

HCA120S30D1

eSiC Silicon Carbide Schottky Diode

1200V, 30A

Description

The 1200V eSiC is an advanced Power Master Semiconductor's silicon carbide diode family. This technology combines the benefits of excellent low forward voltage and robustness. Consequently, the eSiC family is suitable for application requiring high power efficiency.

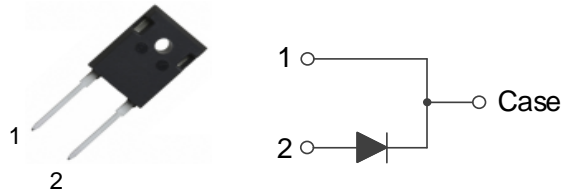
Applications

- Solar inverter, UPS
- EV charging station
- Power Factor Correction

Features

| V_{RRM} | I_F | $T_{J,max}$ | Q_C |
|-----------|-------|-------------|--------|
| 1200 V | 30 A | 175 °C | 180 nC |

- No reverse recovery current
- Low forward voltage
- 175°C Max junction temperature
- High surge current capability
- Switching behavior independent of temperature
- Pb-Free, Halogen Free and RoHS compliant



Absolute Maximum Ratings ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Value | Unit | |
|----------------|--|--|------------------|----------------------|
| V_{RRM} | Repetitive Peak Reverse Voltage | 1200 | V | |
| I_F | Forward Current | $T_C = 150^\circ\text{C}$ 30 | A | |
| $I_{F,SM}$ | Non-Repetitive Forward Surge Current | $T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$ | 180 | A |
| | | $T_C = 150^\circ\text{C}, t_p = 10\text{ ms}$ | 153 | A |
| $I_{F,Max}$ | Non-Repetitive Peak Forward Current | $T_C = 25^\circ\text{C}, t_p = 10\text{ }\mu\text{s}$ | 1340 | A |
| | | $T_C = 150^\circ\text{C}, t_p = 10\text{ }\mu\text{s}$ | 1139 | A |
| I^2dt value | $\int I^2 dt$ | $T_C = 25^\circ\text{C}, t_p = 10\text{ ms}$ | 162 | A^2s |
| | | $T_C = 150^\circ\text{C}, t_p = 10\text{ ms}$ | 117 | A^2s |
| P_{tot} | Power Dissipation | $T_C = 25^\circ\text{C}$ 429 | W | |
| T_J, T_{STG} | Operating Junction and Storage Temperature | -55 to +175 | $^\circ\text{C}$ | |

Thermal Characteristics

| Symbol | Parameter | Value | Unit |
|-----------------|--|-------|---------------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Max. | 0.35 | $^\circ\text{C}/\text{W}$ |

Package Marking and Ordering Information

| Part Number | Top Marking | Package | Packing Method | Quantity |
|-------------|-------------|---------|----------------|----------|
| HCA120S30D1 | HCA120S30D1 | TO-247 | Tube | 30 units |

Electrical Characteristics ($T_C = 25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|--------|---------------------------|--|-----|------|------|---------------|
| V_F | Forward Voltage | $I_F = 30\text{ A}, T_C = 25^\circ\text{C}$ | | 1.39 | 1.70 | V |
| | | $I_F = 30\text{ A}, T_C = 175^\circ\text{C}$ | | 1.8 | - | |
| I_R | Reverse Current | $V_R = 1200\text{ V}, T_C = 25^\circ\text{C}$ | | - | 100 | μA |
| | | $V_R = 1200\text{ V}, T_C = 175^\circ\text{C}$ | | - | 300 | |
| Q_C | Total Capacitive Charge | $V_R = 800\text{ V}, T_C = 25^\circ\text{C}$ | | 180 | | nC |
| C | Total Capacitance | $V_R = 1\text{ V}, f = 100\text{ kHz}$ | | 2017 | | pF |
| | | $V_R = 800\text{ V}, f = 100\text{ kHz}$ | | 123 | | |
| E_C | Capacitance Stored Energy | $V_R = 800\text{ V}, T_C = 25^\circ\text{C}$ | | 50.9 | | μJ |

