

FFPF12UP20DN

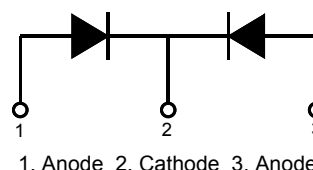
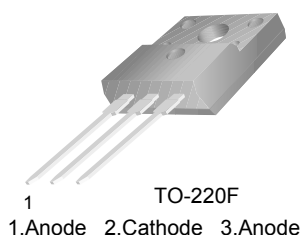
Ultrafast Recovery Power Rectifier

Features

- Ultrafast with Soft Recovery : $< 35\text{ns}$ ($@I_F = 6\text{A}$)
- High Reverse Voltage : $V_{RRM} = 200\text{V}$
- Enhanced Avalanche Energy Rated
- Planar Construction

Applications

- Output Rectifiers
- Switching Mode Power Supply
- Free-wheeling Diode
- Power Switching Circuits



Absolute Maximum Ratings

(per diode) $T_C = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
V_{RRM}	Peak Repetitive Reverse Voltage	200	V
V_{RWM}	Working Peak Reverse Voltage	200	V
V_R	DC Blocking Voltage	200	V
$I_{F(AV)}$	Average Rectified Forward Current @ $T_C = 120^\circ\text{C}$	6	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	60	A
T_J, T_{STG}	Operating Junction and Storage Temperature	- 65 to +150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Max	Units
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case	5.0	$^\circ\text{C/W}$

Package Marking and Ordering Information

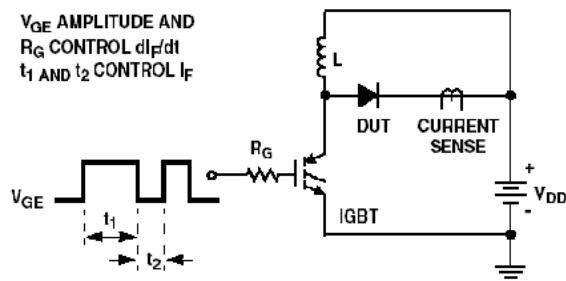
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F12UP20DN	FFPF12UP20DNTU	TO-220F	-	-	50

Electrical Characteristics (per diode) $T_C = 25^\circ\text{C}$ unless otherwise noted

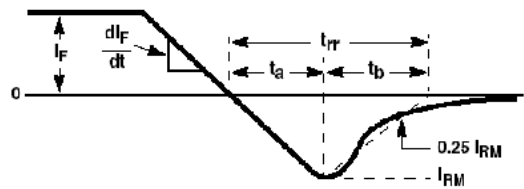
Symbol	Parameter		Min.	Typ.	Max.	Units
V_{FM}^*	$I_F = 6\text{A}$	$T_C = 25^\circ\text{C}$	-	-	1.15	V
	$I_F = 6\text{A}$	$T_C = 100^\circ\text{C}$	-	-	1.0	V
I_{RM}^*	$V_R = 200\text{V}$	$T_C = 25^\circ\text{C}$	-	-	100	μA
	$V_R = 200\text{V}$	$T_C = 100^\circ\text{C}$	-	-	500	μA
t_{rr}	$I_F = 1\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$, $V_{CC} = 30\text{V}$	$T_C = 25^\circ\text{C}$	-	-	30	ns
	$I_F = 6\text{A}$, $di/dt = 200\text{A}/\mu\text{s}$, $V_{CC} = 130\text{V}$	$T_C = 25^\circ\text{C}$	-	-	35	ns
t_a	$I_F = 6\text{A}$, $di/dt = 200\text{A}/\mu\text{s}$, $V_{CC} = 130\text{V}$	$T_C = 25^\circ\text{C}$	-	12	-	ns
t_b		$T_C = 25^\circ\text{C}$	-	12	-	ns
Q_{rr}		$T_C = 25^\circ\text{C}$	-	24	-	nC
W_{AVL}	Avalanche Energy ($L = 20\text{mH}$)		10	-	-	mJ

* Pulse Test: Pulse Width=300 μs , Duty Cycle=2%

Test Circuit and Waveforms

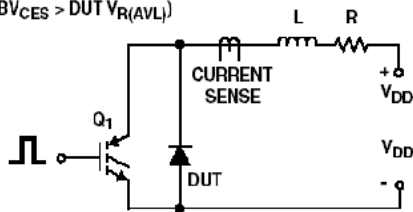


t_{rr} TEST CIRCUIT

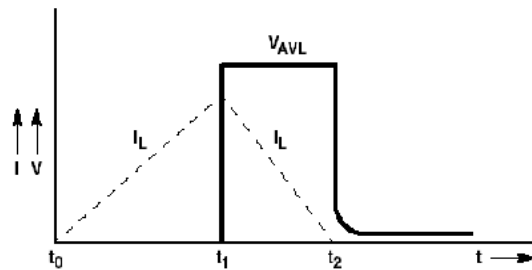


t_{rr} WAVEFORMS AND DEFINITIONS

- $I_{MAX} = 1\text{A}$
- $L = 20\text{mH}$
- $R < 0.1\Omega$
- $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
- $Q_1 = \text{IGBT (BV}_{CES} > V_{R(AVL)})$



