

# Ultrafast Dual Diode

60 A, 200 V

## FFA60UP20DN

### 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.

### Features

- Ultrafast Recovery,  $T_{TR} < 32 \text{ ns}$  (@  $I_F = 30 \text{ A}$ )
- 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
- These Devices are Pb-Free and are RoHS Compliant

### Applications

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

### ABSOLUTE MAXIMUM RATINGS

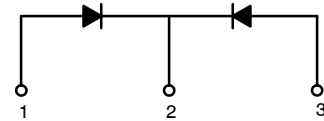
(per diode)  $T_C = 25^\circ\text{C}$  unless otherwise noted

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

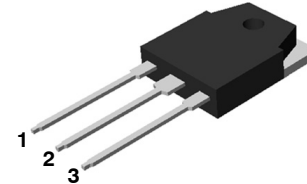
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

### THERMAL CHARACTERISTICS

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



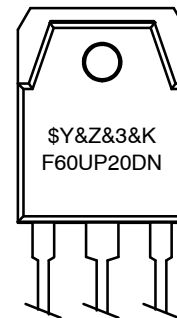
1. Anode 2. Cathode 3. Anode



1. Anode 2. Cathode 3. Anode

TO-3P-3LD / EIAJ SC-65, ISOLATED CASE 340BZ

### MARKING DIAGRAM



\$Y = Logo  
&Z = Assembly Plant Code  
&3 = Date Code  
&K = Lot Run Traceability Code  
F60UP20DN = Specific Device Code

### ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

# FFA60UP20DN

## ELECTRICAL CHARACTERISTICS

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

| Symbol         | Parameter                             | Test Conditions   | Min | Typ  | Max         | Unit          |
|----------------|---------------------------------------|---|-----|------|-------------|---------------|
| $V_F$ (Note 1) | Maximum Instantaneous Forward Voltage | $I_F = 30\text{ A}$ , $T_C = 25^\circ\text{C}$<br>$I_F = 30\text{ A}$ , $T_C = 100^\circ\text{C}$   | -   | -    | 1.15<br>1.0 | V             |
| $I_R$ (Note 1) | Maximum Instantaneous Reverse Current | $V_R = 200\text{ V}$ , $T_C = 25^\circ\text{C}$<br>$V_R = 200\text{ V}$ , $T_C = 100^\circ\text{C}$ | -   | -    | 10<br>100   | $\mu\text{A}$ |
| $t_{rr}$       | Reverse Recovery Time                 | $I_F = 30\text{ A}$ , $di_F/dt = 200\text{ A}/\mu\text{s}$ , $V_R = 130\text{ V}$                   | -   | 32   | -           | ns            |
| $I_{rr}$       | Reverse Recovery Current              |   | -   | 2.4  | -           | A             |
| $Q_{rr}$       | Reverse Recovery Charge               |   | -   | 38.4 | -           | 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            |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ , Duty Cycle = 2%

