



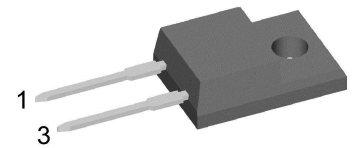
FRED

V_{RRM}	=	600 V
I_{FAV}	=	10 A
t_{rr}	=	35 ns

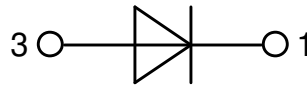
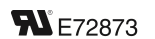
Fast Recovery Epitaxial Diode Single Diode

Part number

DFE10I600PM



Backside: isolated



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-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

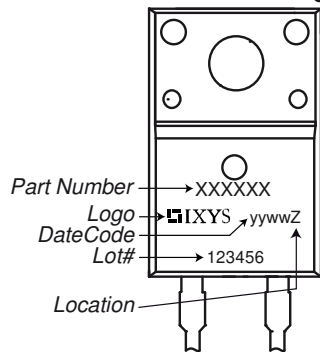
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Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			600	V	
I_R	reverse current, drain current	$V_R = 600 V$	$T_{VJ} = 25^{\circ}C$		20	μA	
		$V_R = 480 V$	$T_{VJ} = 125^{\circ}C$		1.5	mA	
V_F	forward voltage drop	$I_F = 10 A$	$T_{VJ} = 25^{\circ}C$		1.53	V	
		$I_F = 20 A$			1.75	V	
		$I_F = 10 A$	$T_{VJ} = 150^{\circ}C$		1.41	V	
		$I_F = 20 A$			1.73	V	
I_{FAV}	average forward current	$T_C = 80^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}C$		10	A	
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		1.12	V	
r_F	slope resistance				29	m Ω	
R_{thJC}	thermal resistance junction to case				4.2	K/W	
R_{thCH}	thermal resistance case to heatsink			0.5		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		30	W	
I_{FSM}	max. forward surge current	$t = 10 ms; (50 Hz), sine; V_R = 0 V$	$T_{VJ} = 45^{\circ}C$		100	A	
C_J	junction capacitance	$V_R = 400 V f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		5	pF	
I_{RM}	max. reverse recovery current	} $I_F = 10 A; V_R = 300 V$ $-di_F/dt = 100 A/\mu s$	$T_{VJ} = 25^{\circ}C$		2.6	A	
			$T_{VJ} = 125^{\circ}C$		4	A	
t_{rr}	reverse recovery time		$T_{VJ} = 25^{\circ}C$		65	ns	
			$T_{VJ} = 125^{\circ}C$		110	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	2500			V
		t = 1 minute	2100			V

Product Marking

Part description

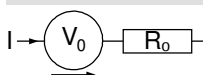
D = Diode
 F = FRED
 E = fast, low VF
 10 = Current Rating [A]
 I = Single Diode
 600 = Reverse Voltage [V]
 PM = TO-220ACFP (2)

