



## Features

- Low Forward Voltage ( $V_F$ ) Drop with Positive Temperature Coefficient
- Zero Reverse Recovery Current / Forward Recovery Voltage
- Temperature-Independent Switching Behavior

## Applications

- Battery Chargers
- Solar & Renewable Energy Power Conversion
- Industrial Power Supplies
- Boost Diodes in PFC & DC-DC



TO247-2L  
Package



| Part Number | Package  | Marking    |
|-------------|----------|------------|
| HC4D30120H  | TO247-2L | HC4D30120H |

## Maximum Ratings( $T = 25^{\circ}\text{C}$ unless otherwise specified)

| Parameter                             | Symbol      | Value | Unit                 | Test Conditions                                                      | Note   |
|---------------------------------------|-------------|-------|----------------------|----------------------------------------------------------------------|--------|
| Repetitive Peak Reverse Voltage       | $V_{RRM}$   | 1200  | V                    |                                                                      |        |
| DC Blocking Voltage                   | $V_{DC}$    | 1200  |                      |                                                                      |        |
| Continuous Forward Current            | $I_F$       | 94    | A                    | $T_J = 25^{\circ}\text{C}$                                           | Fig. 3 |
|                                       |             | 45    |                      | $T_J = 135^{\circ}\text{C}$                                          |        |
|                                       |             | 30    |                      | $T_J = 155^{\circ}\text{C}$                                          |        |
| Repetitive Peak Forward Surge Current | $I_{FRM}$   | 121   |                      | $T_c = 25^{\circ}\text{C}$ , $t_p = 10\text{ ms}$ , Half Sine Pulse  |        |
|                                       |             | 68    |                      | $T_c = 110^{\circ}\text{C}$ , $t_p = 10\text{ ms}$ , Half Sine Pulse |        |
| Non-Repetitive Forward Surge Current  | $I_{FSM}$   | 233   |                      | $T_c = 25^{\circ}\text{C}$ , $t_p = 10\text{ ms}$ , Half Sine Pulse  |        |
|                                       |             | 209   |                      | $T_c = 110^{\circ}\text{C}$ , $t_p = 10\text{ ms}$ , Half Sine Pulse |        |
| Power Dissipation                     | $P_{tot}$   | 441   | W                    | $T_c = 25^{\circ}\text{C}$                                           | Fig. 4 |
|                                       |             | 191   |                      | $T_c = 110^{\circ}\text{C}$                                          |        |
| $i^2t$ Value                          | $\int i^2t$ | 271   | $\text{A}^2\text{s}$ | $T_c = 25^{\circ}\text{C}$ , $t_p = 10\text{ ms}$                    |        |
|                                       |             | 218   |                      | $T_c = 110^{\circ}\text{C}$ , $t_p = 10\text{ ms}$                   |        |



## Electrical Characteristics

| Parameter                 | Symbol | Typ.  | Max. | Units         | Test Conditions                                                        | Note   |
|---------------------------|--------|-------|------|---------------|------------------------------------------------------------------------|--------|
| Forward Voltage           | $V_F$  | 1.5   | 1.8  | V             | $I_F = 30\text{ A}, T_J = 25\text{ }^\circ\text{C}$                    | Fig. 1 |
|                           |        | 2.2   | 3    |               | $I_F = 30\text{ A}, T_J = 175\text{ }^\circ\text{C}$                   |        |
| Reverse Current           | $I_R$  | 40    | 250  | $\mu\text{A}$ | $V_R = 1200\text{ V}, T_J = 25\text{ }^\circ\text{C}$                  | Fig. 2 |
|                           |        | 70    | 450  |               | $V_R = 1200\text{ V}, T_J = 175\text{ }^\circ\text{C}$                 |        |
| Total Capacitive Charge   | $Q_C$  | 152   |      | nC            | $V_R = 800\text{ V}, T_J = 25\text{ }^\circ\text{C}$                   | Fig. 5 |
| Total Capacitance         | C      | 2,177 |      | pF            | $V_R = 0\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$   | Fig. 6 |
|                           |        | 136   |      |               | $V_R = 400\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$ |        |
|                           |        | 100   |      |               | $V_R = 800\text{ V}, T_J = 25\text{ }^\circ\text{C}, f = 1\text{ MHz}$ |        |
| Capacitance Stored Energy | $E_C$  | 44    |      | $\mu\text{J}$ | $V_R = 800\text{ V}$                                                   | Fig. 7 |

Note:

SiC Schottky Diodes are majority carrier devices, so there is no reverse recovery charge.

