

Final datasheet

CoolSiC™ Schottky diode 2000 V G5

- Features
- $V_{RRM} = 2000\text{ V}$
 - $I_F = 80\text{ A}$
 - $V_F = 1.5\text{ V}$
 - 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



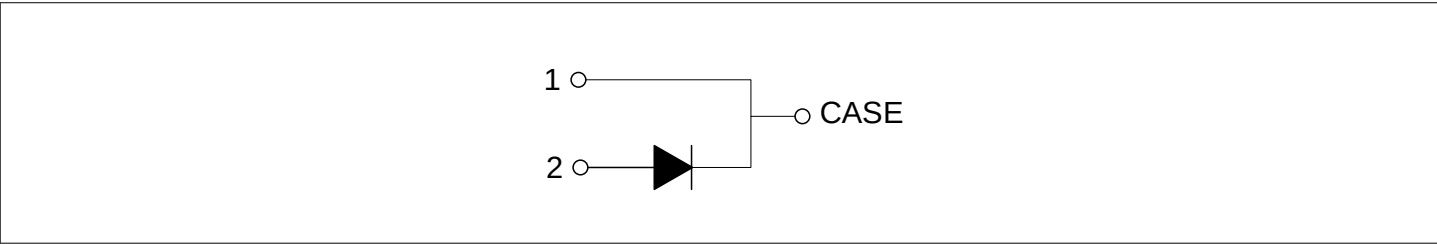
Description

Pin definition:

Pin 1 – Cathode

Pin 2 – Anode

Pin 3, 4 – not connected



Type	Package	Marking
IDYH80G200C5	PG-TO247-4-PLUS-NT14	D8020C5



Table of contents

	Description	1
	Features	1
	Potential applications	1
	Product validation	1
	Table of contents	2
1	Package	3
2	SiC Diode	3
3	Characteristics diagrams	5
4	Package outlines	8
	Revision history	9
	Disclaimer	10

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	$R_{th(j-c)}$			0.1	0.13	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	$D = 1$	$T_c = 25\text{ °C}$	157	A
			$T_c = 135\text{ °C}$	101	
			$T_c = 148\text{ °C}$	80	
Surge repetitive forward current, sine halfwave ¹⁾	$I_{F,RM}$	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	320	A
			$T_c = 100\text{ °C}$	240	
Surge non-repetitive forward current, sine halfwave	$I_{F,SM}$	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	463	A
			$T_c = 150\text{ °C}$	399	
Non-repetitive peak forward current	$I_{F,max}$	$T_c = 25\text{ °C}, t_p = 10\text{ }\mu\text{s}$		2800	A
I^2t value	$\int I^2t$	$t_p = 10\text{ ms}$	$T_c = 25\text{ °C}$	1072	A^2s
			$T_c = 150\text{ °C}$	796	
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}		$T_c = 25\text{ °C}$	656	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	$I_F = 80\text{ A}$	$T_{vj} = 25\text{ °C}$		1.5	1.75	V
			$T_{vj} = 150\text{ °C}$		2.3		
Reverse current	I_R	$V_R = 2000\text{ V}$	$T_{vj} = 25\text{ °C}$		40	1200	μA
			$T_{vj} = 150\text{ °C}$		290		
Total capacitive charge	Q_C	$V_R = 1500\text{ V}$, $T_{vj} = 25\text{ °C}$ & 150 °C , $Q_C = \int_0^{V_R} C(V)dV$			716		nC
Total capacitance	C	$f = 100\text{ kHz}$	$V_R = 1\text{ V}$		9100		pF
			$V_R = 600\text{ V}$		365		
			$V_R = 1500\text{ V}$		245		
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.

