

## Silicon Carbide Schottky Diode

### Features

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

$$V_{RRM} = 1700 \text{ V}$$

$$I_F (T_C=159^\circ\text{C}) = 10\text{A}$$

$$Q_C = 30 \text{ nC}$$

### Benefits

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

### Package



### Applications

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



**Maximum Ratings (at  $T_C = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)**

| Parameter                                                                                                                                                                            | Symbol        | Value          | Unit                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|----------------------|
| Repetitive Peak Reverse Voltage                                                                                                                                                      | $V_{RRM}$     | 1700           | V                    |
| Surge Peak Reverse Voltage                                                                                                                                                           | $V_{RSM}$     | 1700           | V                    |
| DC Peak Reverse Voltage                                                                                                                                                              | $V_R$         | 1700           | V                    |
| Continuous Forward Current<br>$T_C = 25^{\circ}\text{C}$<br>$T_C = 135^{\circ}\text{C}$<br>$T_C = 159^{\circ}\text{C}$                                                               | $I_F$         | 34<br>17<br>10 | A                    |
| Repetitive Peak Forward Surge Current<br>$T_C = 25^{\circ}\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$<br>$T_C = 110^{\circ}\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$ | $I_{FRM}$     | 45<br>25       | A                    |
| Non-Repetitive Forward Surge Current<br>$T_C = 25^{\circ}\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$<br>$T_C = 110^{\circ}\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$  | $I_{FSM}$     | 105<br>70      | A                    |
| $i^2dt$ value<br>$T_C = 25^{\circ}\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$<br>$T_C = 110^{\circ}\text{C}, t_p=10\text{ms}, \text{Half Sine Pulse}$                         | $\int i^2 dt$ | 55<br>24       | $\text{A}^2\text{s}$ |
| Power dissipation<br>$T_C = 25^{\circ}\text{C}$<br>$T_C = 110^{\circ}\text{C}$                                                                                                       | $P_{tot}$     | 192<br>83      | W                    |
| Operating junction Range                                                                                                                                                             | $T_j$         | -55 to +175    | $^{\circ}\text{C}$   |
| Storage temperature Range                                                                                                                                                            | $T_{stg}$     | -55 to +150    | $^{\circ}\text{C}$   |

**Thermal Resistance**

| Parameter                            | Symbol          | Typ. | Unit                 |
|--------------------------------------|-----------------|------|----------------------|
| Thermal resistance, junction – case. | $R_{thJC(TYP)}$ | 0.62 | $^{\circ}\text{C/W}$ |

**Electrical Characteristic (at T<sub>c</sub> = 25 °C, unless otherwise specified)**

| Parameter               | Symbol         | Value |      |      | Unit | Test Condition                                                                                        |
|-------------------------|----------------|-------|------|------|------|-------------------------------------------------------------------------------------------------------|
|                         |                | min.  | typ. | max. |      |                                                                                                       |
| Forward Voltage         | V <sub>F</sub> | -     | 1.4  | 1.7  | V    | I <sub>F</sub> =10A<br>T <sub>j</sub> =25°C<br>T <sub>j</sub> =175°C                                  |
| Reverse Current         | I <sub>R</sub> | -     | 6    | 100  | μA   | V <sub>R</sub> =1700V<br>T <sub>j</sub> =25°C<br>T <sub>j</sub> =175°C                                |
| Total Capacitive Charge | Q <sub>C</sub> | -     | 109  | -    | nC   | V <sub>R</sub> =1700V, T <sub>j</sub> =25°C<br>$Q_C = \int_0^{V_R} C(V)dV$                            |
| Total Capacitance       | C              | -     | 955  | -    | pF   | T <sub>j</sub> =25°C, f=100KHz<br>V <sub>R</sub> =0V<br>V <sub>R</sub> =800V<br>V <sub>R</sub> =1700V |

