

## 650V/20A

### SiC Schottky Barrier Diode

#### Characteristic

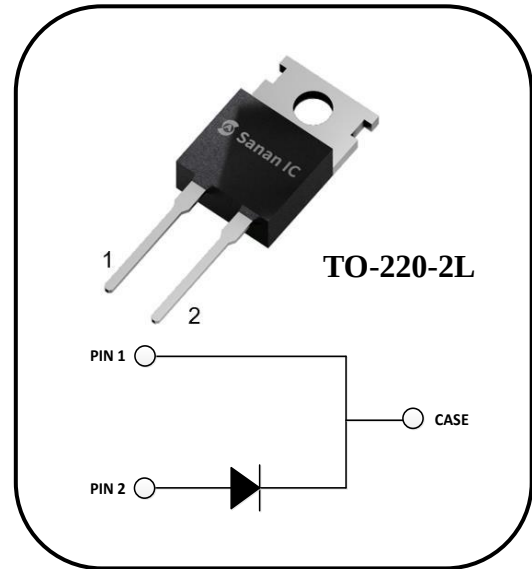
- Zero Reverse Recovery Current
- Positive temperature coefficient
- Temperature-independent performance
- High-speed switching
- Low switching loss
- Low heat dissipation requirements

#### Application

- Switching power supply
- Power factor correction
- Motor drive, traction
- Charging pile

#### Product Description

|                            |     |    |
|----------------------------|-----|----|
| $V_{RRM}$                  | 650 | V  |
| $I_F(135^{\circ}\text{C})$ | 25  | A  |
| $Q_C$                      | 55  | nC |



| Device       | Package   | Marking    |
|--------------|-----------|------------|
| SDS065J020C3 | TO-220-2L | DS065020C3 |

#### Absolute Maximum Ratings

| Parameter                             | Symbol        | Value   | Unit                 | Test Conditions                                                                   |
|---------------------------------------|---------------|---------|----------------------|-----------------------------------------------------------------------------------|
| Reverse voltage (Repetitive peak)     | $V_{RRM}$     | 650     | V                    | $T_C = 25^{\circ}\text{C}$                                                        |
| Reverse Voltage (Surge peak)          | $V_{RSM}$     | 650     |                      | $T_C = 25^{\circ}\text{C}$                                                        |
| Reverse voltage (DC)                  | $V_{DC}$      | 650     |                      | $T_C = 25^{\circ}\text{C}$                                                        |
| Continuous forward current            | $I_F$         | 51      | A                    | $T_C = 25^{\circ}\text{C}$                                                        |
|                                       |               | 25      |                      | $T_C = 135^{\circ}\text{C}$                                                       |
|                                       |               | 20      |                      | $T_C = 150^{\circ}\text{C}$                                                       |
| Surge non-repetitive forward current  | $I_{FSM}$     | 140     | A                    | $T_C = 25^{\circ}\text{C}, t_p = 10\text{ms}, \text{half Sine Pulse}$             |
| Repetitive Peak Forward Surge Current | $I_{FRM}$     | 96      | A                    | $T_C = 25^{\circ}\text{C}, t_p = 10\text{ms}, \text{half Sine Wave}$<br>$D = 0.1$ |
| Total power dissipation               | $P_{TOT}$     | 178     | W                    | $T_C = 25^{\circ}\text{C}$                                                        |
| $i^2t$ value                          | $\int i^2 dt$ | 98      | $\text{A}^2\text{s}$ | $T_C = 25^{\circ}\text{C}, t_p = 10\text{ms}$                                     |
| Operating temperature                 | $T_J$         | -55~175 | $^{\circ}\text{C}$   |                                                                                   |
| storage temperature                   | $T_{stg}$     | -55~175 | $^{\circ}\text{C}$   |                                                                                   |
| Mounting Torque                       | M             | 1       | Nm                   | M3 Screw                                                                          |

## Thermal Characteristics

| Parameter          | Symbol        | Values |      |      | Unit | Test Condition |
|--------------------|---------------|--------|------|------|------|----------------|
|                    |               | Min.   | Typ. | Max. |      |                |
| Thermal resistance | $R_{th(j-c)}$ | /      | 0.84 | /    | °C/W |                |

