = 25^\circ C$		20	pF
$I_{RM}$	max. reverse recovery current		$T_{VJ} = 25^\circ C$ $T_{VJ} = 100^\circ C$		9 14	A A
$t_{rr}$	reverse recovery time	$I_F = 30 A; V_R = 300 V$ $-di_F/dt = 200 A/\mu s$	$T_{VJ} = 25^\circ C$ $T_{VJ} = 100^\circ C$		50 120	ns ns

**Package TO-247**

Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	$RMS$ current	per terminal			50	A
$T_{VJ}$	virtual junction temperature		-55		150	°C
$T_{op}$	operation temperature		-55		125	°C
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				6		g
$M_d$	mounting torque		0.8		1.2	Nm
$F_c$	mounting force with clip		20		120	N

**Product Marking**

**Part description**

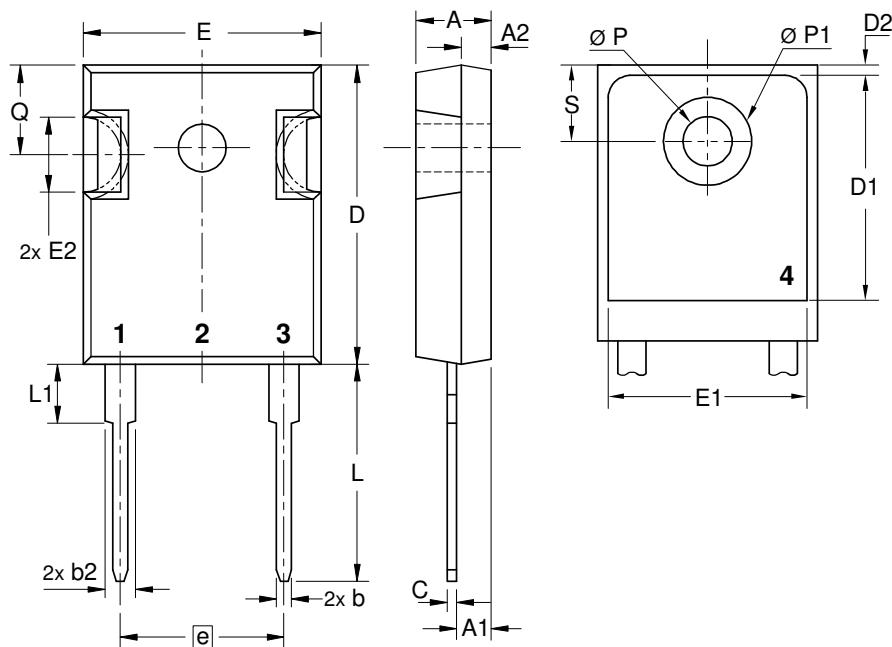
D = Diode  
 F = FRED  
 E = fast, low VF  
 25 = Current Rating [A]  
 I = Single Diode  
 600 = Reverse Voltage [V]  
 HA = TO-247AD (2)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DFE25I600HA	DFE25I600HA	Tube	30	521189

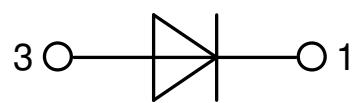
Similar Part	Package	Voltage class
DSEI25-06A	TO-220AC (2)	600
DSEI25-06AS	TO-263AB (D2Pak) (2)	600

**Equivalent Circuits for Simulation**
*\* on die level*
 $T_{VJ} = 150^\circ\text{C}$ 

	<b>Fast Diode</b>	
$V_{0\max}$	threshold voltage	1.1 V
$R_{0\max}$	slope resistance *	7.5 mΩ

**Outlines TO-247**


Sym.	Inches min. max.	Millimeter 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	0.430 BSC	10.92 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 0.244	5.38 6.19
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

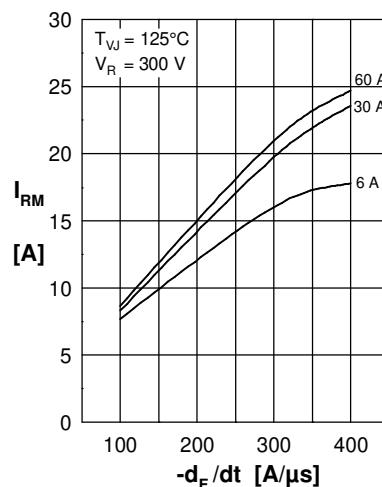
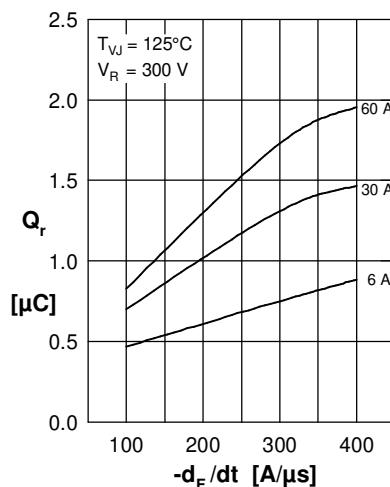
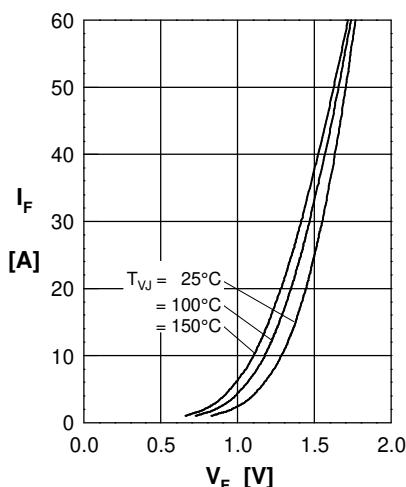


