

V_{RRM} = 1200 V
 $I_F (T_C=160^\circ\text{C})$ = 16 A**
 Q_C = 94 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)
- Uninterruptible power supplies
- Motor drivers
- Power factor correction

Package Pin Definitions

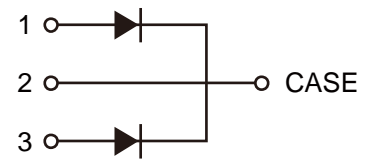
- Pin1- Anode
- Pin2- Cathode
- Pin3- Anode

Package Parameters

| Part Number | Marking | Package |
|-------------|------------|----------|
| B1D16120HC | B1D16120HC | TO-247-3 |

* Per Leg, ** Per Device

TO-247-3 CASE



Maximum Ratings (T_c=25°C unless otherwise specified)

| Symbol | Parameter | Test conditions | Value | Unit |
|--------------------|--------------------------------------|--|---------------------|------------------|
| V _{RRM} | Repetitive peak reverse voltage | | 1200 | V |
| V _{RSM} | Non-repetitive peak reverse voltage | | 1200 | V |
| I _F | Continuous forward current | T _c =25°C T _c =160°C | 35*/70** 8*/16** | A |
| I _{FSM} | Non-repetitive forward surge current | T _c =25°C, t _p =10ms, Half Sine Wave | 80* | A |
| ∫i ² dt | i ² t value | T _c =25°C, t _p =10ms | 31* | A ² S |
| P _{tot} | Power dissipation | T _c =25°C T _c =110°C | 202* 87* | W |
| T _j | Operating junction temperature | | -55~175 | °C |
| T _{stg} | Storage temperature | | -55~175 | °C |
| | TO-247 mounting torque | M3 Screw | 0.7 | Nm |

* Per Leg, ** Per Device

Thermal Characteristics

| Symbol | Parameter | Value | | | Unit |
|---------------------|--|-------|-----------------|------|------|
| | | Min. | Typ. | Max. | |
| R _{th(jc)} | Thermal resistance from junction to case | | 0.74* 0.37** | | K/W |

* Per Leg, ** Per Device

Electrical Characteristics (Per Leg)
Static Characteristics

| Symbol | Parameter | Test conditions | Value | | | Unit |
|----------|-----------------------|---|-------|--------------|------------|---------|
| | | | Min. | Typ. | Max. | |
| V_{DC} | DC blocking voltage | $T_j=25^{\circ}C$ | 1200 | | | V |
| V_F | Diode forward voltage | $I_F=8A$ $T_j=25^{\circ}C$ $I_F=8A$ $T_j=175^{\circ}C$ | | 1.41 1.87 | 1.7 2.8 | V |
| I_R | Reverse current | $V_R=1200V$ $T_j=25^{\circ}C$ $V_R=1200V$ $T_j=175^{\circ}C$ | | 5 25 | 150 250 | μA |

AC Characteristics

| Symbol | Parameter | Test conditions | Value | | | Unit |
|--------|---------------------------|---|-------|-----------------|------|---------|
| | | | Min. | Typ. | Max. | |
| Q_C | Total capacitive charge | $V_R=800V$ $T_j=25^{\circ}C$ $Q_c = \int_0^{V_R} C(V)dV$ | | 47 | | nC |
| C | Total capacitance | $V_R=1V$ $f=1MHz$ $V_R=400V$ $f=1MHz$ $V_R=800V$ $f=1MHz$ | | 519 44 32 | | pF |
| E_C | Capacitance stored energy | $V_R=800V$ | | 25 | | μJ |

Typical Performance (Per Leg)

