

STARPOWER

SEMICONDUCTOR™

FRED

FD1200HFE170A3S

Molding Type Module

1700V/1200A 2 in one-package

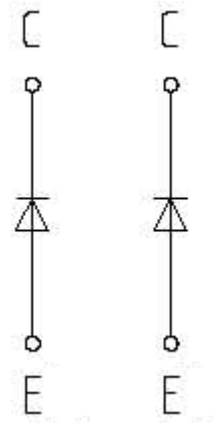
General Description

STARPOWER Diode Power Module provides low forward voltage as well as low reverse recovery loss. They are designed for the applications such as wind turbines.



Features

- Fast soft diode
- Low forward voltage drop
- Small temperature coefficient
- Low reverse recovery losses
- High ruggedness
- Low inductance
- AlSiC baseplate for high power cycling capability
- AlN substrate for low thermal resistance



Equivalent Circuit Schematic

Typical Applications

- 3-level-applications
- Wind turbines
- High power converters
- Traction drives

Absolute Maximum Ratings $T_C=25^{\circ}\text{C}$ unless otherwise noted

Symbol	Description	FD1200HFE170A3S	Units
V_{RRM}	Repetitive Peak Reverse Voltage	1700	V
I_F	Continuous Forward Current @ $T_C=80^{\circ}\text{C}$	1200	A
I_{FRM}	Repetitive Peak Forward Current	2400	A
T_{jmax}	Maximum Junction Temperature	150	$^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	-40 to +125	$^{\circ}\text{C}$
I^2t -value, Diode	$V_R=0\text{V}, t=10\text{ms}, T_j=125^{\circ}\text{C}$	140	kA^2s
V_{ISO}	Isolation Voltage RMS, $f=50\text{Hz}, t=1\text{min}$	4000	V
Mounting Torque	Power Terminal Screw: M8 Mounting Screw: M6	8.0 to 10 4.25 to 5.75	N.m

Notes:

(1) Repetitive rating: Pulse width limited by max. junction temperature

Characteristics Values

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=1200\text{A}$	$T_j=25^{\circ}\text{C}$	1.80	2.20	V
			$T_j=125^{\circ}\text{C}$	1.90		
Q_r	Recovered Charge	$I_F=1200\text{A},$ $V_R=900\text{V},$ $-di/dt=7000\text{A}/\mu\text{s},$	$T_j=25^{\circ}\text{C}$	303		nC
			$T_j=125^{\circ}\text{C}$	508		
I_{RM}	Peak Reverse Recovery Current	$I_F=1200\text{A},$ $V_R=900\text{V},$ $-di/dt=7000\text{A}/\mu\text{s},$	$T_j=25^{\circ}\text{C}$	1140		A
			$T_j=125^{\circ}\text{C}$	1245		
E_{rec}	Reverse Recovery Energy	$I_F=1200\text{A},$ $V_R=900\text{V},$ $-di/dt=7000\text{A}/\mu\text{s},$	$T_j=25^{\circ}\text{C}$	189		mJ
			$T_j=125^{\circ}\text{C}$	338		
L_{CE}	Stray Inductance			18		nH
$R_{CC'+EE'}$	Module Lead Resistance, Terminal To Chip	$T_C=25^{\circ}\text{C}$		0.24		$\text{m}\Omega$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case (Diode Part, per Module)		39	K/kW
$R_{\theta CS}$	Case-to-Sink (Conductive grease applied, per Module)	6		K/kW
Weight	Weight of Module	800		g

