



B1D10065KF

650V ▲ 10A ▲ SiC SCHOTTKY DIODE

SILICON CARBIDE SiC SCHOTTKY DIODE ▲ THT type

Excellent surge capability

Easy paralleling due to positive V_F temperature coefficient

Temperature independent switching



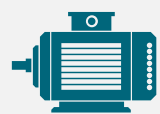




Low forward voltage

TO-220F-2L package ▲ Electrical insulated mounting tab

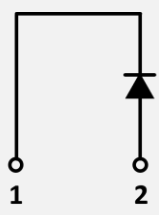
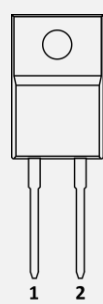
SPECIFICATION

| Item ($T_C = 25^\circ\text{C}$, unless otherwise noted) | | Characteristics |
|--|-----------|---|
| Operating Temperature Range | T_J | -55°C to $+175^\circ\text{C}$ |
| Storage Temperature Range | T_S | -55°C to $+175^\circ\text{C}$ |
| Repetitive Peak Reverse Voltage | V_{RRM} | 650V |
| Continuous Forward Current at $T_C = 95^\circ\text{C}$ | I_F | 10A |
| Total Capacitive Charge ($T_J = 25^\circ\text{C}$) | Q_C | 29nC |
| Capacitance Stored Energy ($V_R = 400\text{V}$) | E_C | $7.5\mu\text{J}$ |
| Diode Forward Voltage ($T_J = 175^\circ\text{C}$, $I_F = 10\text{A}$) | V_F | 1.75V |
| Power Dissipation | P_{TOT} | 34W |

APPLICATIONS

| EV Charging | Industrial Inverters | Motors & Drives | Power Factor Correction | Renewable Energy | SMPS | UPS |
|---|---|---|---|--|---|---|
|  |  |  |  |  |  |  |

PIN DESCRIPTION

| Circuit Diagram | Outline - Front View | Pin No. | Description |
|---|---|---------|------------------|
|  |  | 1 2 | Cathode Anode |

ABSOLUT MAXIMUM RATINGS ▲ $T_C = 25^\circ\text{C}$, unless otherwise noted

| Item | Condition | Symbol | | Unit |
|--------------------------------------|---|---------------|-------------|----------------------|
| Repetitive Peak Reverse Voltage | | V_{RRM} | 650 | V |
| Non-Repetitive Peak Reverse Voltage | | V_{RSM} | 650 | V |
| Continuous Forward Current | $T_C = 25^\circ\text{C}$ | I_F | 15 | A |
| Continuous Forward Current | $T_C = 95^\circ\text{C}$ | I_F | 10 | A |
| Non-Repetitive Forward Surge Current | $T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$, Half Sine Wave | I_{FSM} | 75 | A |
| I^2t Value | $T_C = 25^\circ\text{C}$, $t_p = 10\text{ms}$ | $\int i^2 dt$ | 28.12 | A^2s |
| Power Dissipation | $T_C = 25^\circ\text{C}$ | P_{TOT} | 34 | W |
| Power Dissipation | $T_C = 110^\circ\text{C}$ | P_{TOT} | 15 | W |
| Operating Junction Temperature | | T_J | -55 to +175 | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{STG} | -55 to +175 | $^\circ\text{C}$ |
| TO-220 Mounting Torque | M3 Screw | | 0.7 | Nm |

ELECTRICAL CHARACTERISTICS

| Item | Condition | Symbol | Min. | Typ. | Max. | Unit |
|-------------------------------|---|----------|------|------|------|---------------|
| Static Characteristics | | | | | | |
| DC Blocking Voltage | $T_J = 25^\circ\text{C}$ | V_{DC} | 650 | | | V |
| Diode Forward Voltage | $I_F = 10\text{A}$, $T_J = 25^\circ\text{C}$ | V_F | | 1.43 | 1.60 | V |
| Diode Forward Voltage | $I_F = 10\text{A}$, $T_J = 175^\circ\text{C}$ | V_F | | 1.75 | 2.10 | V |
| Reverse Current | $V_R = 650\text{V}$, $T_J = 25^\circ\text{C}$ | I_R | | 5 | 70 | μA |
| Reverse Current | $V_R = 650\text{V}$, $T_J = 175^\circ\text{C}$ | I_R | | 50 | 500 | μA |

| Item | Condition | Symbol | Min. | Typ. | Max. | Unit |
|--------------------------------|--|--------|------|------|------|---------------|
| Dynamic Characteristics | | | | | | |
| Total Capacitive Charge | $V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$ $Q_C = \int_0^{V_R} C(V) dV$ | Q_C | | 29 | | nC |
| Total Capacitance | $V_R = 1\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$ | C | | 457 | | pF |
| Total Capacitance | $V_R = 300\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$ | C | | 49.7 | | pF |
| Total Capacitance | $V_R = 600\text{V}$, $f = 1\text{MHz}$, $T_J = 25^\circ\text{C}$ | C | | 49.3 | | pF |
| Capacitance Stored Energy | $V_R = 400\text{V}$, $T_J = 25^\circ\text{C}$ | E_C | | 7.5 | | μJ |