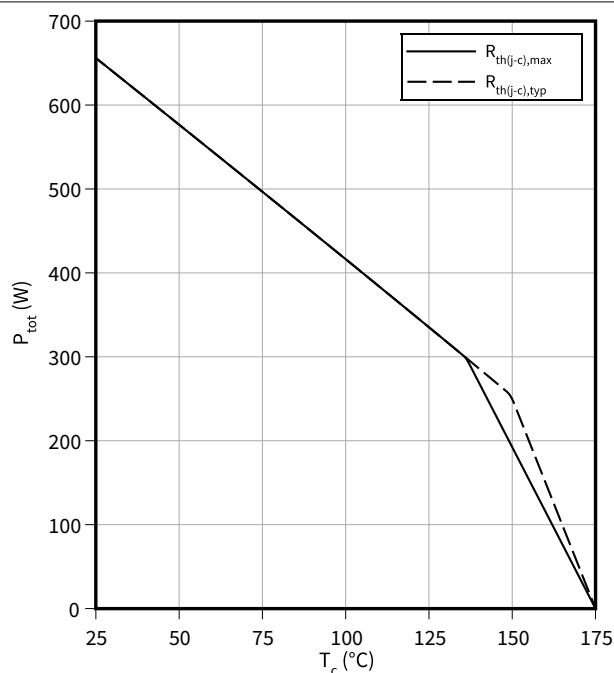
3 Characteristics diagrams

Power dissipation as function of case temperature

$$P_{\text{tot}} = f(T_c)$$

$$T_{vj} \leq 175^\circ\text{C}$$

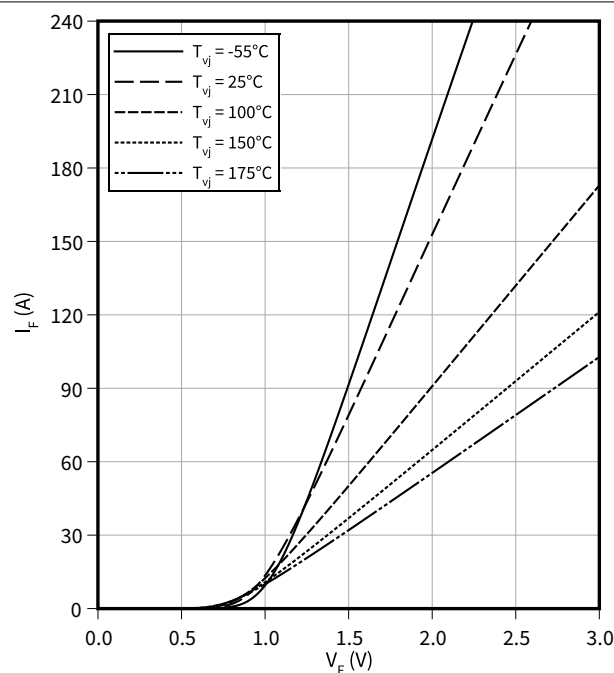
limited by bondwire



Typical forward characteristics

$$I_F = f(V_F)$$

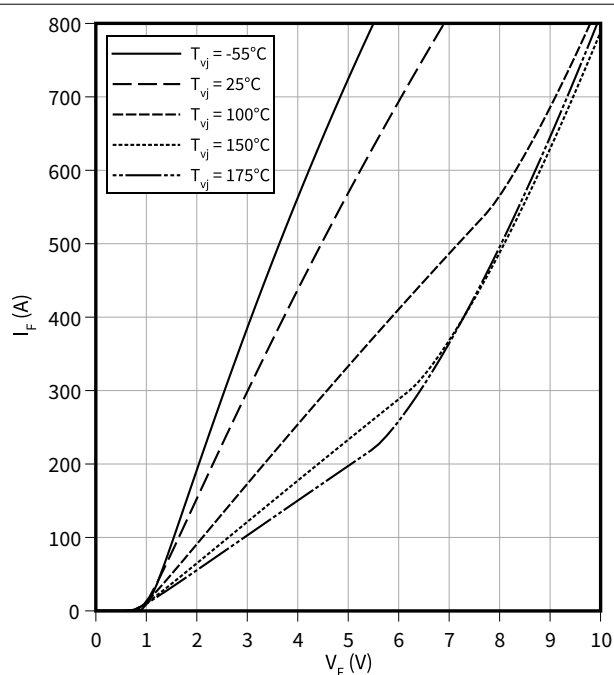
$$t_p = 50 \mu\text{s}$$



Typical forward characteristics in surge current

$$I_F = f(V_F)$$

$$t_p = 50 \mu\text{s}$$

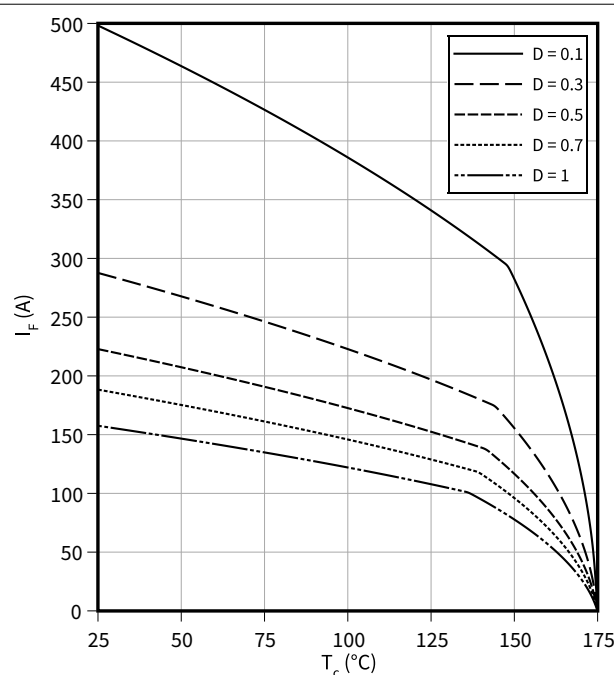


