

### Features

- Reduced RFI and EMI
- Reduced Snubbing
- Extensive Characterization of Recovery Parameters
- Hermetic
- Surface Mount

$$V_R = 200V$$

$$I_{F(AV)} = 60A$$

$$t_{rr} = 35ns$$

### Description

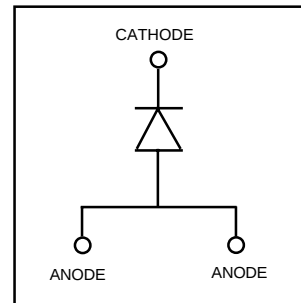
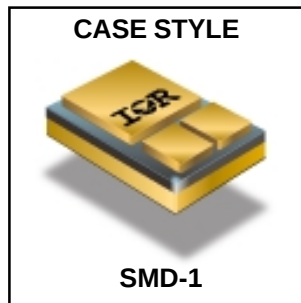
These Ultrafast, soft recovery diodes are optimized to reduce losses and EMI/RFI in high frequency power conditioning systems. An extensive characterization of the recovery behavior for different values of current, temperature and di/dt simplifies the calculations of losses in the operating conditions. The softness of the recovery eliminates the need for a snubber in most applications. These devices are ideally suited for power converters, motors drives and other applications where switching losses are significant portion of the total losses.

### Absolute Maximum Ratings

|                          | Parameter                                          | Max.        | Units      |
|--------------------------|----------------------------------------------------|-------------|------------|
| $V_R$                    | Cathode to Anode Voltage                           | 200         | V          |
| $I_{F(AV)}$              | Continuous Forward Current, ① $T_C = 55^\circ C$   | 60          | A          |
| $I_{FSM}$                | Single Pulse Forward Current, ② $T_C = 25^\circ C$ | 500         |            |
| $P_D @ T_C = 25^\circ C$ | Maximum Power Dissipation                          | 70          | W          |
| $T_J, T_{STG}$           | Operating Junction and Storage Temperature Range   | -55 to +150 | $^\circ C$ |

**Note:** ① D.C. = 50% rect. wave

② 1/2 sine wave, 60 Hz, P.W. = 8.33 ms



**Electrical Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

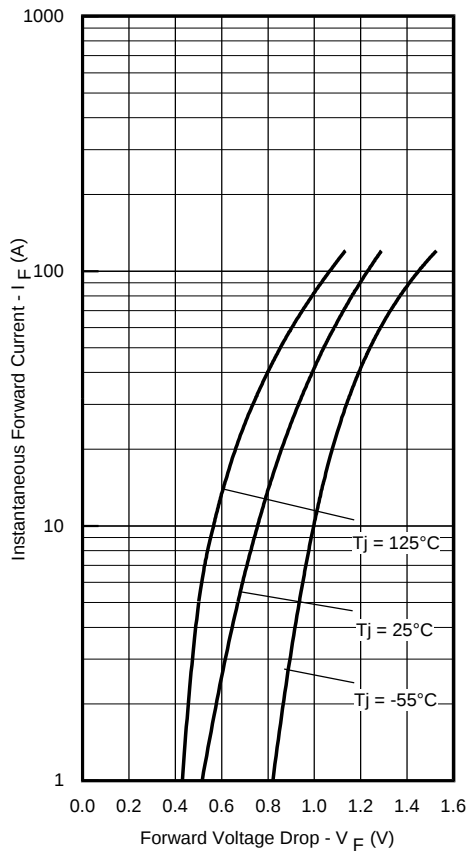
|          | Parameter                             | Min. | Typ. | Max. | Units         | Test Conditions                                            |
|----------|---------------------------------------|------|------|------|---------------|------------------------------------------------------------|
| $V_{BR}$ | Cathode Anode Breakdown Voltage       | 200  | —    | —    | V             | $I_R = 100\mu\text{A}$                                     |
| $V_F$    | Forward Voltage<br>See Fig. 1         | —    | —    | 1.15 | V             | $I_F = 30\text{A}$ , $T_J = -55^\circ\text{C}$             |
|          |                                       | —    | —    | 0.97 |               | $I_F = 30\text{A}$ , $T_J = 25^\circ\text{C}$              |
|          |                                       | —    | —    | 1.08 |               | $I_F = 60\text{A}$ , $T_J = 25^\circ\text{C}$              |
|          |                                       | —    | —    | 1.30 |               | $I_F = 120\text{A}$ , $T_J = 25^\circ\text{C}$             |
|          |                                       | —    | —    | 0.8  |               | $I_F = 30\text{A}$ , $T_J = 125^\circ\text{C}$             |
| $I_R$    | Reverse Leakage Current<br>See Fig. 2 | —    | —    | 50   | $\mu\text{A}$ | $V_R = V_R$ Rated                                          |
|          |                                       | —    | —    | 1.0  | mA            | $V_R = V_R$ Rated, $T_J = 125^\circ\text{C}$               |
| $C_T$    | Junction Capacitance, See Fig. 3      | —    | —    | 190  | pF            | $V_R = 200\text{V}$                                        |
| $L_S$    | Series Inductance                     | —    | 5.9  | —    | nH            | Measured from center of cathode pad to center of anode pad |

