

Final datasheet

CoolSiC™ Schottky diode 2000 V G5

Features

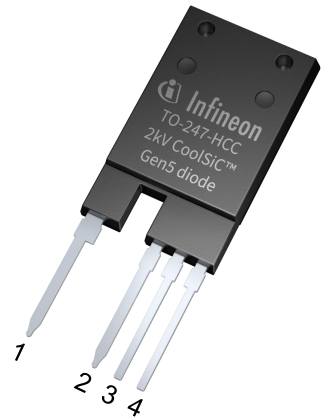
- $V_{RRM} = 2000\text{ V}$
- $I_F = 50\text{ A}$
- $V_F = 1.5\text{ V}$
- No reverse recovery current / no forward recovery
- High surge current capability
- Temperature independent switching behavior
- Low forward voltage even at high operating temperature
- Tight forward voltage distribution
- Specified dv/dt ruggedness
- .XT interconnection technology for best-in-class thermal performance

Potential applications

- String 3-phase inverter
- EV Charging

Product validation

- Qualified for industrial applications according to the relevant tests of JEDEC47/20/22



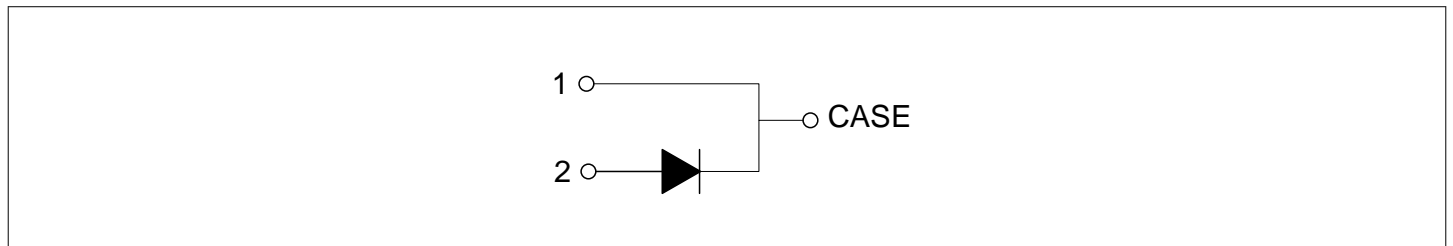
Description

Pin definition:

Pin 1 – Cathode

Pin 2 – Anode

Pin 3, 4 – not connected



| Type | Package | Marking |
|--------------|----------------------|---------|
| IDYH50G200C5 | PG-TO247-4-PLUS-NT14 | D5020C5 |

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1 Package

Table 1 Characteristic values

| Parameter | Symbol | Note or test condition | Values | | | Unit |
|--|---------------|--|--------|------|------|------|
| | | | Min. | Typ. | Max. | |
| Storage temperature | T_{stg} | | -55 | | 150 | °C |
| Soldering temperature | T_{sold} | wave soldering 1.6 mm (0.063 in.) from case for 10 s | | | 260 | °C |
| Thermal resistance, junction-ambient ¹⁾ | $R_{th(j-a)}$ | | | | 62 | K/W |
| Diode thermal resistance, junction-case | $R_{th(j-c)}$ | | | 0.15 | 0.19 | K/W |