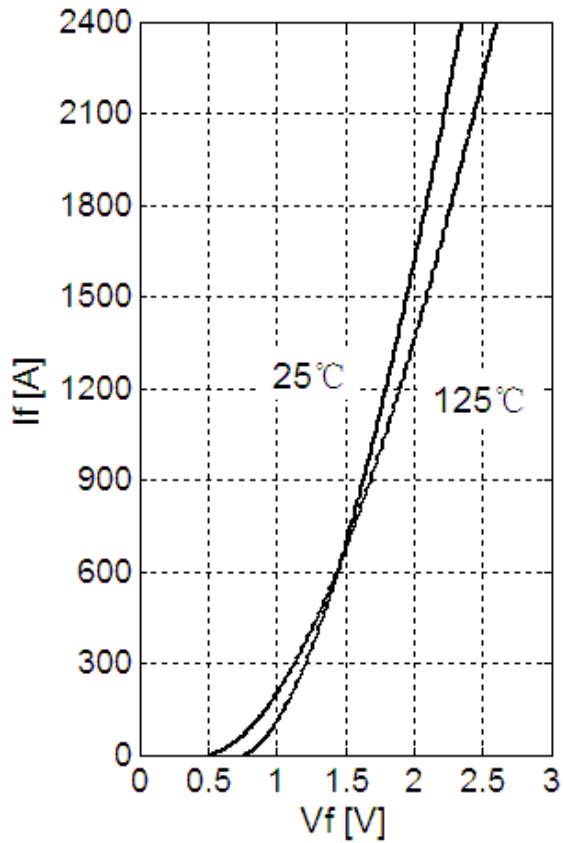


Fig 1. Diode Forward Characteristics

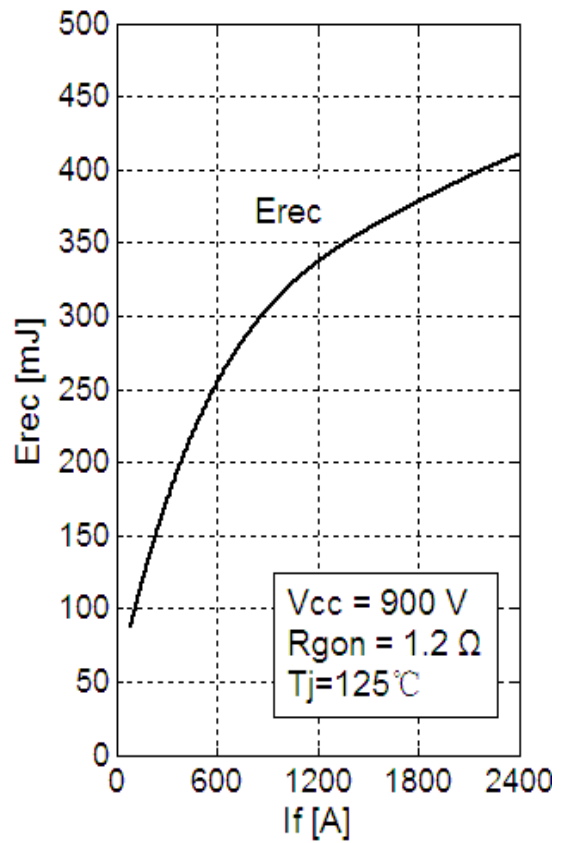


Fig 2. Diode Switching Loss vs. I_F

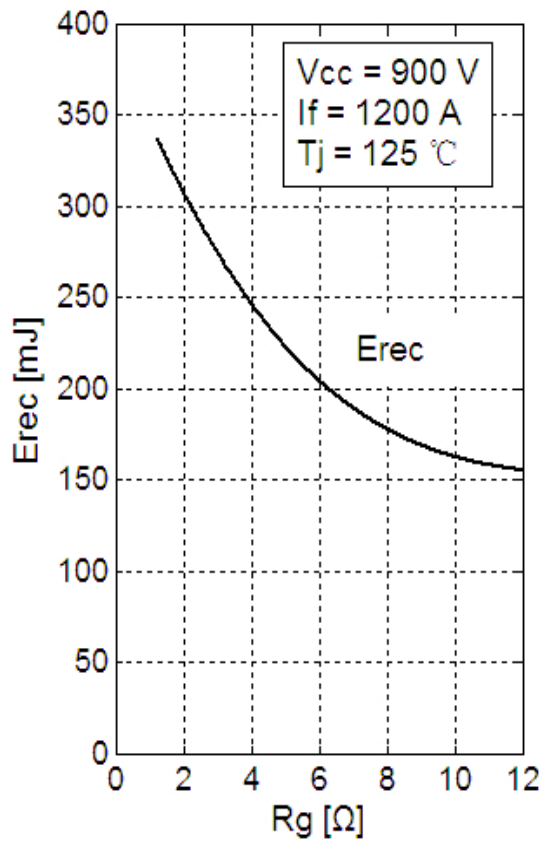


Fig 3. Diode Switching Loss vs. R_G

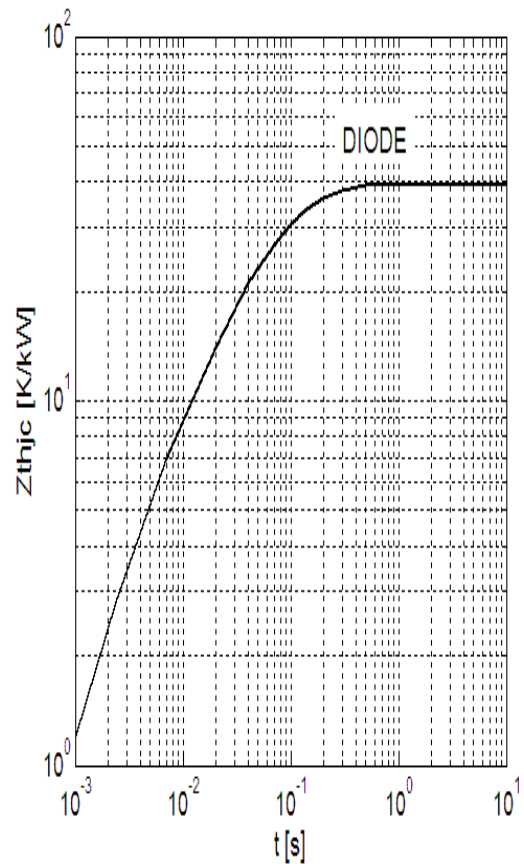


Fig 4. Diode Transient Thermal Impedance

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