## Electrical Characteristics $T_J=25^{\circ}\text{C}$

| Parameter                 | Symbol   | Values |      |      | Unit          | Test Condition                                |
|---------------------------|----------|--------|------|------|---------------|-----------------------------------------------|
|                           |          | Min.   | Typ. | Max. |               |                                               |
| DC blocking voltage       | $V_{DC}$ | 650    | /    | /    | V             | $I_R=100\text{ }\mu\text{A}$                  |
| Forward voltage           | $V_F$    | /      | 1.35 | 1.50 | V             | $I_F=20\text{A}$ , $T_J=25^{\circ}\text{C}$   |
|                           |          | /      | 1.70 | 1.90 |               | $I_F=20\text{A}$ , $T_J=175^{\circ}\text{C}$  |
| Reverse current           | $I_R$    | /      | 2    | 40   | $\mu\text{A}$ | $V_R=650\text{V}$ , $T_J=25^{\circ}\text{C}$  |
|                           |          | /      | 10   | 100  |               | $V_R=650\text{V}$ , $T_J=175^{\circ}\text{C}$ |
| Total capacitance         | C        | /      | 1018 | /    | pF            | $V_R=0\text{V}$ , $f=1\text{MHz}$             |
|                           |          | /      | 104  | /    |               | $V_R=200\text{V}$ , $f=1\text{MHz}$           |
|                           |          | /      | 89   | /    |               | $V_R=400\text{V}$ , $f=1\text{MHz}$           |
| Total capacitive charge   | $Q_C$    | /      | 55   | /    | nC            | $V_R=400\text{V}$                             |
| Capacitance Stored Energy | $E_C$    | /      | 8.3  | /    | $\mu\text{J}$ | $V_R=400\text{V}$                             |