1) leaded

2 SiC Diode

Table 2 Maximum rated values

| Parameter | Symbol | Note or test condition | Values | Unit | |
|---|-------------|--|------------------------|------|------------------|
| Repetitive peak reverse voltage | V_{RRM} | $T_{vj} \geq 25 \text{ °C}$ | 2000 | V | |
| Continuous forward current for $R_{th(j-c,max)}$ | I_F | $D = 1$ | $T_c = 25 \text{ °C}$ | 140 | A |
| | | | $T_c = 135 \text{ °C}$ | 67 | |
| | | | $T_c = 151 \text{ °C}$ | 50 | |
| Surge repetitive forward current, sine halfwave ¹⁾ | $I_{F,RM}$ | $t_p = 10 \text{ ms}$ | $T_c = 25 \text{ °C}$ | 200 | A |
| | | | $T_c = 100 \text{ °C}$ | 150 | |
| Surge non-repetitive forward current, sine halfwave | $I_{F,SM}$ | $t_p = 10 \text{ ms}$ | $T_c = 25 \text{ °C}$ | 325 | A |
| | | | $T_c = 150 \text{ °C}$ | 287 | |
| Non-repetitive peak forward current | $I_{F,max}$ | $T_c = 25 \text{ °C}, t_p = 10 \text{ } \mu\text{s}$ | 1900 | A | |
| I^2t value | $\int I^2t$ | $t_p = 10 \text{ ms}$ | $T_c = 25 \text{ °C}$ | 528 | A ² s |
| | | | $T_c = 150 \text{ °C}$ | 412 | |
| Diode dv/dt ruggedness | dv/dt | $V_R = 0 \dots 1500 \text{ V}$ | 100 | V/ns | |
| Power dissipation for $R_{th(j-c,max)}$ | P_{tot} | | $T_c = 25 \text{ °C}$ | 789 | W |

1) Not subject to production test. The test was performed with 20k pulses (half-wave rectified sine with 10 ms period).

Table 3 Characteristic values

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|--------------------------------|----------|---|--------------------------|--------|------|------|--------------------|
| | | | | Min. | Typ. | Max. | |
| DC blocking voltage | V_{DC} | $T_{vj} = 25\text{ °C}$ | | 2000 | | | V |
| Diode forward voltage | V_F | $I_F = 50\text{ A}$ | $T_{vj} = 25\text{ °C}$ | | 1.5 | 1.75 | V |
| | | | $T_{vj} = 150\text{ °C}$ | | 2.3 | | |
| Reverse current | I_R | $V_R = 2000\text{ V}$ | $T_{vj} = 25\text{ °C}$ | | 25 | 750 | μA |
| | | | $T_{vj} = 150\text{ °C}$ | | 180 | | |
| Total capacitive charge | Q_C | $V_R = 1500\text{ V}, T_{vj} = 25\text{ °C} \& 150\text{ °C},$ $Q_C = \int_0^{V_R} C(V)dV$ | | | 450 | | nC |
| Total capacitance | C | $f = 100\text{ kHz}$ | $V_R = 1\text{ V}$ | | 5700 | | pF |
| | | | $V_R = 600\text{ V}$ | | 230 | | |
| | | | $V_R = 1500\text{ V}$ | | 155 | | |
| Operating junction temperature | T_{vj} | | | -55 | | 175 | $^{\circ}\text{C}$ |

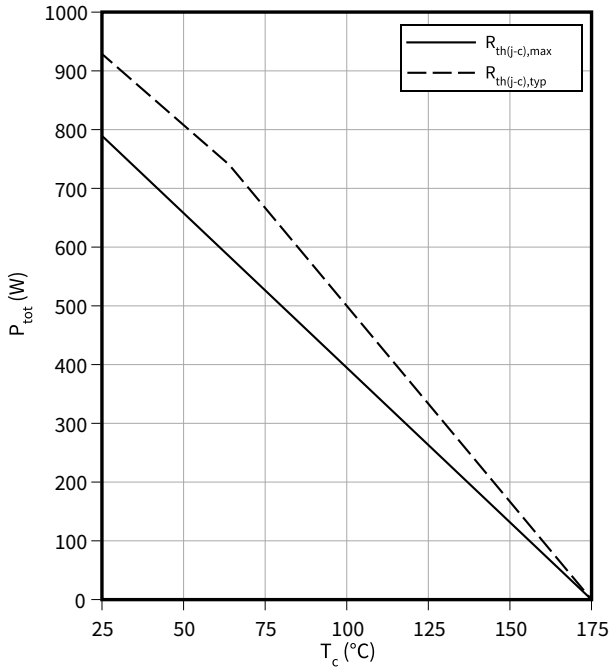
Note: For optimum lifetime and reliability, Infineon recommends operating conditions that do not exceed 80% of the maximum ratings stated in this datasheet.

Electrical Characteristic at $T_{vj} = 25\text{ °C}$, unless otherwise specified.

