

IGBT

TRENCHSTOP™ IGBT3 Chip
SIGC84T120R3LE

Data Sheet

Industrial Power Control



SIGC84T120R3LE

Table of Contents

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

TRENCHSTOP™ IGBT3 Chip

Features:

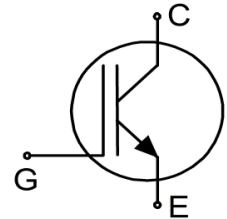
- 1200V trench & field stop technology
- Low turn-off losses
- Short tail current
- Positive temperature coefficient
- Easy paralleling

Recommended for:

- Power modules

Applications:

- Drives



| Chip Type | V_{CE} | I_{cn}^1 | Die Size | Package |
|----------------|----------|------------|-----------------|--------------|
| SIGC84T120R3LE | 1200V | 75A | 9.13mm x 9.15mm | Sawn on foil |

Mechanical Parameters

| | | | |
|----------------------------------|---|--|-----------------|
| Die size | 9.13 x 9.15 | | mm ² |
| Emitter pad size | See chip drawing | | |
| Gate pad size | 1.319 x 0.820 | | |
| Area total | 83.54 | | |
| Thickness | 120 | | µm |
| Wafer size | 200 | | mm |
| Maximum possible chips per wafer | 306 | | |
| 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, ≤500µm | | |
| Reject ink dot size | Ø 0.65mm; max. 1.2mm | | |
| Storage environment | for original and sealed MBB bags | Ambient atmosphere air, temperature 17°C – 25°C, <6 months | |
| | for open MBB bags | Acc. to IEC62258-3: atmosphere >99% Nitrogen or inert gas, humidity <25%RH, temperature 17°C – 25°C, <6 months | |

¹ Nominal collector current at $T_C=100^\circ\text{C}$ for chip packaged in power modules, see application example cited on page 5.

Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|--|--------------|--------------------|
| Collector-emitter voltage, $T_{vj}=25^{\circ}\text{C}$ | V_{CE} | 1200 | V |
| DC collector current, limited by $T_{vj\max}^2$ | I_C | - | A |
| Pulsed collector current, t_p limited by $T_{vj\max}^3$ | $I_{C,puls}$ | 225 | A |
| Gate-emitter voltage | V_{GE} | ± 20 | V |
| Junction temperature range | T_{vj} | -55 ... +175 | $^{\circ}\text{C}$ |
| Operating junction temperature | T_{vj} | -55 ... +150 | $^{\circ}\text{C}$ |
| Short circuit data ^{3/4} $V_{GE}=15\text{V}$, $V_{CC}=900\text{V}$, $T_{vj}=125^{\circ}\text{C}$ | t_{sc} | 10 | μs |
| Reverse bias safe operating area ³ (RBSOA) | $I_{C,\max}=150\text{A}$, $V_{CE,\max}=1200\text{V}$, $T_{vj}\leq 125^{\circ}\text{C}$ | | |

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

| Parameter | Symbol | Conditions | Value | | | Unit |
|--------------------------------------|---------------|--|-------|------|------|---------------|
| | | | min. | typ. | max. | |
| Collector-emitter breakdown voltage | $V_{(BR)CES}$ | $V_{GE}=0\text{V}$, $I_C=3\text{mA}$ | 1200 | - | - | V |
| Collector-emitter saturation voltage | V_{CEsat} | $V_{GE}=15\text{V}$, $I_C=75\text{A}$ | 1.4 | 1.7 | 2.1 | |
| Gate-emitter threshold voltage | $V_{GE(th)}$ | $I_C=3\text{mA}$, $V_{GE}=V_{CE}$ | 5.0 | 5.8 | 6.5 | |
| Zero gate voltage collector current | I_{CES} | $V_{CE}=1200\text{V}$, $V_{GE}=0\text{V}$ | - | - | 10.1 | μA |
| Gate-emitter leakage current | I_{GES} | $V_{CE}=0\text{V}$, $V_{GE}=20\text{V}$ | - | - | 600 | nA |
| Integrated gate resistor | r_G | | 10 | | | Ω |

Electrical Characteristics ³

| Parameter | Symbol | Conditions | Value | | | Unit |
|--------------------------------------|-------------|--|-------|------|------|------|
| | | | min. | typ. | max. | |
| Collector-emitter saturation voltage | V_{CEsat} | $V_{GE}=15\text{V}$, $I_C=75\text{A}$, $T_{vj}=125^{\circ}\text{C}$ | - | 1.9 | - | V |
| Input capacitance | C_{ies} | $V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$, $T_{vj}=25^{\circ}\text{C}$ | - | 5345 | - | pF |
| Reverse transfer capacitance | C_{res} | | - | 242 | - | |

² Depending on thermal properties of assembly.

³ Not subject to production test - verified by design/characterization.

