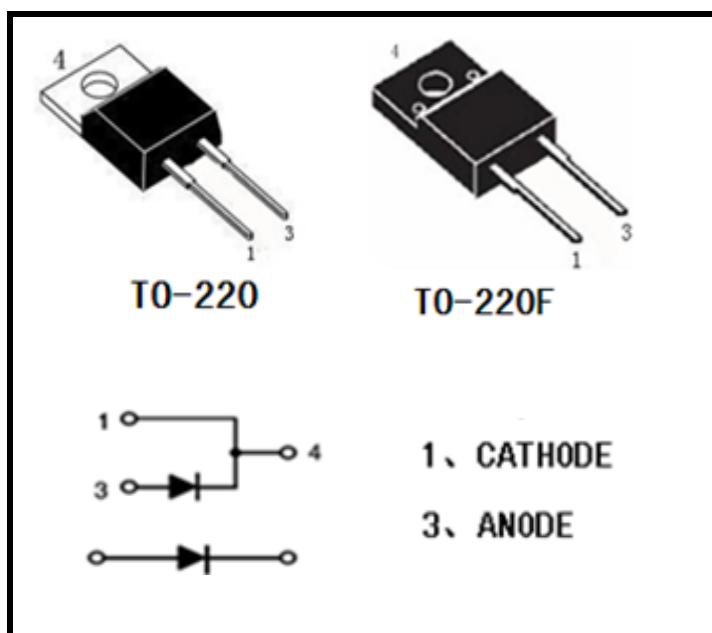


**PRODUCT FEATURES**

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

**APPLICATIONS**

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

**ABSOLUTE MAXIMUM RATINGS**

TC=25° C unless otherwise specified

| Symbol                | Parameter                            | Test Conditions                      | Value       | Unit               |
|-----------------------|--------------------------------------|--------------------------------------|-------------|--------------------|
| $V_R$                 | D.C. Reverse Voltage                 |                                      | 400         | V                  |
| $V_{RRM}$             | Repetitive Reverse Voltage           |                                      | 400         | V                  |
| $I_{F(AV)}$ (per leg) | Average Forward Current              | $T_C=110^{\circ}\text{C}$ , Duty=0.5 | 10          | A                  |
| $I_{FM}$              | Peak Repetitive Forward Current      | $T_C=110^{\circ}\text{C}$ , Duty=0.5 | 20          | A                  |
| $I_{FSM}$             | Non-Repetitive Surge Forward Current | $T=45^{\circ}\text{C}$ , 8.3ms,      | 120         | A                  |
| $T_J$                 | Junction Temperature                 |                                      | -55 to +150 | $^{\circ}\text{C}$ |
| $T_{STG}$             | Storage Temperature Range            |                                      | -55 to +150 | $^{\circ}\text{C}$ |

**ELECTRICAL AND THERMAL CHARACTERISTICS**

TC=25° C unless otherwise specified

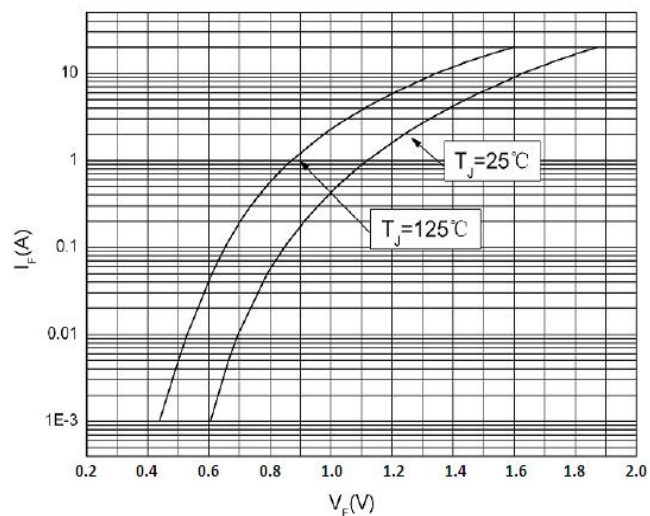
| Symbol           | Parameter                                                                                       | Test Conditions                                   | Min.                  | Typ. | Max. | Unit |    |
|------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------|-----------------------|------|------|------|----|
| I <sub>RM</sub>  | Reverse Leakage Current                                                                         | V <sub>R</sub> =400V, T <sub>J</sub> =25°C        | --                    | --   | 25   | μA   |    |
|                  |                                                                                                 | V <sub>R</sub> =400V, T <sub>J</sub> =125°C       | --                    | --   | 500  | μA   |    |
| V <sub>F</sub>   | Forward Voltage                                                                                 | I <sub>F</sub> =10A, T <sub>J</sub> =25°C         | --                    | 1.6  | 2.2  | V    |    |
|                  |                                                                                                 | I <sub>F</sub> =10A, T <sub>J</sub> =125°C        | --                    | 1.3  | --   | V    |    |
| t <sub>rr</sub>  | Reverse Recovery Time ( I <sub>F</sub> =1A, V <sub>R</sub> =30V, di <sub>F</sub> /dt=-200A/μs ) |                                                   | --                    | 25   | --   | ns   |    |
| t <sub>rr</sub>  | Reverse Recovery Time                                                                           | I <sub>F</sub> =10A<br>VR=400V<br>diF/dt=-200A/μs | T <sub>J</sub> =25°C  | --   | 30   | --   | ns |
| t <sub>rr</sub>  | Reverse Recovery Time                                                                           |                                                   | T <sub>J</sub> =125°C | --   | 60   | --   | ns |
| Q <sub>rr</sub>  | Reverse Recovery Charge                                                                         |                                                   | T <sub>J</sub> =125°C | --   | 150  | --   | nC |
| I <sub>RRM</sub> | Max. Reverse Recovery Current                                                                   |                                                   | T <sub>J</sub> =125°C | --   | 4.5  | --   | A  |

