

V_{RRM} = 1200 V
 $I_F(T_c=135^\circ\text{C})$ = 33 A**
 Q_c = 126 nC**

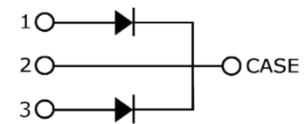
Features:

- Extremely low reverse current
- No reverse recovery current
- Temperature independent switching
- Positive temperature coefficient on V_F
- Excellent surge current capability
- Low Capacitive charge



Benefits

- Essentially No switching losses
- System efficiency improvement over Si Diodes
- Increased power density
- Enabling higher switching frequency
- Reduction of Heat Sink Requirements
- System Cost savings due to smaller magnetics
- Reduced EMI



Applications

- Switch Mode Power Supplies (SMPS)
- Uninterruptable power supplies
- Motor Drivers
- Power Factor Correction

Package Pin definitions

- Pin1- Anode
- Pin2- Cathode
- Pin3- Anode

Package Parameters

| Part Number | Marking | Package |
|-------------|------------|-----------|
| B1D20120HC | B1D20120HC | TO-247-3L |

*per leg; ** per Device

Maximum ratings

| Symbol | Parameter | Test conditions | Value | Unit |
|---------------|--------------------------------------|--|---------------------|------------------|
| V_{RRM} | Repetitive Peak Reverse Voltage | | 1200 | V |
| V_{RSM} | Surge Peak Reverse Voltage | | 1200 | V |
| I_F | Continuous Forward Current | $T_c=25^\circ\text{C}$ $T_c=135^\circ\text{C}$ $T_c=155^\circ\text{C}$ | 35* 16.5* 11* | A |
| I_{FSM} | Non-Repetitive Forward Surge Current | $T_c=25^\circ\text{C}$, $t_p=10\text{ms}$, sine halfwave | 77* | A |
| $\int i^2 dt$ | i^2t Value | $T_c=25^\circ\text{C}$, $t_p=10\text{ms}$ | 29.6* | A ² S |
| P_{tot} | Power Dissipation | $T_c=25^\circ\text{C}$ $T_c=110^\circ\text{C}$ | 205* 89* | W |
| T_j | Operating junction temperature | | -55~175 | °C |
| T_{stg} | Storage temperature | | -55~135 | °C |

Thermal Characteristics

| Symbol | Parameter | Value | | | Unit |
|--------------|---|-------|-------|------|------|
| | | Min. | Typ. | Max. | |
| $R_{th(jc)}$ | Thermal resistance from junction to case | | 0.72* | | K/W |
| $R_{th(ja)}$ | Thermal resistance from junction to ambient | | 34.7* | | K/W |

*per leg; ** per Device

Electrical Characteristics
Static Characteristics (T_j=25°C unless otherwise specified)

| Symbol | Parameter | Test conditions | Value | | | Unit |
|-----------------|-----------------------|---|-------|----------------|------|------|
| | | | Min. | Typ. | Max. | |
| V _{DC} | DC blocking voltage | T _j =25°C | 1200 | | | V |
| V _F | Diode forward voltage | I _F =10A T _j =25°C I _F =10A T _j =175°C | | 1.46* 2.05* | | V |
| I _R | Reverse current | V _R =1200V T _j =25°C V _R =1200V T _j =175°C | | 4.5* 45* | | μA |

Dynamic Characteristics (T_j=25°C unless otherwise specified)

| Symbol | Parameter | Test conditions | Value | | | Unit |
|----------------|-------------------------|---|-------|--------------------|------|------|
| | | | Min. | Typ. | Max. | |
| Q _c | Total capacitive charge | V _R =800V T _j =25°C $Q_c = \int_0^{V_R} C(V)dV$ | | 63* | | nC |
| C | Total Capacitance | V _R =1V f=1MHz V _R =400V f=1MHz V _R =800V f=1MHz | | 614* 62* 51* | | pF |

*per leg; ** per Device

Typical Performance (Per Leg)