THERMAL RESISTANCE PERFORMANCE

| Item | Symbol | Min. | Typ. | Max. | Unit |
|--------------------------------------|-----------------|------|-------|------|------|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | | 4.331 | | K/W |

REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 1 • Typical Forward Characteristics I_F vs. V_F

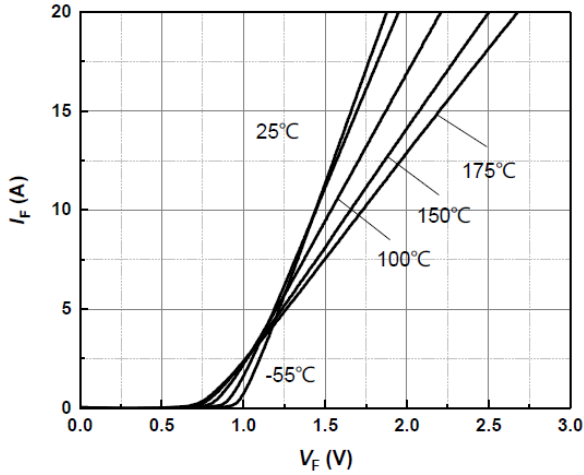


Fig. 2 • Typical Reverse Current I_R as function of Reverse Voltage V_R

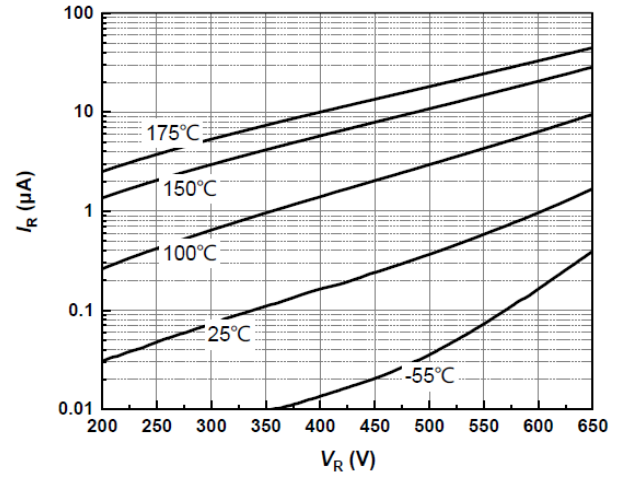


Fig. 3 • Diode Forward Current I_F as function of Case Temperature T_C (D = Duty Cycle)

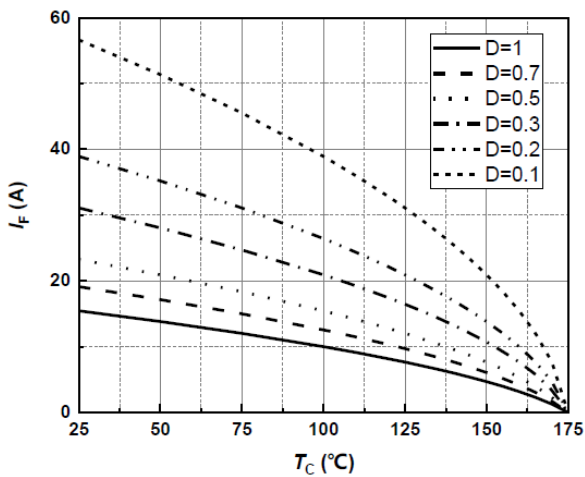


Fig. 4 • Typical Capacitance C as function of Reverse Voltage V_R , $C = f(V_R)$, $T_J = 25^\circ\text{C}$, $f = 1\text{MHz}$

