

## Silicon Carbide Schottky Diode

### Features

- 1700V Schottky Rectifier
- Zero Reverse Recovery Current
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching

|                                         |   |        |
|-----------------------------------------|---|--------|
| $V_{RRM}$                               | = | 1700 V |
| $I_F (T_C=165\text{ }^{\circ}\text{C})$ | = | 25 A   |
| $Q_C$                                   | = | 286 nC |

### Benefits

- Replace Bipolar with Unipolar Rectifiers
- Essentially No Switching Losses
- Higher Efficiency
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway

### Applications

- Switch Mode Power Supplies (SMPS)
- Power Factor Correction
- Motor Drives

### Package



**Maximum ratings (T<sub>C</sub>=25°C unless otherwise specified)**

| Parameter                             | Symbol              | Test Conditions                                                | Value       | Unit             | Note  |
|---------------------------------------|---------------------|----------------------------------------------------------------|-------------|------------------|-------|
| Repetitive Peak Reverse Voltage       | V <sub>RRM</sub>    |                                                                | 1700        | V                |       |
| DC Peak Reverse Voltage               | V <sub>R</sub>      |                                                                | 1700        | V                |       |
| Continuous Forward Current            | I <sub>F</sub>      | T <sub>C</sub> =25°C                                           | 102         | A                | Fig.3 |
|                                       |                     | T <sub>C</sub> =135°C                                          | 52          |                  |       |
|                                       |                     | T <sub>C</sub> =165°C                                          | 25          |                  |       |
| Repetitive Peak Forward Surge Current | I <sub>FRM</sub>    | T <sub>C</sub> =25°C, t <sub>P</sub> =10 ms, Half Sine Pulse   | 120         | A                |       |
|                                       |                     | T <sub>C</sub> =110°C, t <sub>P</sub> =10 ms, Half Sine Pulse  | 123         |                  |       |
| Non-Repetitive Forward Surge Current  | I <sub>FSM</sub>    | T <sub>C</sub> =25°C, t <sub>P</sub> =10 ms, Half Sine Pulse   | 150         | A                |       |
|                                       |                     | T <sub>C</sub> =110°C, t <sub>P</sub> =10 ms, Half Sine Pulse  | 132         |                  |       |
| Non-Repetitive Forward Surge Current  | I <sub>F,MAX</sub>  | T <sub>C</sub> =25°C, t <sub>P</sub> =10μs, Square Wave Pulse  | 942         | A                |       |
|                                       |                     | T <sub>C</sub> =110°C, t <sub>P</sub> =10μs, Square Wave Pulse | 812         |                  |       |
| i <sup>2</sup> t value                | ∫ i <sup>2</sup> dt | T <sub>C</sub> =25°C, t <sub>P</sub> =10 ms                    | 113         | A <sup>2</sup> s |       |
|                                       |                     | T <sub>C</sub> =110°C, t <sub>P</sub> =10 ms                   | 86          |                  |       |
| Power Dissipation                     | P <sub>tot</sub>    | T <sub>C</sub> =25°C                                           | 750         | W                | Fig.4 |
|                                       |                     | T <sub>C</sub> =110°C                                          | 325         |                  |       |
| Operating Temperature                 | T <sub>J</sub>      |                                                                | -55 to +175 | °C               |       |
| Storage Temperature                   | T <sub>stg</sub>    |                                                                | -55 to +175 | °C               |       |
| TO-247 Mounting Torque                |                     | M3 Screw<br>6-32 Screw                                         | 1<br>8.8    | Nm<br>lbf-in     |       |

**Electrical Characteristics (T<sub>J</sub>=25°C)**

| Parameter                 | Symbol         | Test Conditions                                     | Value |      |      | Unit | Note  |
|---------------------------|----------------|-----------------------------------------------------|-------|------|------|------|-------|
|                           |                |                                                     | Min.  | Typ. | Max. |      |       |
| Forward Voltage           | V <sub>F</sub> | I <sub>F</sub> =25A, T <sub>J</sub> =25°C           |       | 1.50 | 1.7  | V    | Fig.1 |
|                           |                | I <sub>F</sub> =25A, T <sub>J</sub> =175°C          |       | 2.20 | 2.9  |      |       |
| Reverse Current           | I <sub>R</sub> | V <sub>R</sub> =1700V, T <sub>J</sub> =25°C         |       | 18   | 45   | μA   | Fig.2 |
|                           |                | V <sub>R</sub> =1700V, T <sub>J</sub> =175°C        |       | 243  |      |      |       |
| Total Capacitive Charge   | Q <sub>C</sub> | V <sub>R</sub> =1700V, T <sub>J</sub> =25°C         |       | 286  |      | nC   | Fig.5 |
| Total Capacitance         | C              | V <sub>R</sub> =0V, T <sub>J</sub> =25°C, f=1MHz    |       | 2840 |      | pF   | Fig.6 |
|                           |                | V <sub>R</sub> =800V, T <sub>J</sub> =25°C, f=1MHz  |       | 122  |      |      |       |
|                           |                | V <sub>R</sub> =1700V, T <sub>J</sub> =25°C, f=1MHz |       | 121  |      |      |       |
| Capacitance Stored Energy | E <sub>C</sub> | V <sub>R</sub> =1700 V                              |       | 150  |      | μJ   | Fig.7 |