Diode forward current as function of temperature

$$I_F = f(T_c)$$

$$D = \text{duty cycle}, T_{vj} \leq 175^\circ\text{C}, V_{\text{th}}, R_{\text{diff}} @ T_{vj} = 175^\circ\text{C}$$

$R_{\text{th(j-c),max}}$, limited by bondwire



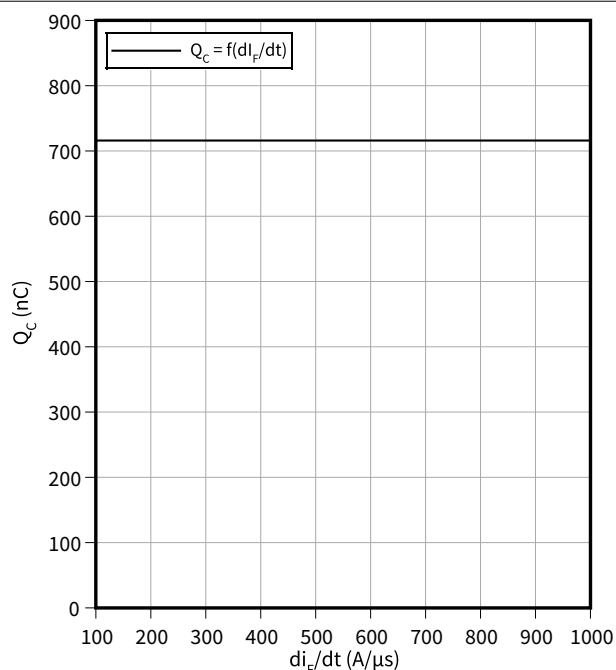
3 Characteristics diagrams

Typical capacitive charge as function of current slope

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

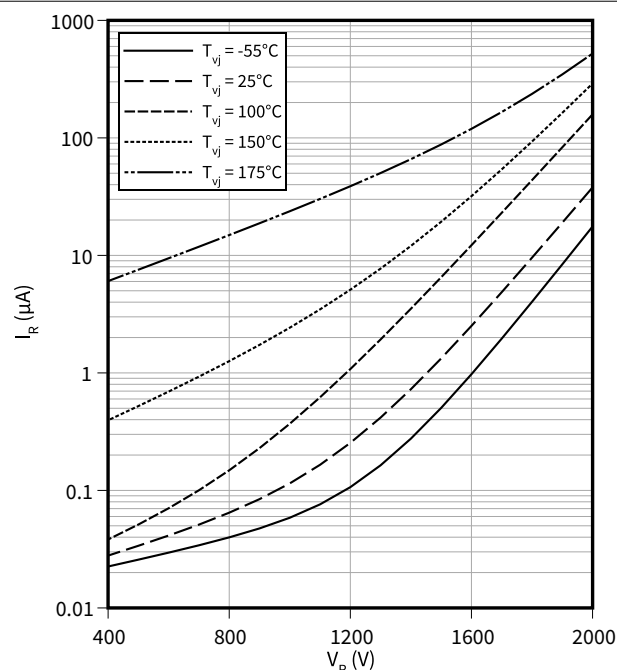
$T_{vj} = 25^\circ\text{C}$, $V_R = 1500\text{ V}$

