

Final datasheet

CoolSiC™ Schottky diode 2000 V G5

- Features
- $V_{RRM} = 2000\text{ V}$
  - $I_F = 10\text{ A}$
  - $V_F = 1.5\text{ V}$
  - 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

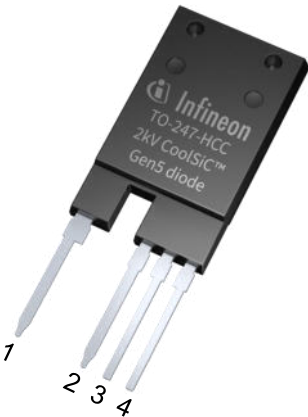
Description

Pin definition:

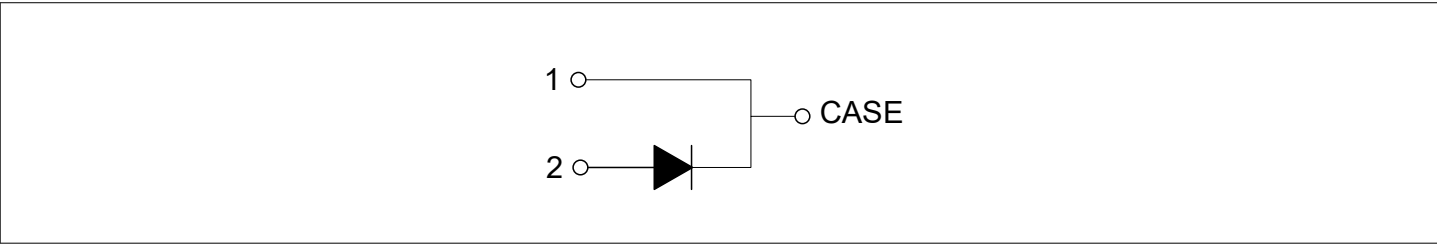
Pin 1 – Cathode

Pin 2 – Anode

Pin 3, 4 – not connected



- Lead-free
- Green
- Halogen-free
- RoHS



| Type         | Package              | Marking |
|--------------|----------------------|---------|
| IDYH10G200C5 | PG-TO247-4-PLUS-NT14 | D1020C5 |



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**1 Package**

**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 <sup>1)</sup> | $R_{th(j-a)}$ |                                                      |        |      | 62   | K/W  |
| Diode thermal resistance, junction-case            | $R_{th(j-c)}$ |                                                      |        | 0.47 | 0.61 | 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 $R_{th(j-c,max)}$              | $I_F$       | $D = 1$                                           | $T_c = 25\text{ °C}$  | 35     | A                |
|                                                               |             |                                                   | $T_c = 135\text{ °C}$ | 17     |                  |
|                                                               |             |                                                   | $T_c = 159\text{ °C}$ | 10     |                  |
| Surge repetitive forward current, sine halfwave <sup>1)</sup> | $I_{F,RM}$  | $t_p = 10\text{ ms}$                              | $T_c = 25\text{ °C}$  | 40     | A                |
|                                                               |             |                                                   | $T_c = 100\text{ °C}$ | 30     |                  |
| Surge non-repetitive forward current, sine halfwave           | $I_{F,SM}$  | $t_p = 10\text{ ms}$                              | $T_c = 25\text{ °C}$  | 97     | A                |
|                                                               |             |                                                   | $T_c = 150\text{ °C}$ | 93     |                  |
| Non-repetitive peak forward current                           | $I_{F,max}$ | $T_c = 25\text{ °C}, t_p = 10\text{ }\mu\text{s}$ |                       | 650    | A                |
| $I^2t$ value                                                  | $\int I^2t$ | $t_p = 10\text{ ms}$                              | $T_c = 25\text{ °C}$  | 47     | A <sup>2</sup> s |
|                                                               |             |                                                   | $T_c = 150\text{ °C}$ | 43     |                  |
| Diode dv/dt ruggedness                                        | $dv/dt$     | $V_R = 0...1500\text{ V}$                         |                       | 100    | V/ns             |
| Power dissipation for $R_{th(j-c,max)}$                       | $P_{tot}$   |                                                   | $T_c = 25\text{ °C}$  | 245    | 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**