**Thermal Characteristics**

| Parameter                            | Symbol           | Value | Unit | Note   |
|--------------------------------------|------------------|-------|------|--------|
| Thermal Resistance(Junction to Case) | R <sub>eJC</sub> | 0.2   | °C/W | Fig. 8 |

## Typical Performance

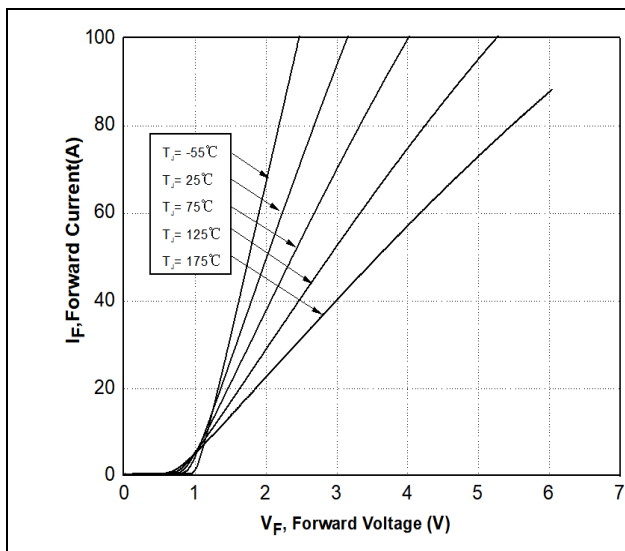


Figure 1. Forward Characteristics

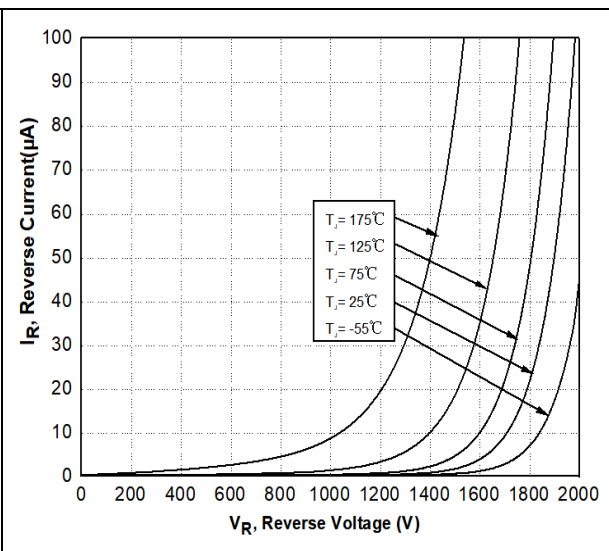


Figure 2. Reverse Characteristics

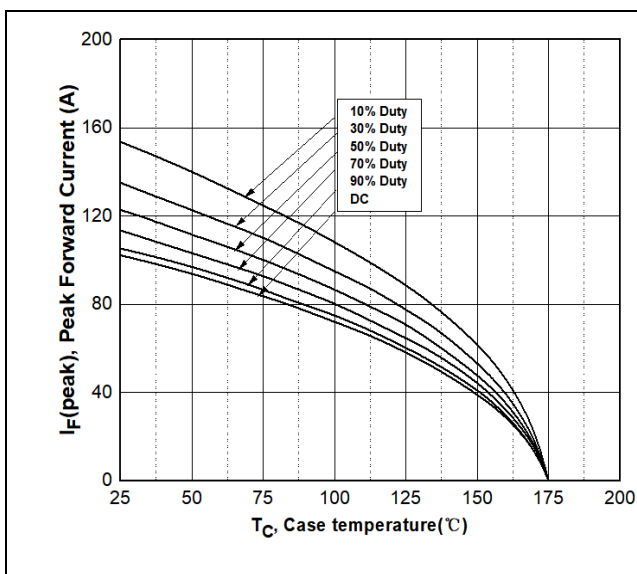


Figure 3. Current Derating

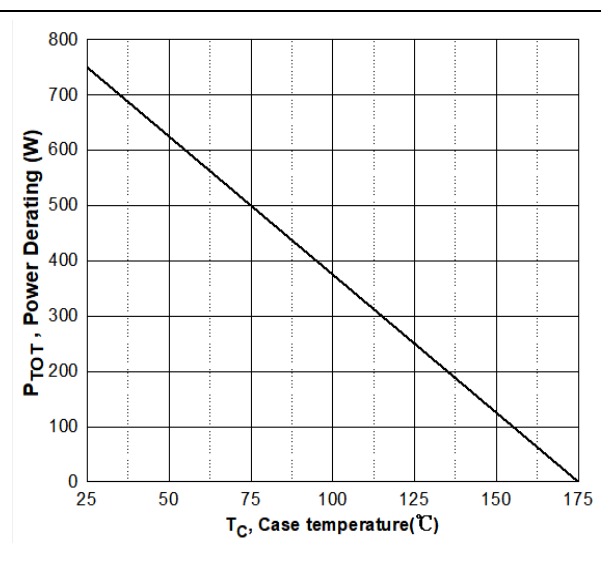


Figure 4. Power Derating

## Typical Performance

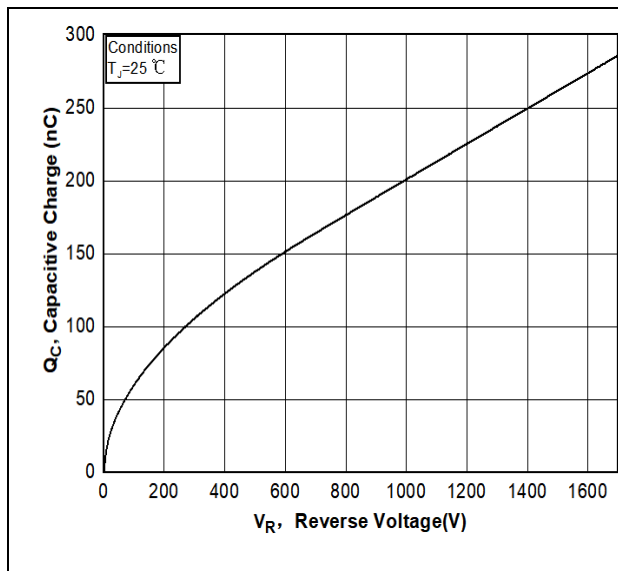


Figure 5. Capacitance Charge Vs. Reverse

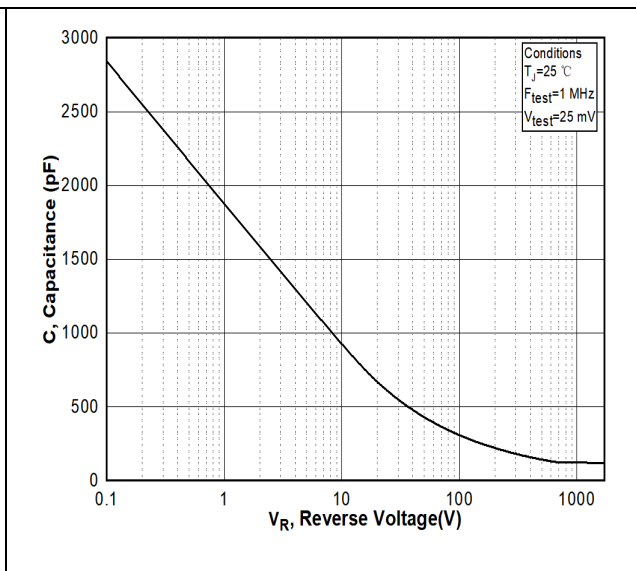


