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Pb Free Plating Product

## MM80FU040PC



80 Ampere, 400 Volt Common Cathode Fast Recovery Epitaxial Diode

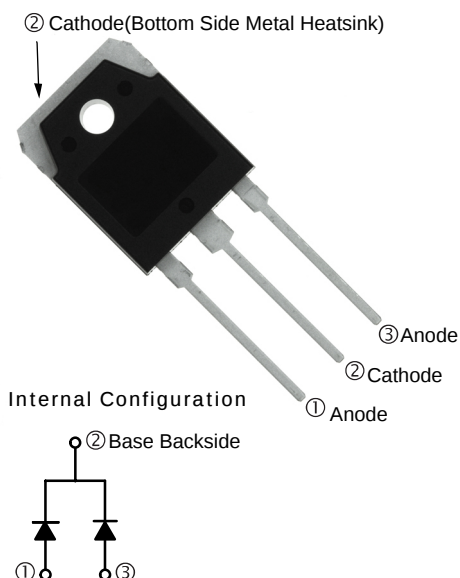
## APPLICATION

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

## PRODUCT FEATURE

- Ultrafast Recovery Time
- Soft Recovery Characteristics
- Low Recovery Loss
- Low Forward Voltage
- High Surge Current Capability
- Low Leakage Current

## TO-3PN/TO-3PB



## GENERAL DESCRIPTION

MM80FU040PC using the latest FRED FAB process (planar passivation chip) with ultrafast and soft recovery characteristic.

## ABSOLUTE MAXIMUM RATINGS

 $T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol          | Parameter                            | Test Conditions                                           | Values      | Unit               |
|-----------------|--------------------------------------|-----------------------------------------------------------|-------------|--------------------|
| $V_R$           | Maximum D.C. Reverse Voltage         |                                                           | 400         | V                  |
| $V_{RRM}$       | Maximum Repetitive Reverse Voltage   |                                                           | 400         | V                  |
| $I_{F(AV)}$     | Average Forward Current              | $T_C = 110^\circ\text{C}$ , Per Diode                     | 40          | A                  |
|                 |                                      | $T_C = 110^\circ\text{C}$ , Per Package                   | 80          | A                  |
| $I_{F(RMS)}$    | RMS Forward Current                  | $T_C = 110^\circ\text{C}$ , Per Diode                     | 56          | A                  |
| $I_{FSM}$       | Non-Repetitive Surge Forward Current | $T_J = 45^\circ\text{C}$ , $t = 10\text{ms}$ , 50Hz, Sine | 400         | A                  |
| $P_D$           | Power Dissipation                    |                                                           | 156         | W                  |
| $T_J$           | Junction Temperature                 |                                                           | -40 to +150 | $^\circ\text{C}$   |
| $T_{STG}$       | Storage Temperature Range            |                                                           | -40 to +150 | $^\circ\text{C}$   |
| Torque          | Module-to-Sink                       | Recommended (M3)                                          | 1.1         | N·m                |
| $R_{\theta JC}$ | Thermal Resistance                   | Junction-to-Case                                          | 0.8         | $^\circ\text{C/W}$ |
| Weight          |                                      |                                                           | 6.0         | g                  |

## ELECTRICAL CHARACTERISTICS

 $T_C = 25^\circ\text{C}$  unless otherwise specified

| Symbol    | Parameter                     | Test Conditions                                                               | Min. | Typ. | Max. | Unit          |
|-----------|-------------------------------|-------------------------------------------------------------------------------|------|------|------|---------------|
| $I_{RM}$  | Reverse Leakage Current       | $V_R = 400\text{V}$                                                           | --   | --   | 10   | $\mu\text{A}$ |
|           |                               | $V_R = 400\text{V}$ , $T_J = 125^\circ\text{C}$                               | --   | --   | 150  | $\mu\text{A}$ |
| $V_F$     | Forward Voltage               | $I_F = 40\text{A}$                                                            | --   | 1.3  | 1.8  | V             |
|           |                               | $I_F = 40\text{A}$ , $T_J = 125^\circ\text{C}$                                | --   | 1.1  |      | V             |
| $t_{rr}$  | Reverse Recovery Time         | $I_F = 1\text{A}$ , $V_R = 30\text{V}$ , $di_F/dt = -200\text{A}/\mu\text{s}$ | --   | 22   | --   | ns            |
| $t_{rr}$  | Reverse Recovery Time         | $V_R = 200\text{V}$ , $I_F = 40\text{A}$                                      | --   | 52   | --   | ns            |
| $I_{RRM}$ | Max. Reverse Recovery Current | $di_F/dt = -200\text{A}/\mu\text{s}$ , $T_J = 25^\circ\text{C}$               | --   | 4.5  | --   | A             |
| $t_{rr}$  | Reverse Recovery Time         | $V_R = 200\text{V}$ , $I_F = 40\text{A}$                                      | --   | 71   | --   | ns            |
| $I_{RRM}$ | Max. Reverse Recovery Current | $di_F/dt = -200\text{A}/\mu\text{s}$ , $T_J = 125^\circ\text{C}$              | --   | 9    | --   | A             |