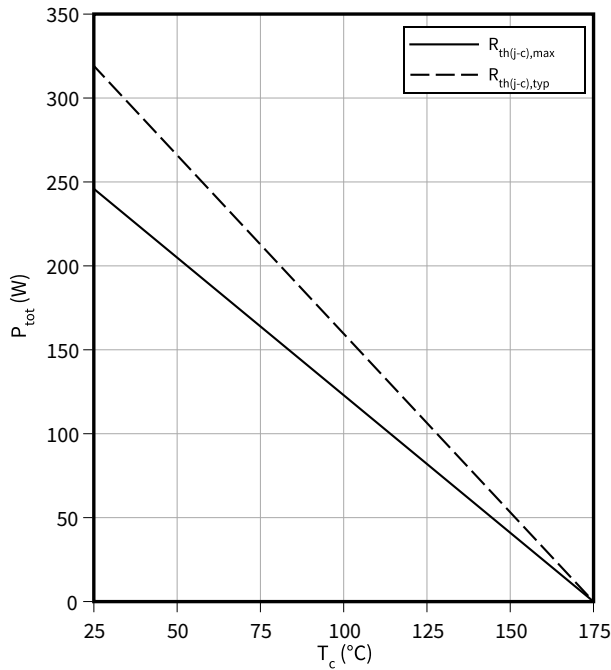
| Parameter                      | Symbol   | Note or test condition                                                                             |                          | Values |      |      | Unit               |
|--------------------------------|----------|----------------------------------------------------------------------------------------------------|--------------------------|--------|------|------|--------------------|
|                                |          |                                                                                                    |                          | Min.   | Typ. | Max. |                    |
| DC blocking voltage            | $V_{DC}$ | $T_{vj} = 25\text{ °C}$                                                                            |                          | 2000   |      |      | V                  |
| Diode forward voltage          | $V_F$    | $I_F = 10\text{ A}$                                                                                | $T_{vj} = 25\text{ °C}$  |        | 1.5  | 1.75 | V                  |
|                                |          |                                                                                                    | $T_{vj} = 150\text{ °C}$ |        | 2.3  |      |                    |
| Reverse current                | $I_R$    | $V_R = 2000\text{ V}$                                                                              | $T_{vj} = 25\text{ °C}$  |        | 5    | 150  | $\mu\text{A}$      |
|                                |          |                                                                                                    | $T_{vj} = 150\text{ °C}$ |        | 36   |      |                    |
| Total capacitive charge        | $Q_C$    | $V_R = 1500\text{ V}$ , $T_{vj} = 25\text{ °C}$ & $150\text{ °C}$ ,<br>$Q_C = \int_0^{V_R} C(V)dV$ |                          |        | 89   |      | nC                 |
| Total capacitance              | $C$      | $f = 100\text{ kHz}$                                                                               | $V_R = 1\text{ V}$       |        | 1140 |      | pF                 |
|                                |          |                                                                                                    | $V_R = 600\text{ V}$     |        | 45   |      |                    |
|                                |          |                                                                                                    | $V_R = 1500\text{ V}$    |        | 31   |      |                    |
| 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  $T_{vj} = 25^{\circ}\text{C}$ , unless otherwise specified.