Figure 6. Capacitance Vs. Reverse Voltage

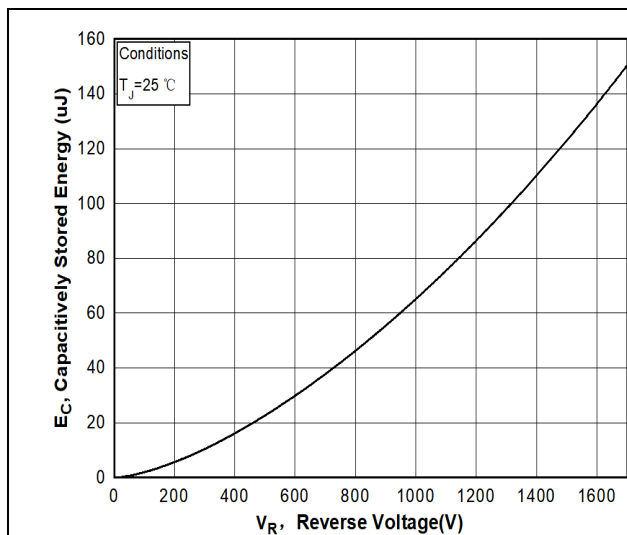


Figure 7. Capacitance Stored Energy

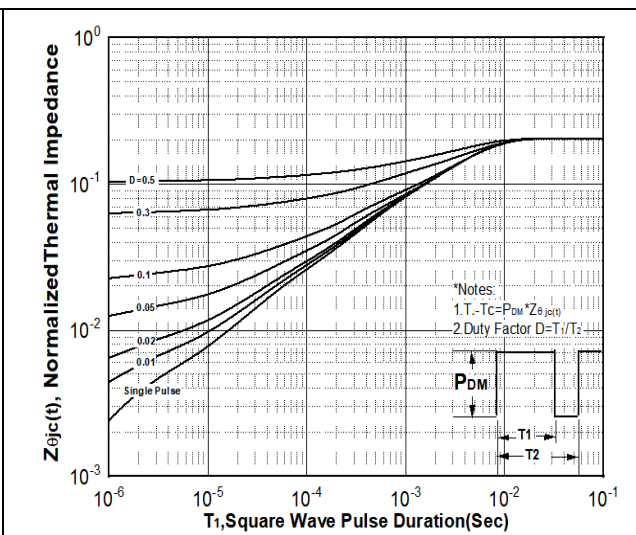
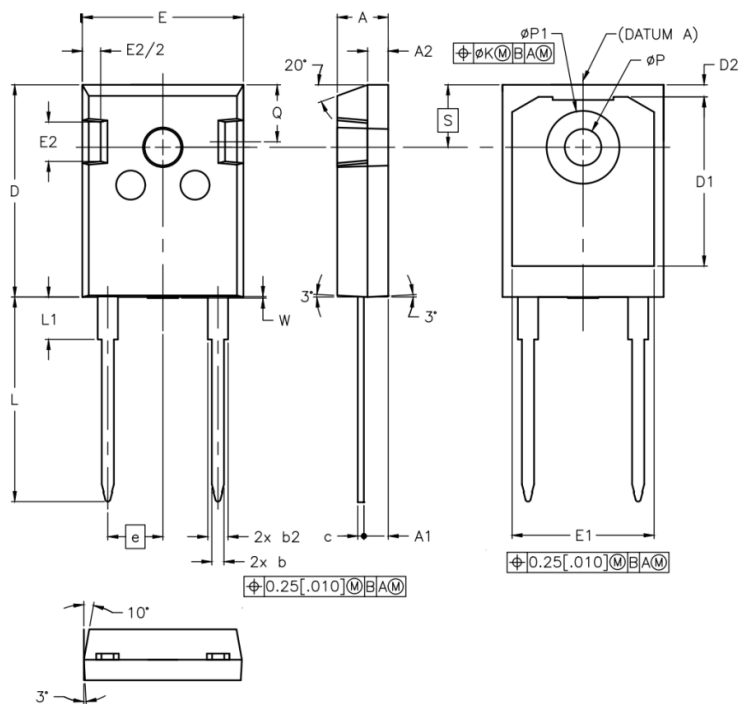


Figure 8. Transient Thermal Response Curve(Junction-to-Case)

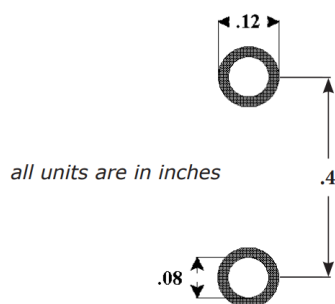
## Package Dimensions

### Package TO-247-2L



| POS | Inches |      | Millimeters |       |
|-----|--------|------|-------------|-------|
|     | Min    | Max  | Min         | Max   |
| A   | .190   | .205 | 4.70        | 5.31  |
| A1  | .087   | .102 | 2.21        | 2.59  |
| A2  | .059   | .098 | 1.50        | 2.49  |
| b   | .039   | .055 | 0.99        | 1.40  |
| b2  | .065   | .094 | 1.65        | 2.39  |
| c   | .015   | .035 | 0.38        | 0.89  |
| D   | .819   | .845 | 20.80       | 21.46 |
| D1  | .515   | -    | 13.08       | -     |
| D2  | .020   | .053 | 0.51        | 1.35  |
| E   | .620   | .640 | 15.49       | 16.26 |
| E1  | .530   | -    | 13.46       | -     |
| E2  | .135   | .157 | 3.43        | 3.99  |
| e   | .214   |      | 5.44        |       |
| ØK  | .010   |      | 0.25        |       |
| L   | .780   | .800 | 19.81       | 20.32 |
| L1  | -      | .177 | -           | 4.50  |
| ØP  | .140   | .144 | 3.56        | 3.66  |
| ØP1 | .278   | .291 | 7.06        | 7.39  |
| Q   | .212   | .244 | 5.38        | 6.20  |
| S   | .243   |      | 6.17        |       |
| W   | -      | .006 | -           | 0.15  |

## Recommended Solder Pad Layout



TO247-2L