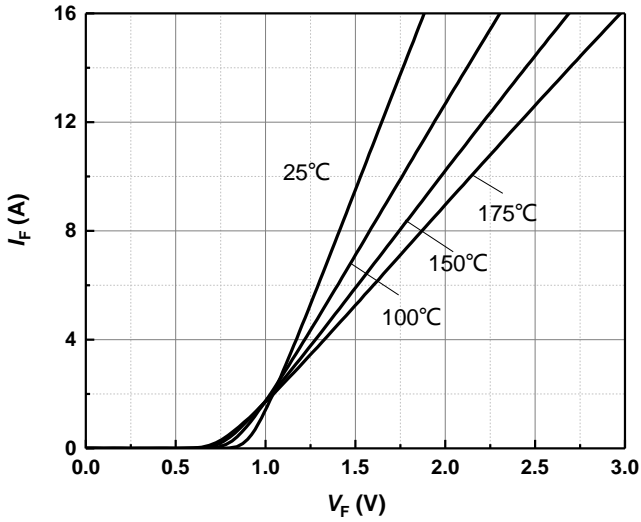


Figure 1. Typical forward characteristics

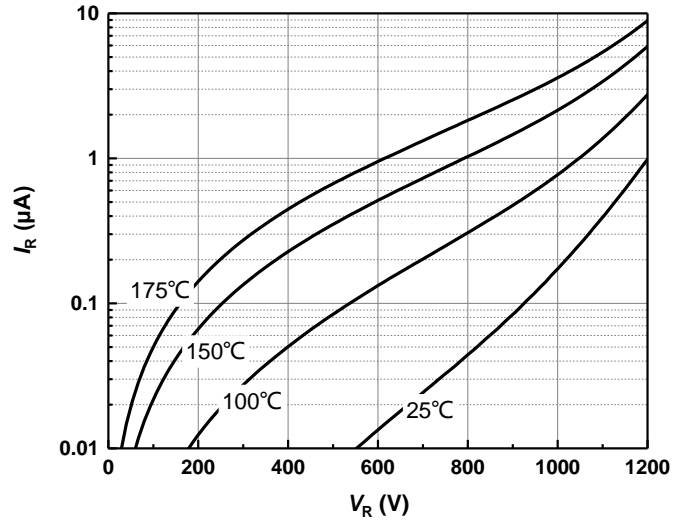


Figure 2. Typical reverse current as function of reverse voltage

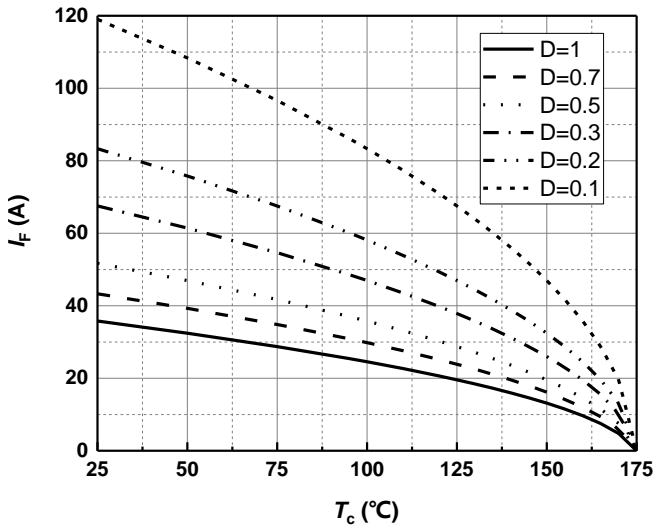


Figure 3. Diode forward current as function of temperature, D=duty cycle

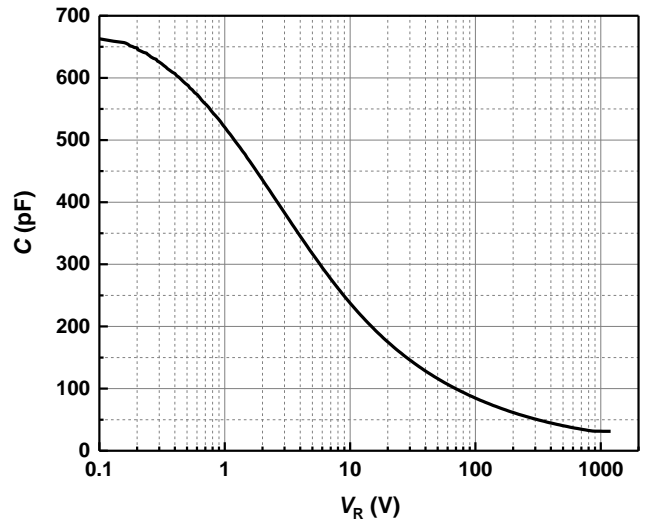


Figure 4. Typical capacitance as function of reverse voltage, $C=f(V_R)$; $T_J=25^{\circ}$ C; $f=1$ MHz

