

## FRED

$$V_{RRM} = 600\text{ V}$$

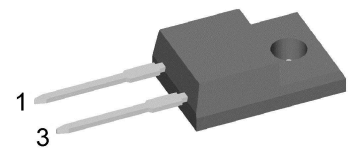
$$I_{FAV} = 10\text{ A}$$

$$t_{rr} = 110\text{ ns}$$

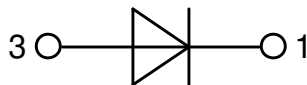
## Single Diode

## Part number

DFE10I600PM



Backside: Isolated

 E72873


## 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-220FP

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

## Terms and Conditions of Usage

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

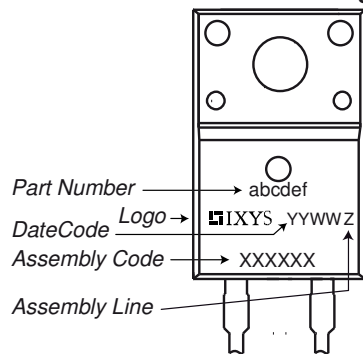
Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;
- the conclusion of quality agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Fast Diode				Ratings				
Symbol	Definition	Conditions		min.	typ.	max.	Unit	
V <sub>RSM</sub>	max. non-repetitive reverse blocking voltage	T <sub>VJ</sub> = 25°C				600	V	
V <sub>RRM</sub>	max. repetitive reverse blocking voltage	T <sub>VJ</sub> = 25°C				600	V	
I <sub>R</sub>	reverse current, drain current	V <sub>R</sub> = 600 V	T <sub>VJ</sub> = 25°C			20	μA	
		V <sub>R</sub> = 480 V	T <sub>VJ</sub> = 125°C			1.5	mA	
V <sub>F</sub>	forward voltage drop	I <sub>F</sub> = 10 A	T <sub>VJ</sub> = 25°C			1.50	V	
		I <sub>F</sub> = 20 A				1.77	V	
		I <sub>F</sub> = 10 A	T <sub>VJ</sub> = 150°C			1.38	V	
		I <sub>F</sub> = 20 A				1.70	V	
I <sub>FAV</sub>	average forward current	T <sub>C</sub> = 100°C rectangular      d = 0.5	T <sub>VJ</sub> = 150°C			10	A	
V <sub>F0</sub>	threshold voltage	} for power loss calculation only				0.98	V	
r <sub>F</sub>	slope resistance					28.7	mΩ	
R <sub>thJC</sub>	thermal resistance junction to case					4.2	K/W	
R <sub>thCH</sub>	thermal resistance case to heatsink				0.50		K/W	
P <sub>tot</sub>	total power dissipation	T <sub>C</sub> = 25°C				30	W	
I <sub>FSM</sub>	max. forward surge current	t = 10 ms; (50 Hz), sine; V <sub>R</sub> = 0 V		T <sub>VJ</sub> = 45°C		100	A	
C <sub>J</sub>	junction capacitance	V <sub>R</sub> = 400 V   f = 1 MHz		T <sub>VJ</sub> = 25°C	5		pF	
I <sub>RM</sub>	max. reverse recovery current	} I <sub>F</sub> = 10 A; V <sub>R</sub> = 300 V -di <sub>F</sub> /dt = 100 A/μs		T <sub>VJ</sub> = 25 °C	4		A	
				T <sub>VJ</sub> = 125°C	2		A	
t <sub>rr</sub>	reverse recovery time			T <sub>VJ</sub> = 25 °C	110		ns	
				T <sub>VJ</sub> = 125°C	25		ns	

Package TO-220FP				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal				20	A
$T_{VJ}$	virtual junction temperature			-55		150	°C
$T_{op}$	operation temperature			-55		125	°C
$T_{stg}$	storage temperature			-55		150	°C
Weight					2		g
$M_D$	mounting torque			0.4		0.6	Nm
$F_C$	mounting force with clip			20		60	N
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	3.2	2.7			mm
$d_{Spb/Apb}$		terminal to backside	2.5	2.5			mm
$V_{ISOL}$	isolation voltage	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	2500			V
		t = 1 minute		2100			V

### Product Marking



### Part description

D = Diode  
 F = FRED  
 E = fast, low VF  
 10 = Current Rating [A]  
 I = Single Diode  
 600 = Reverse Voltage [V]  
 PM = TO-220ACFP (2)

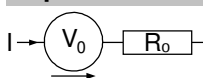
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DFE10I600PM	DFE10I600PM	Tube	50	503920

Similar Part	Package	Voltage class
DSEI8-06A	TO-220AC (2)	600
DSEI8-06AS	TO-263AB (D2Pak) (2)	600

