

advanced

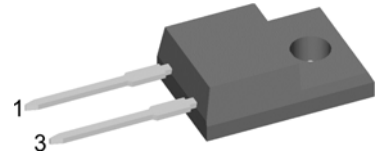
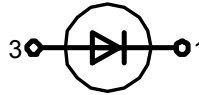
# FRED

Fast Recovery Diode  
Low Loss and Soft Recovery  
Single Diode

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

Part number (Marking on product)

**DFE 10 I 600PM**



Backside: isolated

### Features / Advantages:

- Planar passivated chips
- Low leakage current
- Very short recovery time
- Improved thermal behaviour
- 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-220ACFP
- Industry standard outline
  - Plastic overmolded tab for electrical isolation
  - Epoxy meets UL 94V-0
  - RoHS compliant

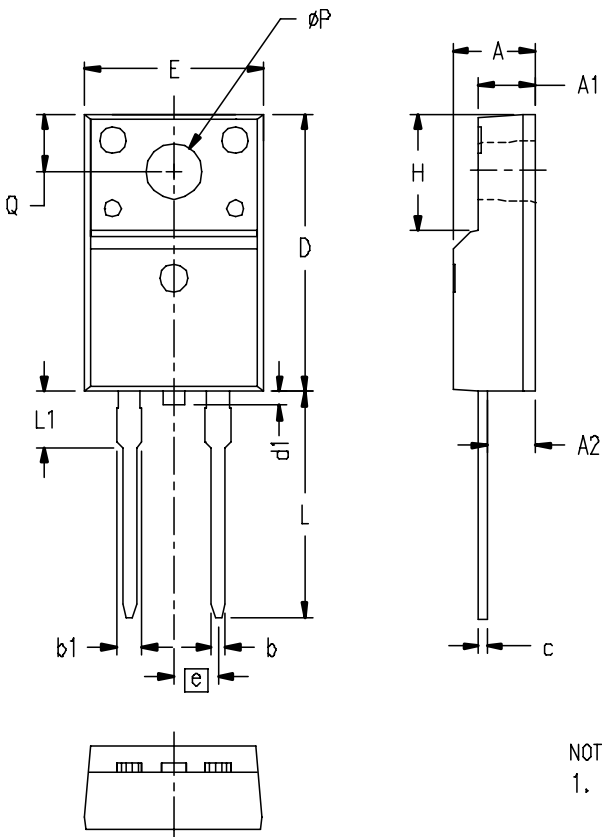
### Ratings

Symbol	Definition	Conditions	Ratings			Unit	
			min.	typ.	max.		
$V_{RRM}$	max. repetitive reverse voltage	$T_{VJ} = 25\text{ °C}$			600	V	
$I_R$	reverse current	$V_R = 600\text{ V}$			20	$\mu\text{A}$	
		$V_R = 600\text{ V}$			1.5	mA	
$V_F$	forward voltage	$I_F = 10\text{ A}$			1.50	V	
		$I_F = 20\text{ A}$			1.80	V	
		$I_F = 10\text{ A}$	$T_{VJ} = 150\text{ °C}$			1.30	V
		$I_F = 20\text{ A}$	$T_{VJ} = 150\text{ °C}$			1.70	V
$I_{FAV}$	average forward current	rectangular, $d = 0.5$			10	A	
$V_{FO}$	threshold voltage slope resistance } for power loss calculation only				0.98	V	
$r_F$					28.7	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				4.20	K/W	
$T_{VJ}$	virtual junction temperature		-55		150	$^{\circ}\text{C}$	
$P_{tot}$	total power dissipation	$T_C = 25\text{ °C}$			30	W	
$I_{FSM}$	max. forward surge current	$t_p = 10\text{ ms (50 Hz), sine}$			100	A	
$I_{RM}$	max. reverse recovery current	$I_F = 10\text{ A};$ $-di_F/dt = 100\text{ A}/\mu\text{s}$	$T_{VJ} = 25\text{ °C}$				A
			$T_{VJ} = 125\text{ °C}$		4		A
$t_{rr}$	reverse recovery time	$V_R = 300\text{ V}$	$T_{VJ} = 25\text{ °C}$		35	ns	
			$T_{VJ} = 125\text{ °C}$		120	ns	
$C_J$	junction capacitance	$V_R = 300\text{ V}; f = 1\text{ MHz}$		tbd		pF	
$E_{AS}$	non-repetitive avalanche energy	$I_{AS} = \text{tbd A}; L = 100\text{ }\mu\text{H}$			tbd	mJ	
$I_{AR}$	repetitive avalanche current	$V_A = 1.5 \cdot V_R \text{ typ.}; f = 10\text{ kHz}$			tbd	A	

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$I_{RMS}$	RMS current	per pin*			35	A
$R_{thCH}$	thermal resistance case to heatsink			0.50		K/W
$M_D$	mounting torque		0.4		0.6	Nm
$F_C$	mounting force with clip		20		60	N
$T_{sta}$	storage temperature		-55		150	°C
<b>Weight</b>				2		g

\* Irms is typically limited by: 1. pin-to-chip resistance; or by 2. current capability of the chip.

In case of 1, a common cathode/anode configuration and a non-isolated backside, the whole current capability can be used by connecting the backside.

**Outlines TO-220ACFP**


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.177	.193	4.50	4.90
A1	.092	.108	2.34	2.74
A2	.101	.117	2.56	2.96
b	.028	.035	0.70	0.90
b1	.050	.058	1.27	1.47
c	.018	.024	0.45	0.60
D	.617	.633	15.67	16.07
d1	0	.043	0	1.10
E	.392	.408	9.96	10.36
e	.100 BSC		2.54 BSC	
H	.255	.271	6.48	6.88
L	.499	.523	12.68	13.28
L1	.119	.135	3.03	3.43
ØP	.121	.129	3.08	3.28
Q	.126	.134	3.20	3.40

**NOTE:**

1. All metal surface are matte pure tin plated except trimmed area.