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November 2014

FFA60UP20DN — Ultrafast Dual Diode

FFA60UP20DN 60 A, 200 V, Ultrafast Dual Diode

Features

- Ultrafast Recovery, $T_{rr} = 32 \text{ ns}$ (@ $I_F = 30 \text{ A}$)
- Max. Forward Voltage, $V_F = 1.15 \text{ V}$ (@ $T_C = 25^\circ\text{C}$)
- Reverse Voltage: $V_{RRM} = 200 \text{ V}$
- Avalanche Energy Rated
- RoHS Compliant

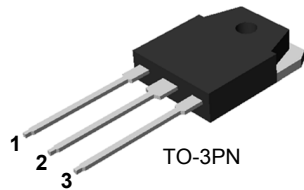
Description

The FFA60UP20DN is an ultrafast diode with low forward voltage drop and rugged UIS capability. This device is intended for use as freewheeling and clamping diodes in a variety of switching power supplies and other power switching applications. It is specially suited for use in switching power supplies and industrial applications as Welder and UPS application.

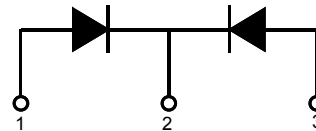
Applications

- Power Switching Circuits
- Output Rectifiers
- Free-Wheeling Diodes
- SMPS
- Welder
- UPS

Pin Assignments



1. Anode 2. Cathode 3. Anode



1. Anode 2. Cathode 3. Anode

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

| Symbol | Parameter | Rating | Unit |
|----------------|---|--------------|------------------|
| V_R | DC Blocking Voltage | 200 | V |
| V_{RRM} | Peak Repetitive Reverse Voltage | 200 | V |
| V_{RWM} | Working Peak Reverse Voltage | 200 | V |
| $I_{F(AV)}$ | Average Rectified Forward Current @ $T_C = 100^\circ\text{C}$ | 30 | A |
| I_{FSM} | Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave | 300 | A |
| T_J, T_{STG} | Operating Junction and Storage Temperature | - 65 to +175 | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Rating | Unit |
|-----------------|--|--------|--------------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 1.4 | $^\circ\text{C/W}$ |

Package Marking and Ordering Information

| Part Number | Top Mark | Package | Packing Method | Reel Size | Tape Width | Quantity |
|---------------|-----------|---------|----------------|-----------|------------|----------|
| FFA60UP20DNTU | F60UA60DN | TO-3P | Tube | N/A | N/A | 30 |

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

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|----------------------------------|---|------|-------------------|-------------|---------------|
| V_F^* | Maximum Instantaneous Forward Voltage $I_F = 30\text{ A}$ $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$ | - | - | 1.15 1.0 | V |
| I_R^* | Maximum Instantaneous Reverse Current @ rated V_R $T_C = 25^\circ\text{C}$ $T_C = 100^\circ\text{C}$ | - | - | 10 100 | μA |
| t_{rr} I_{rr} Q_{rr} | Reverse Recovery Time Reverse Recovery Current Reverse Recovery Charge ($I_F = 30\text{ A}$, $di_F/dt = 200\text{ A}/\mu\text{s}$, $V_R = 130\text{ V}$) | - | 32 2.4 38.4 | - | ns A nC |
| t_{rr} | Maximum Reverse Recovery Time ($I_F = 1\text{ A}$, $di_F/dt = 100\text{ A}/\mu\text{s}$) | - | - | 40 | ns |
| W_{AVL} | Avalanche Energy ($L=40\text{ mH}$) | 2 | - | - | mJ |

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

Test Circuit and Waveforms

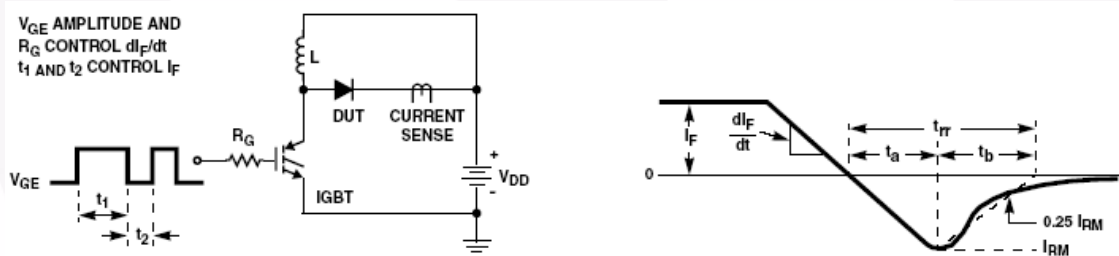


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

$L = 40\text{mH}$
 $R < 0.1\Omega$
 $V_{DD} = 50\text{V}$

$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
 $Q1 = \text{IGBT } (BV_{CES} > V_{R(AVL)})$

