Pb Free Plating Product

# FFPF60SA60DSTU

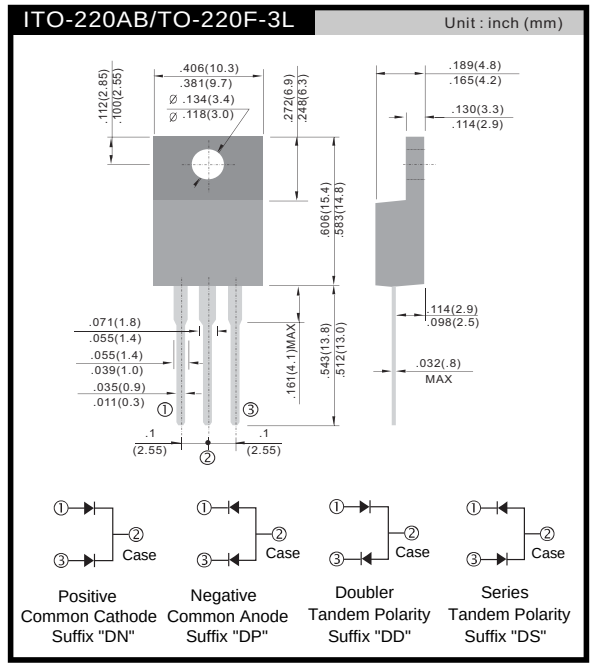
16Amperes,600Volts Insulated Dual Series Connection Ultra Fast Soft Recovery Rectifiers

## APPLICATION

- Freewheeling, Snubber, Clamp
- Inversion Welder
- PFC
- Plating Power Supply
- Ultrasonic Cleaner and Welder
- Converter & Chopper
- UPS

## PRODUCT FEATURE

- Ultrafast Recovery Time
- Soft Recovery Characteristics
- 150℃Operating Junction Temperature
- Low Forward Voltage
- High Surge Current Capability
- Low Leakage Current




## GENERAL DESCRIPTION

FFPF60SA60DSTU using ThinkiSemi lastest FRED FAB process(planar passivation pellet) with ultrafast soft recovery characteristics.

## Absolute Maximum Ratings (per leg) $T_C$=25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{RRM}$ | Peak Repetitive Reverse Voltage | 600 | V |
| $V_{RWM}$ | Working Peak Reverse Voltage | 600 | V |
| $V_R$ | DC Blocking Voltage | 600 | V |
| $I_{F(AV)}$ | Average Rectified Forward Current @ $T_C$ = 95 °C | 8 | A |
| $I_{FSM}$ | Non-repetitive Peak Surge Current 60Hz Single Half-Sine Wave | 80 | A |
| $P_D$ | Power Dissipation | 26 | W |
| $W_{AVL}$ | Avalanche Energy (1A, 40mH) | 20 | mJ |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature | - 65 to +150 | °C |

## Thermal Characteristics

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction to Case | 3.125 | °C/W |
| $R_{\theta JA}$ | Maximum Thermal Resistance, Junction to Ambient | 62.5 | °C/W |



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## Electrical Characteristics (per leg) $T_C$=25 °C unless otherwise noted

| Symbol | Parameter | | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| $V_{FM}$ * | Maximum Instantaneous Forward Voltage<br>$I_F$ = 8A<br>$I_F$ = 8A | <br>$T_C$ = 25 °C<br>$T_C$ = 125 °C | <br>-<br>- | <br>2.0<br>1.6 | <br>2.4<br>2.0 | V |
| $I_{RM}$ * | Maximum Instantaneous Reverse Current<br>@ rated $V_R$ | <br>$T_C$ = 25 °C<br>$T_C$ = 125 °C | <br>-<br>- | <br>-<br>- | <br>100<br>1000 | µA |
| $t_{rr}$ | Maximum Reverse Recovery Time<br>($I_F$ =1A, di/dt = 100A/µs, $V_R$ = 30V) | | - | - | 25 | ns |
| $t_{rr}$ | Maximum Reverse Recovery Time<br>($I_F$ =8A, di/dt = 100A/µs, $V_R$ = 30V) | | - | - | 30 | ns |
| $t_{rr}$<br>$I_{rr}$<br>$Q_{rr}$ | Reverse Recovery Time<br>Reverse Recovery Current<br>Reverse Recovery Charge<br>($I_F$ =8A, di/dt = 200A/µs, $V_R$ = 390V) | | -<br>-<br>- | 39<br>2<br>39 | -<br>-<br>- | ns<br>A<br>nC |