Typical Performance

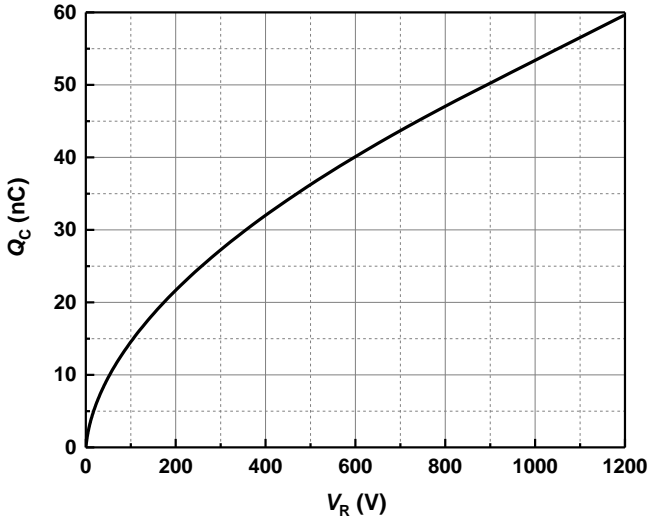


Figure 5. Typical reverse charge as function of reverse voltage

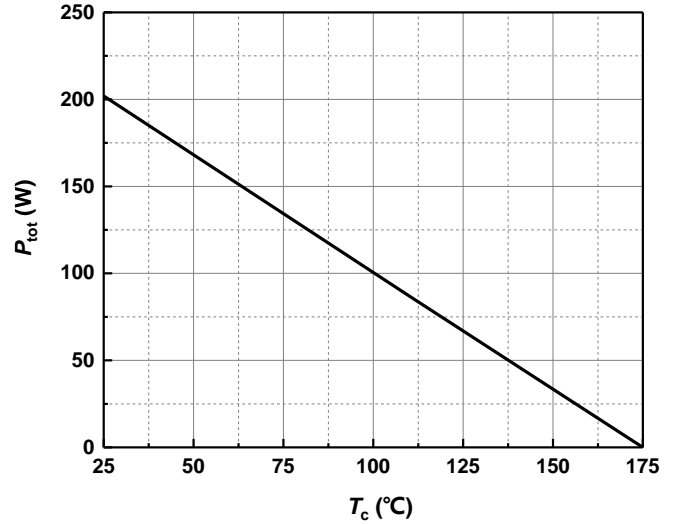


Figure 6. Power dissipation as function of case temperature

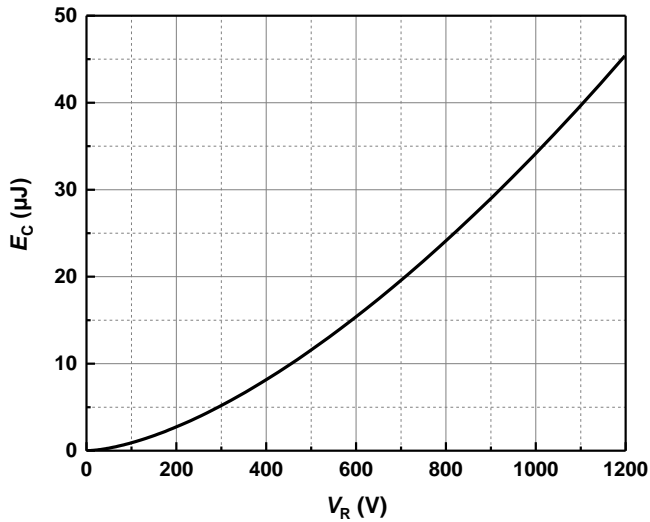


Figure 7. Capacitance stored energy

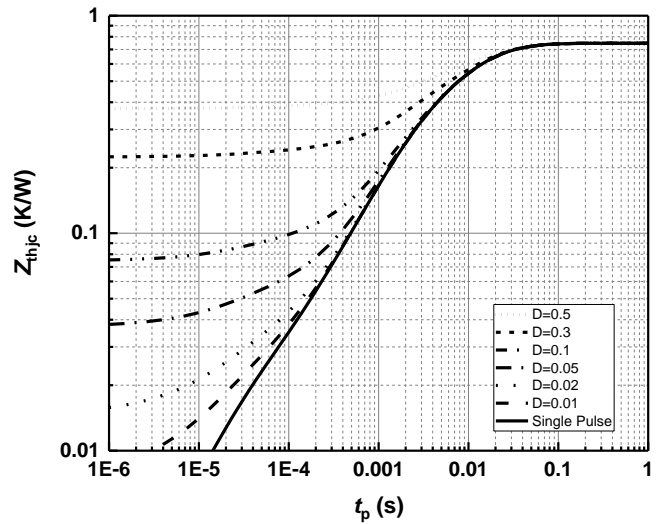
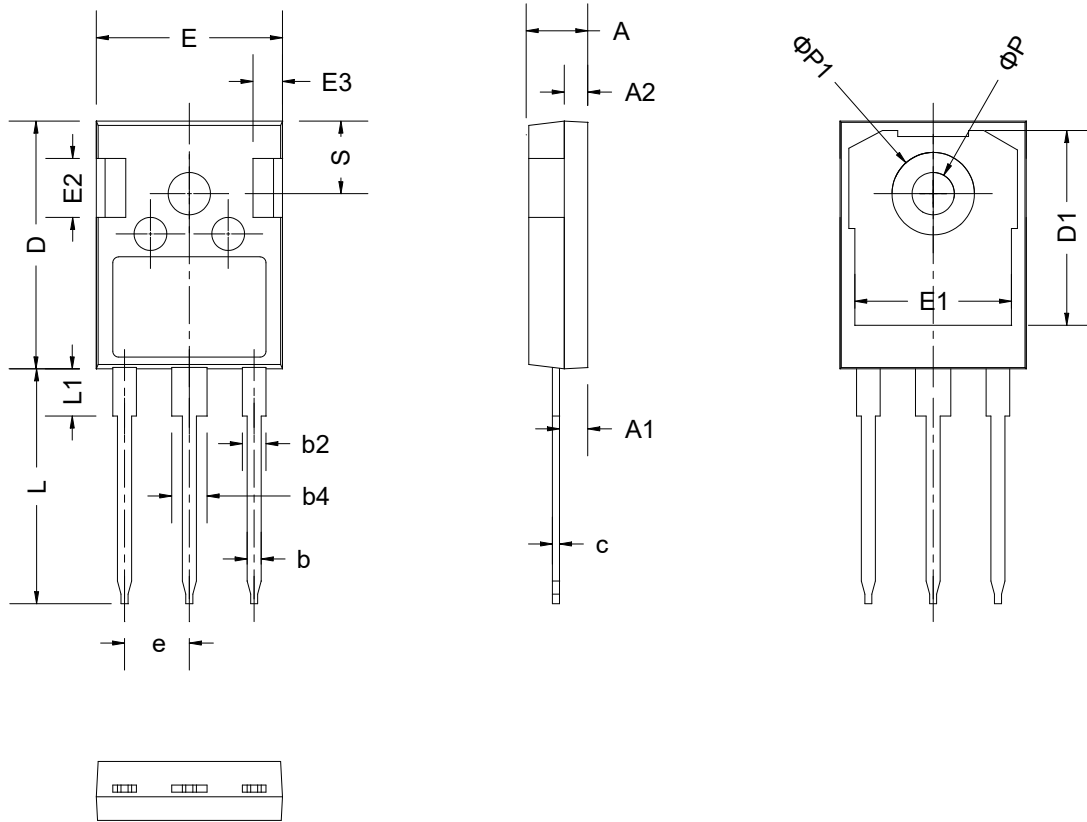


Figure 8. Max. transient thermal impedance, $Z_{thjc} = f(t)$, parameter: $D = t/T$

Package Dimensions



| SYMBOL | mm | | |
|--------|----------|-------|-------|
| | MIN | NOM | MAX |
| A | 4.80 | 5.00 | 5.20 |
| A1 | 2.21 | 2.41 | 2.59 |
| A2 | 1.85 | 2.00 | 2.15 |
| b | 1.11 | 1.21 | 1.36 |
| b2 | 1.91 | 2.01 | 2.21 |
| b4 | 2.91 | 3.01 | 3.21 |
| c | 0.51 | 0.61 | 0.75 |
| D | 20.80 | 21.00 | 21.30 |
| D1 | 16.25 | 16.55 | 16.85 |
| E | 15.50 | 15.80 | 16.10 |
| E1 | 13.00 | 13.30 | 13.60 |
| E2 | 4.80 | 5.00 | 5.20 |
| E3 | 2.30 | 2.50 | 2.70 |
| e | 5.44 BSC | | |
| L | 19.62 | 19.92 | 20.22 |
| L1 | - | - | 4.30 |
| φ P | 3.40 | 3.60 | 3.80 |
| φ P1 | - | - | 7.30 |
| S | 6.16 BSC | | |

Revision History

| Document Version | Date of Release | Description of Changes |
|-------------------------|------------------------|---------------------------------------|
| Rev. 0.1 | 2021-01-06 | Release of the preliminary datasheet. |
| Rev. 1.0 | 2021-06-15 | Characteristics updated. |
| | | |
| | | |

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