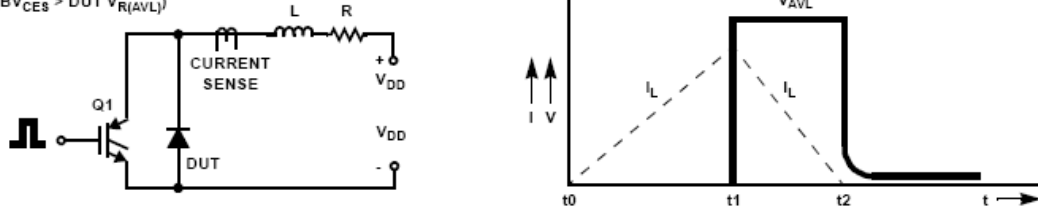


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

Typical Characteristics

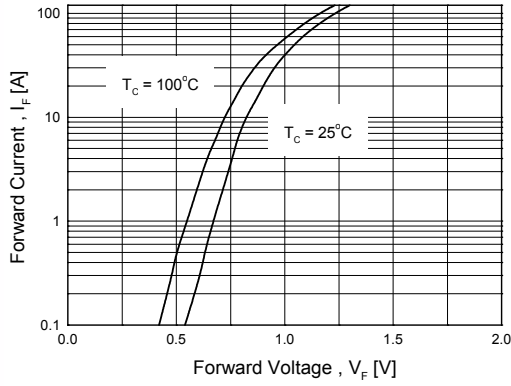


Figure 3. Typical Forward Voltage Drop vs. Forward Current

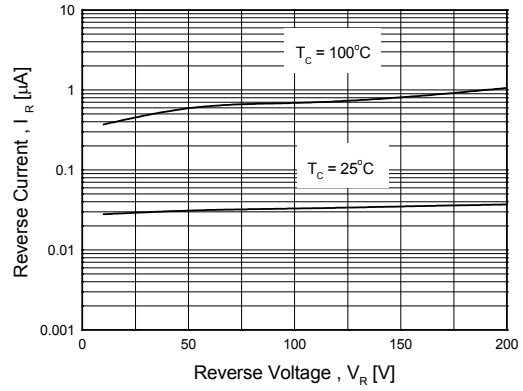


Figure 4. Typical Reverse Current vs. Reverse Voltage

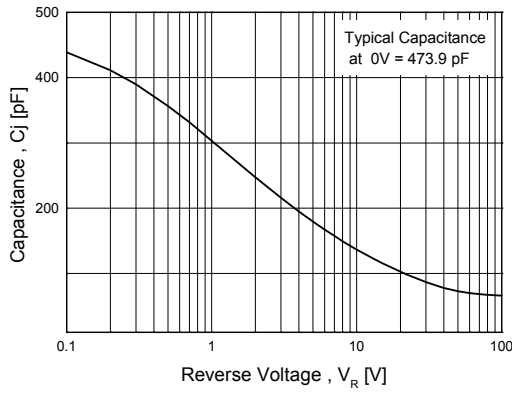


Figure 5. Typical Junction Capacitance

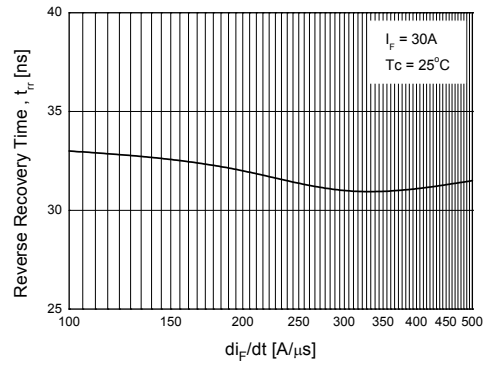


Figure 6. Typical Reverse Recovery Time vs. di_F/dt