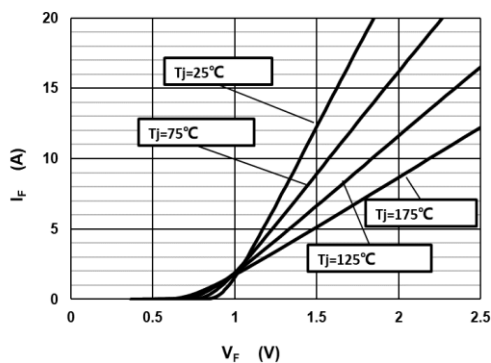
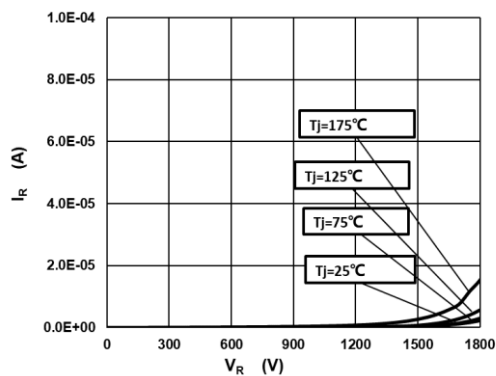
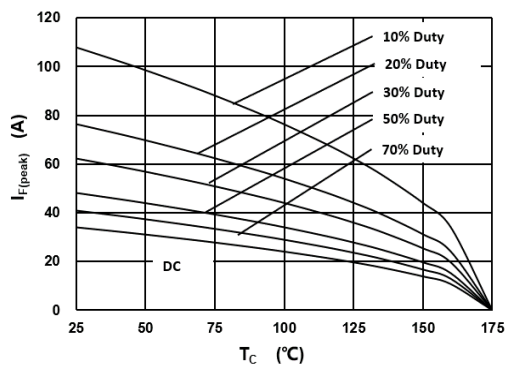
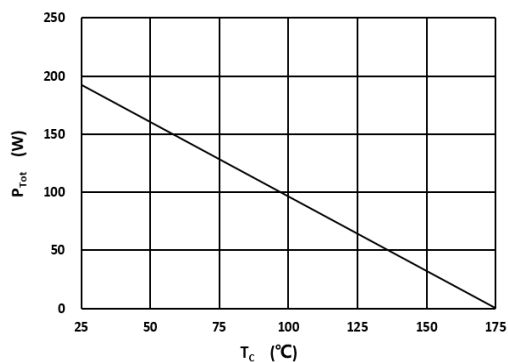
**Characteristics Curve:**
**Fig 1: Forward Characteristics**