3 Characteristics diagrams

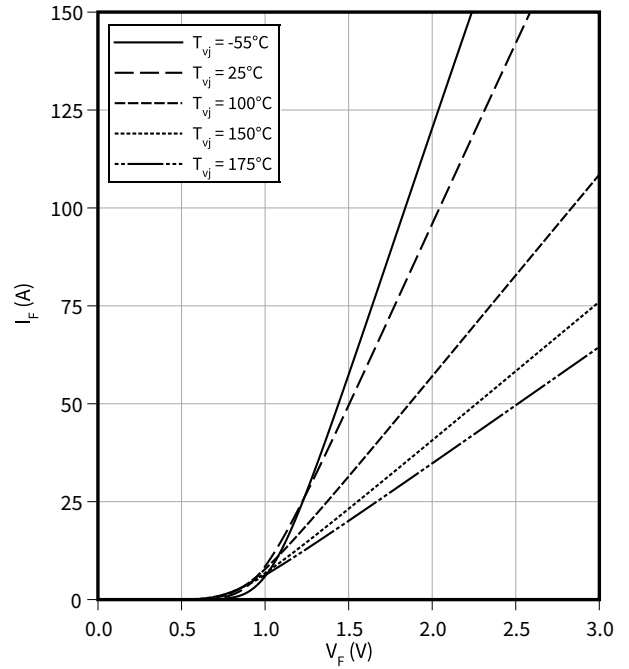
Power dissipation as function of case temperature

$P_{tot} = f(T_c)$
 $T_{vj} \leq 175\text{ °C}$
 limited by bondwire



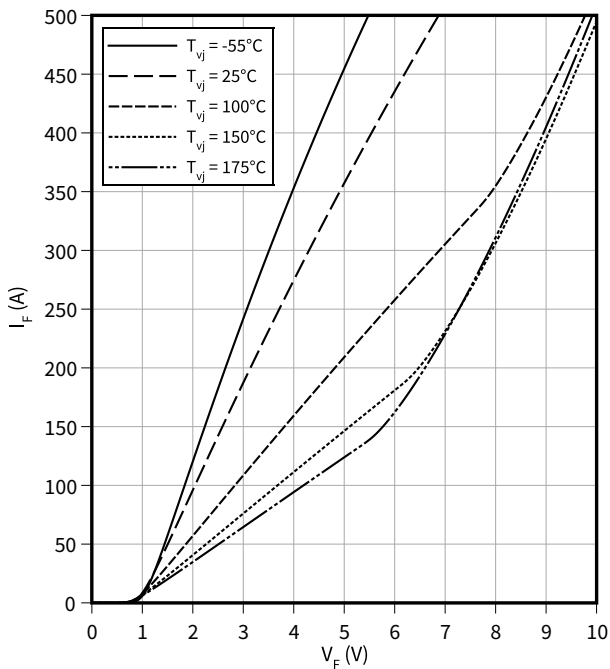
Typical forward characteristics

$I_F = f(V_F)$
 $t_p = 50\text{ }\mu\text{s}$



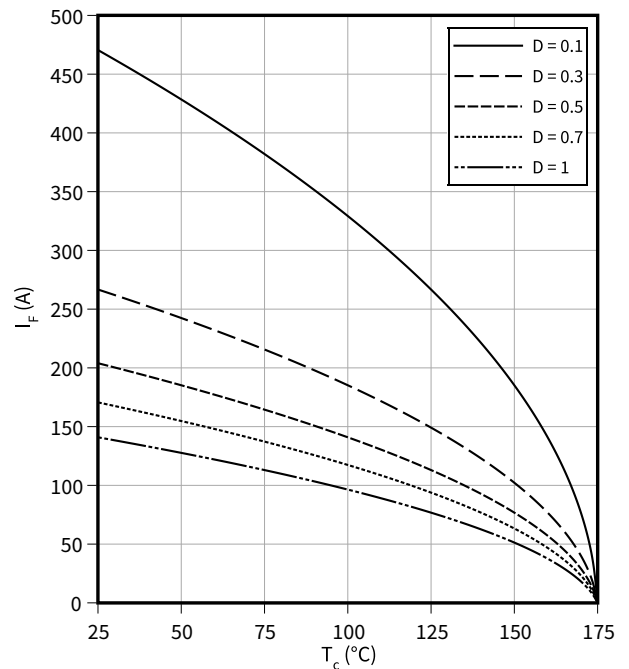
Typical forward characteristics in surge current

