

HCW120D20D1

eSiC Silicon Carbide Schottky Diode

1200V, 20A

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

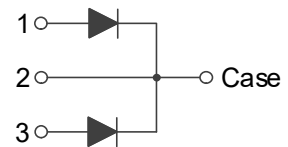
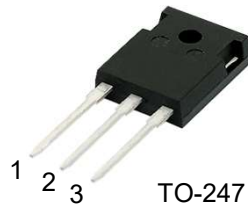
Applications

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

Features (Per Leg/Device)

| V_{RRM} | I_F | $T_{J,max}$ | Q_C |
|-----------|-----------|-------------|-------|
| 1200 V | 10 / 20 A | 175 °C | 63 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 (Per Leg / Device, Per Leg unless otherwise specified)

| Symbol | Parameter | Value | Unit |
|----------------|--|---|------|
| V_{RRM} | Repetitive Peak Reverse Voltage | $T_C = 25^\circ\text{C}$ 1200 | V |
| I_F | Forward Current | $T_C = 150^\circ\text{C}$ 10 / 20 | A |
| $I_{F,SM}$ | Non-Repetitive Forward Surge Current | $T_C = 25^\circ\text{C}, t_p = 10 \text{ ms}$ | 79 |
| | | $T_C = 150^\circ\text{C}, t_p = 10 \text{ ms}$ | 67 |
| $I_{F,Max}$ | Non-Repetitive Peak Forward Current | $T_C = 25^\circ\text{C}, t_p = 10 \mu\text{s}$ | 810 |
| | | $T_C = 150^\circ\text{C}, t_p = 10 \mu\text{s}$ | 690 |
| I^2dt value | $\int I^2 dt$ | $T_C = 25^\circ\text{C}, t_p = 10 \text{ ms}$ | 31 |
| | | $T_C = 150^\circ\text{C}, t_p = 10 \text{ ms}$ | 23 |
| P_{tot} | Power Dissipation | $T_C = 25^\circ\text{C}$ 147 | W |
| T_J, T_{STG} | Operating Junction and Storage Temperature | -55 to +175 | °C |

Thermal Characteristics

| Symbol | Parameter | Value | Unit |
|-----------------|--|-------------|------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case, Max.(Per Leg / Per Device) | 1.02 / 0.45 | °C/W |

