

Preliminary datasheet

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

Features

- $V_{CE}=650\text{ V}$
- $I_C=20\text{ A}$
- 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

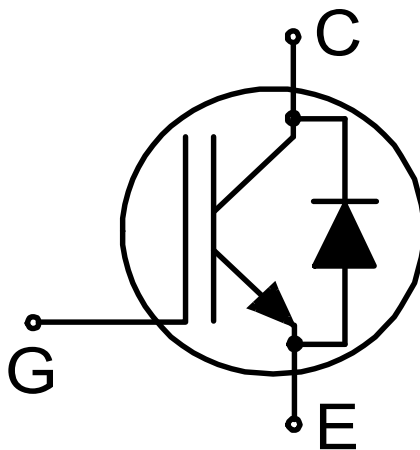
- Welding
- PFC
- ZCS

Product validation

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



Description



Type	Package	Marking
IKWH20N65WR6	PG-TO247-3-32	H20EWR6



Table of contents

Description 1

Features 1

Potential applications 1

Product validation 1

Table of contents 2

1 Package 3

2 IGBT 3

3 Diode 4

4 Package outlines 6

5 Testing conditions 7

Revision history 8

Disclaimer 9

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		$T_C = 25\text{ °C}$	55	A
			$T_C = 100\text{ °C}$	20	
Pulsed collector current, t_p limited by T_{vjmax}	I_{Cpuls}			60	A
Turn-off safe operating area		$V_{CE} \leq 650\text{ V}, t_p \leq 1\text{ }\mu\text{s}, T_{vj} \leq 175\text{ °C}$		60	A
Gate-emitter voltage	V_{GE}			± 20	V
Transient gate-emitter voltage	V_{GE}	$t_p \leq 10\text{ }\mu\text{s}, D < 0.010$		± 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	$V_{CE\text{ sat}}$	$I_C = 20.0\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25\text{ °C}$	1.35	1.70	V
			$T_{vj} = 175\text{ °C}$	1.60		

Table 3 Characteristic values (continued)

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Gate-emitter threshold voltage	V_{GEth}	$I_C = 0.20 \text{ mA}$, $V_{CE} = V_{GE}$	3.20	4.00	4.80	V
Zero gate voltage collector current	I_{CES}	$V_{CE} = 650 \text{ V}$, $V_{GE} = 0 \text{ V}$			40	μA
		$T_{vj} = 25 \text{ }^\circ\text{C}$				
		$T_{vj} = 175 \text{ }^\circ\text{C}$		700		
Gate-emitter leakage current	I_{GES}	$V_{CE} = 0 \text{ V}$, $V_{GE} = 20 \text{ V}$			100	nA
Transconductance	g_{fs}	$I_C = 20.0 \text{ A}$, $V_{CE} = 20 \text{ V}$		60.0		S
Input capacitance	C_{ies}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 100 \text{ kHz}$		2147		pF
Output capacitance	C_{oes}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 100 \text{ kHz}$		22		pF
Reverse transfer capacitance	C_{res}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 100 \text{ kHz}$		9		pF
Gate charge	Q_G	$I_C = 20.0 \text{ A}$, $V_{GE} = 15 \text{ V}$, $V_{CE} = 520 \text{ V}$		97		nC
IGBT thermal resistance, junction-case	R_{thjc}				1.10	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	$T_C = 25 \text{ }^\circ\text{C}$	17	A
		$T_C = 100 \text{ }^\circ\text{C}$	10	
Diode pulsed current, limited by T_{vjmax}	I_{Fpuls}		60	A

Table 5 Characteristic values

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Diode forward voltage	V_F	$I_F = 8.5 \text{ A}$				V
		$T_{vj} = 25 \text{ }^\circ\text{C}$		1.30	1.60	
		$T_{vj} = 175 \text{ }^\circ\text{C}$		1.55		
Reverse leakage current	I_R	$V_R = 650 \text{ V}$			40	μA
		$T_{vj} = 25 \text{ }^\circ\text{C}$				
		$T_{vj} = 175 \text{ }^\circ\text{C}$		700		