**Dynamic Recovery Characteristics @  $T_J = 25^\circ\text{C}$  (unless otherwise specified)**

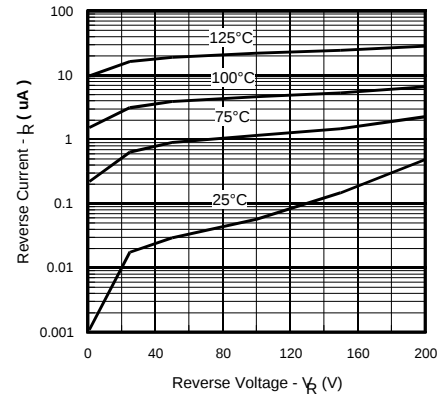
|                   | Parameter                             | Min. | Typ. | Max. | Units                  | Test Conditions                                                              |
|-------------------|---------------------------------------|------|------|------|------------------------|------------------------------------------------------------------------------|
| $t_{rr}$          | Reverse Recovery Time                 | —    | —    | 35   | ns                     | $I_F = 1.0\text{A}$ , $V_R = 30\text{V}$ , $di/dt = 300\text{A}/\mu\text{s}$ |
| $t_{rr1}$         | Reverse Recovery Time                 | —    | 45   | —    | ns                     | $T_J = 25^\circ\text{C}$ See Fig. 5                                          |
| $t_{rr2}$         |                                       | —    | 71   | —    |                        | $T_J = 125^\circ\text{C}$ See Fig. 6                                         |
| $I_{RRM1}$        | Peak Recovery Current                 | —    | 5.3  | —    | A                      | $T_J = 25^\circ\text{C}$ See Fig. 7                                          |
| $I_{RRM2}$        |                                       | —    | 10.3 | —    |                        | $T_J = 125^\circ\text{C}$ See Fig. 8                                         |
| $Q_{rr1}$         | Reverse Recovery Charge               | —    | 120  | —    | nC                     | $T_J = 25^\circ\text{C}$ See Fig. 7                                          |
| $Q_{rr2}$         |                                       | —    | 366  | —    |                        | $T_J = 125^\circ\text{C}$ See Fig. 8                                         |
| $di_{(rec)M}/dt1$ | Peak Rate of Fall of Recovery Current | —    | 590  | —    | $\text{A}/\mu\text{s}$ | $T_J = 25^\circ\text{C}$ See Fig. 8                                          |
| $di_{(rec)M}/dt2$ | During $t_b$                          | —    | 1290 | —    |                        | $T_J = 125^\circ\text{C}$ See Fig. 8                                         |

**Thermal - Mechanical Characteristics**

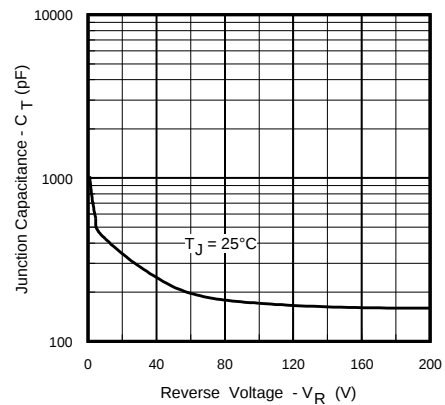
|            | Parameter        | Typ. | Max. | Units                     |
|------------|------------------|------|------|---------------------------|
| $R_{thJC}$ | Junction-to-Case | —    | 1.76 | $^\circ\text{C}/\text{W}$ |
| Wt         | Weight           | 2.6  | —    | g                         |