**THERMAL CHARACTERISTICS**

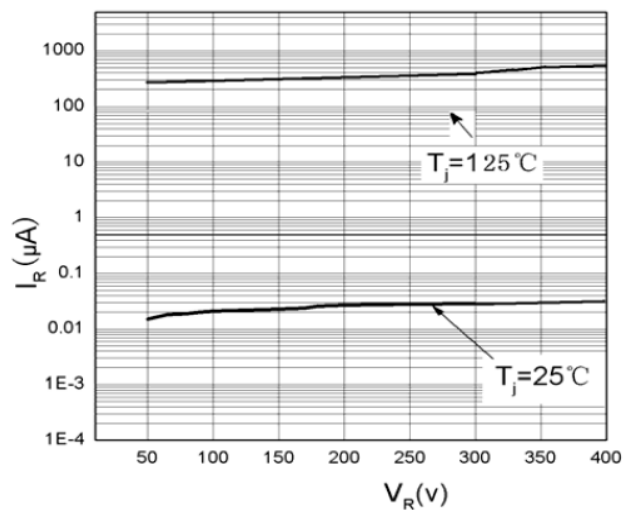
| Rating                     | Symbol        | Value   |     | Unit                        |
|----------------------------|---------------|---------|-----|-----------------------------|
| Maximum Thermal Resistance | $\theta_{JC}$ | T0-220  | 2.5 | $^{\circ}\text{C}/\text{W}$ |
|                            |               | T0-220F | 4   |                             |