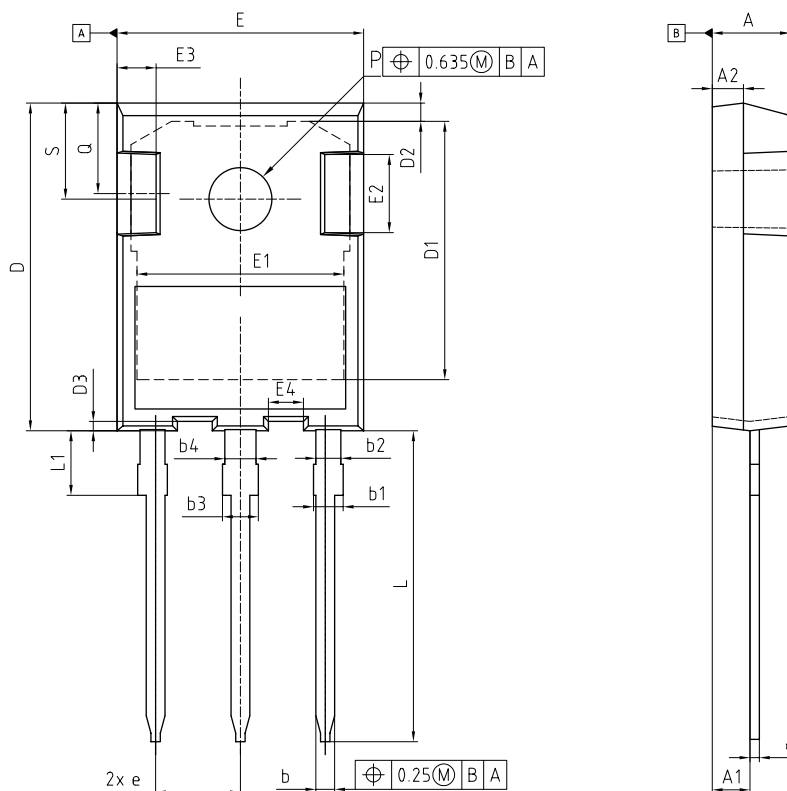
Table 5 Characteristic values (continued)

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

PG-TO247-3-HCC



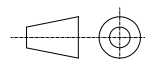
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.27	2.54	0.089	0.100
A2	1.85	2.16	0.073	0.085
b	1.07	1.33	0.042	0.052
b1	1.48	2.02	0.058	0.080
b2	1.48	1.72	0.058	0.068
b3	1.84	2.42	0.072	0.095
b4	1.84	2.18	0.072	0.086
c	0.55	0.68	0.022	0.027
D	20.80	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
D3	0.55	0.65	0.022	0.026
E	15.70	16.13	0.618	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	2.60	0.039	0.102
E4	3.44	3.76	0.135	0.148
e	5.44 (BSC)		0.214 (BSC)	
L	19.80	20.32	0.780	0.800
L1	4.90	5.10	0.161	0.176
øP	2.40	2.60	0.138	0.146
Q	5.34	5.54	0.216	0.236
S	2.14	2.34	0.238	0.248
N	3		3	