## Typical Electrical Characteristics Curves

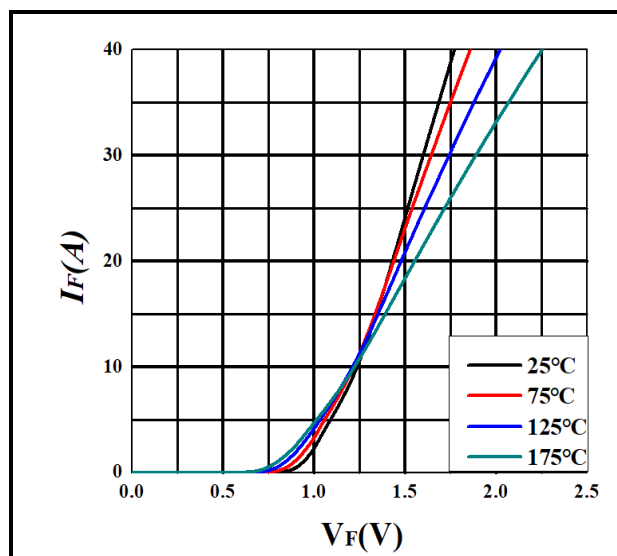


Figure 1. Forward Characteristics

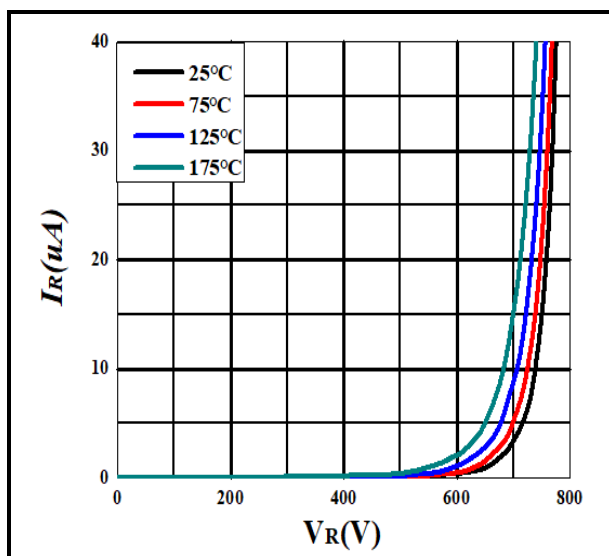


Figure 2. Reverse Characteristics

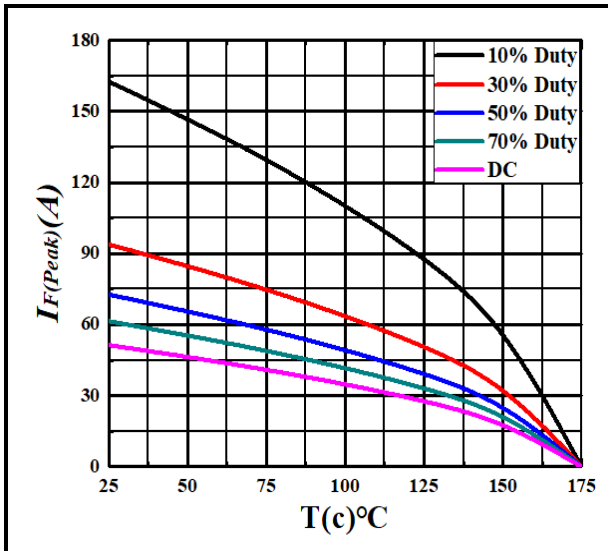


Figure 3. Current Derating

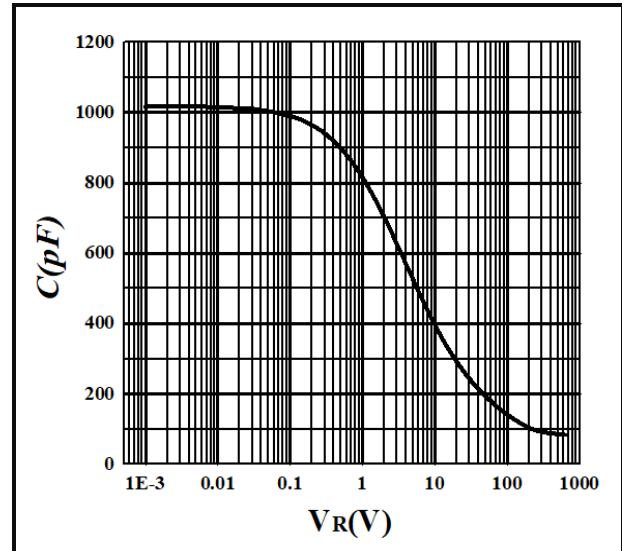


Figure 4. Capacitance vs. Reverse Voltage

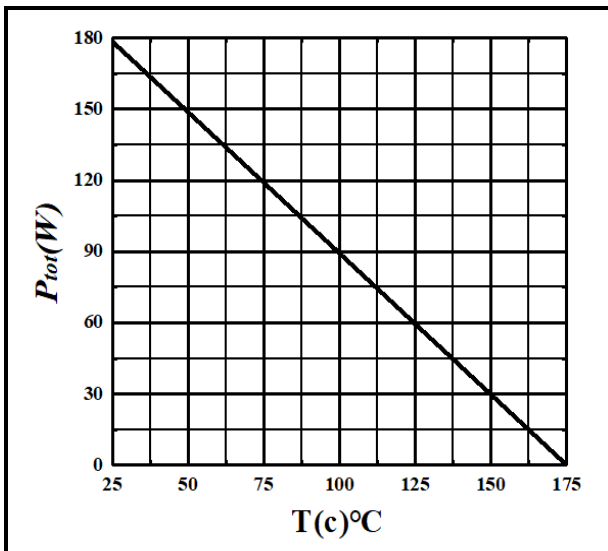


Figure 5. Power Derating

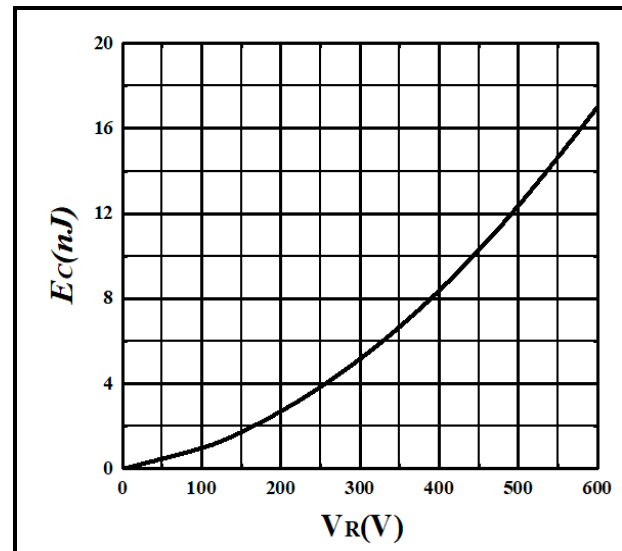


Figure 6. Capacitance Stored Energy

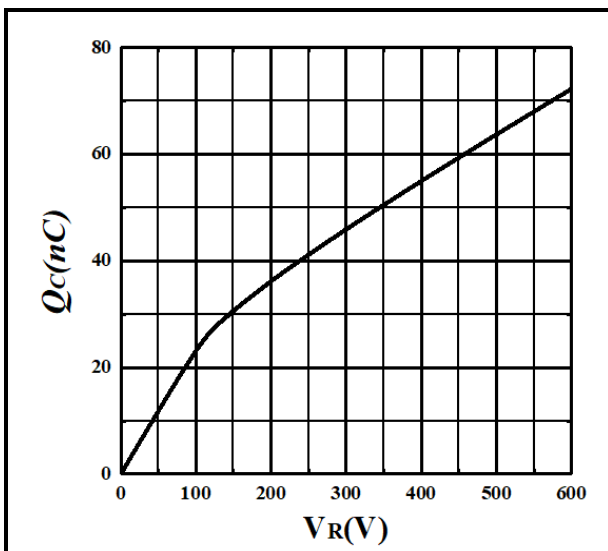
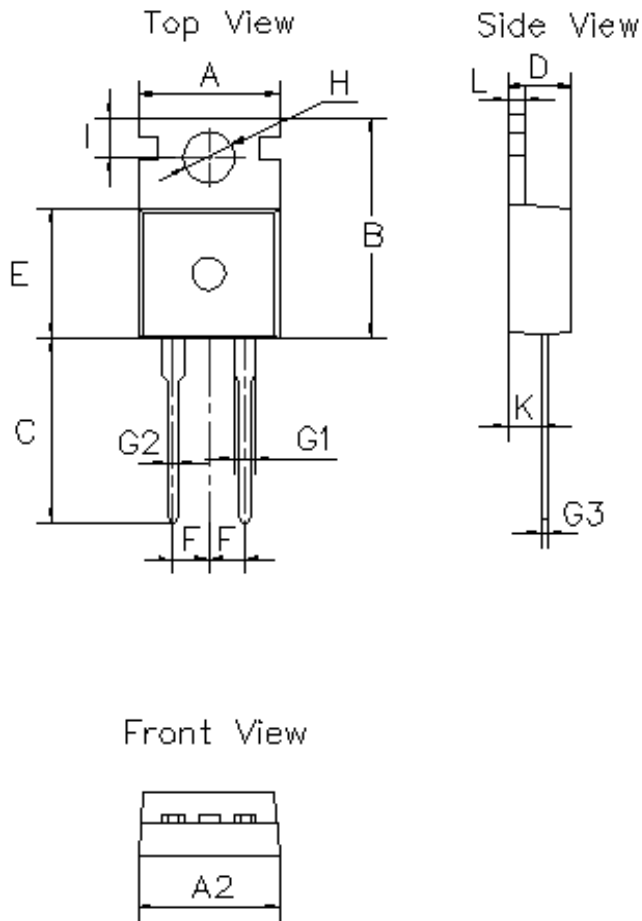


Figure 7. Total Capacitance Charge vs. Reverse Voltage

## Package



| Dimension unit: [mm] |          |       |       |
|----------------------|----------|-------|-------|
| SYMBOL               | MIN      | NOM   | MAX   |
| A                    | 9.66     | 9.90  | 10.28 |
| A2                   | 9.80     | 10.00 | 10.20 |
| B                    | 15.60    | 15.70 | 15.80 |
| C                    | 12.70    | 13.08 | 14.27 |
| D                    | 4.30     | 4.50  | 4.70  |
| E                    | 8.59     | 9.20  | 9.40  |
| F                    | 2.54 BSC |       |       |
| G1                   | 1.32     | 1.52  | 1.62  |
| G2                   | 0.70     | 0.80  | 0.95  |
| G3                   | 0.45     | 0.50  | 0.60  |
| H dia.               | 3.50     | 3.60  | 3.70  |
| I                    | 2.70     | 2.80  | 2.90  |
| K                    | 2.20     | 2.40  | 2.90  |
| L                    | 1.15     | 1.30  | 1.40  |

## Ordering information

|               |                    |
|---------------|--------------------|
| Part Number   | SDS065J020C3-ISATH |
| Package       | TO-220-2L          |
| Unit Quantity | 1000 EA            |
| Packing Type  | Tube               |
| RoHS          | Yes                |