guaranteed by design



Typical reverse characteristics

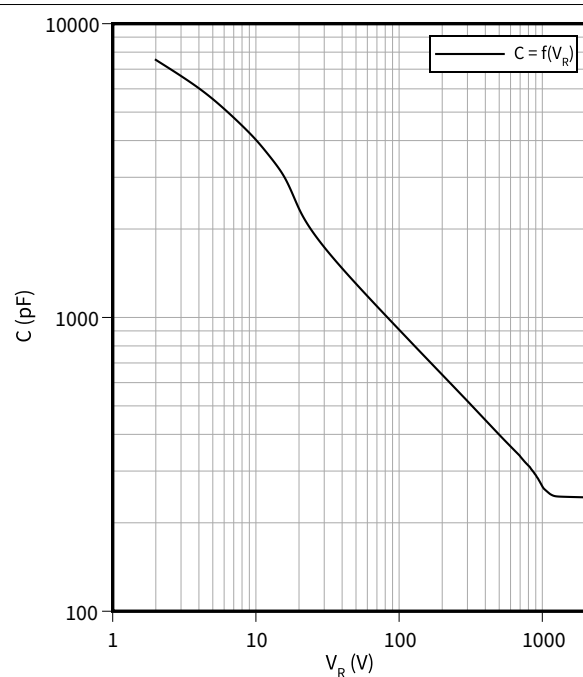
$$I_R = f(V_R)$$



Typical capacitance as function of reverse voltage

$$C = f(V_R)$$

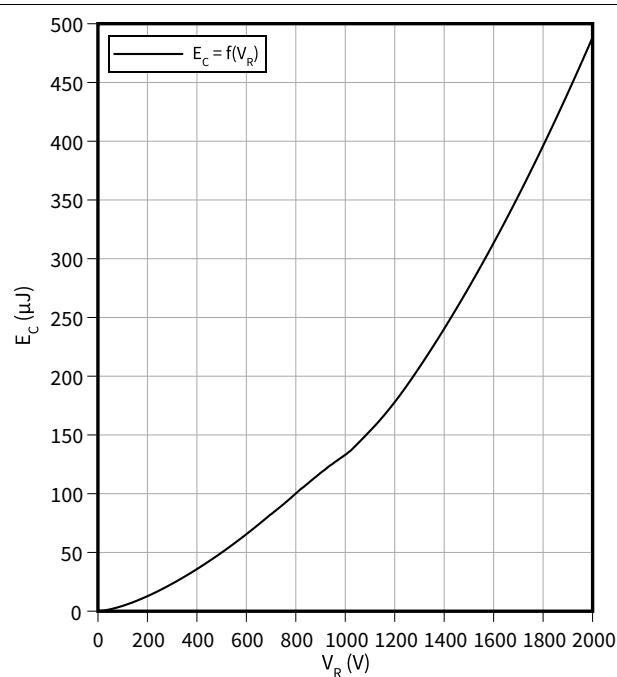
$T_{vj} = 25^\circ\text{C}$, $f = 100\text{ kHz}$