DOCUMENT NO.
Z8B00205969

SCALE 3:1

0 1 2 3mm

EUROPEAN PROJECTION



ISSUE DATE
25.09.2020

REVISION
0

Figure 1

5 Testing conditions

5 Testing conditions

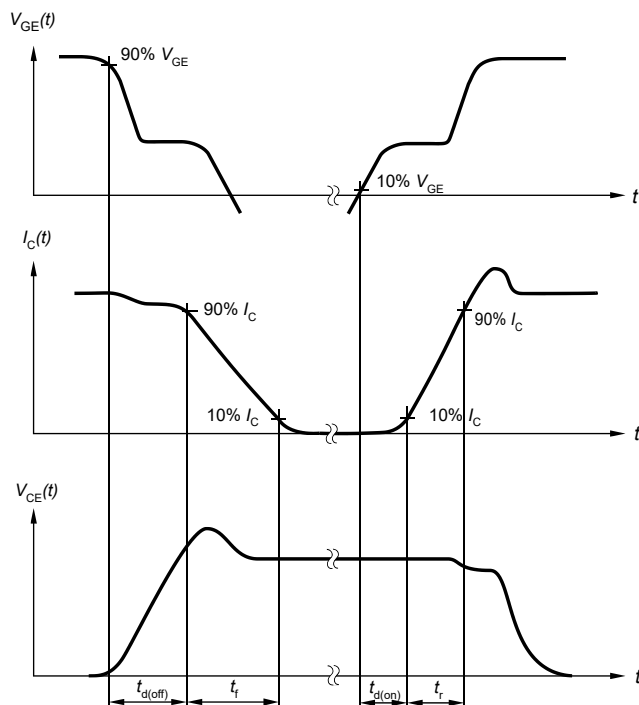


Figure A. Definition of switching times

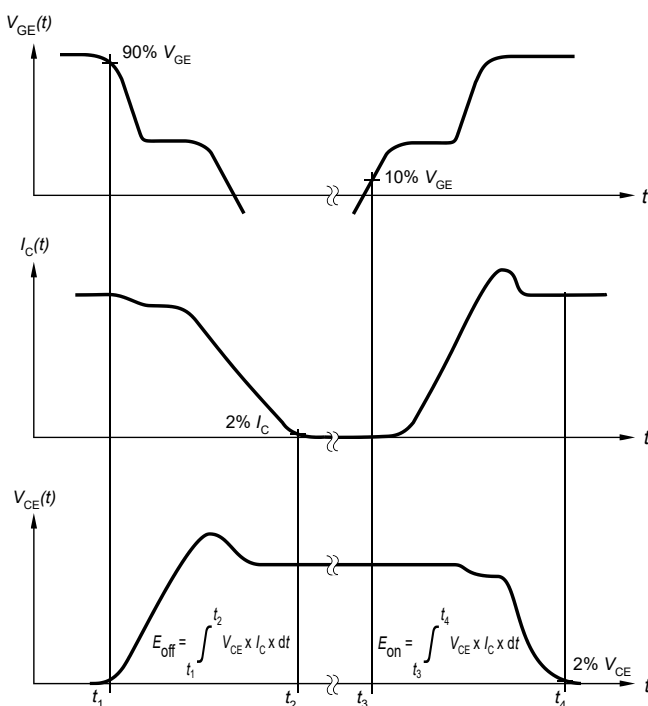


Figure B. Definition of switching losses

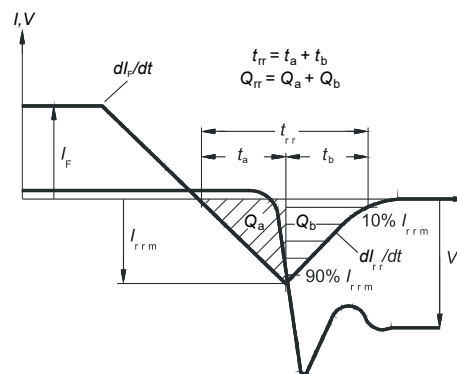


Figure C. Definition of diode switching characteristics

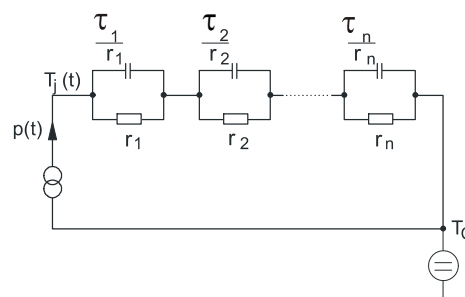


Figure D. Thermal equivalent circuit

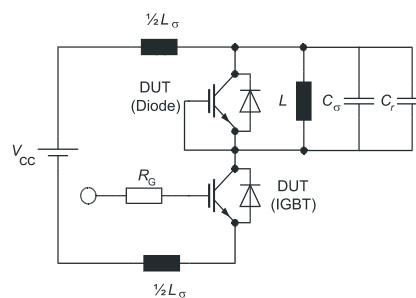


Figure E. **Dynamic test circuit**
 Parasitic inductance L_{σ} ,
 parasitic capacitor C_{σ} ,
 relief capacitor C_r ,
 (only for ZVT switching)

Figure 2

Revision history

Revision history

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

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2021-04-21

Published by

Infineon Technologies AG
81726 Munich, Germany

© 2021 Infineon Technologies AG
All Rights Reserved.

Do you have a question about any aspect of this document?

Email: erratum@infineon.com

Document reference
IFX-

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

Please note that this product is not qualified according to the AEC Q100 or AEC Q101 documents of the Automotive Electronics Council.

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Infineon:](#)

[IKWH20N65WR6XKSA1](#)