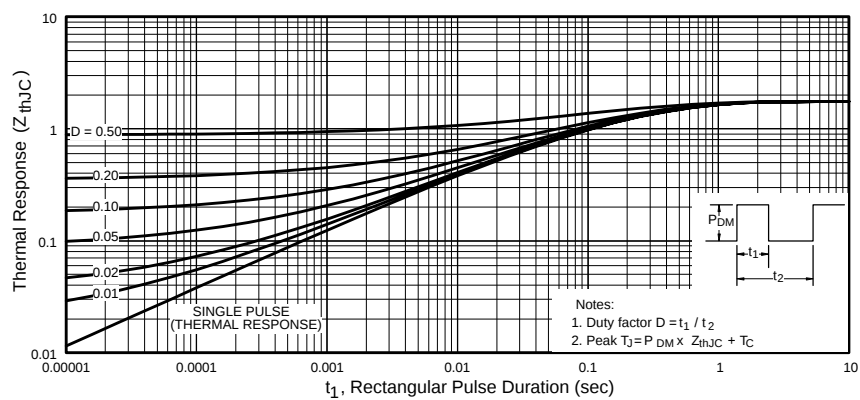
**Fig. 1** - Maximum Forward Voltage Drop Vs. Instantaneous Forward Current



**Fig. 2** - Typical Reverse Current Vs. Reverse Voltage



**Fig. 3** - Typical Junction Capacitance Vs. Reverse Voltage



**Fig. 4** - Maximum Thermal Impedance  $Z_{thJC}$  Characteristics

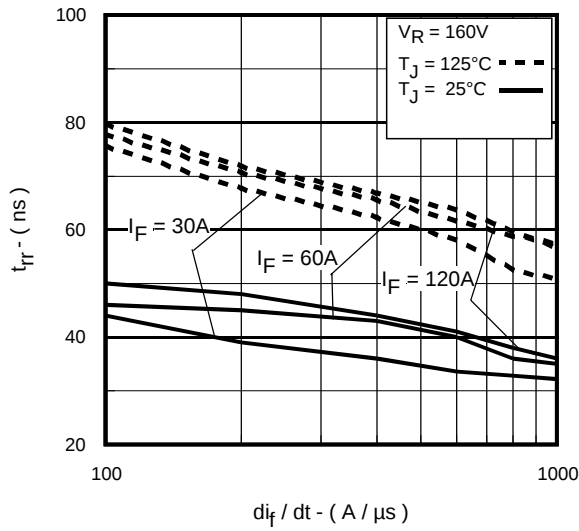


Fig. 5 - Typical Reverse Recovery Vs.  $di_f/dt$ ,

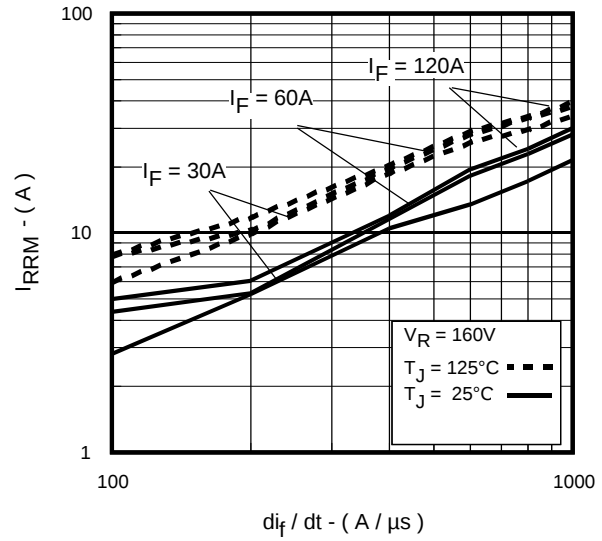


Fig. 6 - Typical Recovery Current Vs.  $di_f/dt$ ,

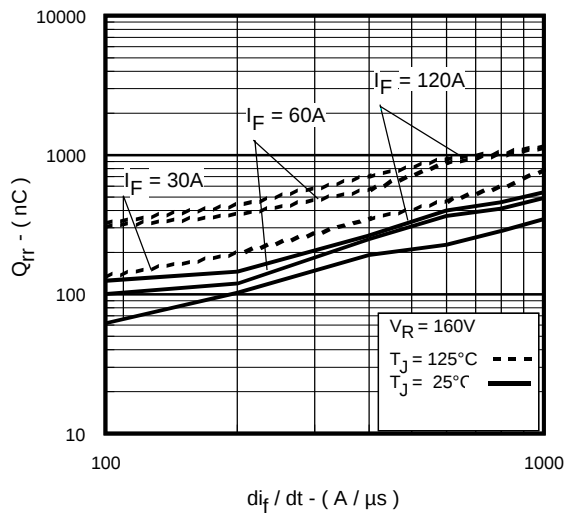


Fig. 7 - Typical Stored Charge Vs.  $di_f/dt$

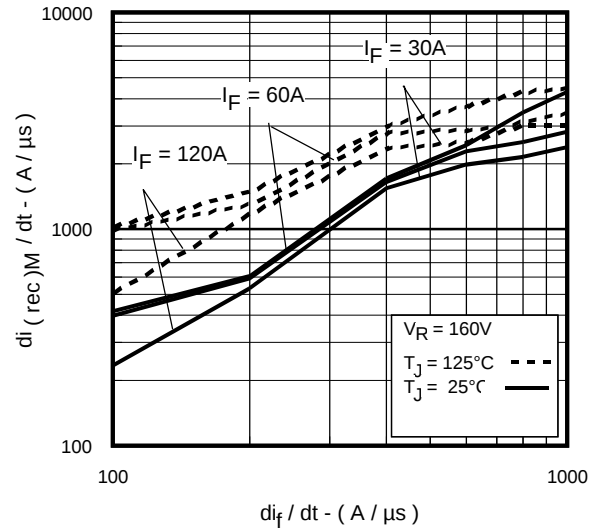