$I_F = f(V_F)$
 $t_p = 50\text{ }\mu\text{s}$



Diode forward current as function of temperature

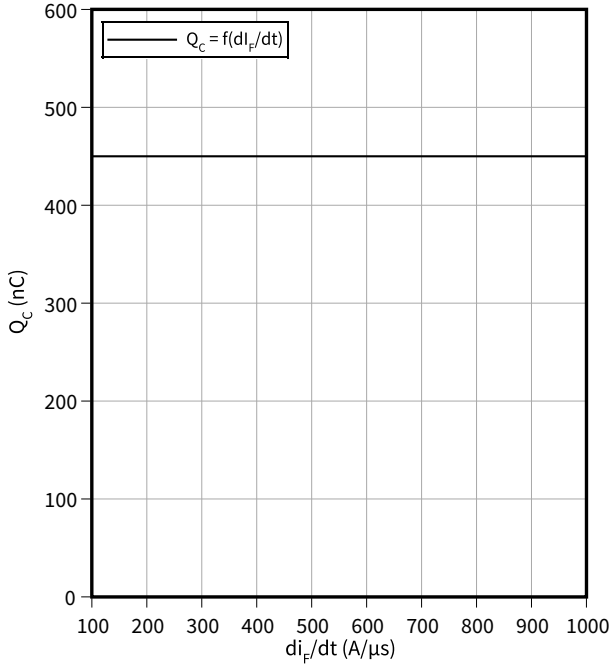
$I_F = f(T_c)$
 $D = \text{duty cycle}, T_{vj} \leq 175\text{ °C}, V_{th}, R_{diff} @ T_{vj} = 175\text{ °C}$



3 Characteristics diagrams

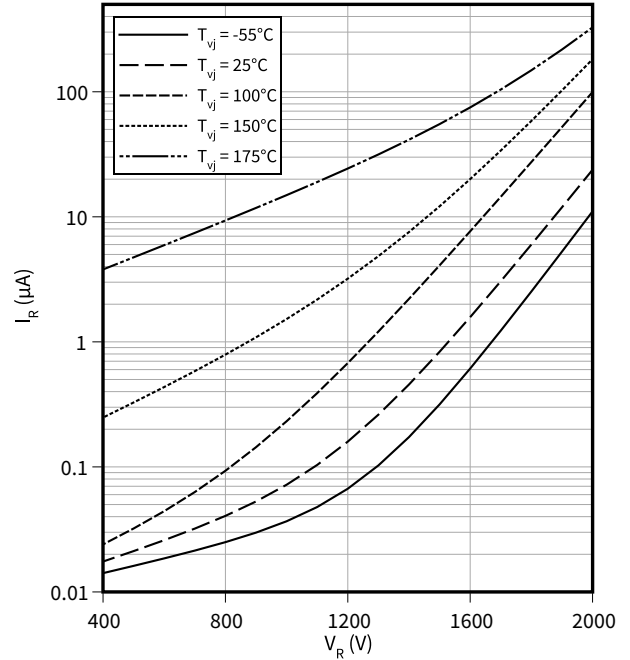
Typical capacitive charge as function of current slope

$Q_C = f(di_F/dt)$
 $T_{vj} = 25\text{ °C}$, $V_R = 1500\text{ V}$
 guaranteed by design