Typical Performance Characteristics

Figure 1. Power Derating

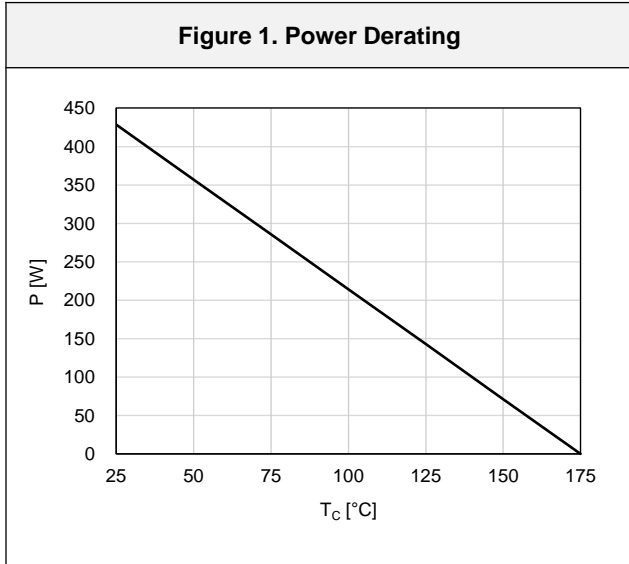


Figure 2. Current Derating

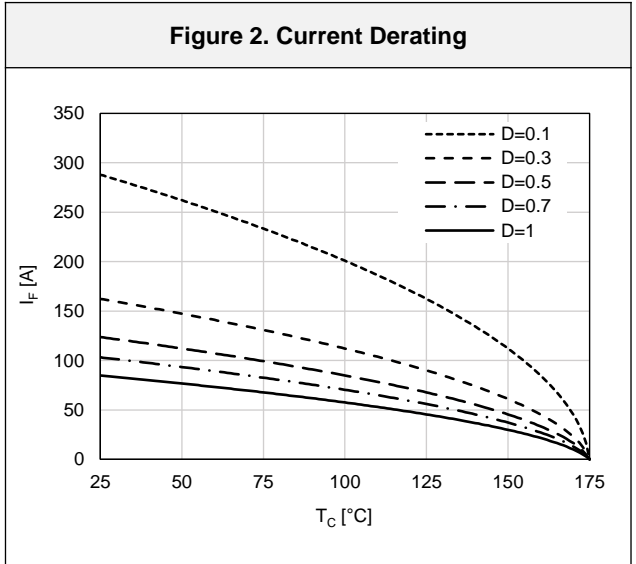


Figure 3. Forward Characteristics