Fig. 1 Forward current  $I_F$  versus max. forward voltage drop  $V_F$

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

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

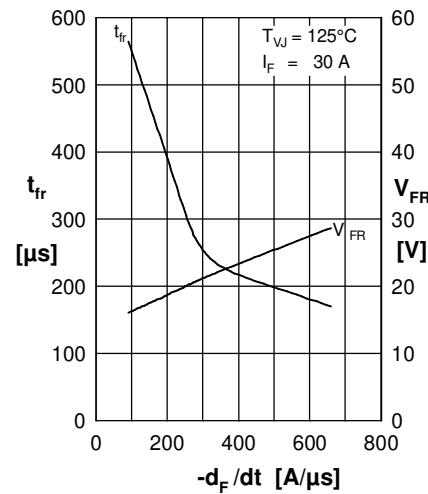
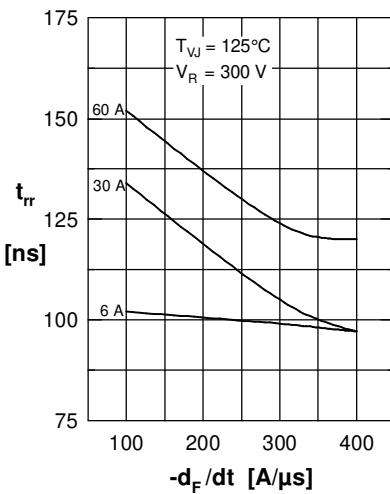
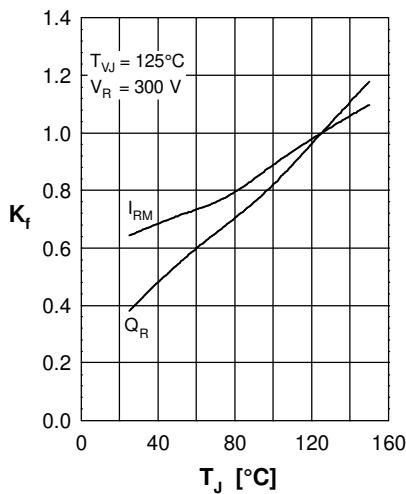


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

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

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

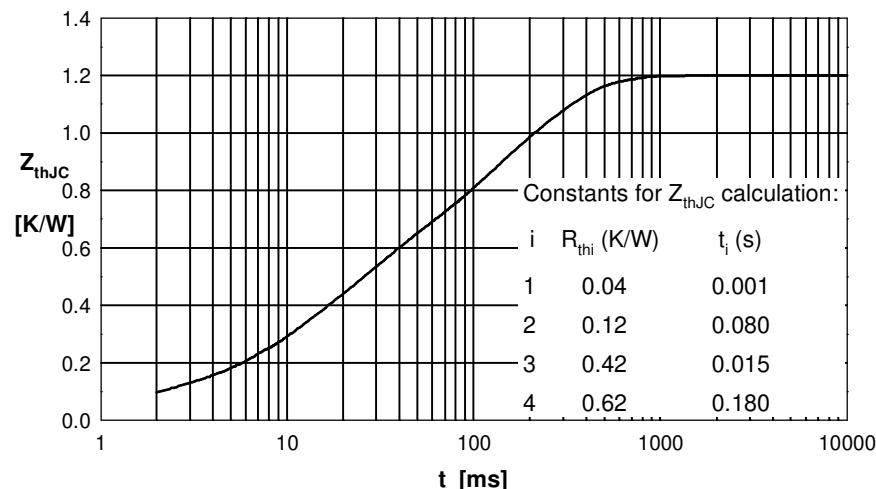
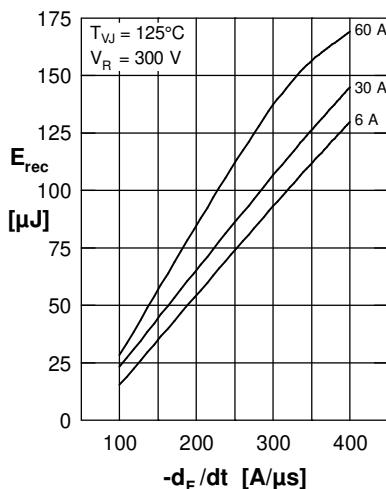


Fig. 7 Recovery energy versus  $-di_F/dt$

Fig. 8 Transient thermal impedance junction to case