### Equivalent Circuits for Simulation

\* on die level

$T_{VJ} = 150^\circ\text{C}$



$V_{0\max}$  threshold voltage

$R_{0\max}$  slope resistance \*

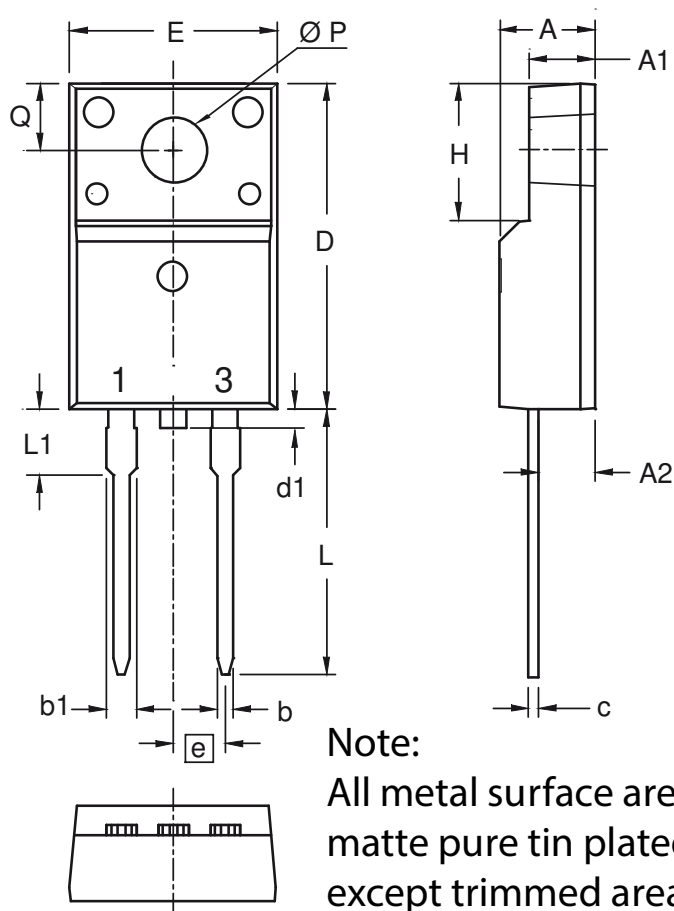
**Fast Diode**

0.98

25.7

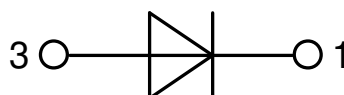
V

mΩ

**Outlines TO-220FP**


**Note:**  
All metal surface are  
matte pure tin plated  
except trimmed area.

Dim.	Millimeters		Inches	
	min	max	min	max
A	4.50	4.90	0.177	0.193
A1	2.34	2.74	0.092	0.108
A2	2.56	2.96	0.101	0.117
b	0.70	0.90	0.028	0.035
b1	1.27	1.47	0.050	0.058
c	0.45	0.60	0.018	0.024
D	15.67	16.07	0.617	0.633
d1	0	1.10	0	0.043
E	9.96	10.36	0.392	0.408
e	2.54 BSC		0.100 BSC	
H	6.48	6.88	0.255	0.271
L	12.68	13.28	0.499	0.523
L1	3.03	3.43	0.119	0.135
$\varnothing P$	3.08	3.28	0.121	0.129
Q	3.20	3.40	0.126	0.134