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

## Typical Characteristics

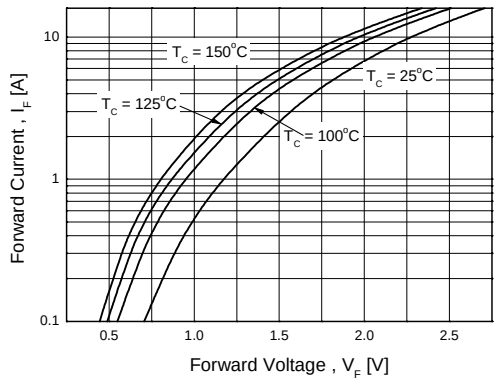



**Figure 1. Typical Forward Voltage Drop vs. Forward Current**

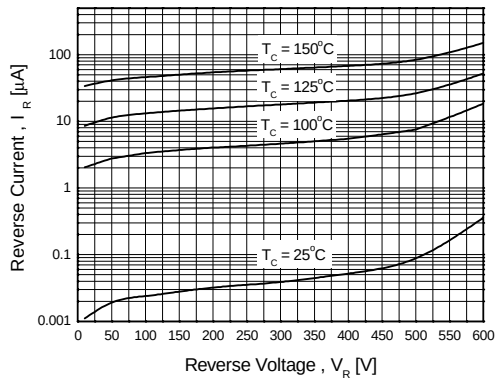



**Figure 2. Typical Reverse Current vs. Reverse Voltage**

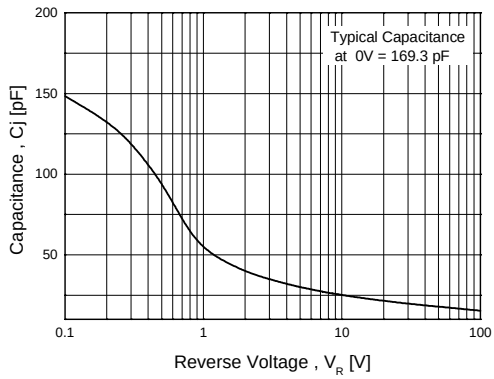



**Figure 3. Typical Junction Capacitance**

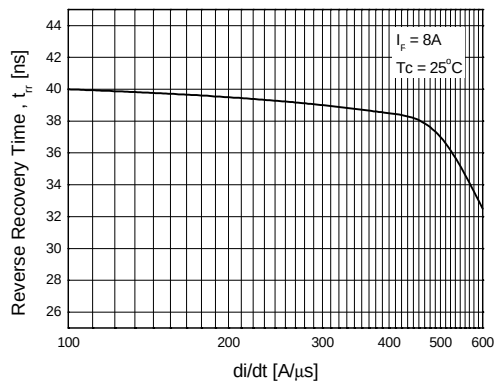



**Figure 4. Typical Reverse Recovery Time vs. di/dt**



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## Typical Characteristics (Continued)

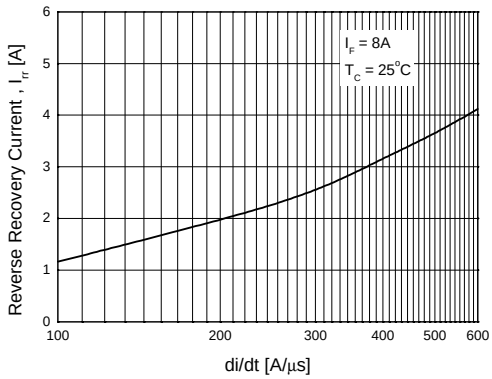



**Figure 5. Typical Reverse Recovery Current vs. di/dt**

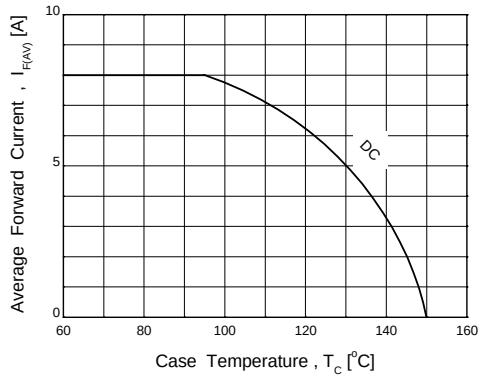



**Figure 6. Forward Curent Derating Curve**

## Test Circuits and Waveforms

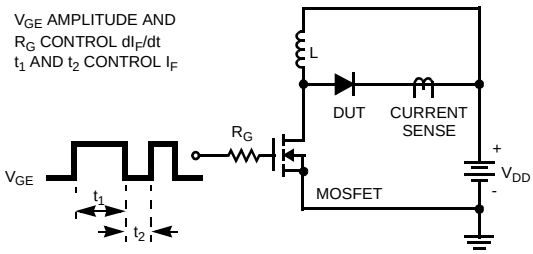



**Figure 7. $t_{rr}$ Test Circuit**

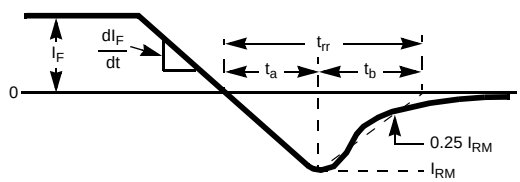



**Figure 8. $t_{rr}$ Waveforms and Definitions**

I = 1A
L = 40mH
R < 0.1Ω
$V_{DD}$ = 50V
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
$Q_1$ = IGBT ($BV_{CES}$ > DUT $V_{R(AVL)}$)

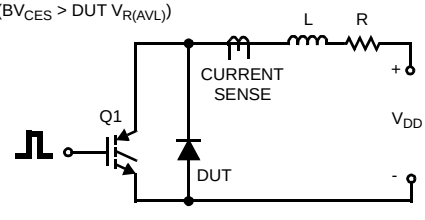



**Figure 9. Avalanche Energy Test Circuit**

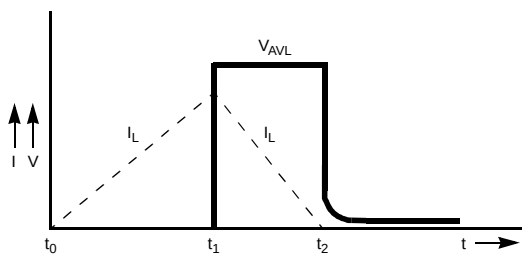



**Figure 10. Avalanche Current and Voltage Waveforms**



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