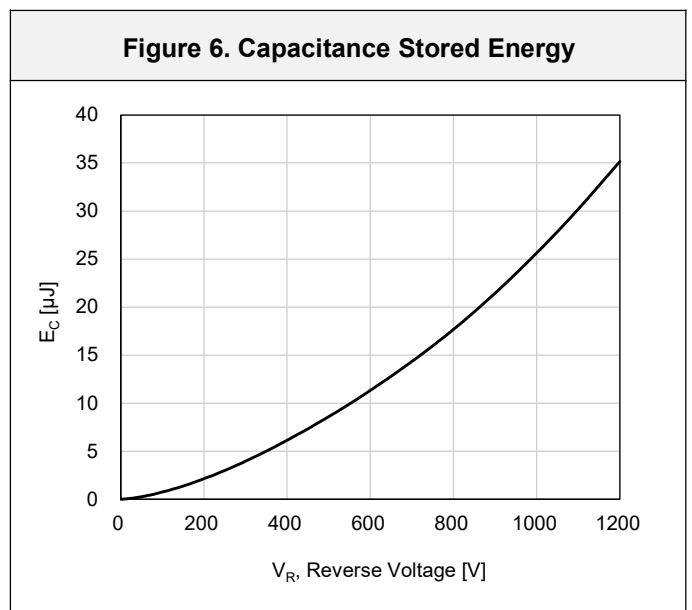
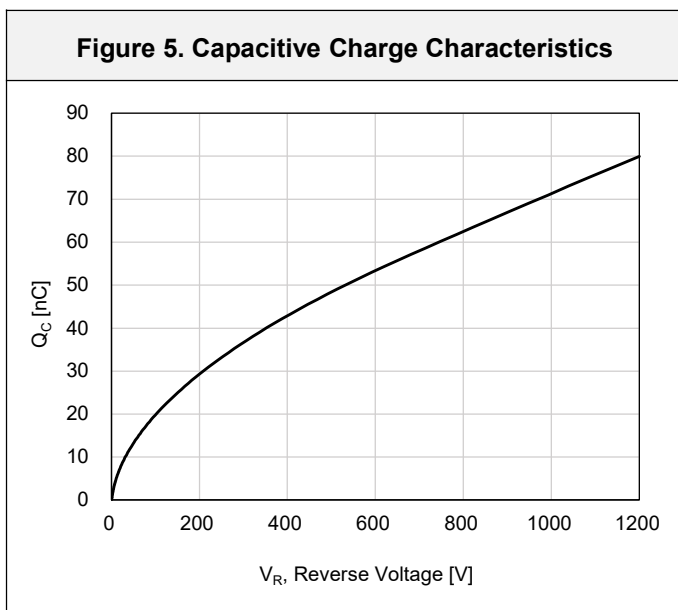
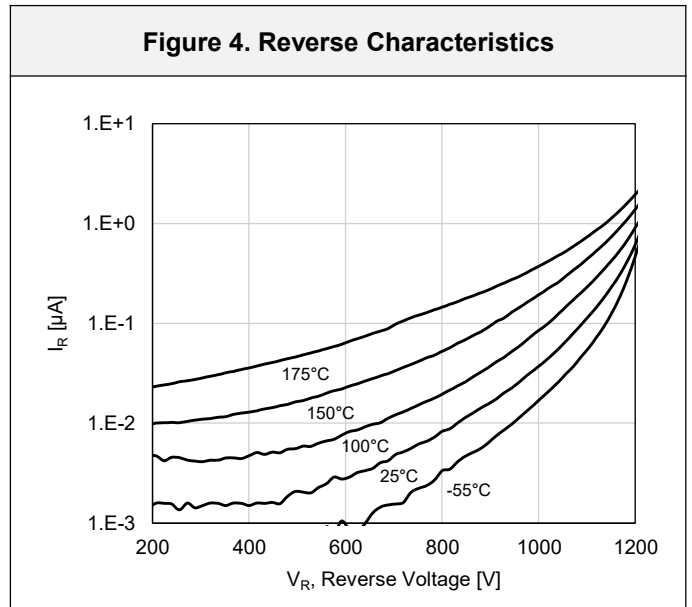
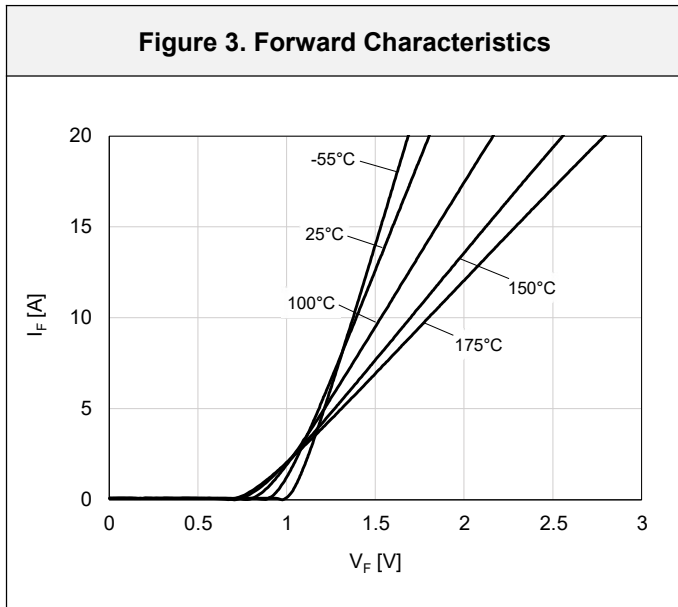