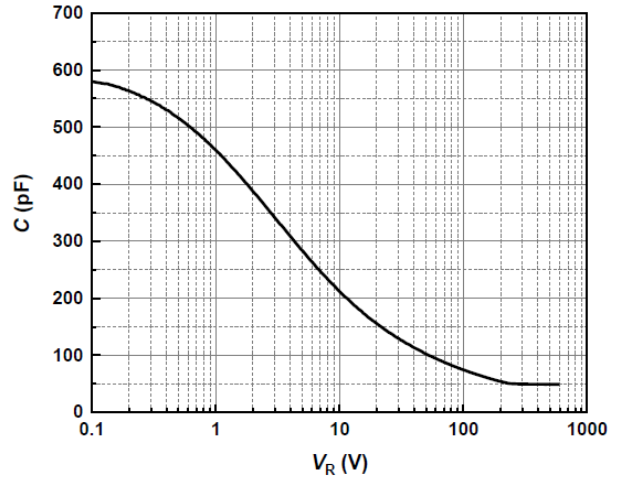


Fig. 5 • Typical Reverse Charge Q_C as function of Reverse Voltage V_R

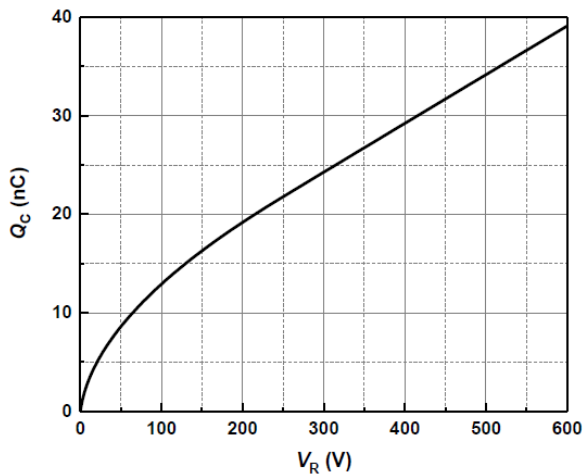
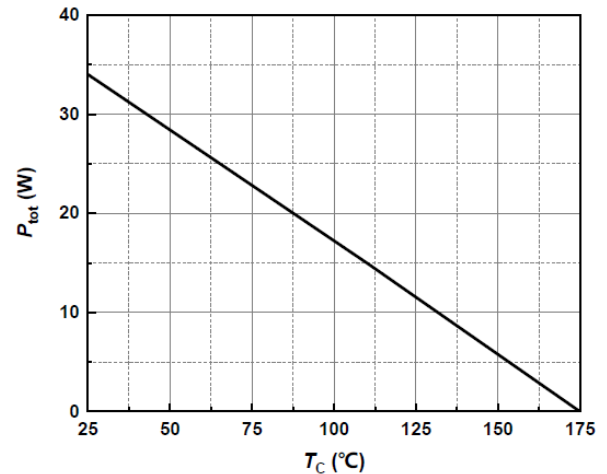


