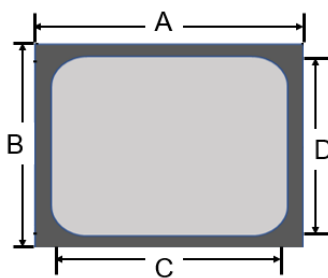




## SMD50C120KM 1200V 50A SiC Schottky Diode

**DESCRIPTION:** SM provides leading edge technology for the SiC Schottky barrier diodes with the advanced thin-wafer technology. The new family of 1200V products showing improved efficiency over all load conditions, attributed to its lower figure of merit ( $Q_c \times V_f$ ).

### DIE INFORMATION



### FEATURES

- 1200V Schottky Barrier Diode
- Zero Reverse Recovery/Zero Forward Recovery
- 100% UIS screened
- Temperature Independent Switching Behavior

### TYPICAL APPLICATIONS

- Switch mode power supply
- Power factor correction
- Solar inverter
- Uninterruptible power supply

### MAJOR RATINGS AND CHARACTERISTICS

| Symbol        | Parameter                                 | Value | Unit                 | Test Conditions                                        |
|---------------|-------------------------------------------|-------|----------------------|--------------------------------------------------------|
| $V_{RRM}$     | Repetitive Peak Reverse Voltage           | 1200  | V                    |                                                        |
| $V_R$         | DC Peak Blocking Voltage                  | 1200  | V                    |                                                        |
| $I_F$         | Continuous Forward Current                | 50    | A                    | $T_C=175^\circ\text{C}$                                |
| $I_{FRM}$     | Repetitive Peak Forward Surge Current     | 140   | A                    | $T_C=25^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave |
| $I_{FSM}$     | Non-Repetitive Peak Forward Surge Current | 280*  | A                    | $T_C=25^\circ\text{C}$ , $t_p = 10$ ms, Half Sine Wave |
| $\int i^2 dt$ | $i^2 t$ value                             | 392   | $\text{A}^2\text{s}$ | $T_C=25^\circ\text{C}$ , $t_p=10$ ms, Half Sine Wave   |



|                |                                            |            |    |  |
|----------------|--------------------------------------------|------------|----|--|
| $T_j, T_{stg}$ | Operating Junction and Storage Temperature | -40 ~ +175 | °C |  |
|----------------|--------------------------------------------|------------|----|--|

**ELECTRICAL CHARACTERISTICS (25 °C unless otherwise noted)**

| Symbol   | Parameter                 | Min. | Typ.                    | Max. | Unit    | Test Conditions                                                                                                                                              |
|----------|---------------------------|------|-------------------------|------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $V_{DC}$ | DC blocking voltage       | 1200 |                         |      | V       | $I_R = 250\mu A, T_J = 25\text{ °C}$                                                                                                                         |
| $V_F$    | Forward Voltage           |      | 1.5<br>2.3              | 1.75 | V       | $I_F = 50A, T_J = 25\text{ °C}$<br>$I_F = 50A, T_J = 175\text{ °C}$                                                                                          |
| $I_R$    | Reverse Current           |      | 15<br>130               | 180  | $\mu A$ | $V_R = 1200V, T_J = 25\text{ °C}$<br>$V_R = 1200V, T_J = 175\text{ °C}$                                                                                      |
| Qc       | Total Capacitive Charge   |      | 206                     |      | nC      | $V_R = 800V$                                                                                                                                                 |
| C        | Total Capacitance         |      | 3.058<br>0.194<br>0.146 |      | nF      | $V_R = 0V, T_J = 25\text{ °C}, f = 1\text{ MHz}$<br>$V_R = 400V, T_J = 25\text{ °C}, f = 1\text{ MHz}$<br>$V_R = 800V, T_J = 25\text{ °C}, f = 1\text{ MHz}$ |
| $E_C$    | Capacitance Stored Energy |      | 46.7                    |      | $\mu J$ | $V_R = 800V$                                                                                                                                                 |

**MECHANICAL PARAMETERS**

| PARAMETERS            | TYP       | UNIT    |
|-----------------------|-----------|---------|
| Die Size              | 4.25×4.25 | mm      |
| Anode Pad Opening     | 3.88×3.88 | mm      |
| Street Size           | 60        | $\mu m$ |
| Thickness             | 100 ± 10  | $\mu m$ |
| Wafer Size            | 150       | mm      |
| Anode Metalization Al | 4         | $\mu m$ |
| Cathode Metalization  | Ti/Ni/Ag  | /       |
| Frontside Passivation | Polyimide | /       |