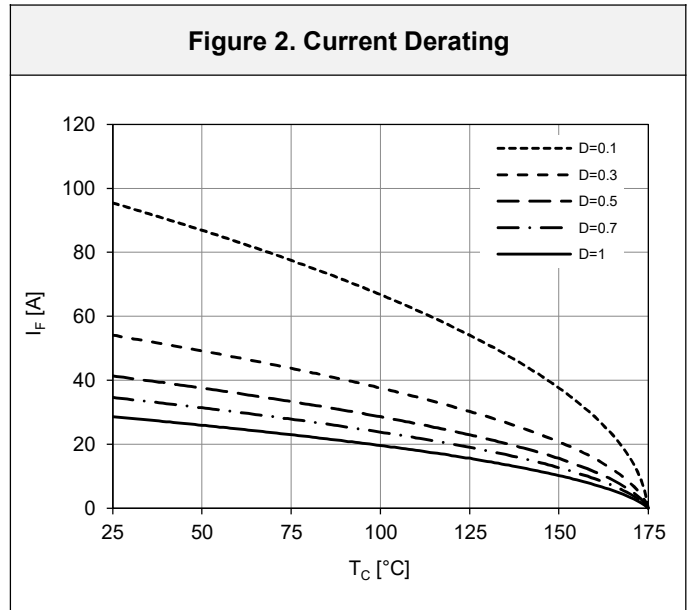
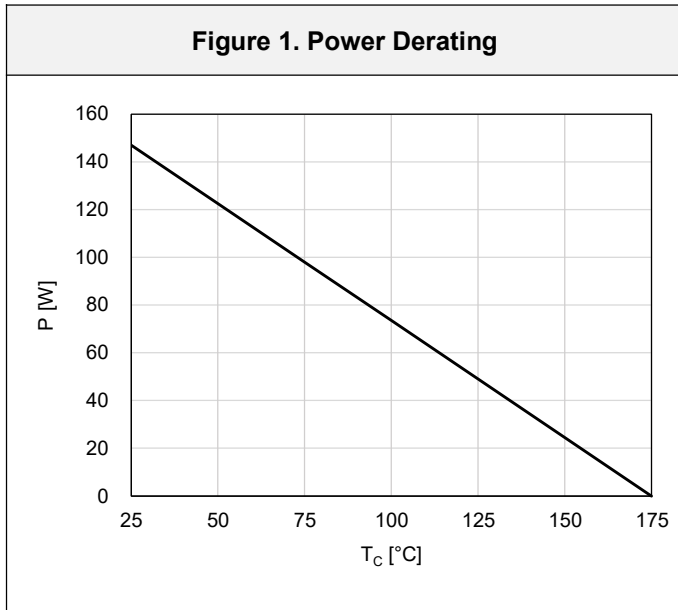
Package Marking and Ordering Information