Fig. 6 • Power Dissipation P_{TOT} as function of Case Temperature T_C



REFERENCE DATA ▲ TYPICAL PERFORMANCE

Fig. 7 • Capacitance Stored Energy

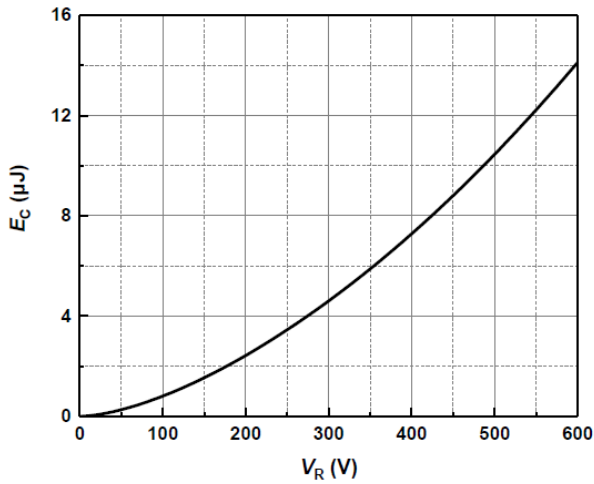
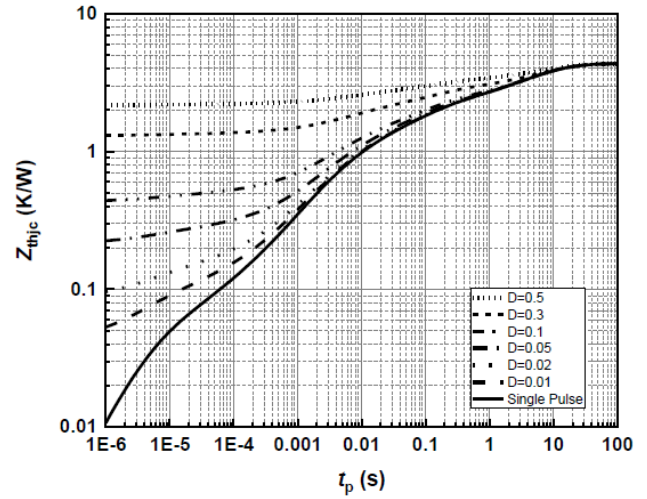
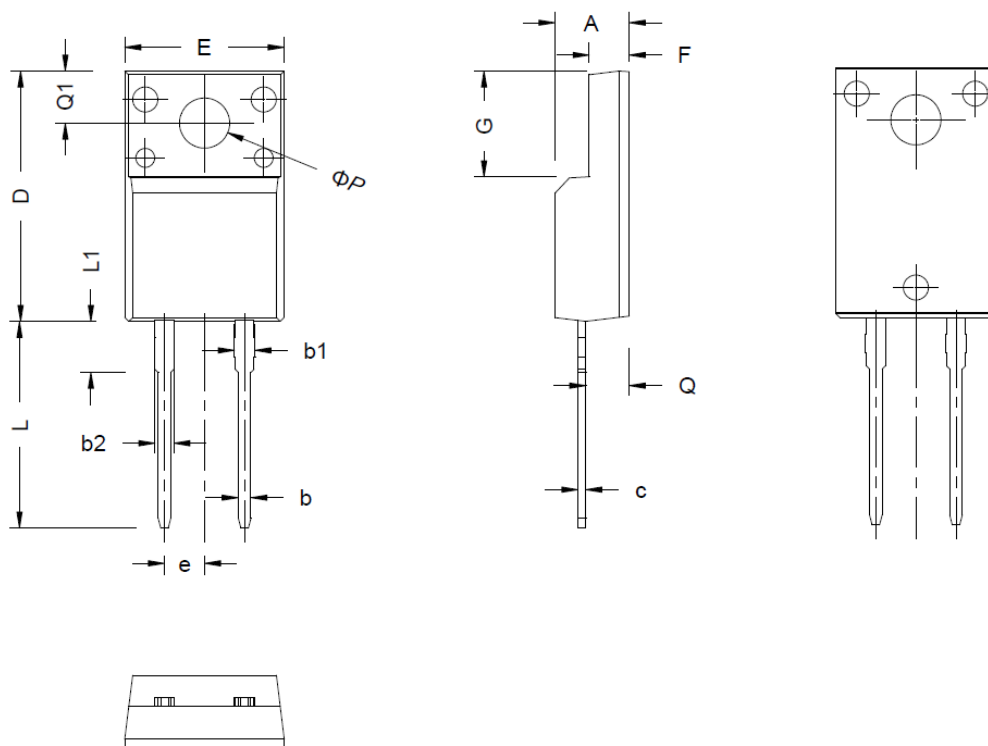


Fig. 8 • Maximum Transient Thermal Impedance, $Z_{thjc} = f(t)$, Parameter: $D = t/T$



PACKAGE OUTLINE



| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|-----------------------|-----------------------|-----------------------|
| A | 4.60 | 4.70 | 4.80 |
| b | 0.70 | 0.80 | 0.91 |
| b1 | 1.20 | 1.30 | 1.47 |
| b2 | 1.10 | 1.20 | 1.30 |
| c | 0.45 | 0.50 | 0.63 |
| D | 15.80 | 15.87 | 15.97 |
| D | 15.15 | 15.45 | 15.75 |
| e | 2.54 BSC | | |
| E | 10.00 | 10.10 | 10.30 |

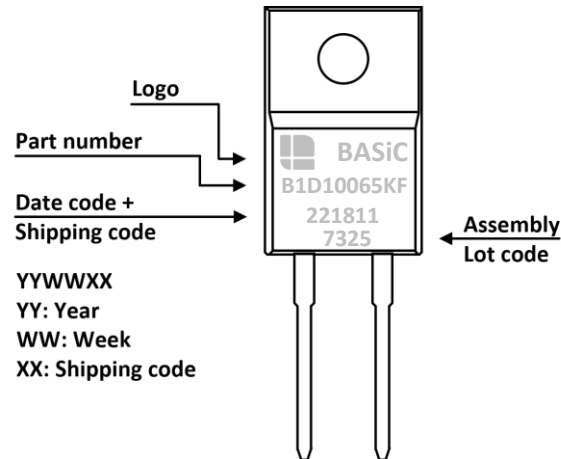
| Sym | Millimeters (Min.) | Millimeters (Typ.) | Millimeters (Max.) |
|-----|-----------------------|-----------------------|-----------------------|
| F | 2.44 | 2.54 | 2.64 |
| G | 6.50 | 6.70 | 6.90 |
| L | 12.90 | 13.10 | 13.30 |
| L | 12.70 | - | 13.70 |
| L1 | 3.13 | 3.23 | 3.33 |
| Q | 2.65 | 2.75 | 2.85 |
| Q1 | 3.20 | 3.30 | 3.40 |
| ØP | 2.08 | 3.18 | 3.28 |