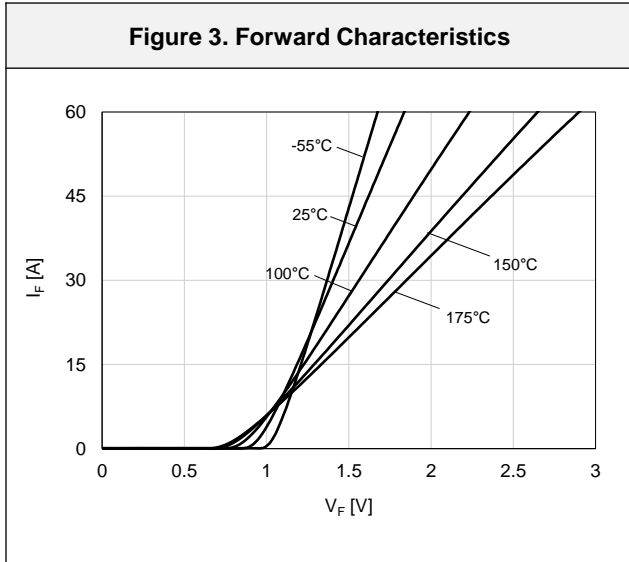


Figure 4. Reverse Characteristics

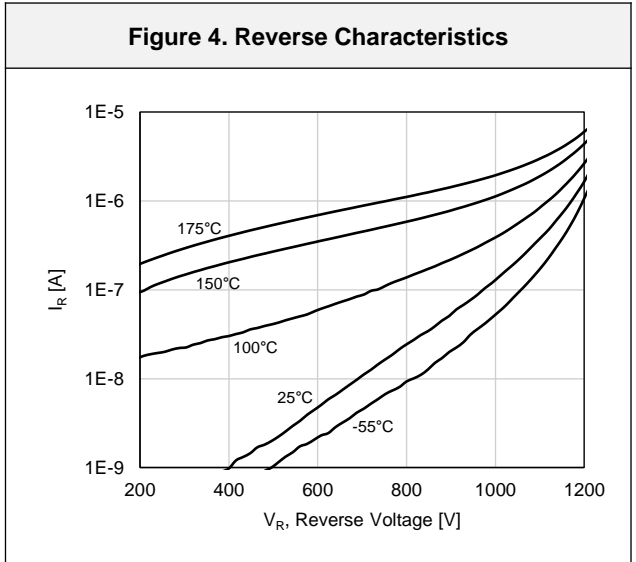


Figure 5. Capacitive Charge Characteristics

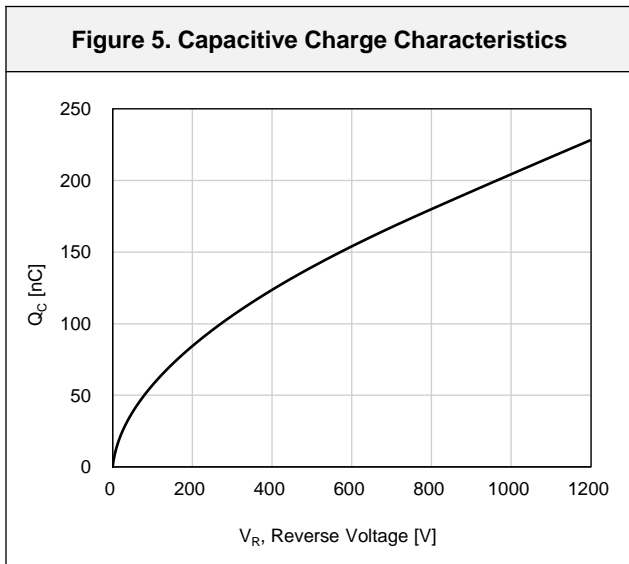
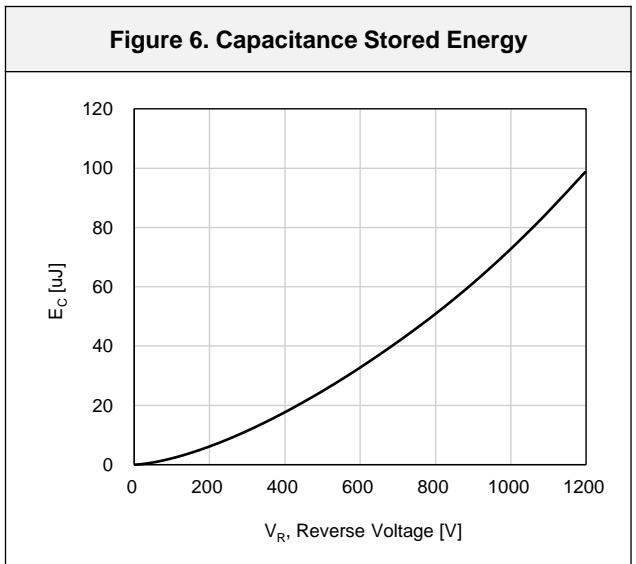