3 Characteristics diagrams

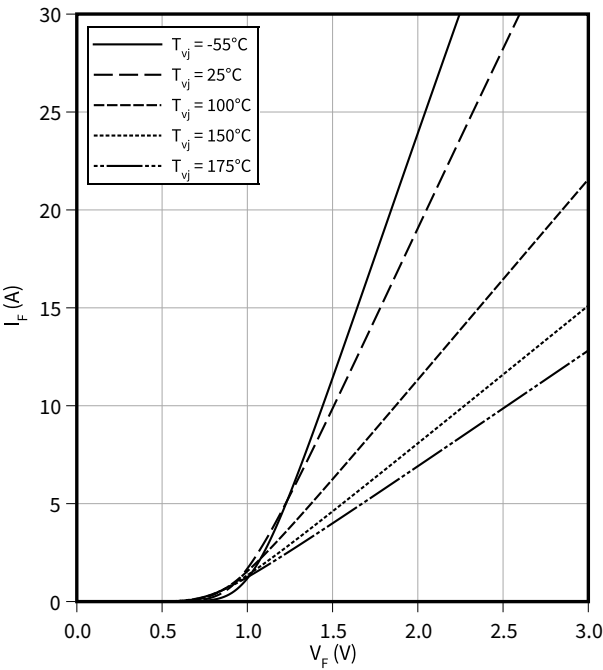
Power dissipation as function of case temperature

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



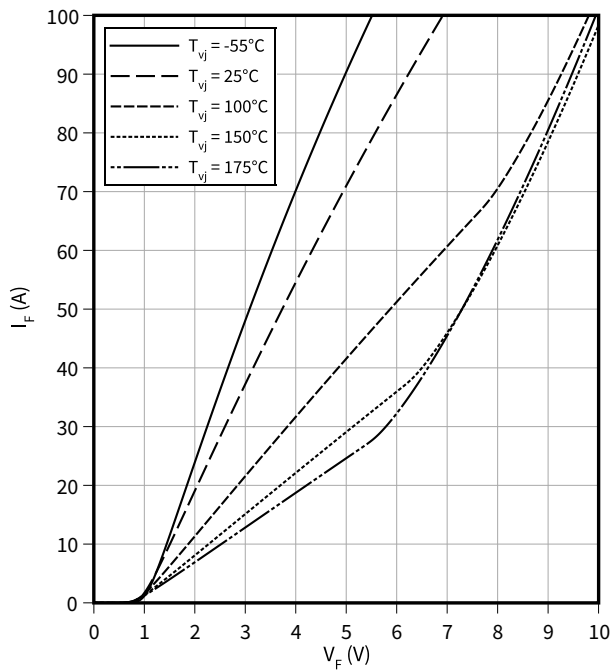
Typical forward characteristics

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



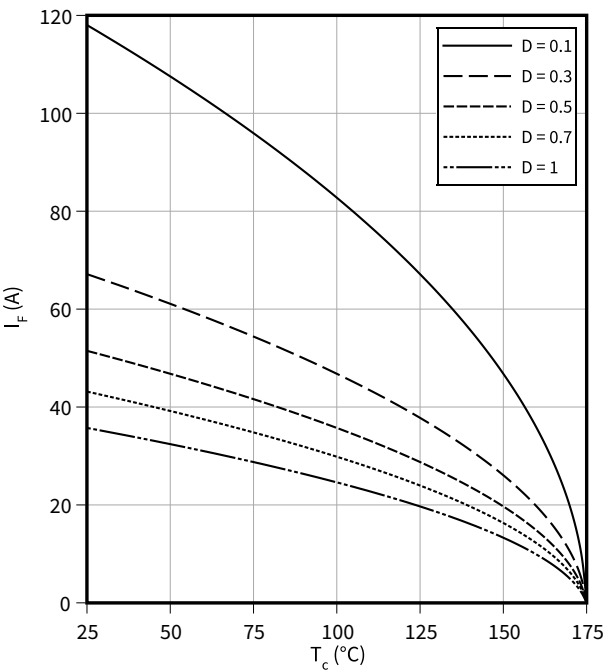
Typical forward characteristics in surge current