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

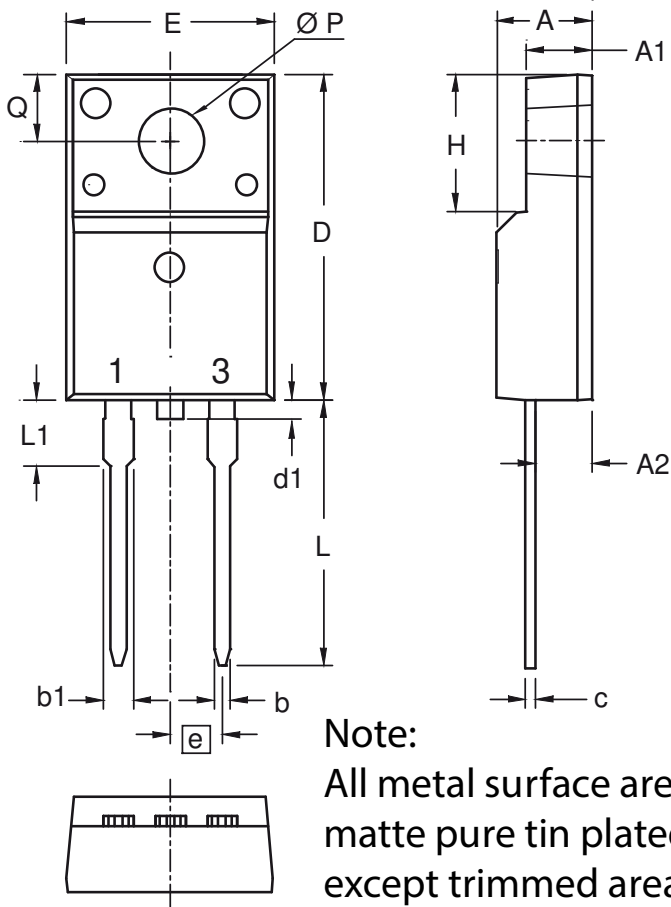
* on die level

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


$V_{0\ max}$	threshold voltage	1.12	V
$R_{0\ max}$	slope resistance *	25.9	mΩ

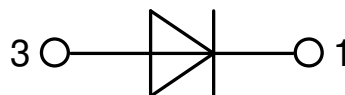


Outlines TO-220FP



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



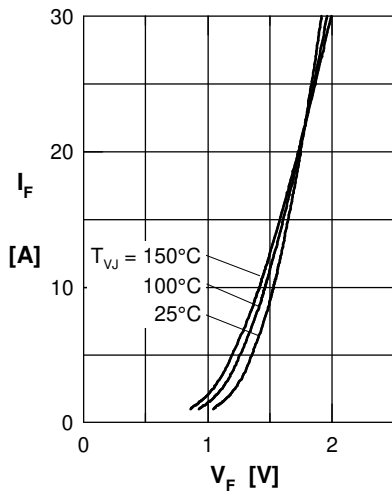
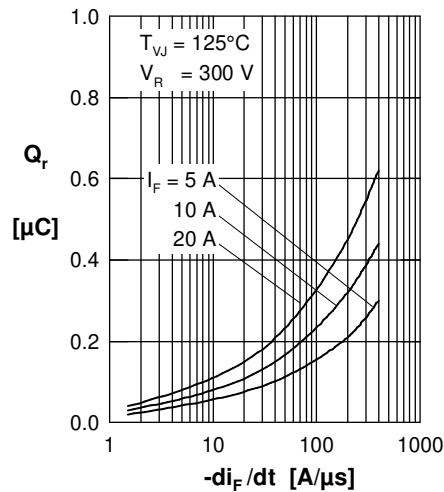
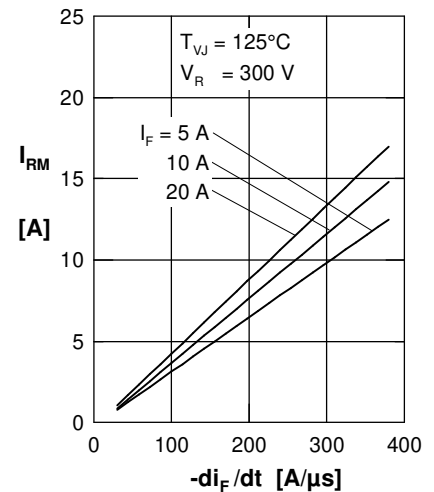
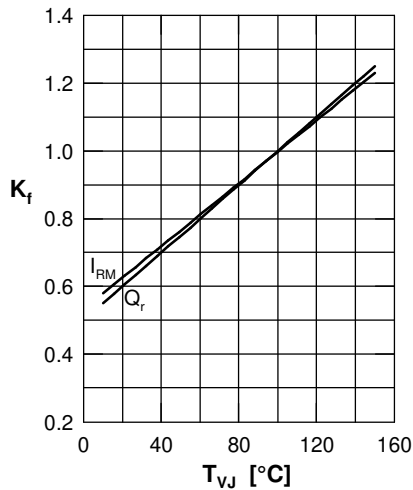
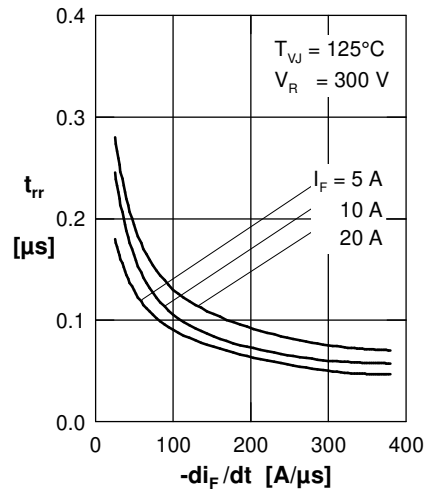
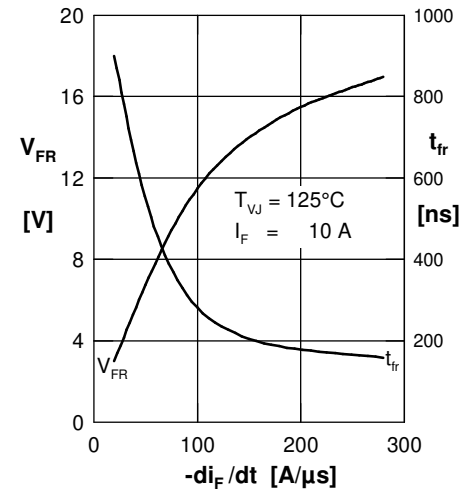
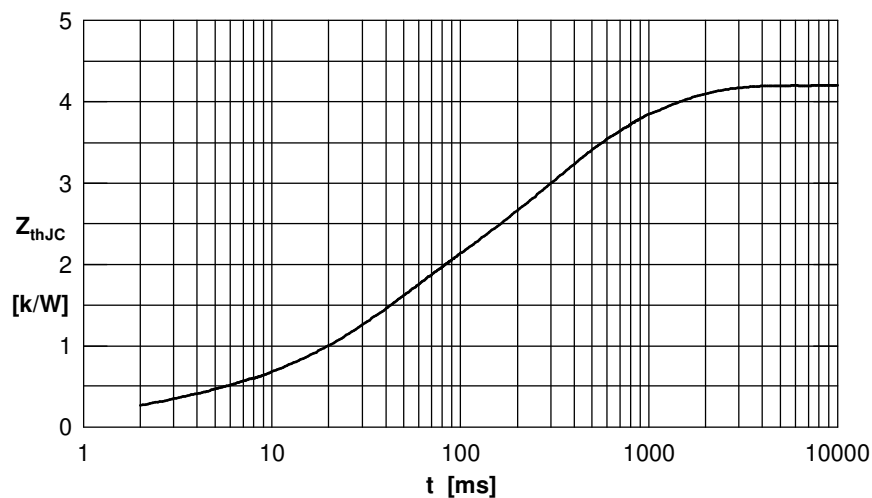
Fast Diode

 Fig. 1 Forward current I_F versus 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 Transient thermal impedance junction to case

 Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.270	0.002
2	1.230	0.032
3	1.560	0.226
4	1.140	0.820