## Typical Characteristics

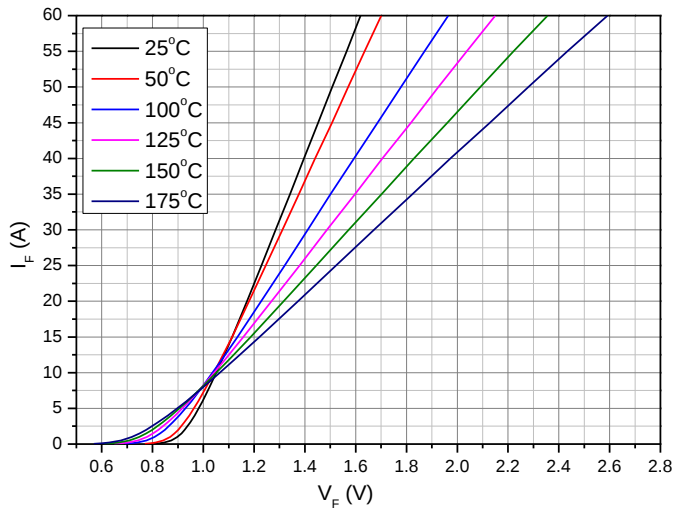


Figure 1. Forward Characteristics

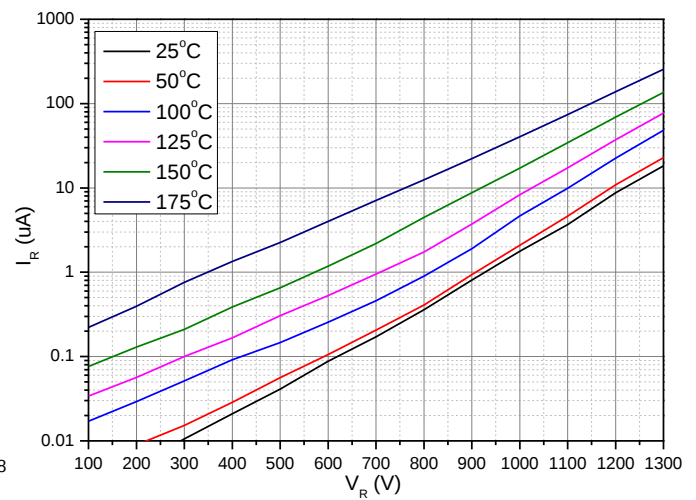


Figure 2. Reverse Characteristics

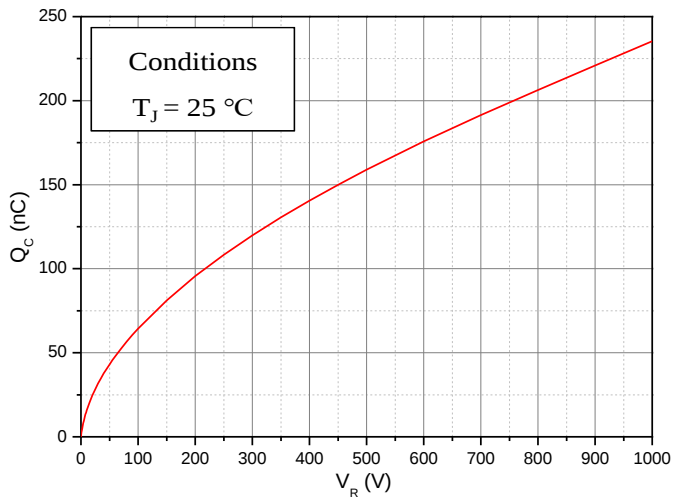


Figure 3. Total Capacitance Charge vs. Reverse Voltage

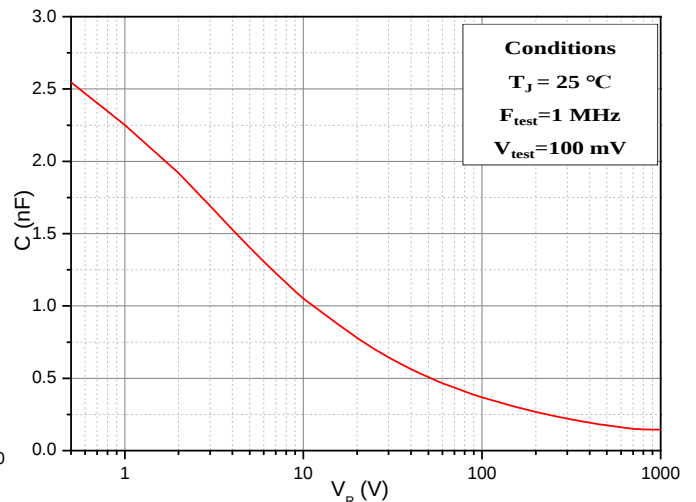
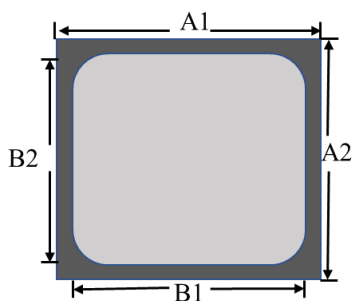


Figure 4. Capacitance vs. Reverse Voltage

## Chip Dimensions



| symbol                 | Dimens on |       |
|------------------------|-----------|-------|
|                        | mm        | inch  |
| A 1 (die size)         | 4.25      | 0.167 |
| A 2 (die size)         | 4.25      | 0.167 |
| B1 (anode pad opening) | 3.88      | 0.153 |
| B2 (anode pad opening) | 3.88      | 0.153 |



#### Notes

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- Some data are test results of the die packaged by TO247.
  - This product has not been designed or tested for use in, and is not intended for use in, applications implanted into the human body nor in applications in which failure of the product could lead to death, personal injury or property damage, including but not limited to equipment used in the operation of nuclear facilities, life-support machines, cardiac defibrillators or similar emergency medical equipment, aircraft navigation or communication or control systems, or air traffic control systems.
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