

**Preliminary datasheet**

**Reverse-Conducting IGBT in TRENCHSTOP™ 5 technology with monolithic body diode**

**Features**

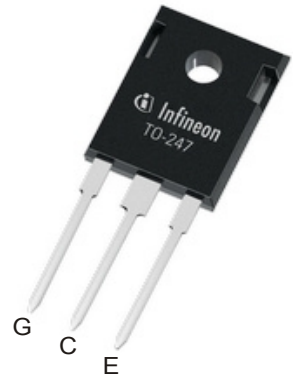
- $V_{CE}=650\text{ V}$
- $I_C=30\text{ A}$
- Powerful monolithic diode optimized for ZCS applications
- High ruggedness and stable temperature behavior
- Very low  $V_{CEsat}$  and low  $E_{off}$
- Easy parallel switching capability due to positive temperature coefficient in  $V_{CEsat}$
- Low temperature dependence of  $V_{CEsat}$  and  $E_{sw}$
- Qualified according to JESD-022 for target applications
- Product spectrum and PSpice Models: <http://www.infineon.com/igbt/>

**Potential applications**

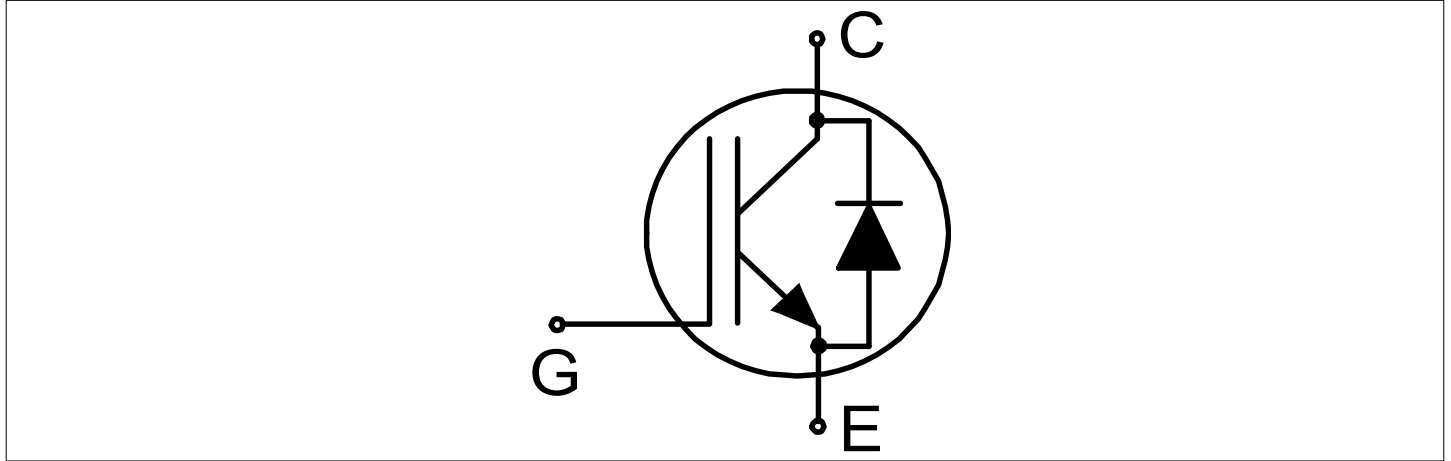
- Welding
- PFC
- ZCS

**Product validation**

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



**Description**



Type	Package	Marking
IKWH30N65WR6	PG-TO247-3-32	H30EWR6

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## 1 Package

## 1 Package

Table 1 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Internal emitter inductance measured 5mm. (0.197in) from case	$L_E$			13.0		nH
Storage temperature	$T_{stg}$		-55		150	°C
Soldering temperature		wave soldering 1.6mm (0.063in.) from case for 10s			260	°C
Mounting torque , M3 screw Maximum of mounting process: 3	$M$				0.6	Nm
Thermal resistance, junction-ambient	$R_{th(j-a)}$				40	K/W

