

IGBT

TRENCHSTOP™ IGBT3 Chip

**SIGC15T65E**

Data Sheet

Industrial Power Control

## Table of Contents

<b>Features and Applications .....</b>	<b>3</b>
<b>Mechanical Parameters .....</b>	<b>3</b>
<b>Maximum Ratings .....</b>	<b>4</b>
<b>Static and Electrical Characteristics .....</b>	<b>4</b>
<b>Further Electrical Characteristics .....</b>	<b>5</b>
<b>Chip Drawing .....</b>	<b>6</b>
<b>Revision History .....</b>	<b>7</b>
<b>Relevant Application Notes .....</b>	<b>7</b>
<b>Legal Disclaimer .....</b>	<b>8</b>



# SIGC15T65E

## TRENCHSTOP™ IGBT3 Chip

### Features:

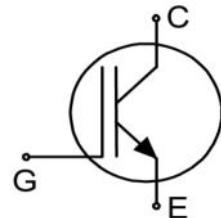
- 650V trench & field stop technology
- Low  $V_{CEsat}$
- Low turn-off losses
- Short tail current
- Positive temperature coefficient
- Easy paralleling

### Recommended for:

- Power modules

### Applications:

- Drives



Chip Type	$V_{CE}$	$I_{Cn}$	Die Size	Package
SIGC15T65E	650V	30A	3.92mm x 3.88mm	Sawn on foil

### Mechanical Parameters

Die size	3.92 x 3.88	
Emitter pad size	See chip drawing	
Gate pad size	0.608 x 1.083	
Area total	15.21	
Silicon thickness	70	μm
Wafer size	200	mm
Maximum possible chips per wafer	1806	
Passivation frontside	Photoimide	
Pad metal	3200nm AlSiCu	
Backside metal	Ni Ag – system To achieve a reliable solder connection it is strongly recommended not to consume the Ni layer completely during production process	
Die bond	Electrically conductive epoxy glue and soft solder	
Wire bond	Al, $\leq 500\mu\text{m}$	
Reject ink dot size	$\varnothing 0.65\text{mm}$ ; max. $1.2\text{mm}$	
Storage environment (<6 months)	for original and sealed MBB bags	Ambient atmosphere air, temperature $17^\circ\text{C} – 25^\circ\text{C}$
	for open MBB bags	Acc. IEC 62258-3; Section 9.4 Storage Environment.

**Maximum Ratings**

In general, from reliability and lifetime point of view, the lower the operation junction temperature and/or the applied voltage, the greater the expected lifetime of any semiconductor device.

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_{vj}=25^{\circ}\text{C}$	$V_{CE}$	650	V
DC collector current, limited by $T_{vj\ max}^1$	$I_C$	-	A
Pulsed collector current, $t_p$ limited by $T_{vj\ max}^2$	$I_{C,puls}$	90	A
Gate-emitter voltage	$V_{GE}$	$\pm 20$	V
Virtual junction temperature	$T_{vj}$	-40 ... +175	$^{\circ}\text{C}$
Short circuit data <sup>1/2/3</sup> $V_{GE}=15\text{V}$ , $V_{CC}=360\text{V}$ , $T_{vj}=150^{\circ}\text{C}$	$t_{sc}$	6	$\mu\text{s}$

**Static Characteristics (tested on wafer),  $T_{vj}=25^{\circ}\text{C}$** 

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0\text{V}$ , $I_C=2\text{mA}$	650	-	-	V
Collector-emitter saturation voltage	$V_{CEsat}$	$V_{GE}=15\text{V}$ , $I_C=30\text{A}$	1.03	1.45	1.87	
Gate-emitter threshold voltage	$V_{GE(th)}$	$I_C=430\mu\text{A}$ , $V_{GE}=V_{CE}$	5.1	5.8	6.4	
Zero gate voltage collector current	$I_{CES}$	$V_{CE}=650\text{V}$ , $V_{GE}=0\text{V}$	-	-	1.6	$\mu\text{A}$
Gate-emitter leakage current	$I_{GES}$	$V_{CE}=0\text{V}$ , $V_{GE}=20\text{V}$	-	-	300	nA
Integrated gate resistor	$r_G$		none			$\Omega$

**Electrical Characteristics <sup>2</sup>**

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter saturation voltage	$V_{CEsat}$	$V_{GE}=15\text{V}$ , $I_C=30\text{A}$ , $T_{vj}=175^{\circ}\text{C}$	-	1.9	-	V
Input capacitance	$C_{ies}$	$V_{CE}=25\text{V}$ , $V_{GE}=0\text{V}$ , $f=1\text{MHz}$ $T_{vj}=25^{\circ}\text{C}$	-	1630	-	pF
Reverse transfer capacitance	$C_{res}$		-	50	-	

<sup>1</sup> Depending on thermal properties of assembly.

<sup>2</sup> Not subject to production test - verified by design/characterization.

<sup>3</sup> Allowed number of short circuits: <1000; time between short circuits: >1s.