TO-220F-2L package ▲ Epoxy meets UL94-V0

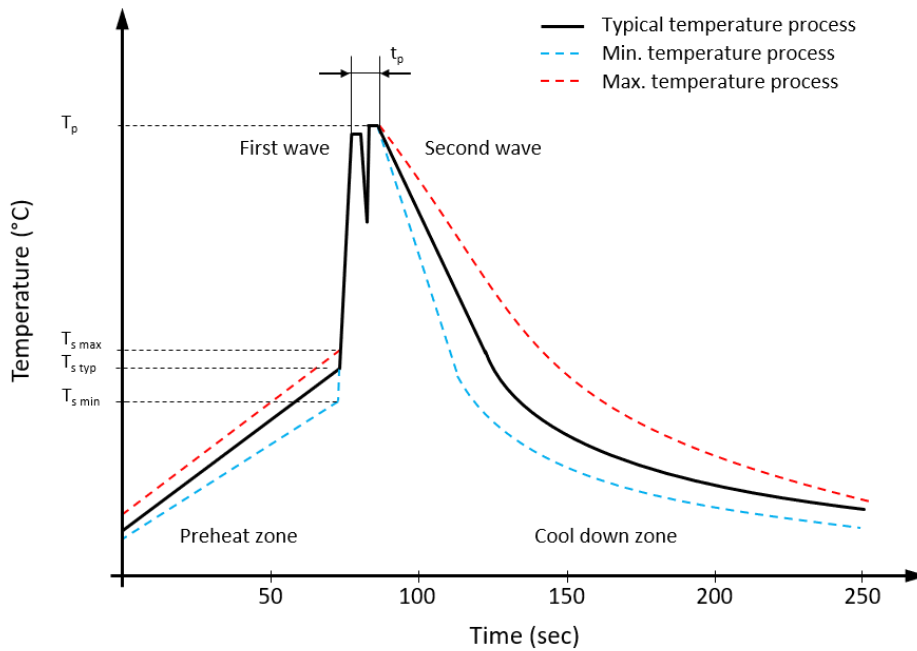
ORDERING INFORMATION

| Part Number | Package | Packing | Tube Qty. | Inner Box Qty. | Outer Box Qty. |
|-------------|------------|---------|-----------|----------------|----------------|
| B1D10065KF | TO-220F-2L | Tube | 50pcs | 500pcs | 5,000pcs |

PART MARKING



RECOMMENDED WAVE SOLDERING PROFILE ▲ THT PACKAGE



Classification wave soldering profile ▲ Refer to EN 61760-1: 2006

| Profile Features | | Value ▲ Sn-Pb Assembly | Value ▲ Pb-free Assembly |
|--|--------------|--|--|
| Preheat temperature min. | $T_{s\ min}$ | 100 °C | 100 °C |
| Preheat temperature typical | $T_{s\ typ}$ | 120 °C | 120 °C |
| Preheat temperature max. | $T_{s\ max}$ | 130 °C | 130 °C |
| Preheat time t_s from $T_{s\ min}$ to $T_{s\ max}$ | t_s | 70 seconds | 70 seconds |
| Peak temperature | T_p | 235 °C to 260 °C | 245 °C to 260 °C |
| Time of actual peak temperature | t_p | Max. 10 seconds Max. 5 second each wave | Max. 10 seconds Max. 5 second each wave |
| Ramp-down rate min. | | ~ 2 °C/second | ~ 2 °C/second |
| Ramp-down rate typical | | ~ 3.5 °C/second | ~ 3.5 °C/second |
| Ramp-down rate max. | | ~ 5 °C/second | ~ 5 °C/second |
| Time 25°C to 25°C | | 4 minutes | 4 minutes |

REVISION TABLE

| Revision | Date | Status | Notes |
|----------|------------|-----------------|---------------------|
| 001 | 30/09/2022 | Initial release | Initial publication |
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