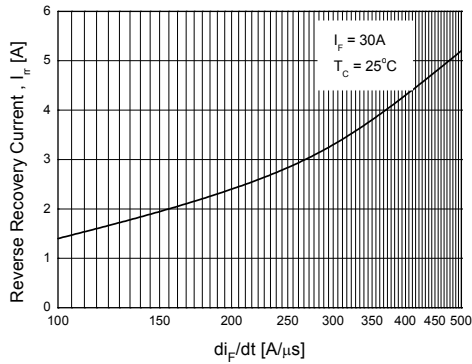


Figure 7. Typical Reverse Recovery Current vs. di_F/dt

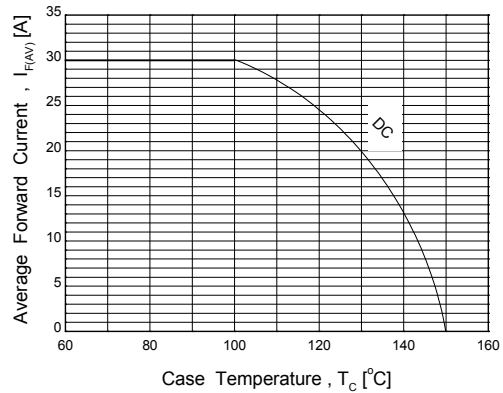
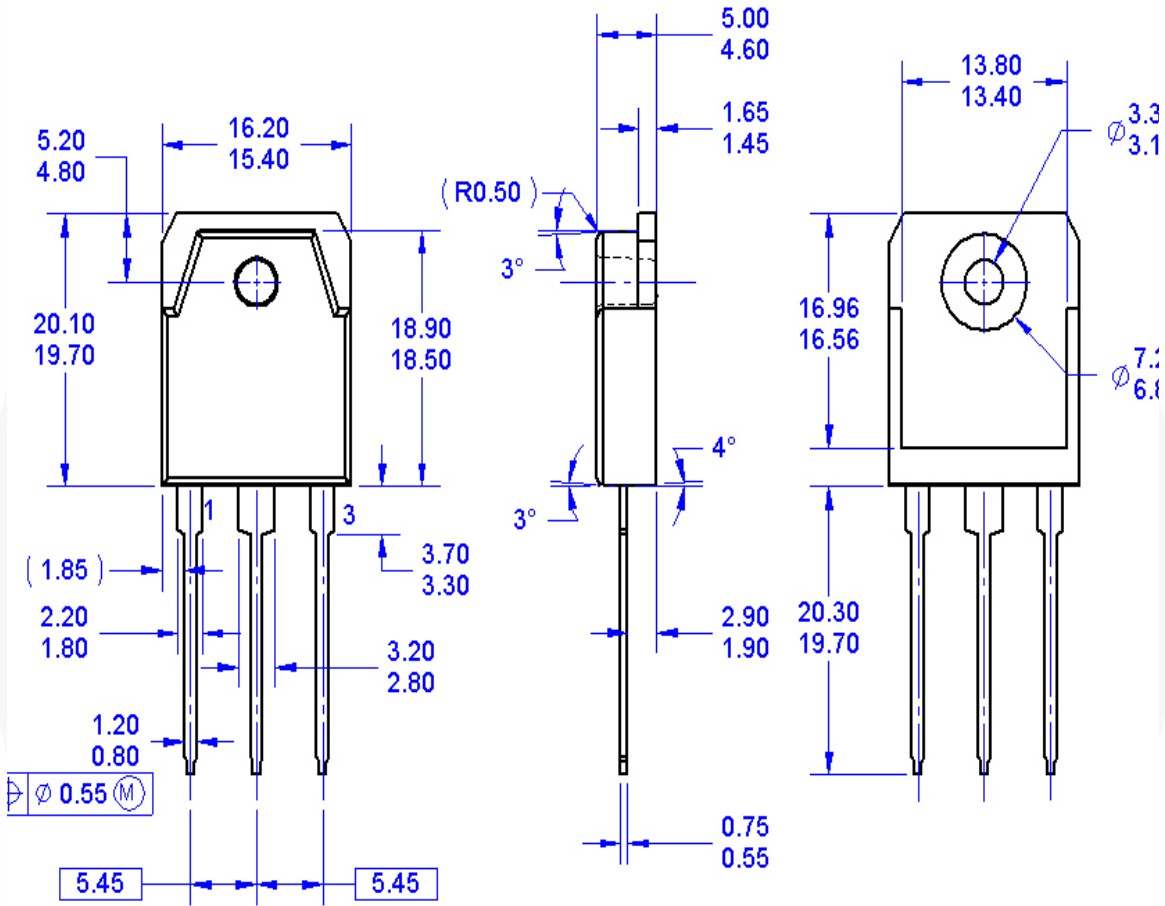


Figure 8. Forward Current Derating Curve

Mechanical Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO EIAJ SC-65 PACKAGING STANDARD.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
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Figure 9. TO-3P 3L - 3LD, T03, PLASTIC, EIAJ SC-65

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