## Thermal & Mechanical Characteristics

| Parameter                                   | Symbol           | Value       | Units                       | Note            |
|---------------------------------------------|------------------|-------------|-----------------------------|-----------------|
| Thermal Resistance, Junction to Case (Typ.) | $R_{\theta, JC}$ | 0.34        | $^\circ\text{C} / \text{W}$ |                 |
| Operating Junction & Storage Temperature    | $T_J, T_{stg}$   | -55 to +175 | $^\circ\text{C}$            | Fig. 8          |
| Maximum Processing Temperature              | $T_{PROC}$       | 325         |                             | 10 min. Maximum |

## Electrostatic Discharge (ESD) Classifications

| Parameter           | Symbol | Value                             |
|---------------------|--------|-----------------------------------|
| Human Body Model    | HBM    | Class 3B ( $\geq 8000\text{ V}$ ) |
| Charge Device Model | CDM    | Class C3 ( $\geq 1000\text{ V}$ ) |



## Typical Performance

Figure 1. Forward Characteristics

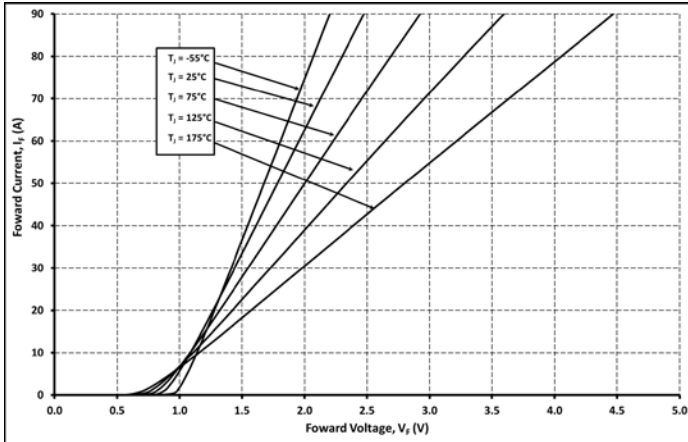


Figure 2. Reverse Characteristics

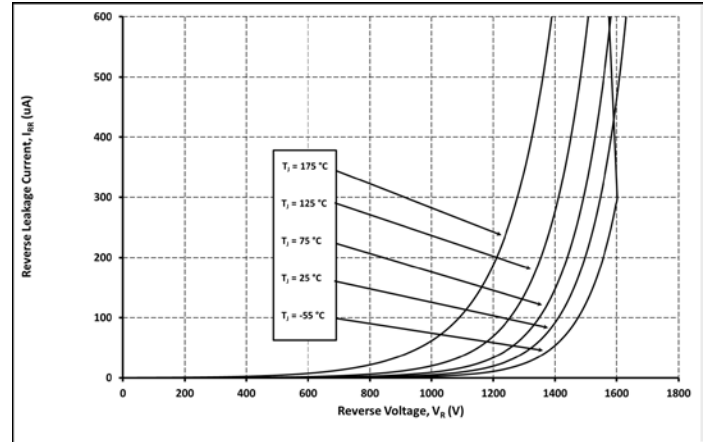


Figure 3. Current Derating

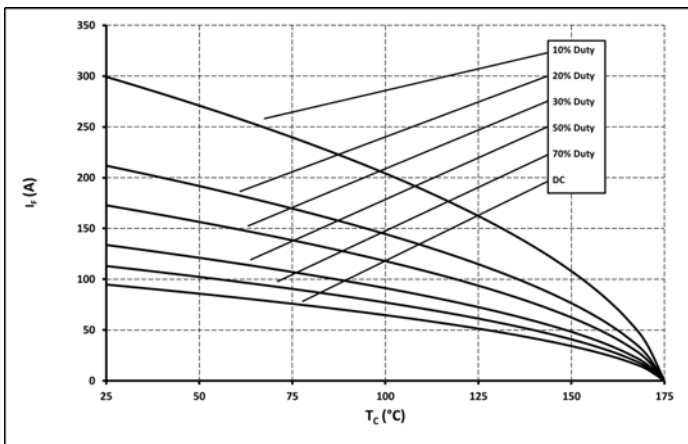


Figure 4. Power Derating

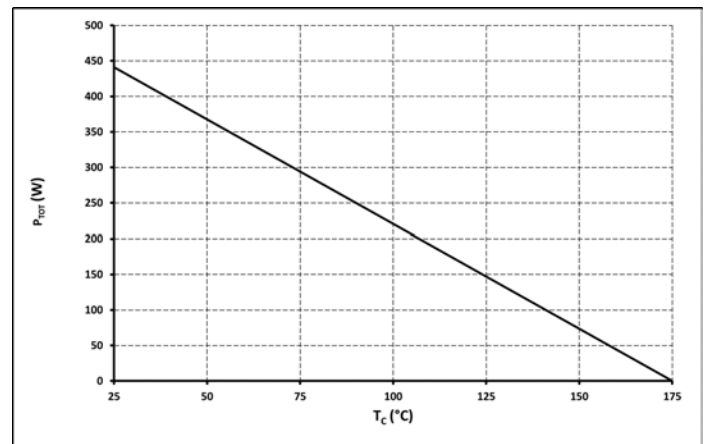


Figure 5. Total Capacitance Charge vs. Reverse Voltage

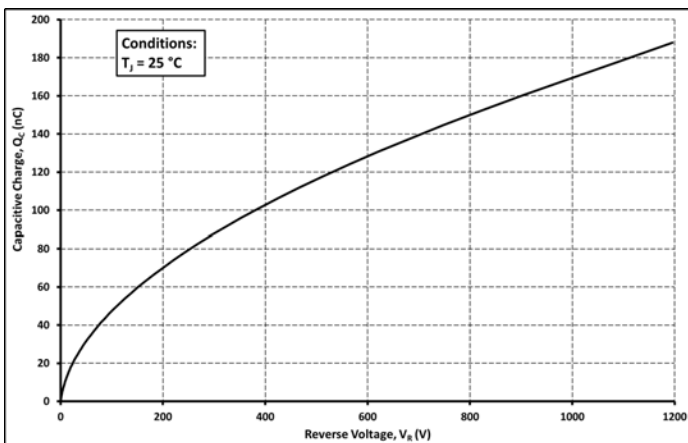
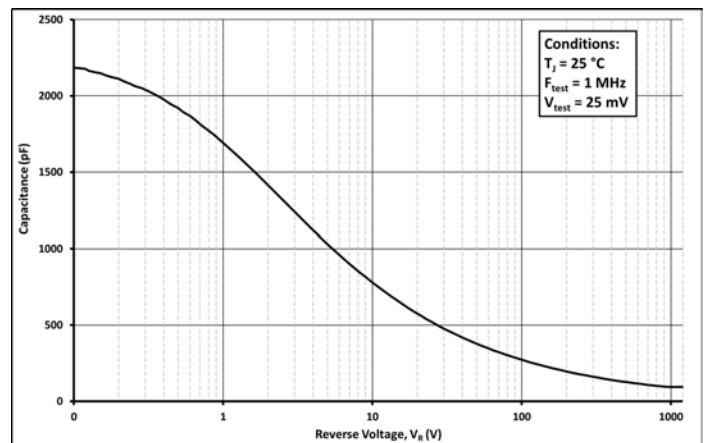


Figure 6. Capacitance vs. Reverse Voltage





## Typical Performance

Figure 7. Capacitance Stored Energy

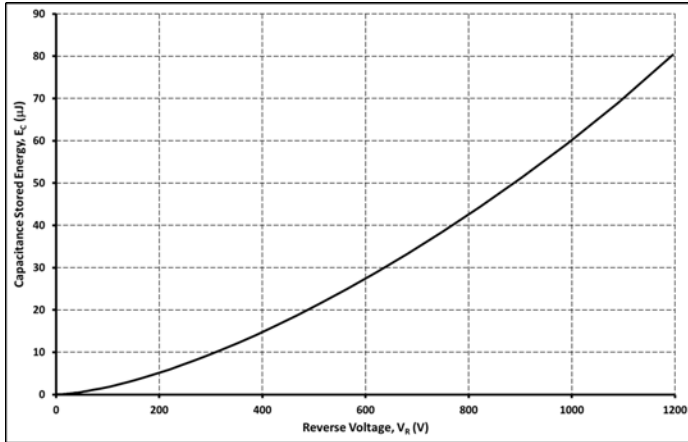
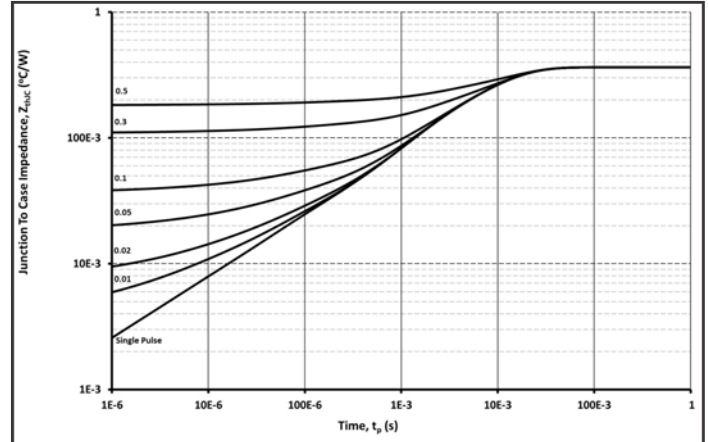