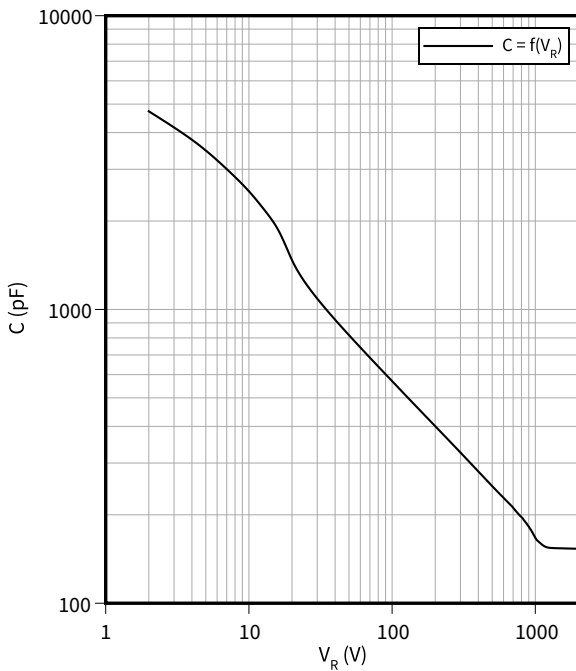
Typical reverse characteristics

$I_R = f(V_R)$



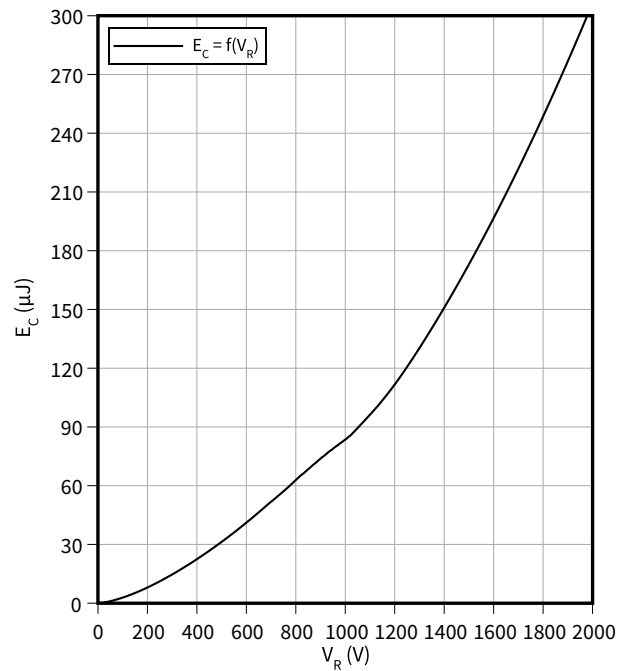
Typical capacitance as function of reverse voltage