Figure 6. Capacitance Stored Energy



Typical Performance Characteristics

Figure 7. Capacitance Characteristics

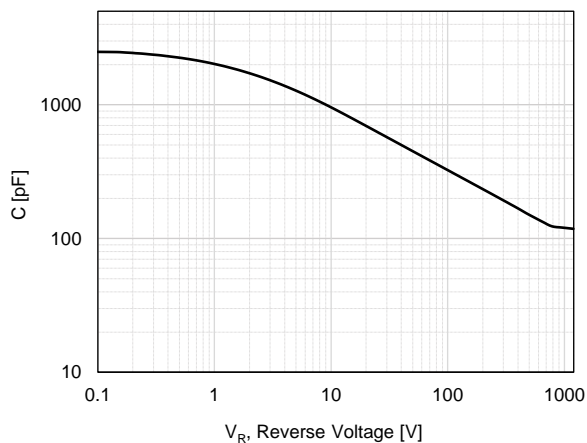
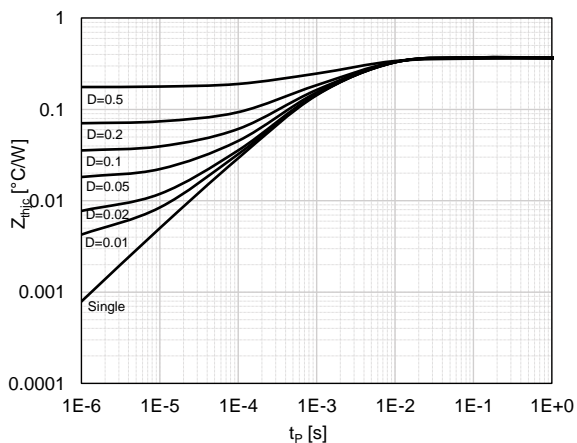
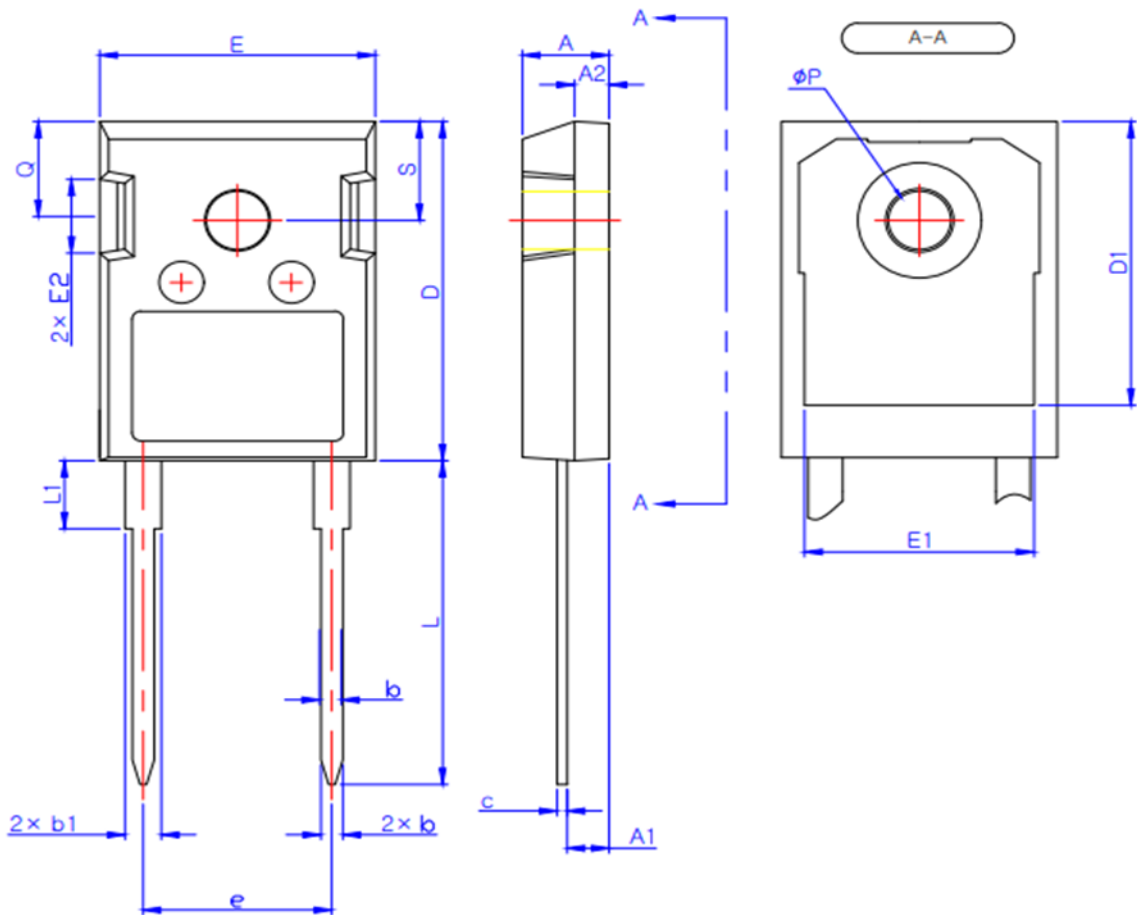


Figure 8. Transient Thermal Response Curve



Package Outlines
TO-247-2L



| SYMBOL | MIN | MAX |
|--------|-----------|-------|
| A | 4.80 | 5.20 |
| A1 | 2.29 | 2.54 |
| A2 | 1.90 | 2.10 |
| b | 1.10 | 1.30 |
| b1 | 1.91 | 2.20 |
| c | 0.50 | 0.70 |
| D | 20.80 | 21.34 |
| D1 | 17.43 | 17.83 |
| E | 15.75 | 16.13 |
| E1 | 13.06 | 13.46 |
| E2 | 4.32 | 4.83 |
| e | 10.90 BSC | |
| L | 19.85 | 20.25 |
| L1 | - | 4.49 |
| phi P | 3.55 | 3.65 |
| Q | 5.59 | 6.19 |
| S | 6.15 BSC | |

* Dimensions in millimeters