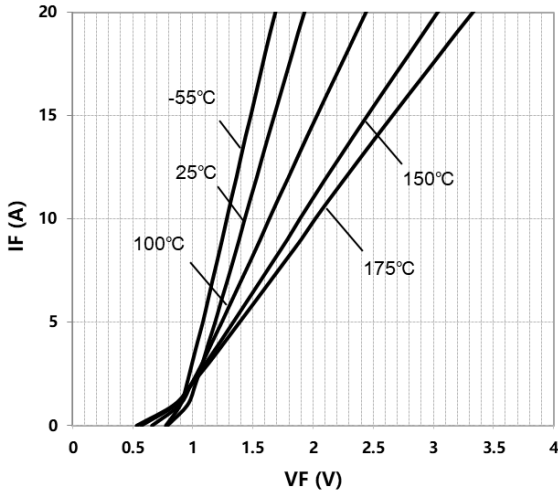


Figure 1. Typical forward characteristics

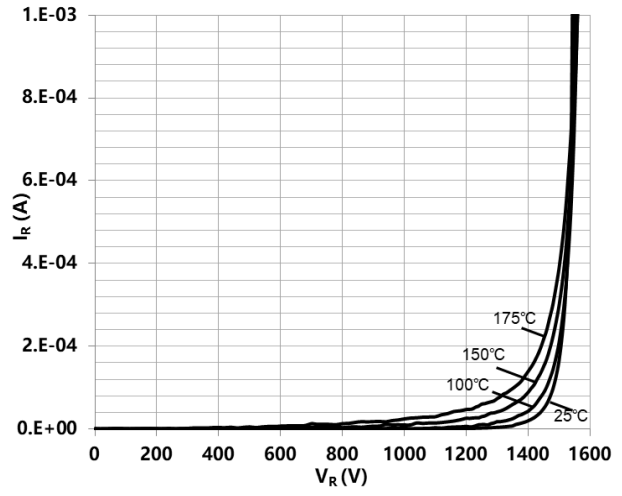


Figure 2. Typical reverse current as function of reverse voltage

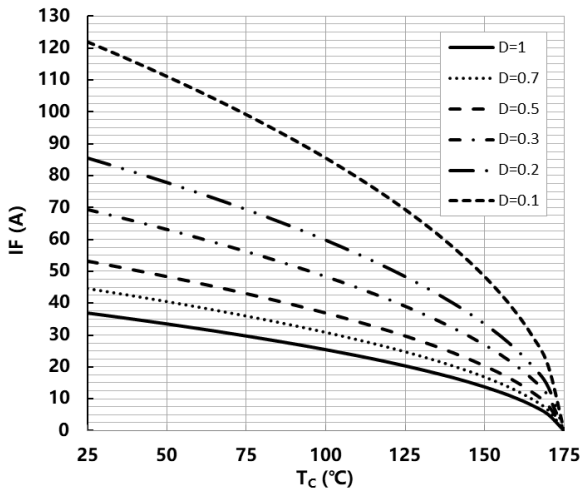


Figure 3. Diode forward current as function of temperature, D=duty cycle

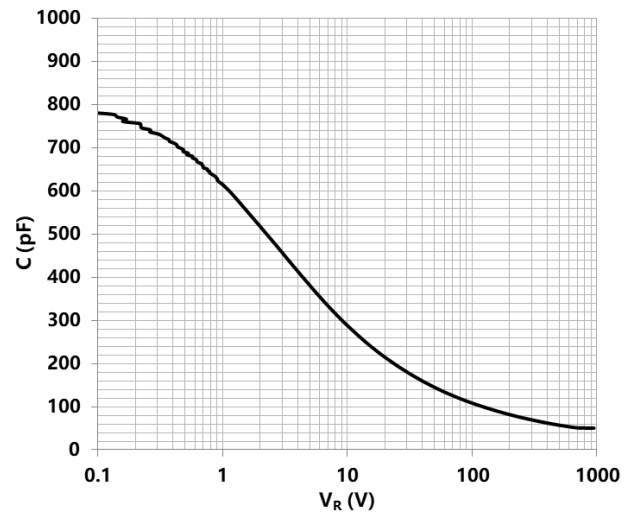


Figure 4. Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_j=25^\circ\text{C}$; $f=1\text{ MHz}$