$C = f(V_R)$
 $T_{vj} = 25\text{ °C}$, $f = 100\text{ kHz}$



Typical capacitively stored energy as function of reverse voltage

$E_C = f(V_R)$
 $f = 100\text{ kHz}$

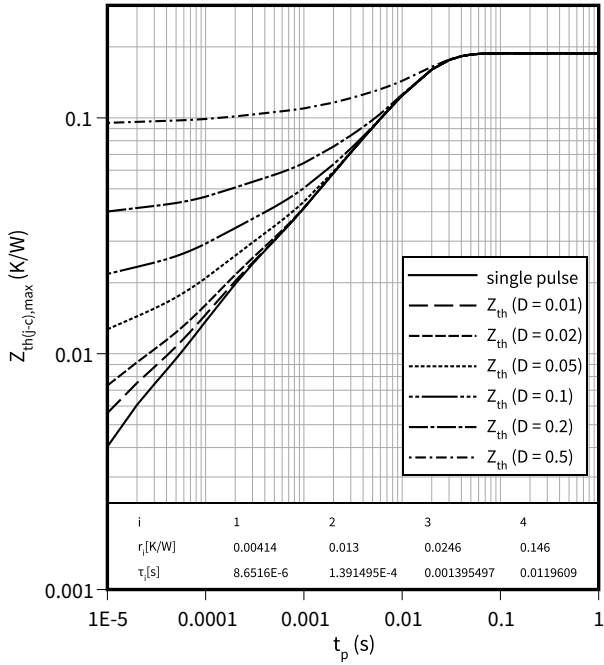


3 Characteristics diagrams

Max. transient thermal impedance

$$Z_{th(j-c),max} = f(t_p)$$

$$D = t_p/T$$



4 Package outlines

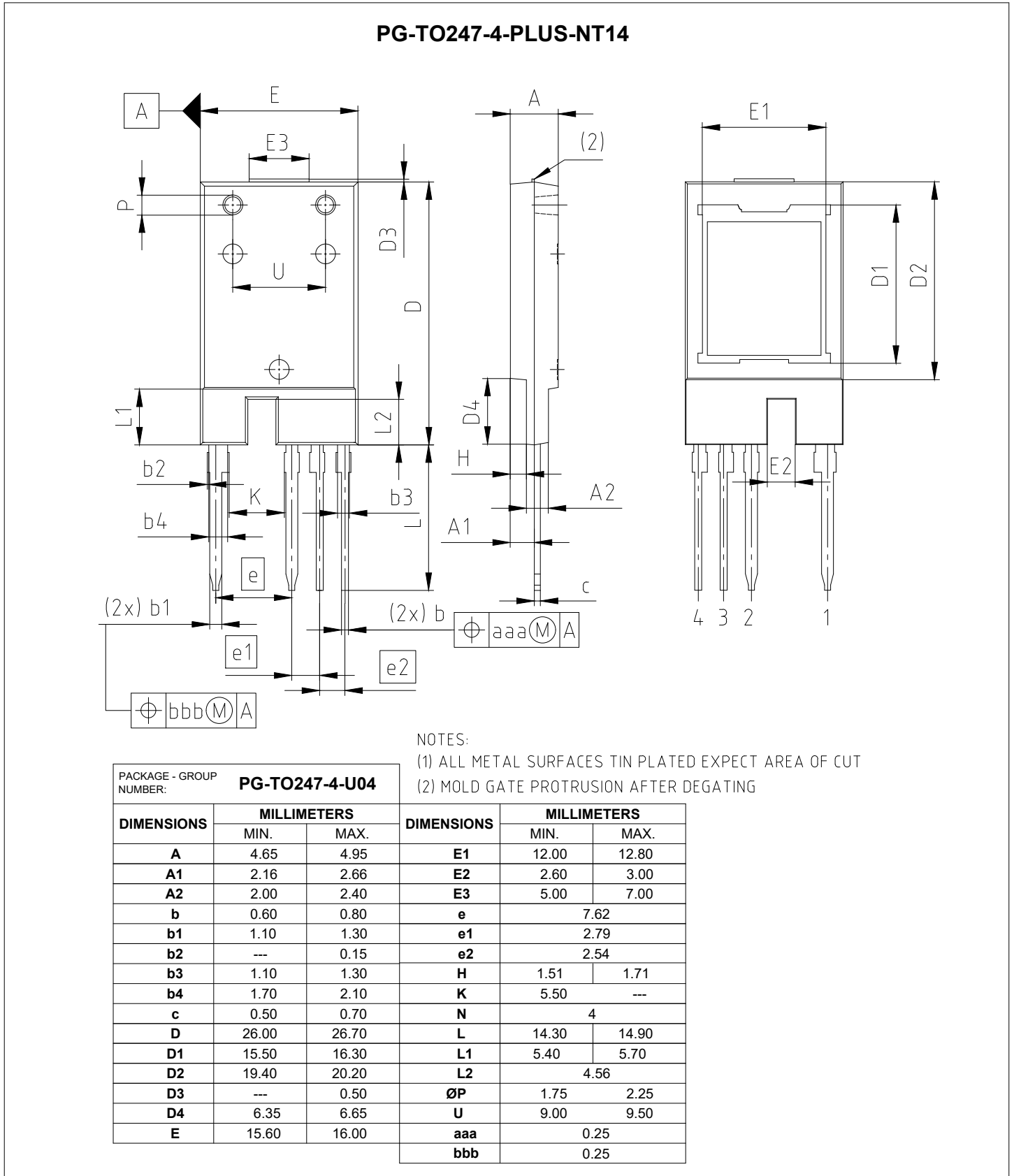


Figure 1

Revision history

| Document revision | Date of release | Description of changes |
|-------------------|-----------------|------------------------|
| 0.10 | 2024-02-14 | Preliminary datasheet |
| 1.00 | 2024-04-15 | Final datasheet |

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