Figure 8. Transient Thermal Impedance

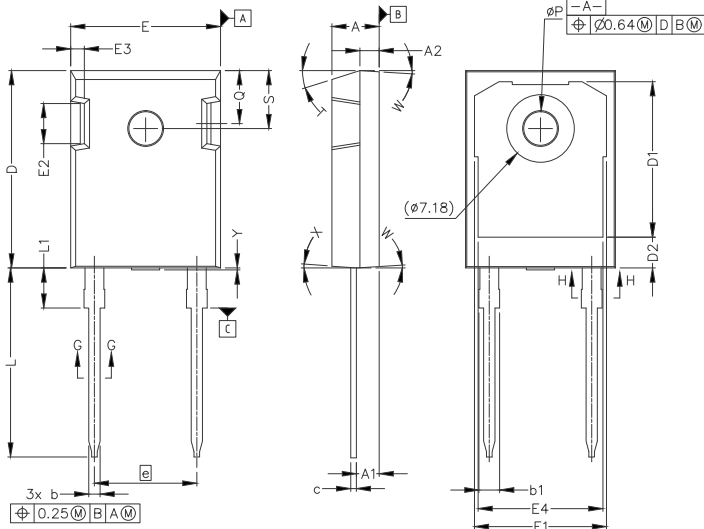




## Package Dimensions

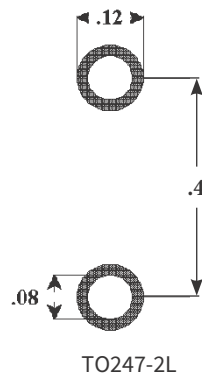
Package: TO247-2L

All dimensions in mm.



| SYM | MILLIMETERS |       | INCHES   |       |
|-----|-------------|-------|----------|-------|
|     | MIN         | MAX   | MIN      | MAX   |
| A   | 4.83        | 5.21  | .190     | .205  |
| A1  | 2.29        | 2.54  | .090     | .100  |
| A2  | 1.91        | 2.16  | .075     | .085  |
| b'  | 1.07        | 1.28  | .042     | .050  |
| b   | 1.07        | 1.33  | .042     | .052  |
| b1  | 1.91        | 2.41  | .075     | .095  |
| b2  | 1.91        | 2.16  | .075     | .085  |
| c'  | 0.55        | 0.65  | .022     | .026  |
| c   | 0.55        | 0.68  | .022     | .027  |
| D   | 20.80       | 21.10 | .819     | .831  |
| D1  | 16.25       | 17.35 | .640     | .683  |
| D2  | 2.86        | 3.16  | .112     | .124  |
| E   | 15.75       | 16.13 | .620     | .635  |
| E1  | 13.10       | 14.15 | .516     | .557  |
| E2  | 3.68        | 5.10  | .145     | .201  |
| E3  | 1.00        | 1.90  | .039     | .075  |
| E4  | 12.38       | 13.43 | .487     | .529  |
| e   | 10.88 BSC   |       | .428 BSC |       |
| L   | 19.81       | 20.32 | .780     | .800  |
| L1  | 4.10        | 4.40  | .161     | .173  |
| φP  | 3.51        | 3.65  | .138     | .144  |
| Q   | 5.49        | 6.00  | .216     | .236  |
| S   | 6.04        | 6.30  | .238     | .248  |
| T   | 17.5° REF.  |       |          |       |
| W   | 3.5° REF.   |       |          |       |
| X   | 4° REF.     |       |          |       |
| Y   | 0           | 0.50  | 0        | 0.020 |

## Recommended Solder Pad Layout



*all units are in inches*



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