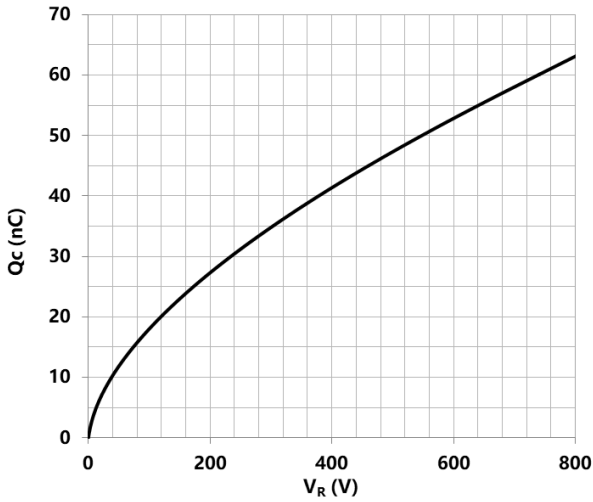


Figure 5. Typical reverse charge as function of reverse voltage

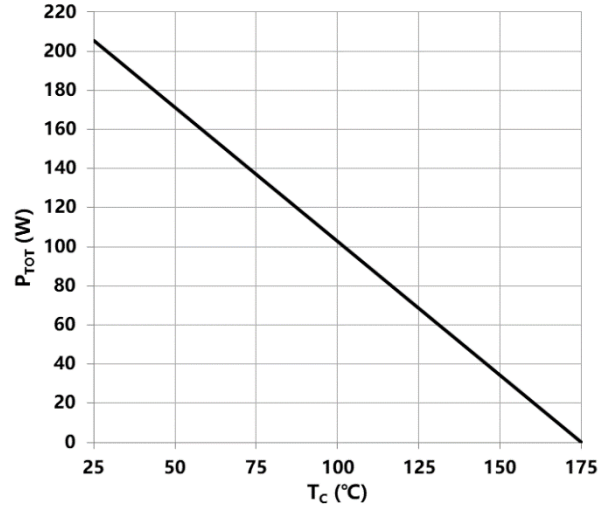


Figure 6. Power dissipation as function of case temperature

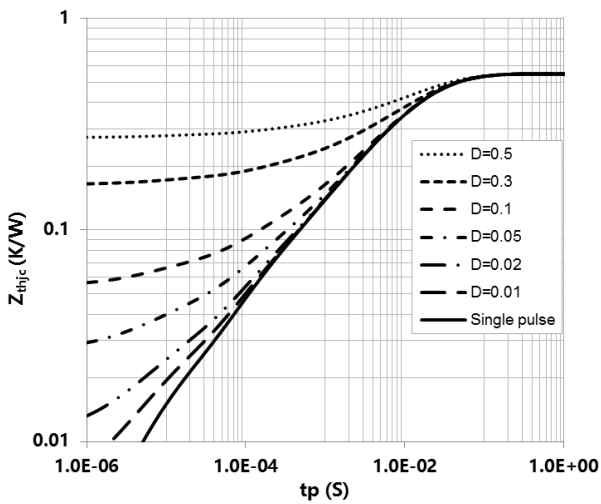
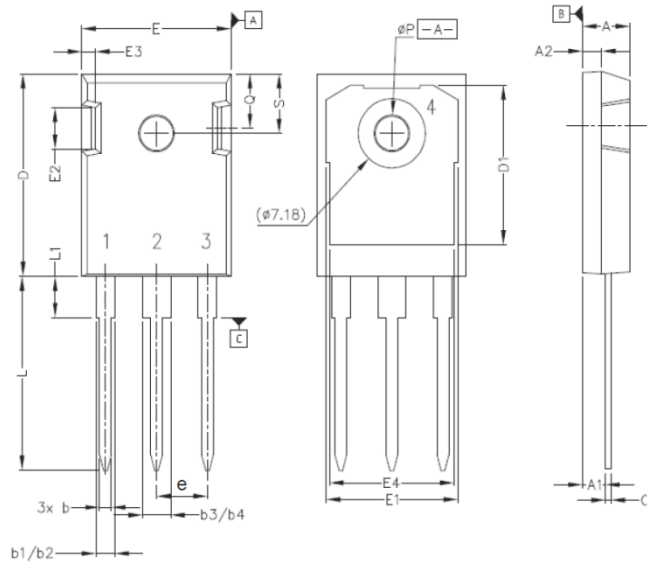


Figure 7. Max. transient thermal impedance, $Z_{th,jc}=f(t)$, parameter: $D=t/T$

Package Dimensions



| POS | Inches | | Millimeters | |
|-----|----------|------|-------------|-------|
| | Min | Max | Min | Max |
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .090 | .100 | 2.29 | 2.54 |
| A2 | .075 | .085 | 1.91 | 2.16 |
| b | .042 | .052 | 1.07 | 1.33 |
| b1 | .075 | .095 | 1.91 | 2.41 |
| b2 | .075 | .085 | 1.91 | 2.16 |
| b3 | .113 | .133 | 2.87 | 3.38 |
| b4 | .113 | .123 | 2.87 | 3.13 |
| c | .022 | .027 | 0.55 | 0.68 |
| D | .819 | .831 | 20.80 | 21.10 |
| D1 | .640 | .695 | 16.25 | 17.65 |
| D2 | .037 | .049 | 0.95 | 1.25 |
| E | .620 | .635 | 15.75 | 16.13 |
| E1 | .516 | .557 | 13.10 | 14.15 |
| E2 | .145 | .201 | 3.68 | 5.10 |
| E3 | .039 | .075 | 1.00 | 1.90 |
| E4 | .487 | .529 | 12.38 | 13.43 |
| N | 3 | | 3 | |
| L | .780 | .800 | 19.81 | 20.32 |
| L1 | .161 | .173 | 4.10 | 4.40 |
| ØP | .138 | .144 | 3.51 | 3.65 |
| Q | .216 | .236 | 5.49 | 6.00 |
| S | .238 | .248 | 6.04 | 6.30 |
| e | .214 BSC | | 5.44 BSC | |

Revision History

Revision: 2019-03-01, Rev. 1.1, Characteristics updated

Previous Revision:

Rev.1.0 Release of datasheet

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