Fig. 8 - Typical  $di_{(rec)M}/dt$  Vs.  $di_f/dt$

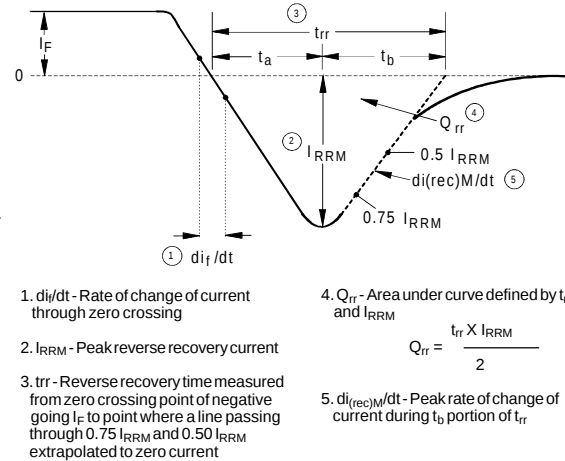
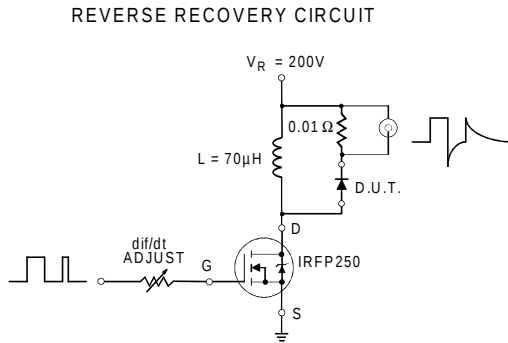
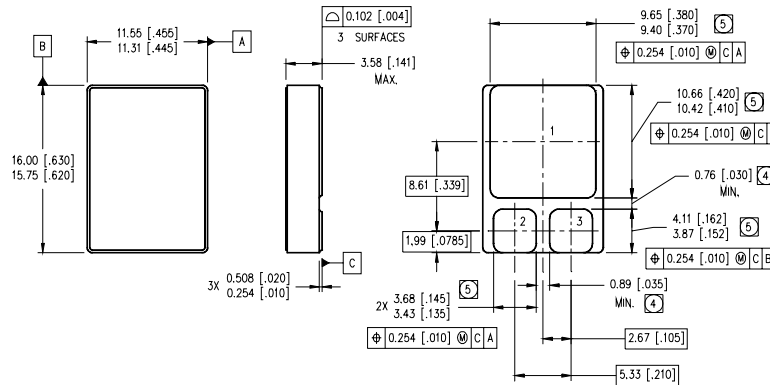


Fig. 9 - Reverse Recovery Parameter Test Circuit

Fig. 10 - Reverse Recovery Waveform and Definitions

## Case Outline and Dimensions — SMD-1



### NOTES:

1. DIMENSIONING & TOLERANCING PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSIONS ARE SHOWN IN MILLIMETERS [INCHES].
4. DIMENSION INCLUDES METALLIZATION FLASH.
5. DIMENSION DOES NOT INCLUDE METALLIZATION FLASH.

### PAD ASSIGNMENTS

- 1 = CATHODE
- 2 = COMMON ANODE
- 3 = COMMON ANODE