

## SiC Schottky Barrier Rectifier

### Features

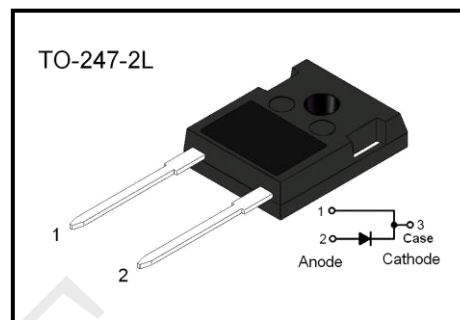
- Reverse withstand voltage 1200V
- Zero reverse recovery current
- High working frequency
- Switch characteristics are not affected by temperature
- Fast switching speed
- Positive temperature coefficient of positive pressure drop

### Advantages

- Very low switching loss
- Higher efficiency
- Low dependence of the system on the heat sink
- No thermal collapse in parallel devices

### Application

- Switching mode power supply, AC/DC converter
- Power factor correction
- Motor drive
- PV inverter and wind turbine



### Absolute Maximum Rating (Ta=25°C)

| Parameter                        | Symbol      | Test conditions                                                                                           | Value          | Unit         |
|----------------------------------|-------------|-----------------------------------------------------------------------------------------------------------|----------------|--------------|
| Peak repetitive reverse voltage  | $V_{RRM}$   |                                                                                                           | 1700           | V            |
| Working peak reverse voltage     | $V_{RWM}$   |                                                                                                           | 1700           | V            |
| DC blocking voltage              | $V_{DC}$    |                                                                                                           | 1700           | V            |
| Average rectified output current | $I_{F(AV)}$ | $T_C = 25^\circ\text{C}$<br>$T_C = 125^\circ\text{C}$<br>$T_C = 150^\circ\text{C}$                        | 40<br>21<br>10 | A            |
| Forward repetitive peak current  | $I_{FRM}$   | $T_C = 25^\circ\text{C}$ , tp=10ms, Half Sine Wave<br>$T_C = 110^\circ\text{C}$ , tp=10ms, Half Sine Wave | 58<br>32       | A            |
| Forward surge current            | $I_{FSM}$   | $T_C = 25^\circ\text{C}$ , tp=10ms, Half Sine Wave<br>$T_C = 110^\circ\text{C}$ , tp=10ms, Half Sine Wave | 148<br>93      | A            |
| Power dissipation                | $P_{tot}$   | $T_C = 25^\circ\text{C}$<br>$T_C = 110^\circ\text{C}$                                                     | 188<br>88      | W            |
| Junction temperature             | $T_j$       |                                                                                                           | -55 ~ +175     | °C           |
| Storage temperature              | $T_{stg}$   |                                                                                                           | -55 ~ +175     | °C           |
| Mounting torque                  |             | M3 Screw<br>6-32 Screw                                                                                    | 1<br>8.8       | Nm<br>lbf-in |