## TEST CIRCUIT AND WAVEFORMS

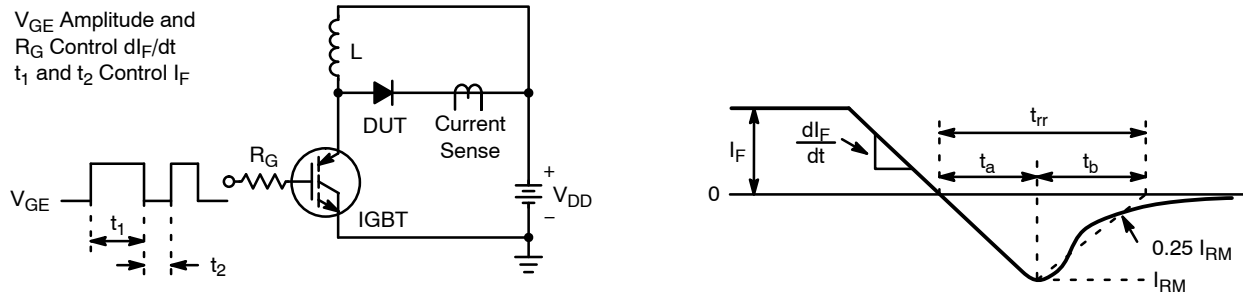


Figure 1. Diode Reverse Recovery Test Circuit & Waveform

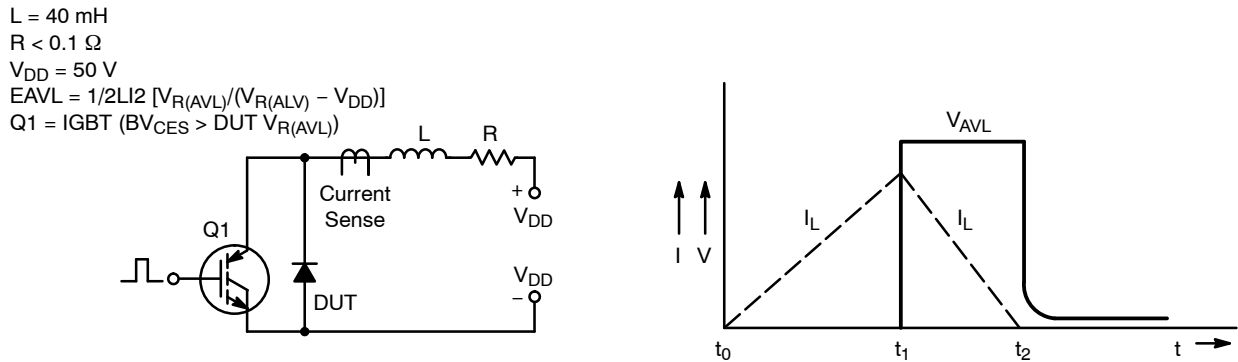


Figure 2. Unclamped Inductive Switching Test Circuit & Waveform

## ORDERING INFORMATION

| Part Number   | Top Mark  | Package             | Shipping        |
|---------------|-----------|---------------------|-----------------|
| FFA60UP20DNTU | F60UP20DN | TO-3P-3LD (Pb-Free) | 30 Units / Tube |