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



Diode forward current as function of temperature

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



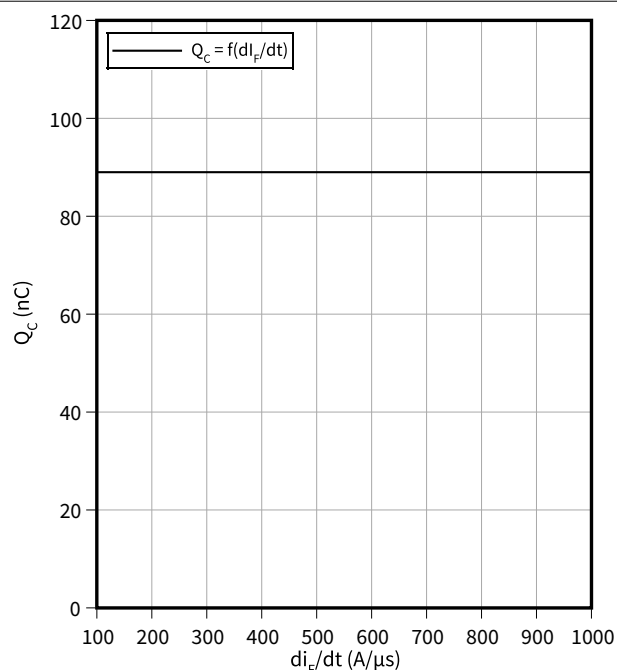
**3 Characteristics diagrams**

**Typical capacitive charge as function of current slope**

$$Q_C = f(di_F/dt)$$

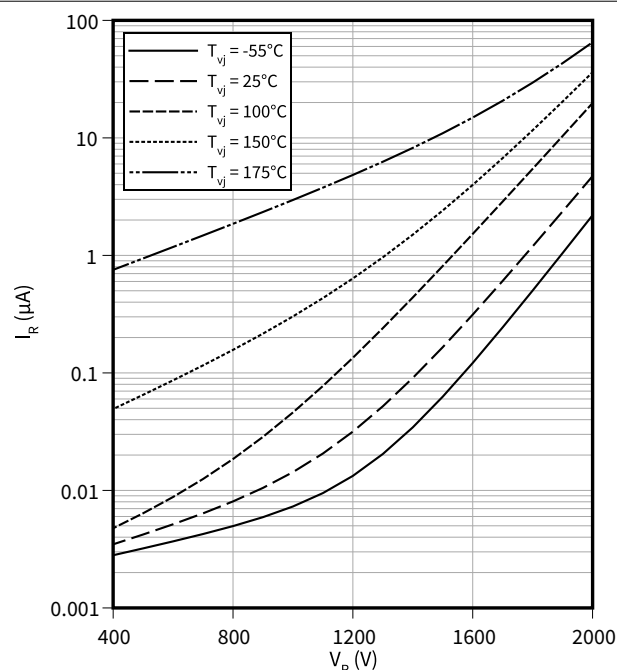
$T_{vj} = 25\text{ °C}$ ,  $V_R = 1500\text{ V}$