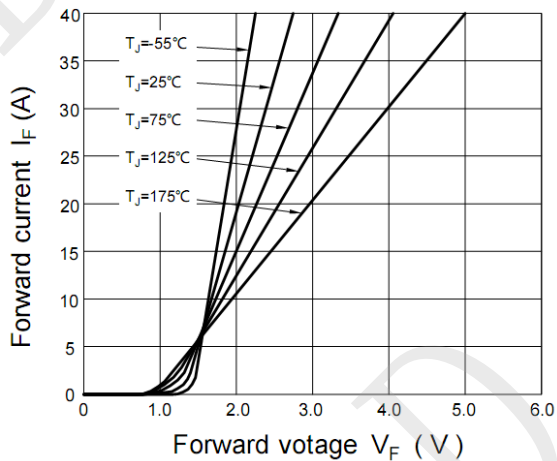
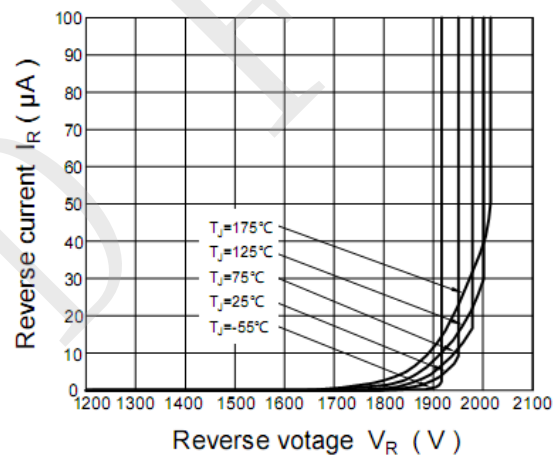
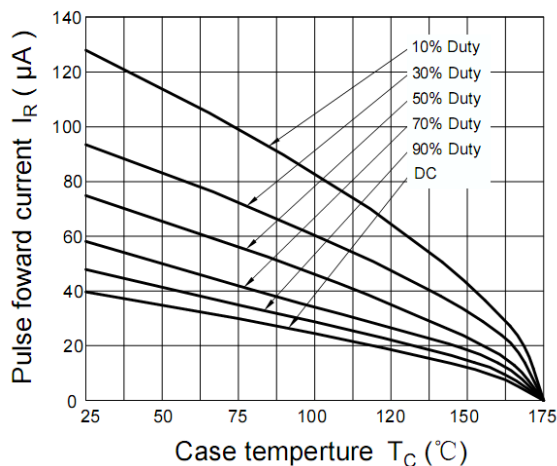
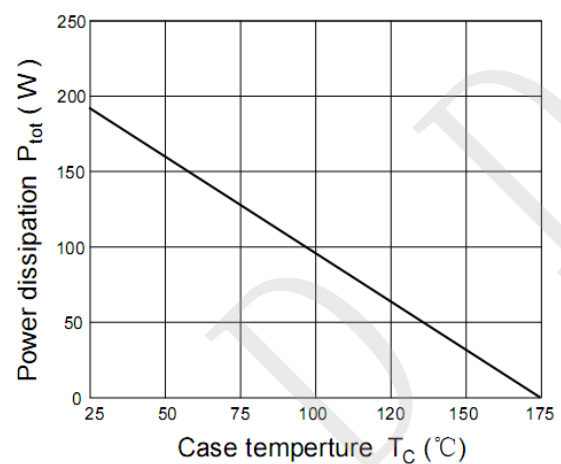
### Thermal characteristics

| Parameter                             | Symbol          | Typ  | Unit |
|---------------------------------------|-----------------|------|------|
| Thermal resistance - junction to case | $R_{\theta JC}$ | 0.62 | °C/W |

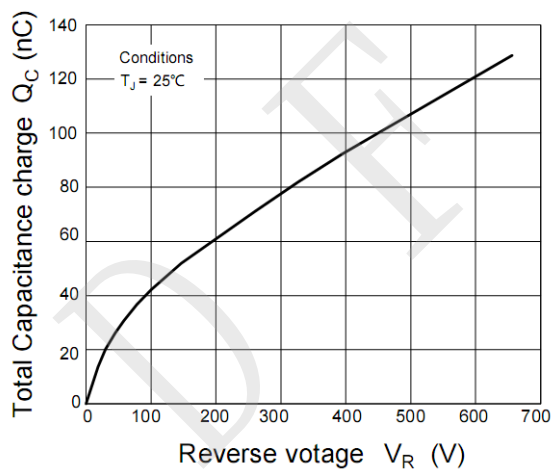
**Electrical Characteristics** ( $T_a=25^\circ\text{C}$  unless otherwise specified)

| Parameter                 | Symbol | Test conditions                                                                                                                                                                                   | Min | Typ              | Max        | Unit          |
|---------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------------------|------------|---------------|
| Forward voltage           | $V_F$  | $I_F = 10\text{ A}$ , $T_j=25^\circ\text{C}$<br>$I_F = 10\text{ A}$ , $T_j=175^\circ\text{C}$                                                                                                     |     | 1.5<br>2.0       | 1.7<br>2.8 | V             |
| Reverse current           | $I_R$  | $V_R = 1700\text{V}$ , $T_j=25^\circ\text{C}$<br>$V_R = 1700\text{V}$ , $T_j=175^\circ\text{C}$                                                                                                   |     | 4<br>24          | 18<br>90   | $\mu\text{A}$ |
| Total capacitive charge   | $Q_C$  | $V_R = 1700\text{V}$ , $T_j=25^\circ\text{C}$                                                                                                                                                     |     | 126              |            | nC            |
| Total capacitance         | C      | $V_R = 0\text{V}$ , $T_j=25^\circ\text{C}$ , $f=1\text{MHz}$<br>$V_R = 800\text{V}$ , $T_j=25^\circ\text{C}$ , $f=1\text{MHz}$<br>$V_R = 1700\text{V}$ , $T_j=25^\circ\text{C}$ , $f=1\text{MHz}$ |     | 1227<br>53<br>52 |            | pF            |
| Capacitance Stored Energy | $E_C$  | $V_R = 1700\text{V}$                                                                                                                                                                              |     | 79               |            | $\mu\text{J}$ |