# FFA60UP20DN

## TYPICAL CHARACTERISTICS

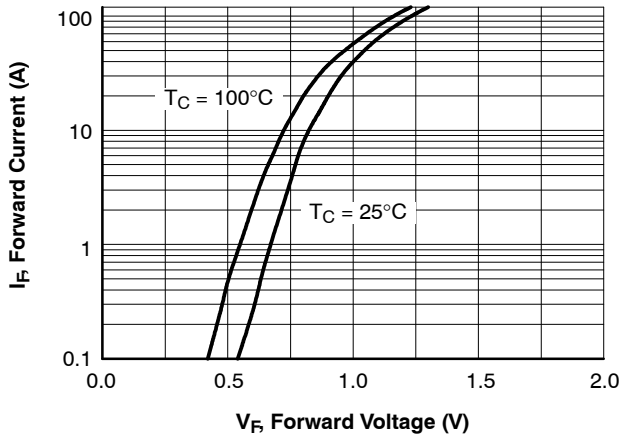


Figure 3. Typical Forward Voltage Drop vs. Forward Current

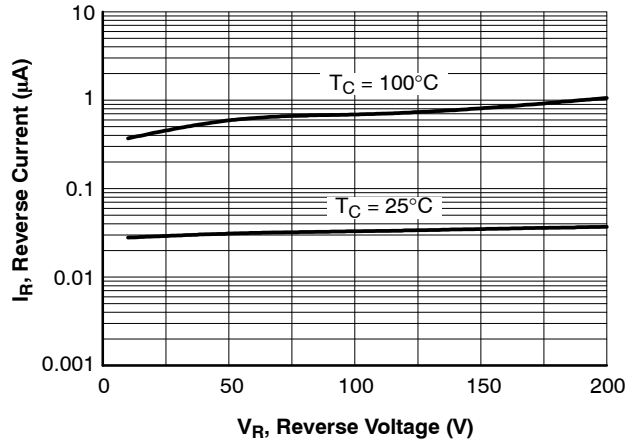


Figure 4. Typical Reverse Current vs. Reverse Voltage

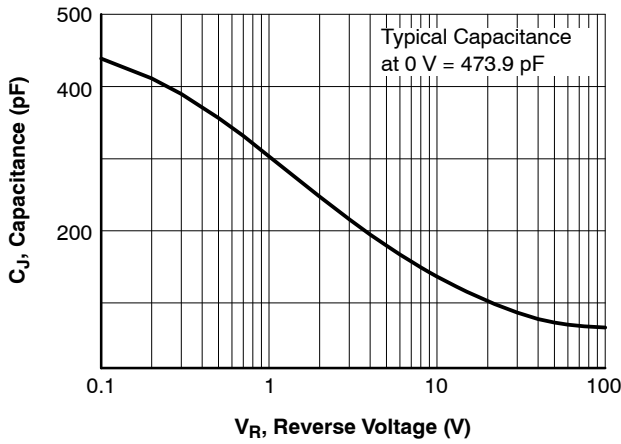


Figure 5. Typical Junction Capacitance

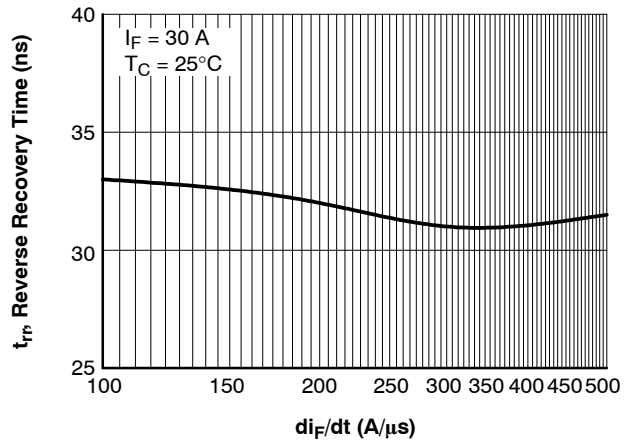


Figure 6. Typical Reverse Recovery Time vs.  $di_F/dt$

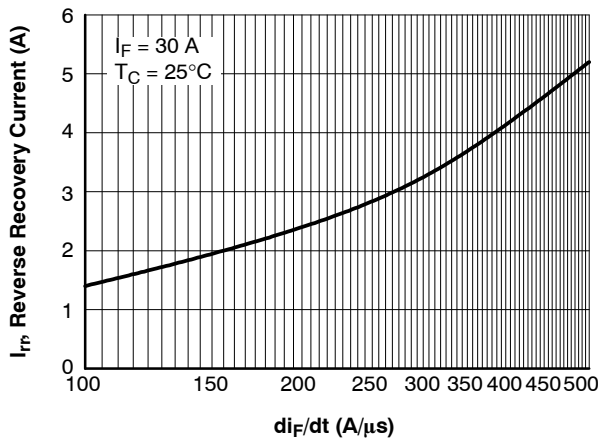


Figure 7. Typical Reverse Recovery Current vs.  $di_F/dt$

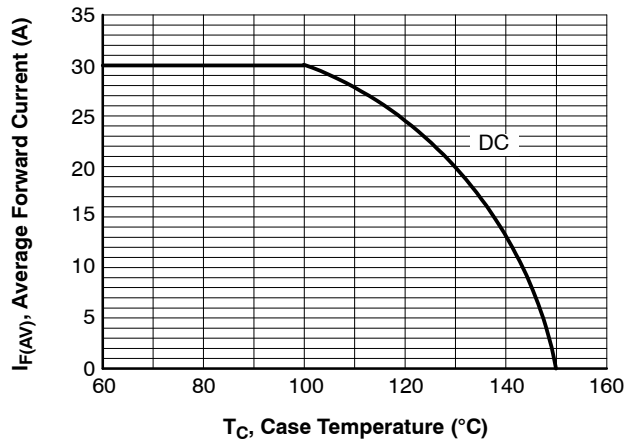