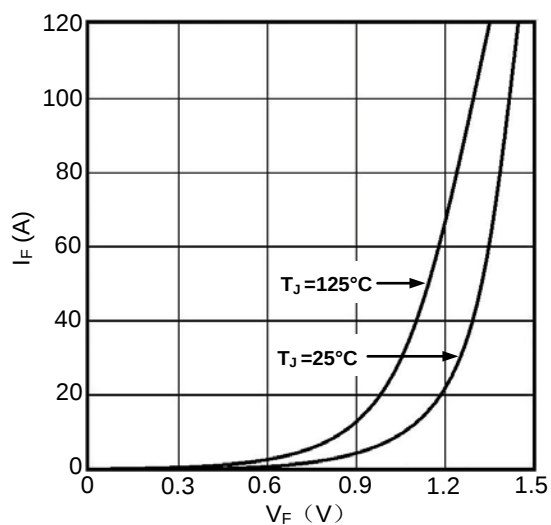


Fig1. Forward Voltage Drop vs Forward Current

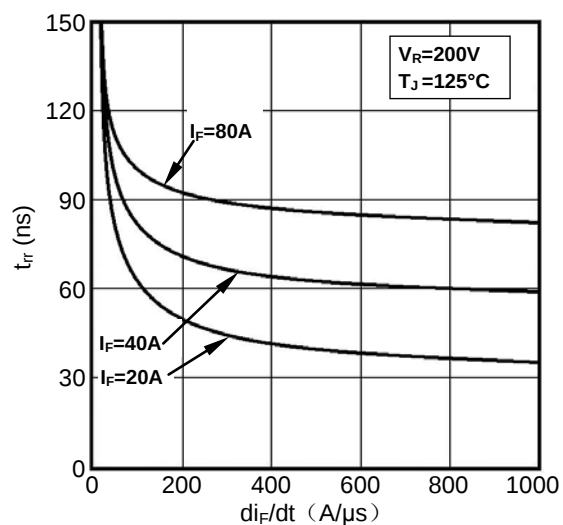
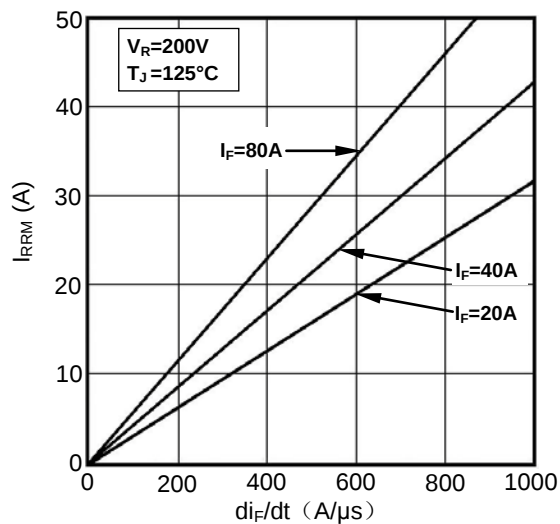
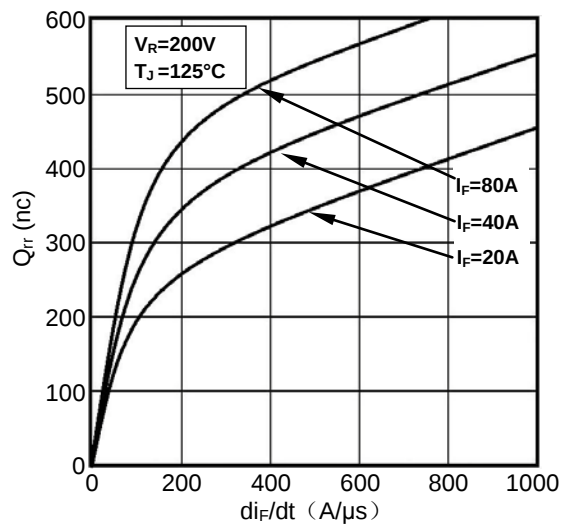
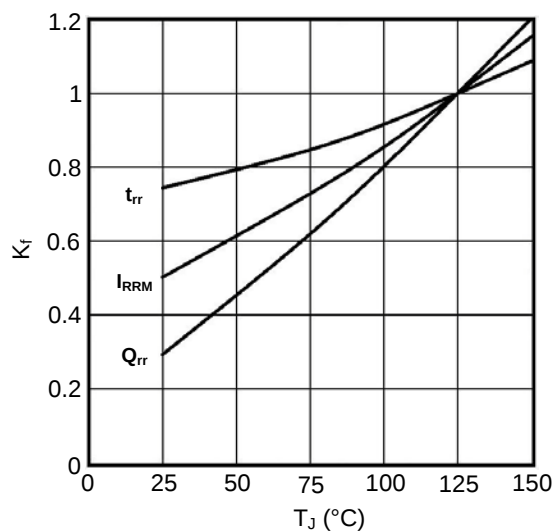
Fig2. Reverse Recovery Time vs  $di_F/dt$ Fig3. Reverse Recovery Current vs  $di_F/dt$ Fig4. Reverse Recovery Charge vs  $di_F/dt$ 

