

FFAF40UP20DN

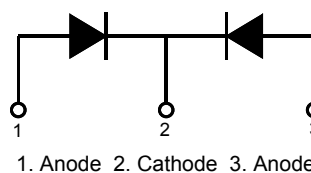
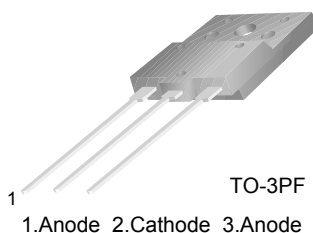
Ultrafast Recovery Power Rectifier

Features

- Ultrafast with Soft Recovery : $< 45\text{ns}$ ($@I_F = 20\text{A}$)
- High Reverse Voltage : $V_{RRM} = 200\text{V}$
- Avalanche Energy Rated
- Planar Construction

Applications

- Output Rectifiers
- Switching Mode Power Supply
- Free-wheeling diode for motor application
- 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 @ $T_C = 110^\circ\text{C}$	20	A
I_{FSM}	Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave	200	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	2.2	$^\circ\text{C/W}$

Package Marking and Ordering Information

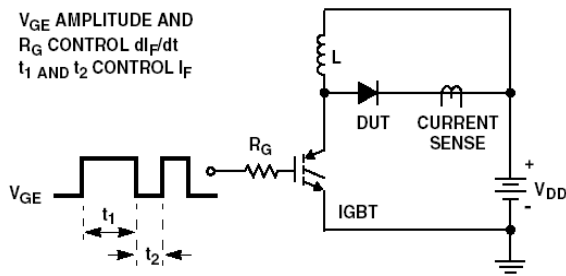
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
F40UP20DN	FFAF40UP20DNTU	TO-3PF	-	-	30

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

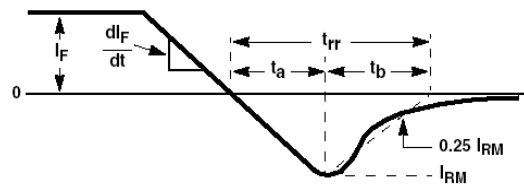
Symbol	Parameter		Min.	Typ.	Max.	Units
V_{FM}^*	$I_F = 20\text{A}$	$T_C = 25^\circ\text{C}$	-	-	1.15	V
	$I_F = 20\text{A}$	$T_C = 100^\circ\text{C}$	-	-	1.0	V
I_{RM}^*	$V_R = 200\text{V}$	$T_C = 25^\circ\text{C}$	-	-	100	μA
	$V_R = 200\text{V}$	$T_C = 100^\circ\text{C}$	-	-	500	μA
t_{rr}	$I_F = 1\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$, $V_{CC} = 30\text{V}$	$T_C = 25^\circ\text{C}$	-	-	35	ns
	$I_F = 20\text{A}$, $di/dt = 200\text{A}/\mu\text{s}$, $V_{CC} = 130\text{V}$	$T_C = 25^\circ\text{C}$	-	-	45	ns
t_a	$I_F = 20\text{A}$, $di/dt = 200\text{A}/\mu\text{s}$, $V_{CC} = 130\text{V}$	$T_C = 25^\circ\text{C}$	-	11	-	ns
t_b		$T_C = 25^\circ\text{C}$	-	13	-	ns
Q_{rr}		$T_C = 25^\circ\text{C}$	-	21	-	nC
W_{AVL}	Avalanche Energy ($L = 40\text{mH}$)		20	-	-	mJ

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

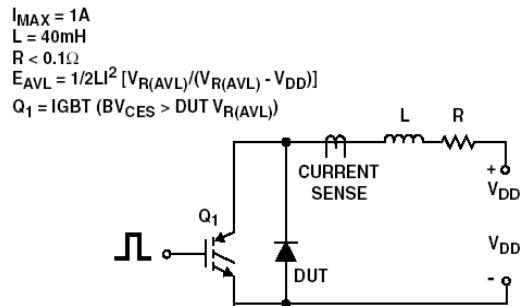
Test Circuit and Waveforms



t_{rr} TEST CIRCUIT



t_{rr} WAVEFORMS AND DEFINITIONS



AVALANCHE ENERGY TEST CIRCUIT



AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Typical Performance Characteristics