guaranteed by design



**Typical reverse characteristics**

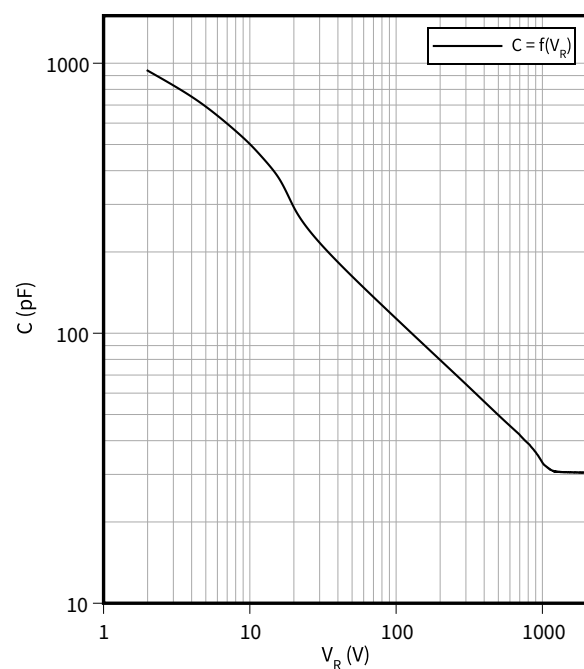
$$I_R = f(V_R)$$



**Typical capacitance as function of reverse voltage**

$$C = f(V_R)$$

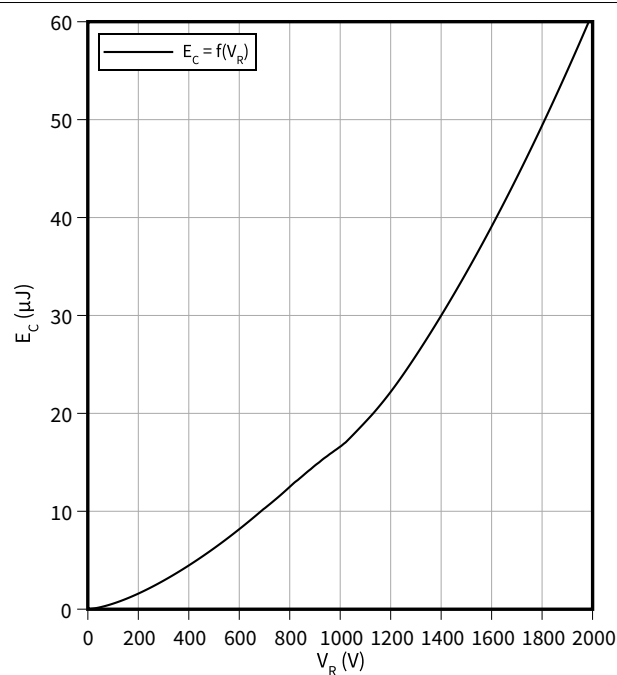
$T_{vj} = 25\text{ °C}$ ,  $f = 100\text{ kHz}$