## 2 IGBT

Table 2 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit	
Collector-emitter voltage	$V_{CE}$	$T_{vj} \geq 25\text{ °C}$	650	V	
DC collector current, limited by $T_{vjmax}$	$I_C$		$T_C = 25\text{ °C}$	67	A
			$T_C = 100\text{ °C}$	30	
Pulsed collector current, $t_p$ limited by $T_{vjmax}$	$I_{Cpuls}$		90	A	
Turn-off safe operating area		$V_{CE} \leq 650\text{ V}$ , $t_p \leq 1\text{ }\mu\text{s}$ , $T_{vj} \leq 175\text{ °C}$	90	A	
Gate-emitter voltage	$V_{GE}$		$\pm 20$	V	
Transient gate-emitter voltage	$V_{GE}$	$t_p \leq 10\text{ }\mu\text{s}$ , $D < 0.010$	$\pm 30$	V	
Power dissipation	$P_{tot}$		$T_C = 25\text{ °C}$	136	W
			$T_C = 100\text{ °C}$	68	

Table 3 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Collector-emitter breakdown voltage	$V_{BRCES}$	$I_C = 0.2\text{ mA}$ , $V_{GE} = 0\text{ V}$	650			V
Collector-emitter saturation voltage	$V_{CE\text{ sat}}$	$I_C = 30.0\text{ A}$ , $V_{GE} = 15\text{ V}$	$T_{vj} = 25\text{ °C}$	1.45	1.75	V
			$T_{vj} = 175\text{ °C}$	1.70		

Table 3 Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Gate-emitter threshold voltage	$V_{GEth}$	$I_C = 0.30 \text{ mA}, V_{CE} = V_{GE}$	3.20	4.00	4.80	V
Zero gate voltage collector current	$I_{CES}$	$V_{CE} = 650 \text{ V}, V_{GE} = 0 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$		40	$\mu\text{A}$
			$T_{vj} = 175 \text{ }^\circ\text{C}$		700	
Gate-emitter leakage current	$I_{GES}$	$V_{CE} = 0 \text{ V}, V_{GE} = 20 \text{ V}$			100	nA
Transconductance	$g_{fs}$	$I_C = 30.0 \text{ A}, V_{CE} = 20 \text{ V}$		60.0		S
Input capacitance	$C_{ies}$	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 100 \text{ kHz}$		2700		pF
Output capacitance	$C_{oes}$	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 100 \text{ kHz}$		27		pF
Reverse transfer capacitance	$C_{res}$	$V_{CE} = 25 \text{ V}, V_{GE} = 0 \text{ V}, f = 100 \text{ kHz}$		11		pF
Gate charge	$Q_G$	$I_C = 30.0 \text{ A}, V_{GE} = 15 \text{ V}, V_{CE} = 520 \text{ V}$		97		nC
IGBT thermal resistance, junction-case	$R_{thjc}$				0.73	K/W
Operating junction temperature	$T_{vj}$		-40		175	$^\circ\text{C}$

Note: Electrical Characteristic, at  $T_{vj}=25^\circ\text{C}$ , unless otherwise specified.

### 3 Diode

Table 4 Maximum rated values

Parameter	Symbol	Note or test condition	Values	Unit	
Repetitive peak reverse voltage	$V_{RRM}$	$T_{vj} \geq 25 \text{ }^\circ\text{C}$	650	V	
Diode forward current, limited by $T_{vjmax}$	$I_F$		$T_C = 25 \text{ }^\circ\text{C}$	20	A
			$T_C = 100 \text{ }^\circ\text{C}$	11	
Diode pulsed current, limited by $T_{vjmax}$	$I_{Fpuls}$		30	A	

Table 5 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit	
			Min.	Typ.	Max.		
Diode forward voltage	$V_F$	$I_F = 10.0 \text{ A}$	$T_{vj} = 25 \text{ }^\circ\text{C}$		1.30	1.60	V
			$T_{vj} = 175 \text{ }^\circ\text{C}$		1.55		
Reverse leakage current	$I_R$	$V_R = 650 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$			40	$\mu\text{A}$
			$T_{vj} = 175 \text{ }^\circ\text{C}$		700		

**Table 5** Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Diode thermal resistance, junction-case	$R_{thjc}$				1.40	K/W
Operating junction temperature	$T_{vj}$		-40		175	°C