## Fast Diode

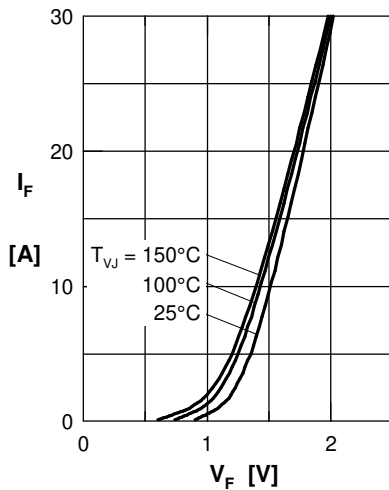


Fig. 1 Forward current  $I_F$  versus  $V_F$

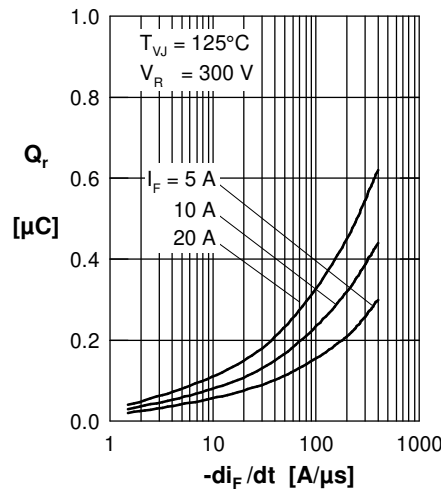


Fig. 2 Typ. reverse recov. charge  $Q_r$  versus  $-di_F/dt$

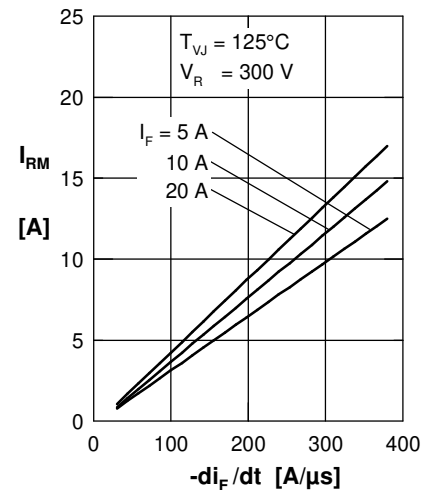


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

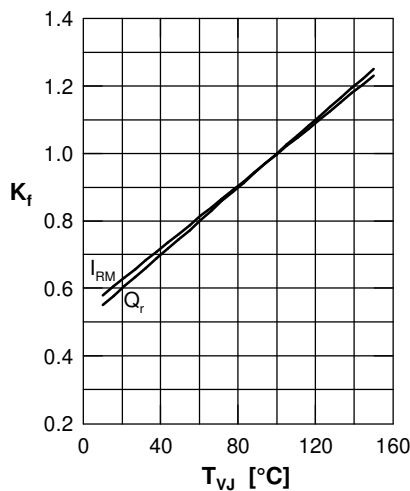


Fig. 4 Dyn. parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

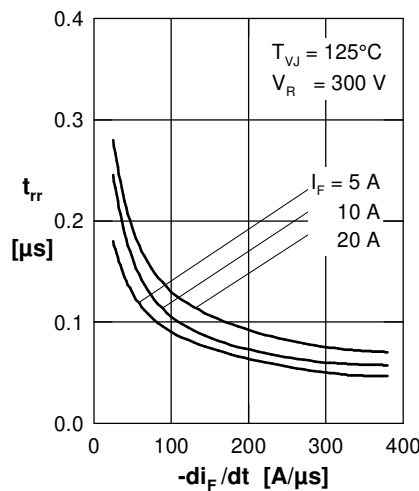


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

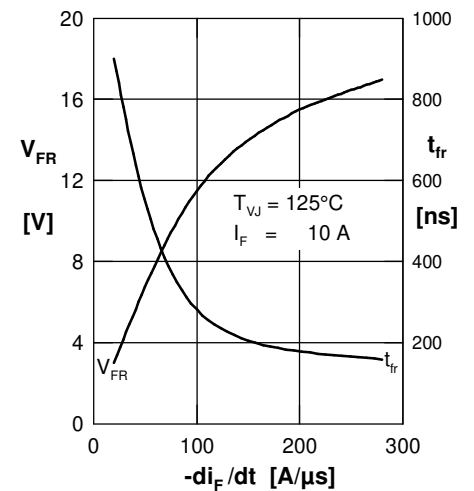


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

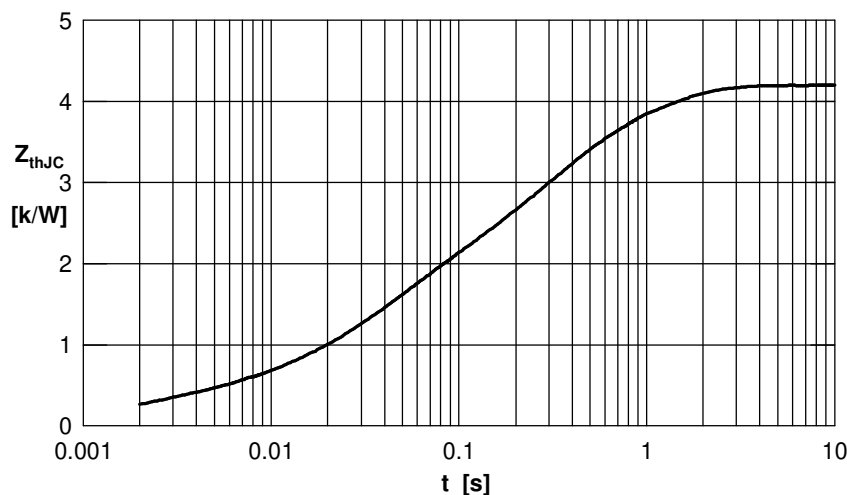


Fig. 7 Transient thermal impedance junction to case