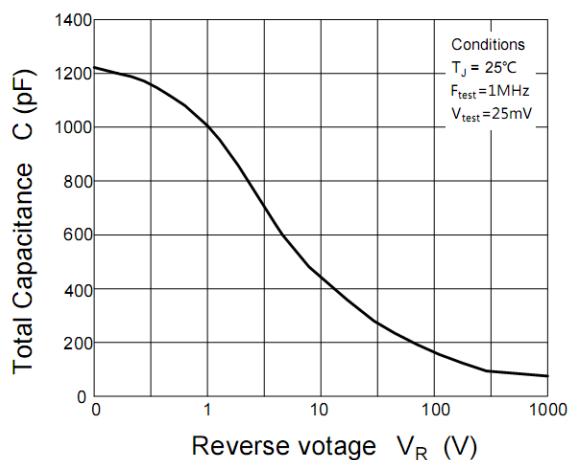
Notes: SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

**Typical Characteristics**

**Figure 1. Forward Characteristics**

**Figure 2. Reverse Characteristics**

**Figure 3. Current Derating**

**Figure 4. Power Derating**

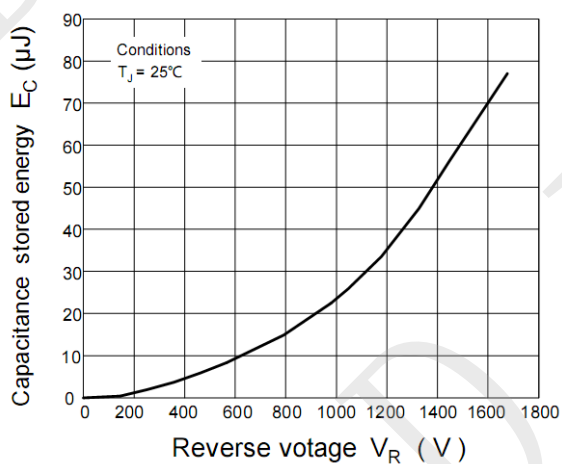
### Typical Characteristics



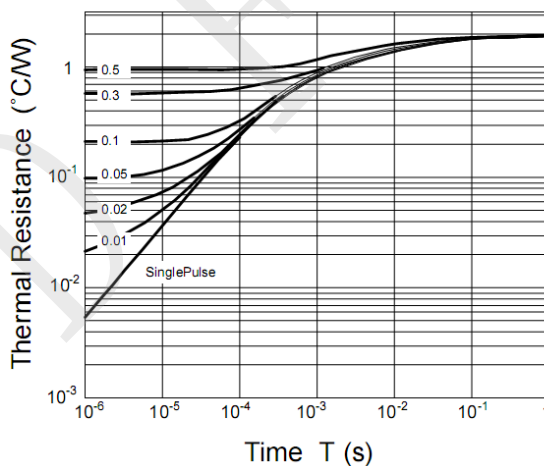
**Figure 5. Total Capacitance charge vs. reverse voltage**



**Figure 6. Capacitance vs reverse voltage**



**Figure 7. Capacitance stored energy**



**Figure 8. Thermal Impedance**

DDF3D10170H

TO-247-2L SiC Schottky Diodes

Package Dimensions

| Dim | Millimeter |       | Inches      |       |
|-----|------------|-------|-------------|-------|
|     | Min.       | Max.  | Min.        | Max.  |
| A   | 4.90       | 5.10  | 0.193       | 0.201 |
| A1  | 1.90       | 2.10  | 0.075       | 0.083 |
| A2  | 2.29       | 2.54  | 0.090       | 0.100 |
| b   | 1.00       | 1.40  | 0.039       | 0.055 |
| b1  | 2.00       | 2.20  | 0.079       | 0.087 |
| c   | 0.50       | 0.70  | 0.020       | 0.028 |
| D   | 15.75      | 16.05 | 0.620       | 0.632 |
| E   | 20.20      | 20.80 | 0.795       | 0.819 |
| e   | 5.45 (BSC) |       | 0.215 (BSC) |       |
| F   | 6.05       | 6.25  | 0.238       | 0.246 |
| F1  | 5.80       | 6.00  | 0.228       | 0.236 |
| L   | 20.10      | 20.40 | 0.791       | 0.803 |
| L1  | 4.05       | 4.35  | 0.159       | 0.171 |
| Φ   | 3.50       | 3.70  | 0.138       | 0.146 |