Fig5. Dynamic Parameters vs Junction Temperature

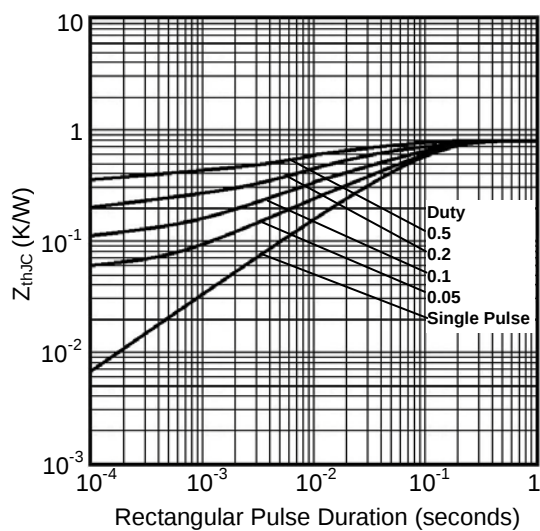


Fig6. Transient Thermal Impedance

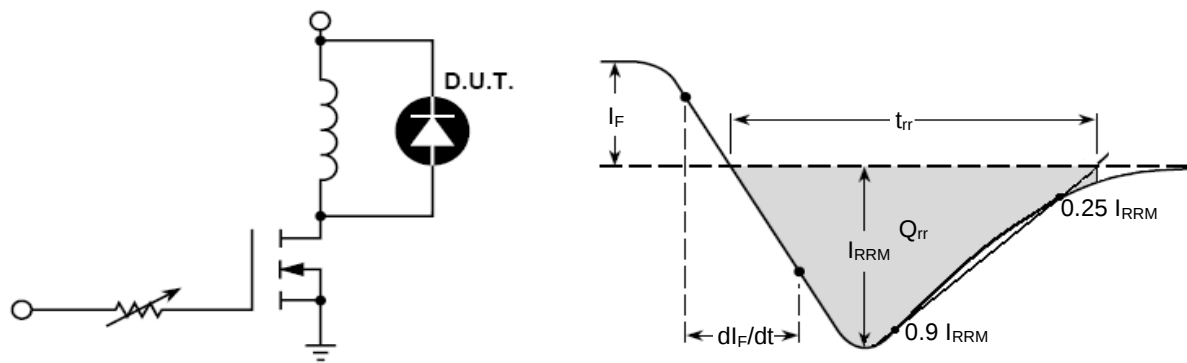
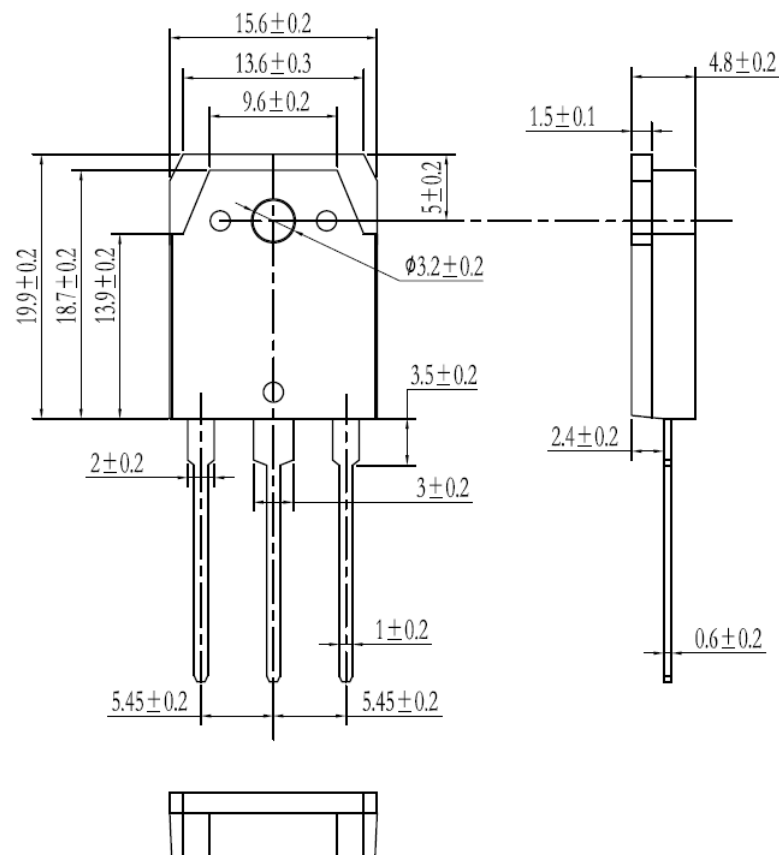


Fig7. Diode Reverse Recovery Test Circuit and Waveform



Dimensions in Millimeters  
Fig8. Package Outline