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

4 Package outlines

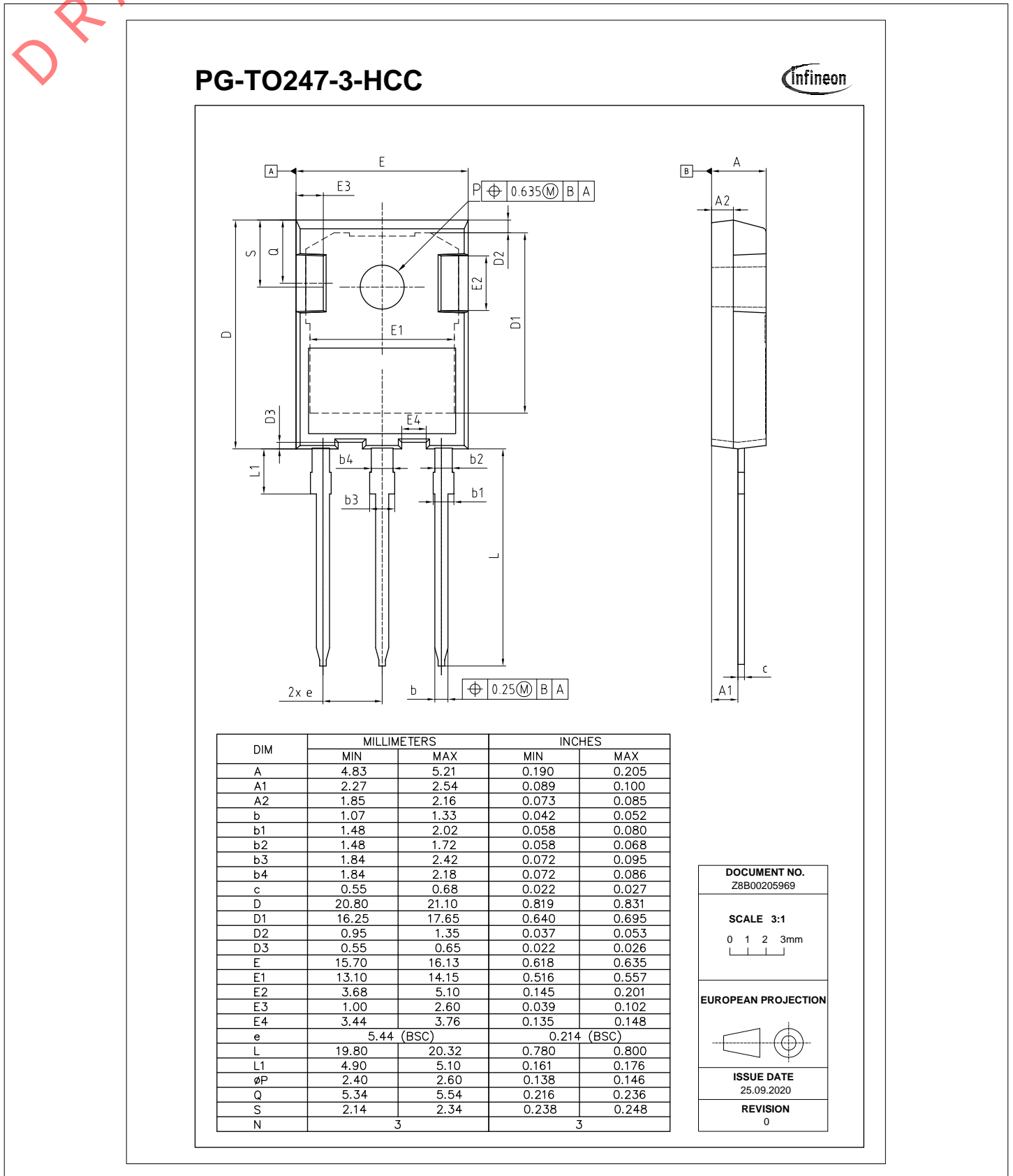


Figure 1

5 Testing conditions

DRAFT

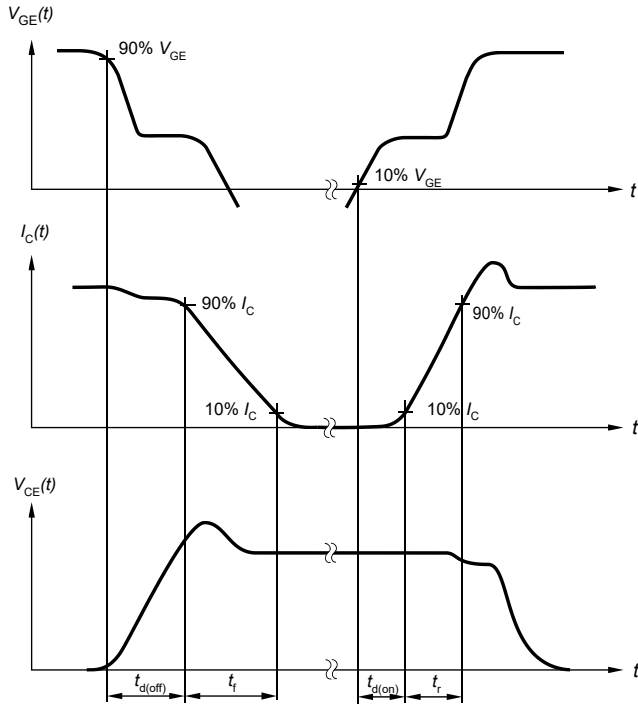


Figure A. Definition of switching times

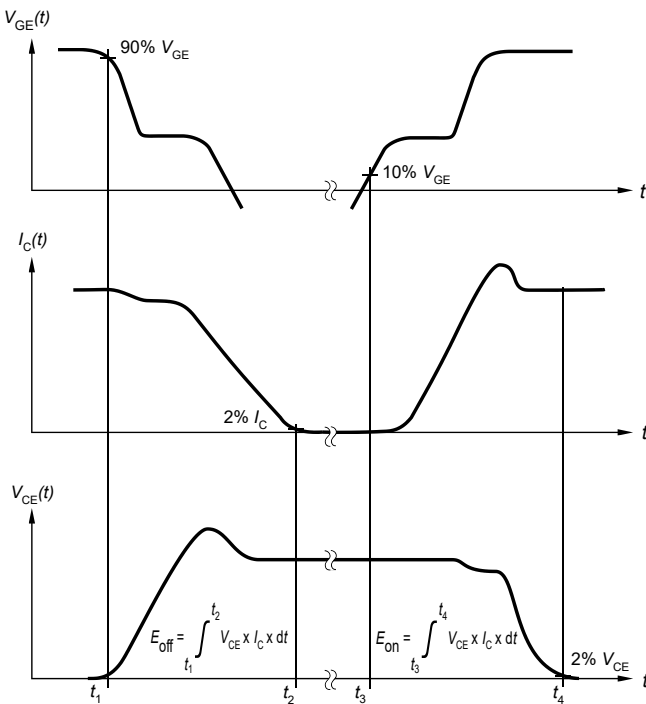


Figure B. Definition of switching losses

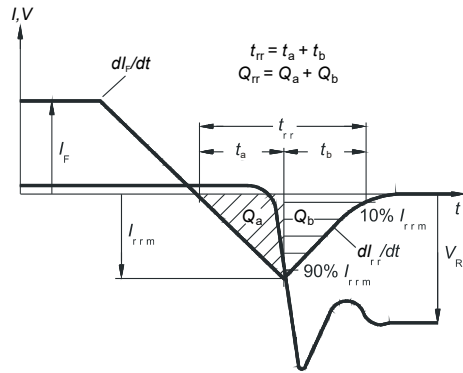


Figure C. Definition of diode switching characteristics

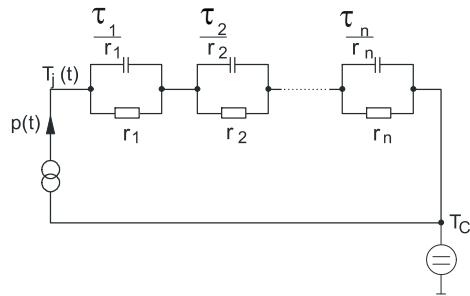


Figure D. Thermal equivalent circuit

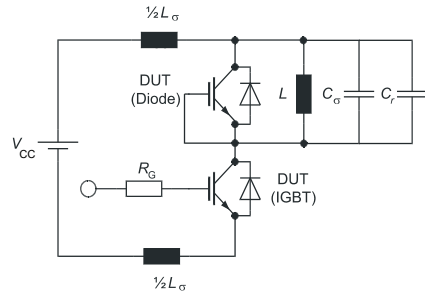


Figure E. Dynamic test circuit  
Parasitic inductance  $L_\sigma$ ,  
parasitic capacitor  $C_\sigma$ ,  
relief capacitor  $C_r$ ,  
(only for ZVT switching)

Figure 2

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Revision history

**Revision history**

Document revision	Date of release	Description of changes
0.10 DRAFT	2021-04-21	Initial version



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**Document reference**

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