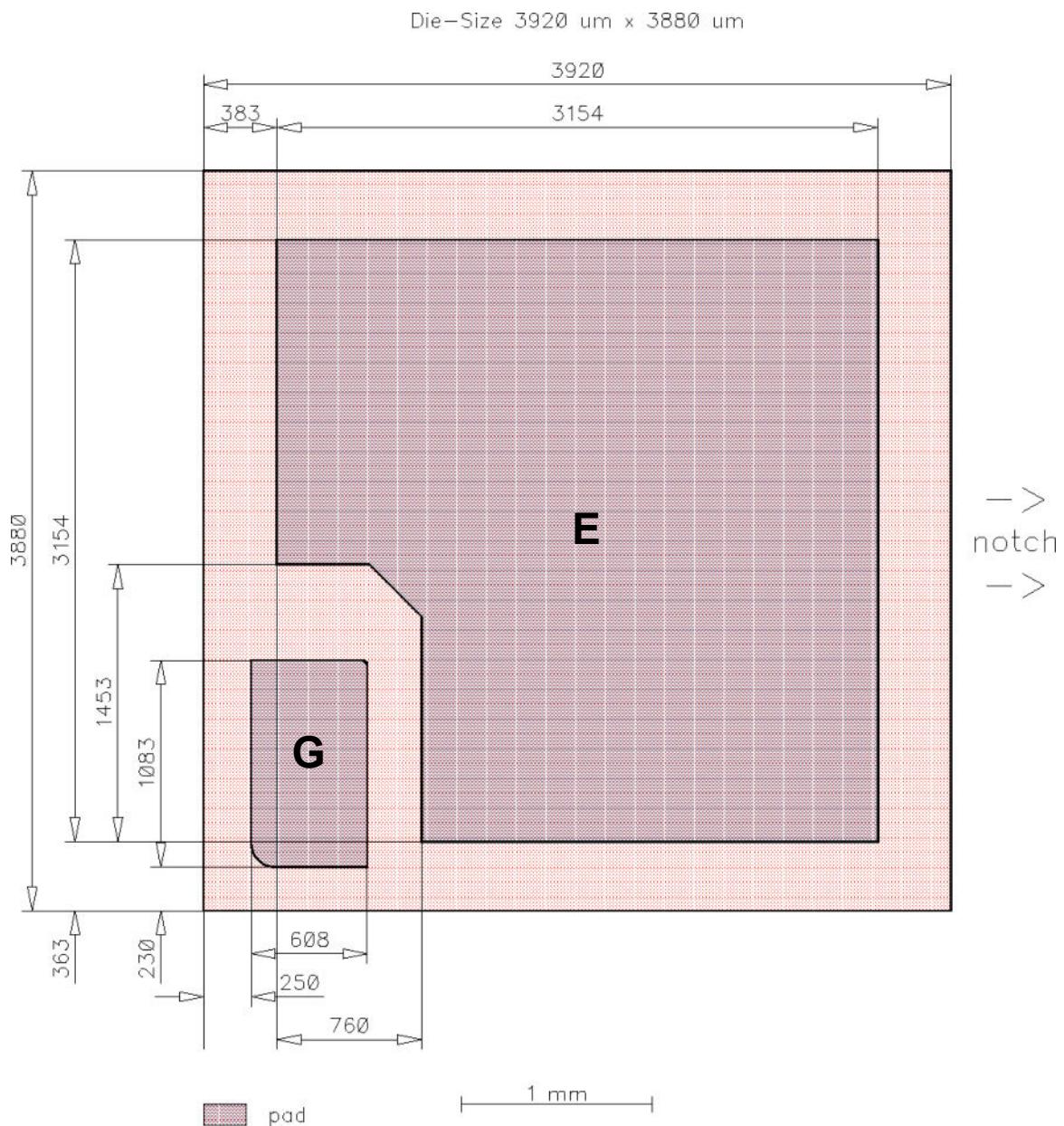


# SIGC15T65E

## Further Electrical Characteristics

Switching characteristics and thermal properties are depending strongly on module design and mounting technology and can therefore not be specified for a bare die.

Application example	IKW30N60T	Rev. 2.6
---------------------	-----------	----------

**Chip Drawing**

**E** = Emitter

**G** = Gate



# SIGC15T65E

## Bare Die Product Specifics

Test coverage at wafer level cannot cover all application conditions. Therefore it is recommended to test all characteristics which are relevant for the application at package level, including RBSOA and SCSOA.

## Description

AQL 0.65 for visual inspection according to failure catalogue

Electrostatic Discharge Sensitive Device according to MIL-STD 883

## Revision History

Revision	Subjects (major changes since last revision)	Date
2.0	Final data sheet	02.02.2015
2.1	Additional Basic Type, editorial changes	04.11.2016
2.2	Editorial changes	25.01.2017

## Relevant Application Notes

--	--



SIGC15T65E

---

**Published by**  
**Infineon Technologies AG**  
**81726 München, Germany**  
**© Infineon Technologies AG 2017.**  
**All Rights Reserved.**

### **IMPORTANT NOTICE**

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

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office ([www.infineon.com](http://www.infineon.com)).

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.

[www.infineon.com](http://www.infineon.com)