Figure 8. Forward Current Derating Curve

# MECHANICAL CASE OUTLINE

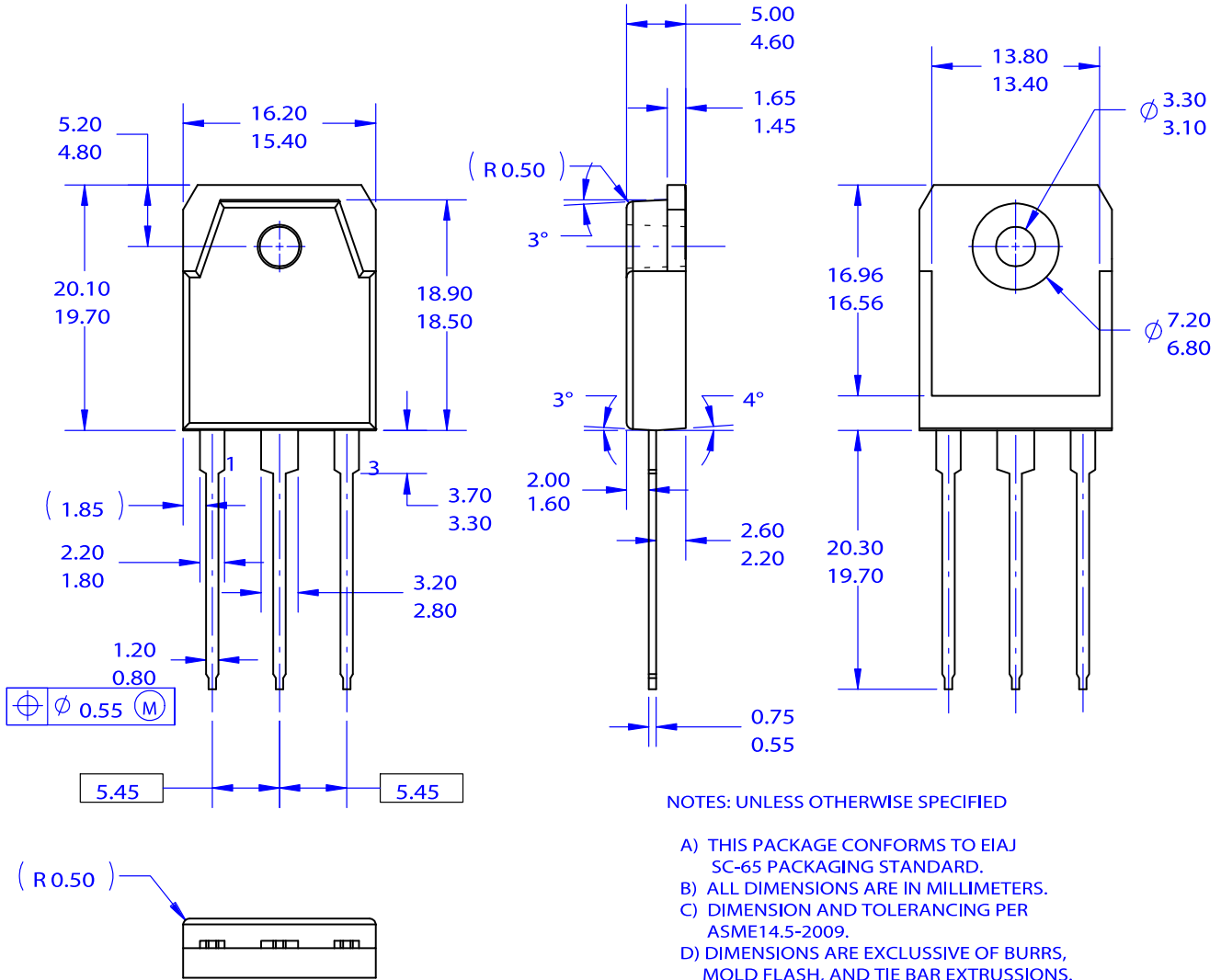
## PACKAGE DIMENSIONS

ON Semiconductor®



### TO-3P-3LD / EIAJ SC-65, ISOLATED CASE 340BZ ISSUE O

DATE 31 OCT 2016



NOTES: UNLESS OTHERWISE SPECIFIED

- A) THIS PACKAGE CONFORMS TO EIAJ SC-65 PACKAGING STANDARD.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSION AND TOLERANCING PER ASME14.5-2009.
- D) DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

|                         |   |  |
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