Figure 1. Typical Forward Voltage Drop

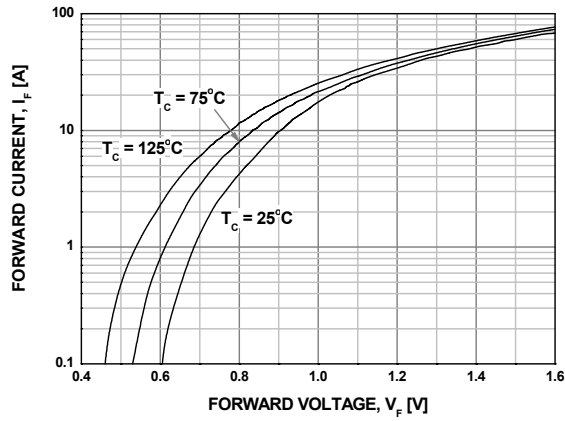


Figure 2. Typical Reverse Current

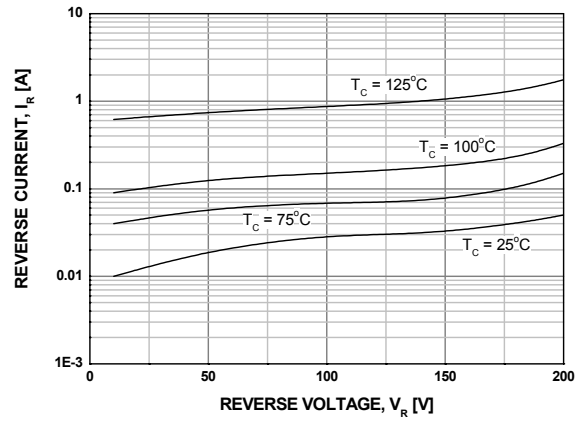


Figure 3. Typical Junction Capacitance

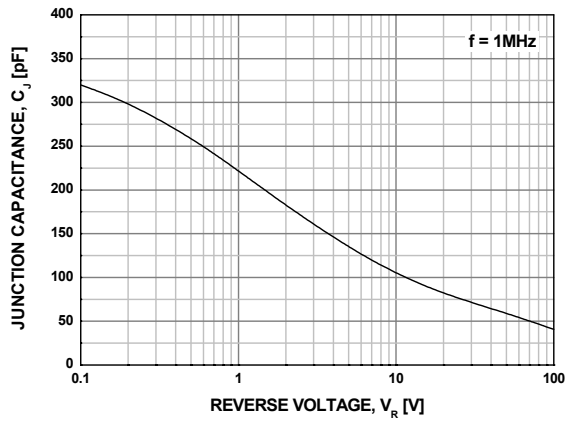


Figure 4. Typical Reverse Recovery Time

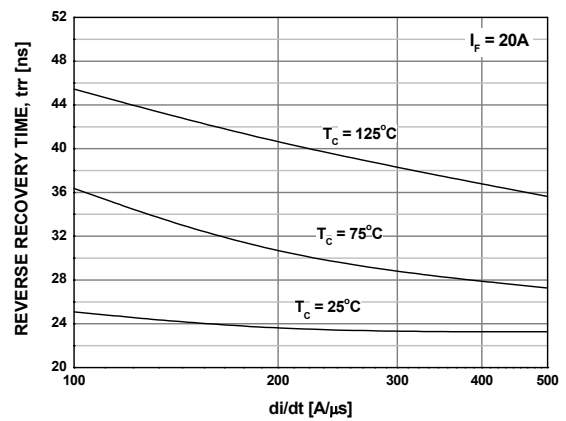


Figure 5. Typical Reverse Recovery Current

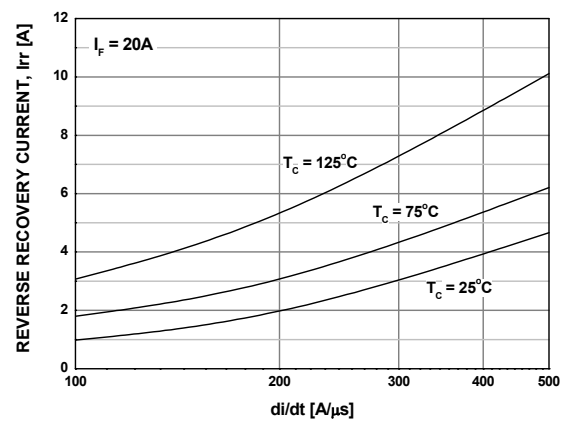
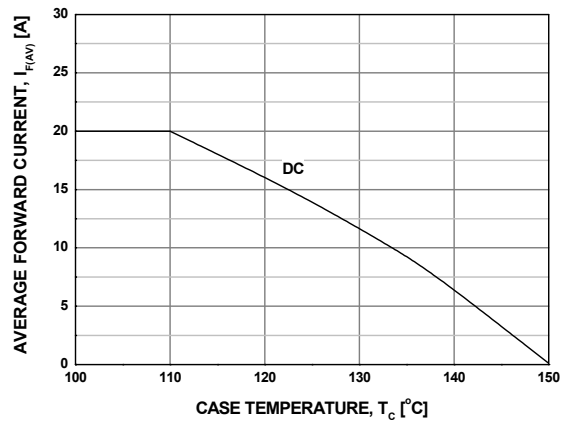


Figure 6. Forward Current Deration Curve



Technical drawing of a mechanical part showing three views: front, side, and top.

Front View:

- Overall width: 15.50 ± 0.20
- Overall height: 26.50 ± 0.20
- Top section height: 4.50 ± 0.20
- Central slot depth: 2.00 ± 0.20
- Slot width: 2.50 ± 0.20
- Hole diameter: $\varnothing 3.60 \pm 0.20$
- Bottom section height: 14.80 ± 0.20
- Bottom section width segments: 2.00 ± 0.20 , 2.00 ± 0.20 , 4.00 ± 0.20
- Bottom section offset: $0.75^{+0.20}_{-0.10}$
- Material specification: 5.45TYP [5.45 ± 0.30]

Side View:

- Overall height: 22.00 ± 0.20
- Top section height: 5.50 ± 0.20
- Section height: 3.00 ± 0.20
- Section width: (1.50)
- Chamfer angle: 10°
- Chamfer length: 0.85 ± 0.03
- Section height: 10.00 ± 0.20
- Section width: 1.50 ± 0.20
- Section height: 23.00 ± 0.20
- Section width: 2.00 ± 0.20
- Section width: 3.30 ± 0.20
- Section offset: $0.90^{+0.20}_{-0.10}$
- Material specification: 5.45TYP [5.45 ± 0.30]

Top View:

- Overall width: 5.50 ± 0.20
- Section height: 3.30 ± 0.20
- Section height: 2.00 ± 0.20

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