⁴ Allowed number of short circuits: <1000; time between short circuits: >1s.



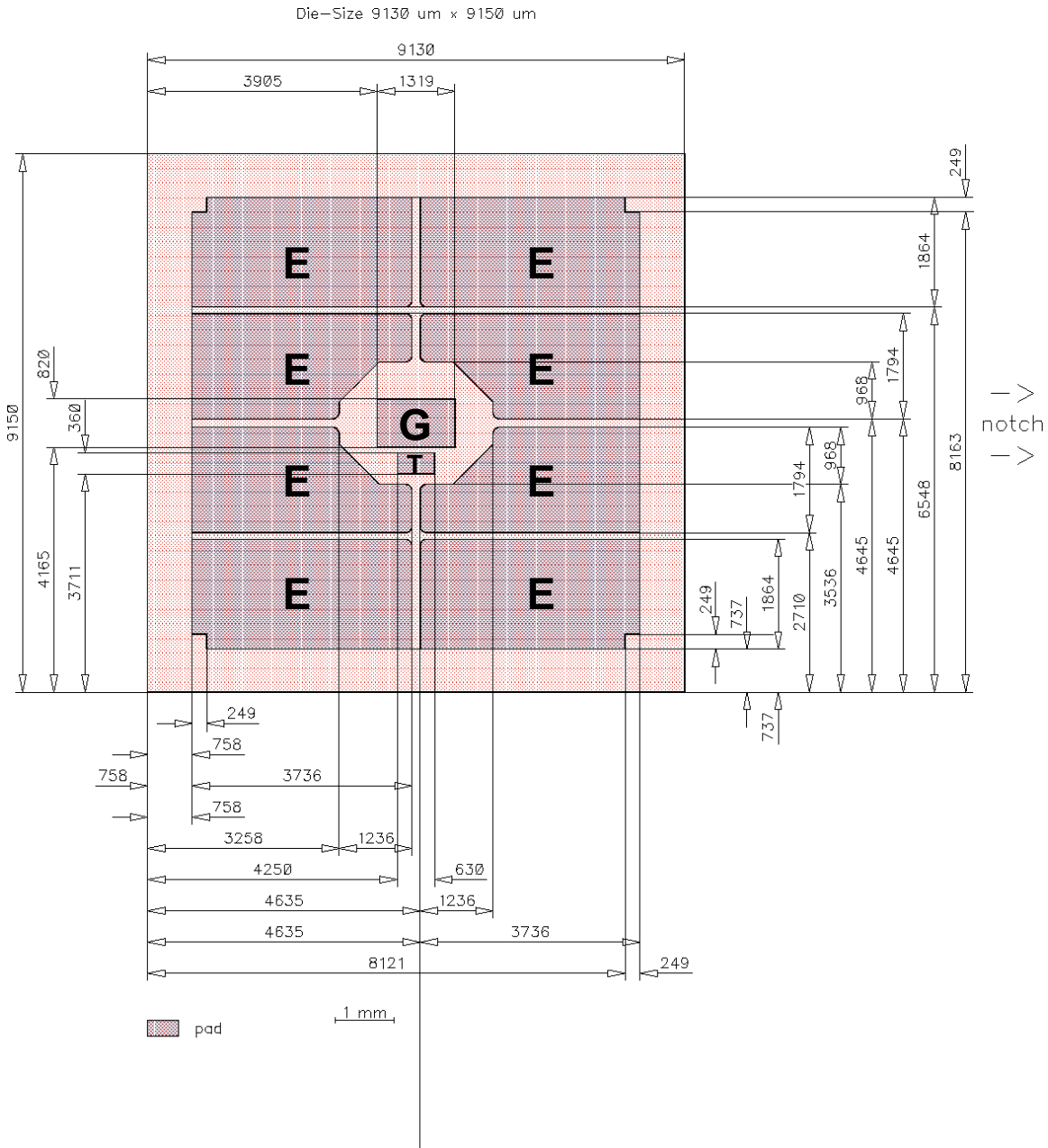
SIGC84T120R3LE

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 | FP75R12KT3 | Rev. 3.0 |
|---------------------|------------|----------|

Chip Drawing



E = Emitter
 G = Gate
 T = Test pad do not contact



SIGC84T120R3LE

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 |
|----------|--|------------|
| 2.2 | Change wafer size to 200mm | 30.04.2010 |
| 2.3 | Additional basic types L7677N, L7677U, L7677F; new gate pad design | 02.07.2014 |
| 2.4 | Minor changes, chip drawing | 06.02.2015 |
| 2.5 | Update disclaimer | 19.08.2015 |

Relevant Application Notes

| | |
|--|--|
| | |
|--|--|



SIGC84T120R3LE

Published by
Infineon Technologies AG
81726 München, Germany
© Infineon Technologies AG 2015.
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).

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

Published by Infineon Technologies AG