**Fig 2: Reverse Characteristics**

**Fig 3: Current Derating**

**Fig 4: Power Derating**


Fig 5: Capacitance vs. Reverse Voltage

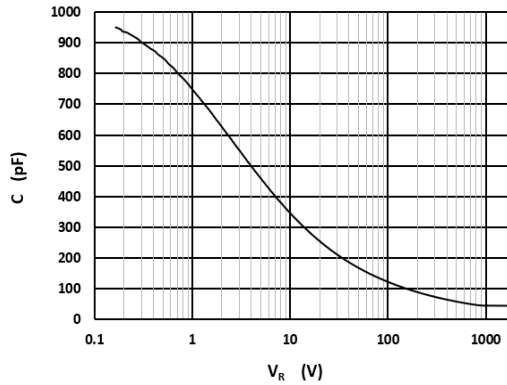


Fig 6: Reverse Charge vs. Reverse Voltage

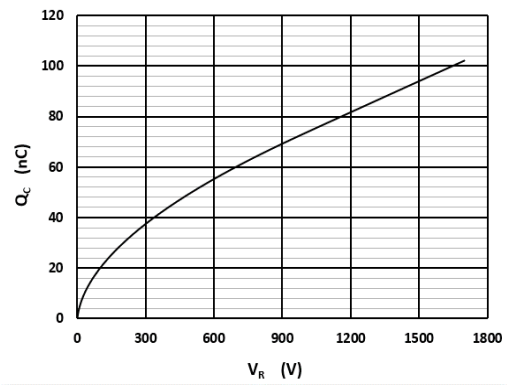


Fig 7: Typical Capacitance Stored Energy

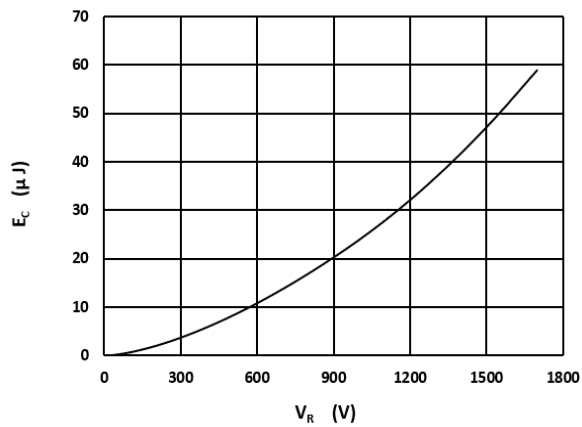
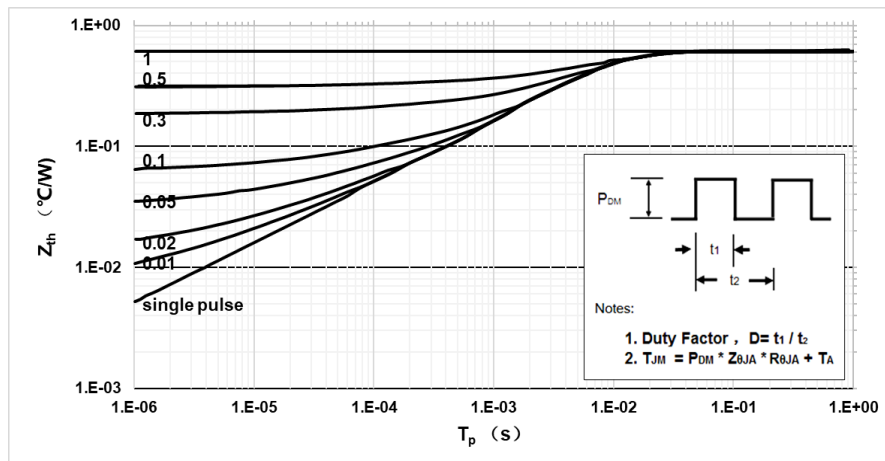
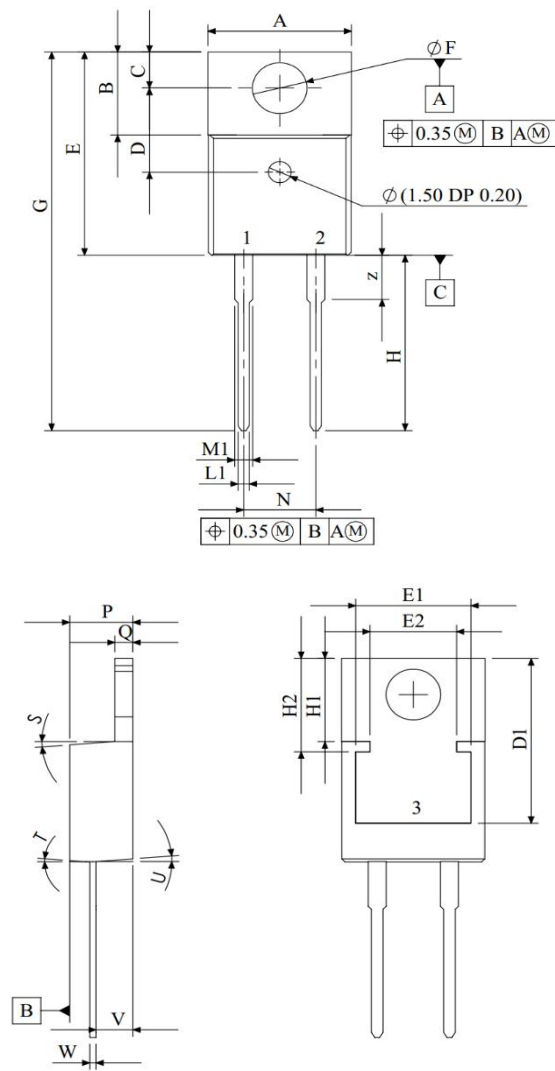


Fig 8: Transient Thermal Impedance



## Package Dimensions

### Package TO-220-2L



| SYMBOL | MIN (mm)   | MAX (mm) |
|--------|------------|----------|
| A      | 9.677      | 10.414   |
| B      | 5.969      | 6.477    |
| C      | 2.540      | 3.048    |
| D      | 5.664      | 8.560    |
| D1     | 12.450 REF |          |
| E      | 14.986     | 15.621   |
| E1     | 8.120 REF  |          |
| E2     | 6.100 REF  |          |
| F      | 3.632      | 3.886    |
| G      | 28.067     | 29.134   |
| H      | 12.700     | 13.970   |
| H1     | 6.223 REF  |          |
| H2     | 7.040 REF  |          |
| L1     | 0.635      | 0.914    |
| M1     | 1.143      | 1.397    |
| N      | 4.953      | 5.207    |
| P      | 4.191      | 4.699    |
| Q      | 1.219      | 1.372    |
| S      | 3°         | 6°       |
| T      | 3°         | 6°       |
| U      | 3°         | 6°       |
| V      | 2.388      | 2.794    |
| W      | 0.356      | 0.635    |
| W1     | 0.356      | 0.520    |
| X      | 3°         | 5.5°     |
| Y      | 9.779      | 10.414   |
| Z      | 3.302      | 3.810    |