| Part Number | Top Marking | Package | Packing Method | Quantity |
|-------------|-------------|---------|----------------|----------|
| HCW120D20D1 | HCW120D20D1 | TO-247 | Tube | 30 units |

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

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|--------|---------------------------|--|-----|------|------|---------------|
| V_F | Forward Voltage | $I_F = 10\text{ A}, T_C = 25^\circ\text{C}$ | | 1.39 | 1.70 | V |
| | | $I_F = 10\text{ A}, T_C = 175^\circ\text{C}$ | | 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 | $V_R = 800\text{ V}, T_C = 25^\circ\text{C}$ | | 63 | | nC |
| C | Total Capacitance | $V_R = 1\text{ V}, f = 100\text{ kHz}$ | | 697 | | pF |
| | | $V_R = 800\text{ V}, f = 100\text{ kHz}$ | | 44 | | |
| E_C | Capacitance Stored Energy | $V_R = 800\text{ V}, T_C = 25^\circ\text{C}$ | | 18 | | μJ |

Typical Performance Characteristics (Per Leg)



Typical Performance Characteristics (Per Leg)

Figure 7. Capacitance Characteristics

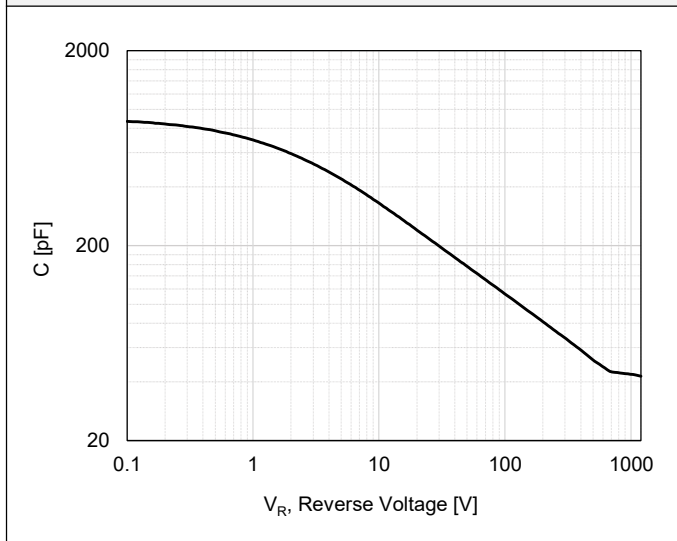
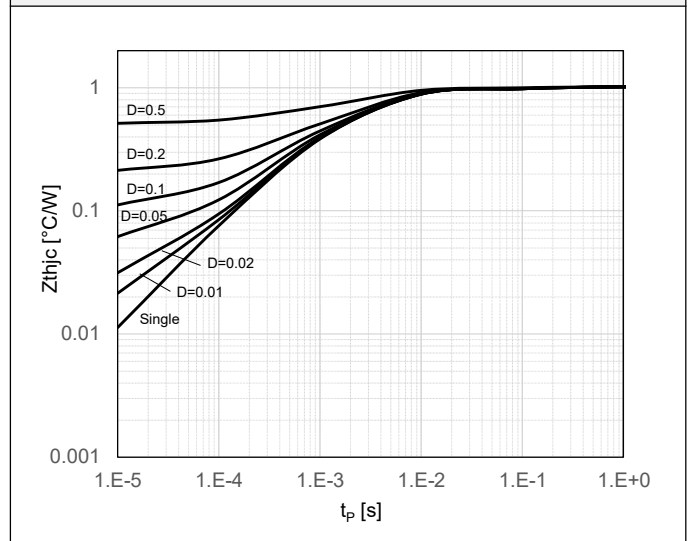
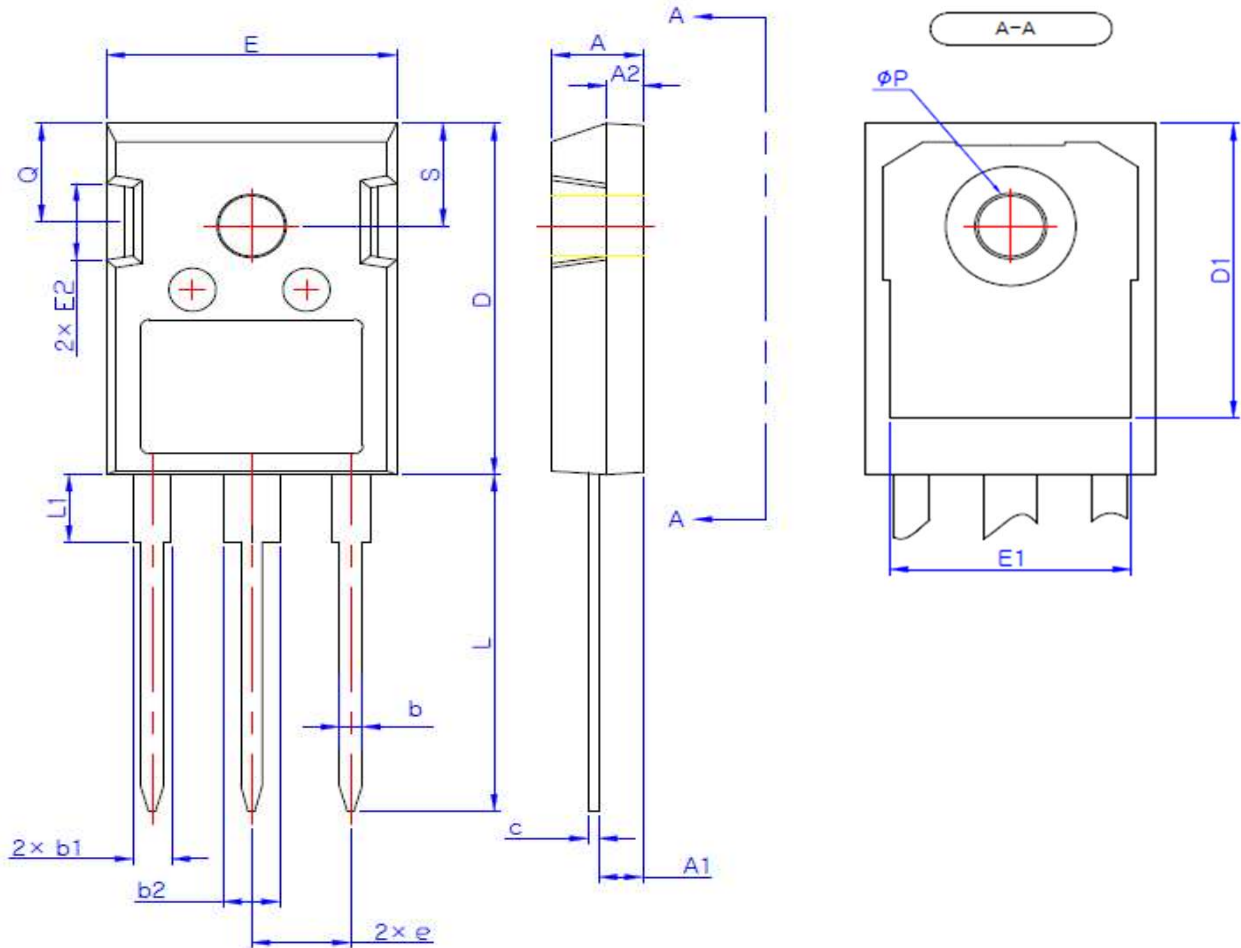