Typical capacitively stored energy as function of reverse voltage

$$E_C = f(V_R)$$

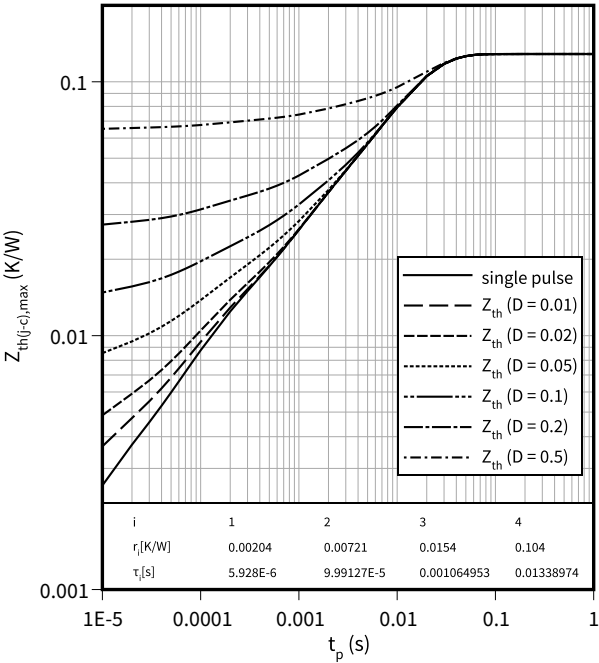
$f = 100\text{ kHz}$



3 Characteristics diagrams

Max. transient thermal impedance

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



4 Package outlines

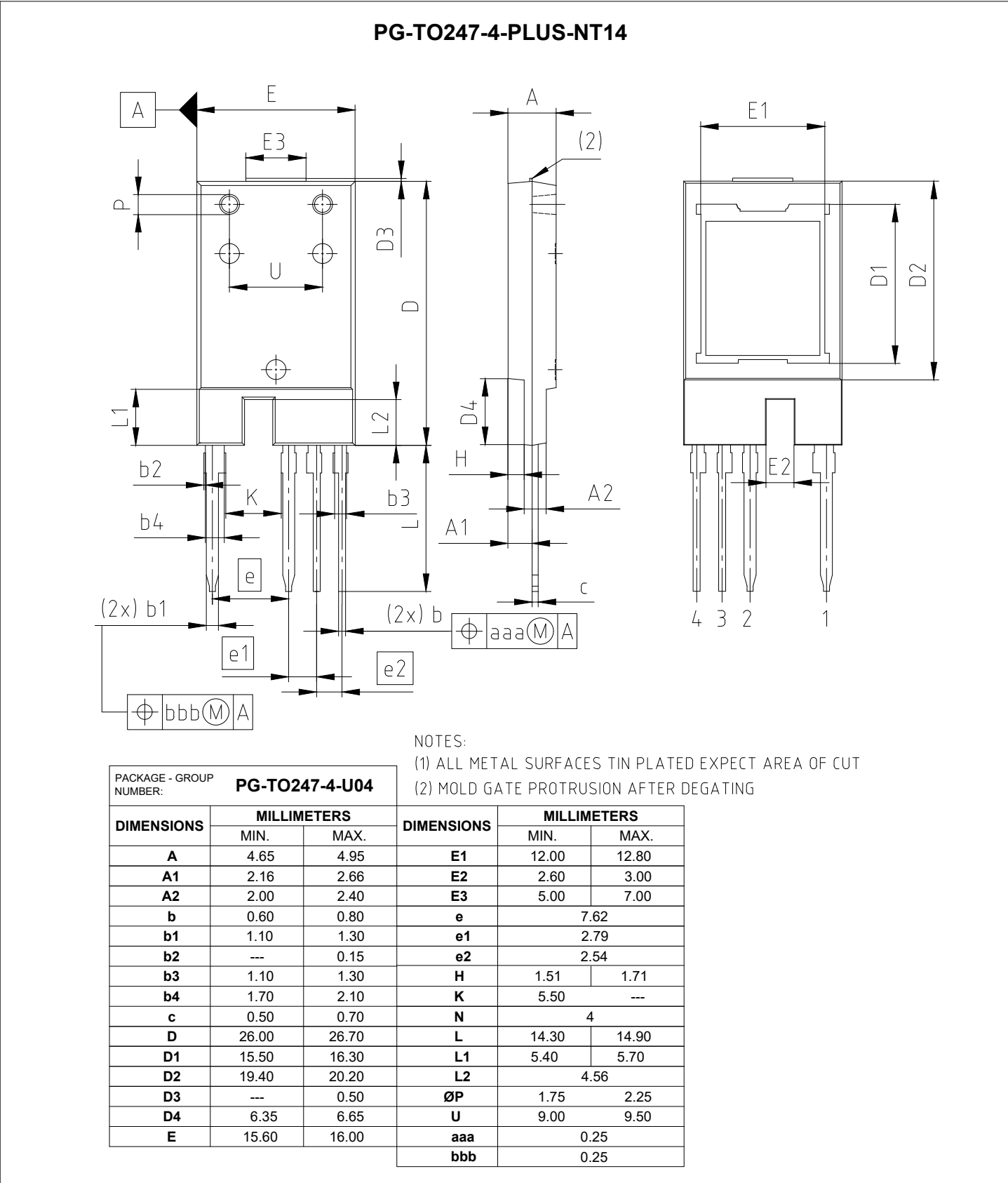


Figure 1



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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