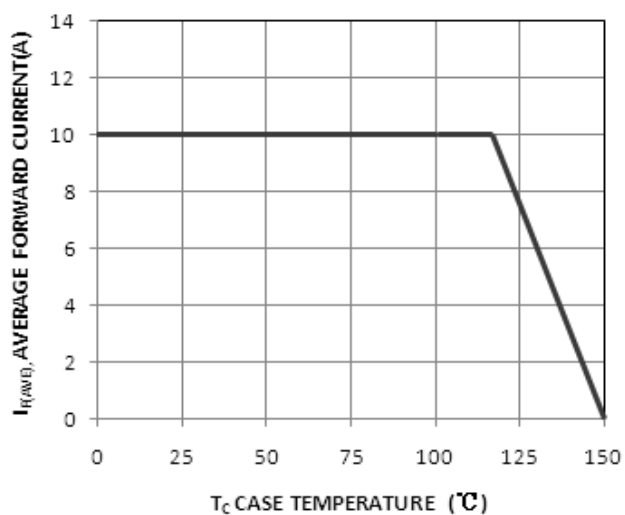
## ■ Characteristics Curves



Typical Forward Voltage Per Diode



Typical Reverse Current Per Diode



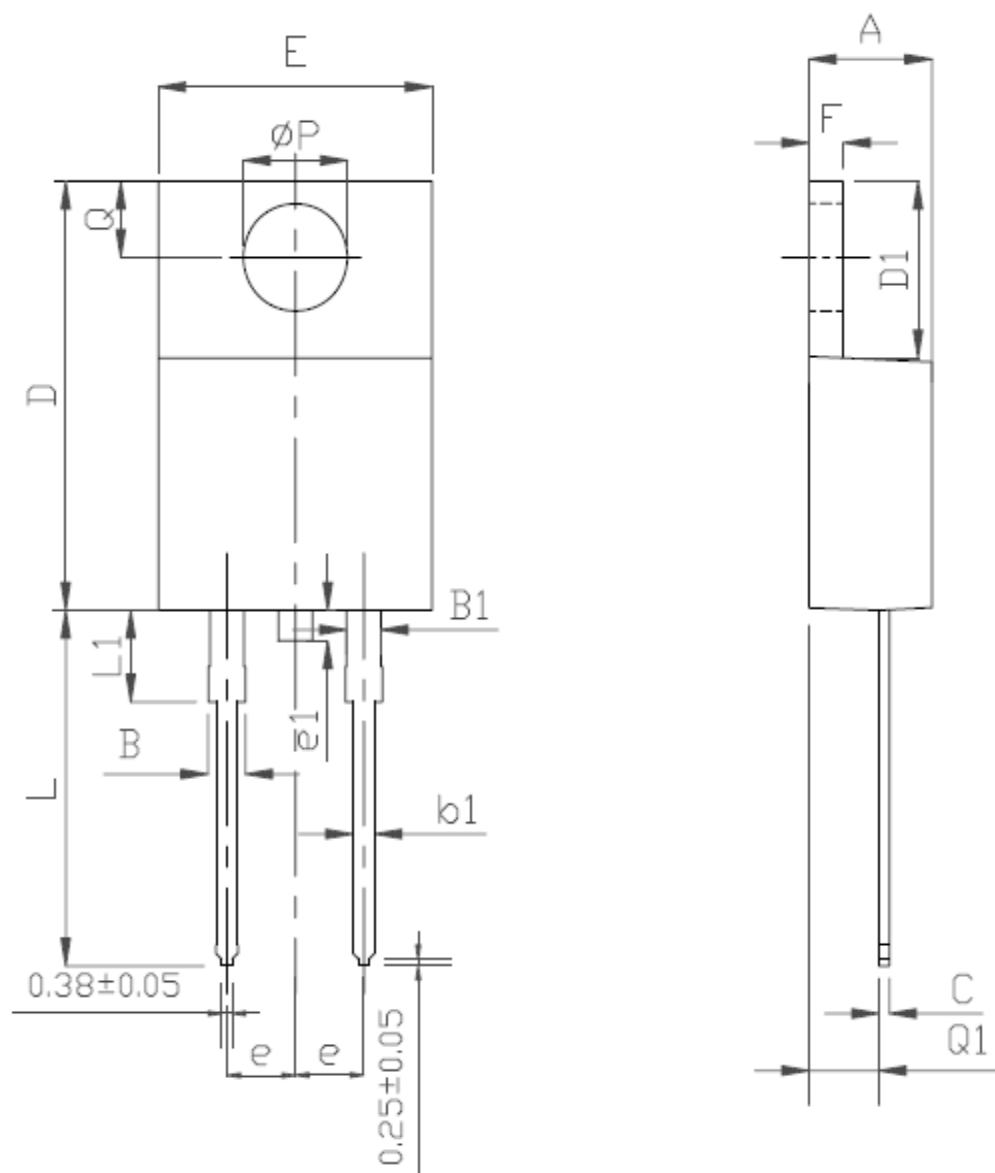
Average Forward Current vs.  
Case Temperature Per Diode



## TO-220 MECHANICAL DATA

UNIT: mm

| SYMBOL | MIN  | NOM | MAX  | SYMBOL | MIN  | NOM  | MAX  |
|--------|------|-----|------|--------|------|------|------|
| A      | 4    |     | 4.8  | e      |      | 2.54 |      |
| B      | 1.2  |     | 1.4  | e1     | 1    |      | 1.5  |
| B1     | 1    |     | 1.4  | F      | 1.1  |      | 1.4  |
| b1     | 0.65 |     | 1    | L      | 12.5 |      | 14.5 |
| c      | 0.4  |     | 0.55 | L1     | 3    | 3.5  | 4    |
| D      | 15   |     | 16.5 | ΦP     |      | 3.8  |      |
| D1     | 5.9  |     | 6.9  | Q      | 2.5  |      | 3    |
| E      | 9.9  |     | 10.7 | Q1     | 2    |      | 2.9  |



## TO-220F MECHANICAL DATA

UNIT: mm

| SYMBOL | MIN  | NOM | MAX  | SYMBOL | MIN  | NOM  | MAX   |
|--------|------|-----|------|--------|------|------|-------|
| A      | 4.5  |     | 4.9  | E1     | 6.5  | 7    | 7.5   |
| A1     | 2.3  |     | 2.9  | e      | 2.44 | 2.54 | 2.64  |
| b      | 0.45 |     | 0.9  | e1     | 1    |      | 1.5   |
| b1     | 1.1  |     | 1.7  | L      | 12.5 |      | 14.3  |
| b2     | 1.2  |     | 1.4  | L1     | 9.45 |      | 10.05 |
| c      | 0.35 |     | 0.65 | L2     | 15   |      | 16    |
| D      | 14.5 |     | 17   | L3     | 3.2  |      | 4.4   |
| D1     | 6.1  |     | 6.9  | ΦP     | 3    |      | 3.3   |
| E      | 9.6  |     | 10.3 | Q      | 2.5  |      | 2.9   |