Figure 8. Transient Thermal Response Curve



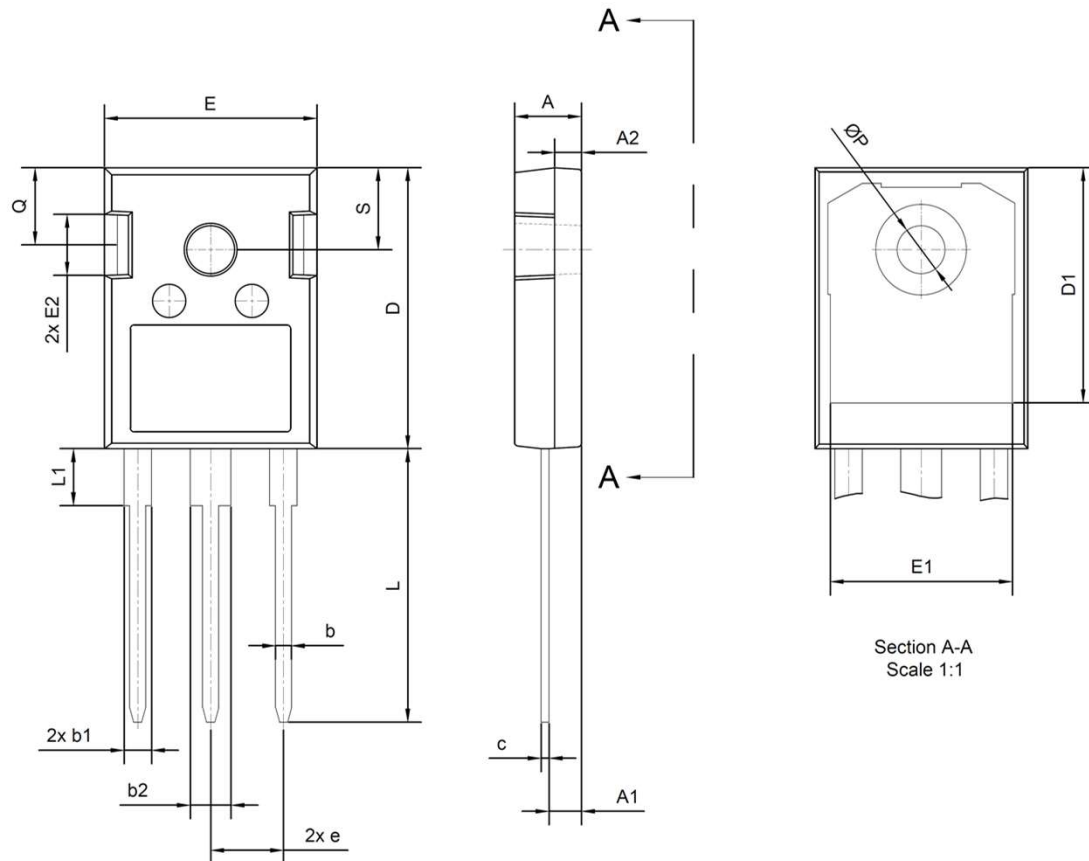
Package Outlines
TO-247 (S)



| SYMBOL | MIN | NOM | MAX |
|----------|----------|-------|-------|
| A | 4.80 | 5.00 | 5.20 |
| A1 | 2.29 | 2.42 | 2.54 |
| A2 | 1.90 | 2.00 | 2.10 |
| b | 1.10 | 1.20 | 1.30 |
| b1 | 1.91 | 2.06 | 2.20 |
| b2 | 2.92 | 3.06 | 3.20 |
| c | 0.50 | 0.60 | 0.70 |
| D | 20.80 | 21.07 | 21.34 |
| D1 | 17.43 | 17.63 | 17.83 |
| E | 15.75 | 15.94 | 16.13 |
| E1 | 13.06 | 13.26 | 13.46 |
| E2 | 4.32 | 4.58 | 4.83 |
| e | 5.45 BSC | | |
| L | 19.85 | 20.05 | 20.25 |
| L1 | 4.05 | 4.27 | 4.49 |
| ϕP | 3.55 | 3.60 | 3.65 |
| Q | 5.59 | 5.89 | 6.19 |
| S | 6.15 BSC | | |

* Dimensions in millimeters

Package Outlines TO-247 (H)



| SYMBOL | Common | | |
|--------|--------------------------|-------|-------|
| | DIMENSIONS MILLIMETER | | |
| | MIN. | NOM. | MAX. |
| A | 4.80 | 5.00 | 5.20 |
| A1 | 2.29 | 2.42 | 2.54 |
| A2 | 1.90 | 2.00 | 2.10 |
| b | 1.10 | 1.20 | 1.30 |
| b1 | 1.91 | 2.06 | 2.20 |
| b2 | 2.92 | 3.06 | 3.20 |
| c | 0.50 | 0.60 | 0.70 |
| D | 20.80 | 21.07 | 21.34 |
| D1 | 17.23 | 17.63 | 18.03 |
| E | 15.75 | 15.94 | 16.13 |
| E1 | 13.46 | 13.66 | 13.86 |
| E2 | 4.32 | 4.58 | 4.83 |
| e | 5.46 BSC | | |
| L | 19.85 | 20.05 | 20.25 |
| L1 | 4.05 | 4.27 | 4.48 |
| ØP | 3.56 | 3.61 | 3.66 |
| Q | 5.38 | 5.79 | 6.20 |
| S | 6.15 BSC | | |