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop

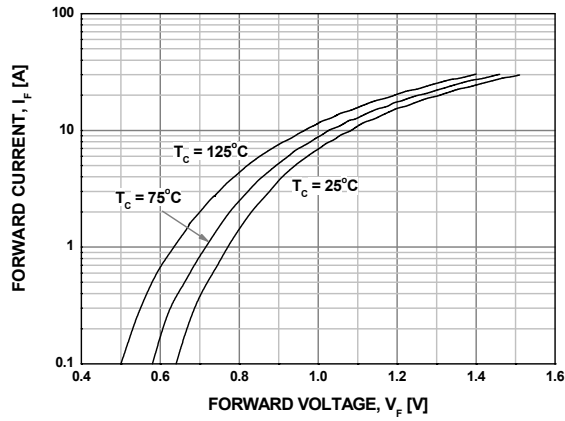


Figure 2. Typical Reverse Current

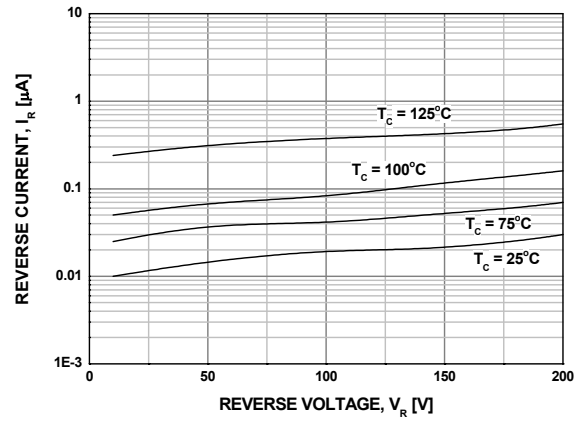


Figure 3. Typical Junction Capacitance

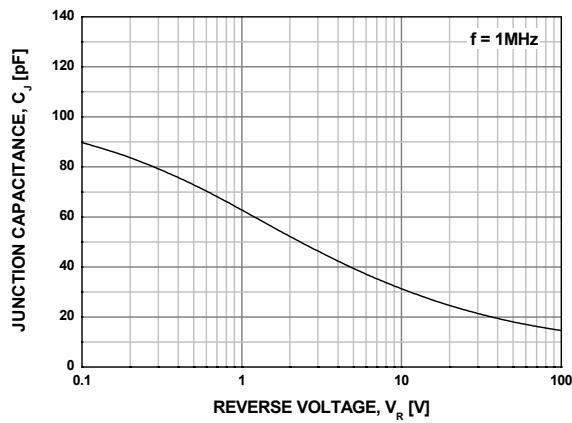


Figure 4. Typical Reverse Recovery Time

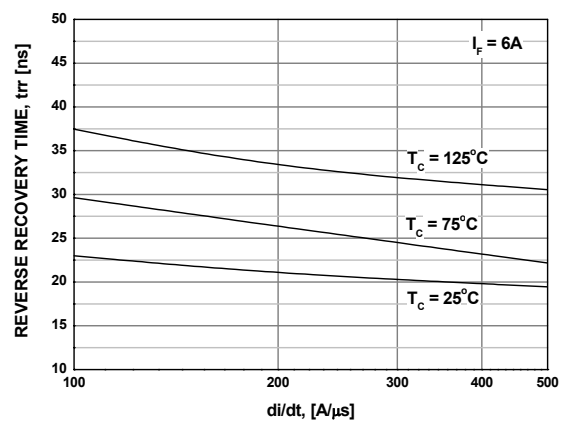


Figure 5. Typical Reverse Recovery Current

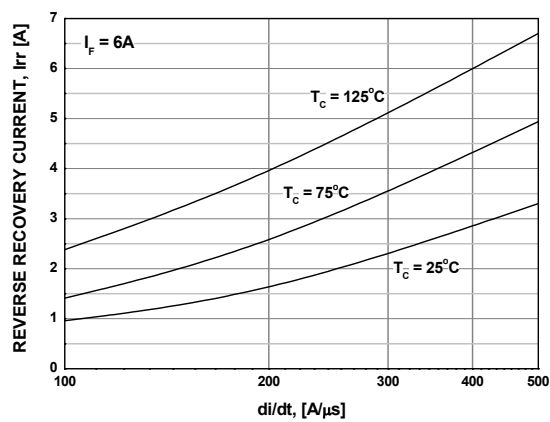


Figure 6. Forward Current Deration Curve