**Typical capacitively stored energy as function of reverse voltage**

$$E_C = f(V_R)$$

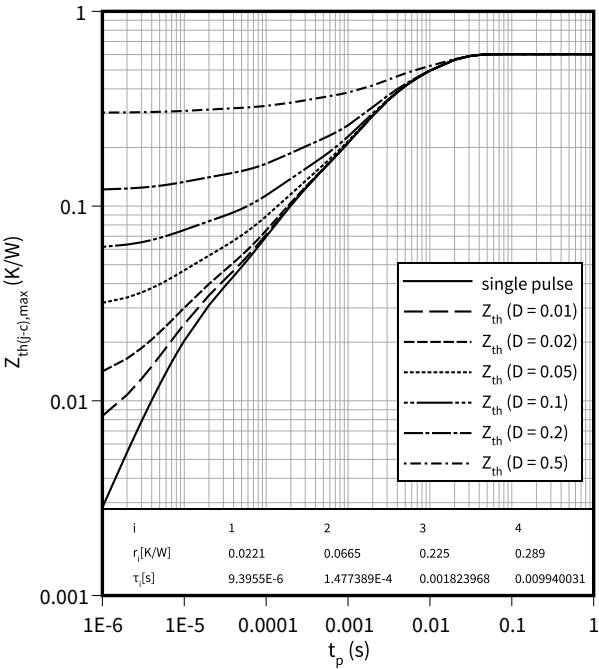
$f = 100\text{ kHz}$



3 Characteristics diagrams

Max. transient thermal impedance

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



4 Package outlines

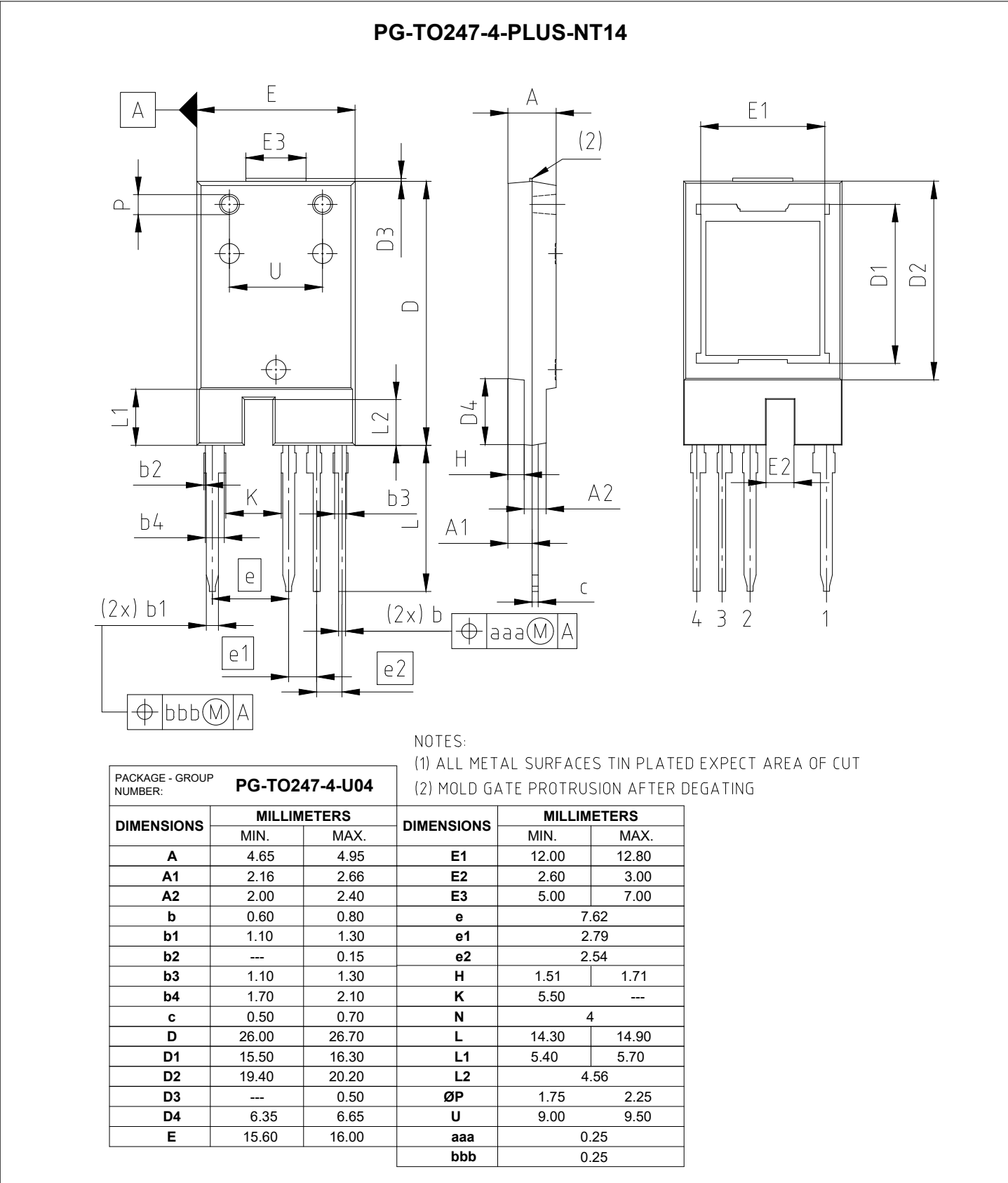


Figure 1

Revision history

Revision history

| Document revision | Date of release | Description of changes |
|-------------------|-----------------|------------------------|
| 0.10              | 2024-02-27      | Preliminary datasheet  |
| 1.00              | 2024-04-15      | Final datasheet        |

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**Email:** [erratum@infineon.com](mailto:erratum@infineon.com)

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