

IGBT

TRENCHSTOP™ IGBT3 Chip
SIGC158T170R3E

Data Sheet

Industrial Power Control

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



SIGC158T170R3E

TRENCHSTOP™ IGBT3 Chip

Features:

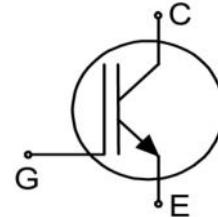
- 1700V trench & field stop technology
- Low turn-off losses
- Short tail current
- Positive temperature coefficient
- Easy paralleling

Recommended for:

- Power modules

Applications:

- Drives



Chip Type	V_{CE}	I_{Cn} ¹	Die Size	Package
SIGC158T170R3E	1700V	125A	12.57mm x 12.57mm	Sawn on foil

Mechanical Parameters

Die size	12.57 x 12.57		mm ²	
Emitter pad size	See chip drawing			
Gate pad size	1.123 x 1.123			
Area total	158.0			
Thickness	190		μm	
Wafer size	200		mm	
Maximum possible chips per wafer	159			
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 $T_C = 100^\circ\text{C}$ assuming chip assembly in power module EconoPACK™ +

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage, $T_{vj}=25^\circ\text{C}$	V_{CE}	1700	V
DC collector current, limited by $T_{vj \text{ max}}^2$	I_C	-	A
Pulsed collector current, t_p limited by $T_{vj \text{ max}}^3$	$I_{C,\text{puls}}$	375	A
Gate-emitter voltage	V_{GE}	± 20	V
Junction temperature range	T_{vj}	-40 ... +175	$^\circ\text{C}$
Operating junction temperature	T_{vj}	-40 ... +150	$^\circ\text{C}$
Short circuit data ^{3/4} $V_{GE}=15\text{V}$, $V_{CC}=1000\text{V}$, $T_{vj}=150^\circ\text{C}$	t_{sc}	10	μs
Reverse bias safe operating area ³ (RBSOA)	$I_{C,\text{max}}=250\text{A}$, $V_{CE,\text{max}}=1700\text{V}$, $T_{vj} \leq 150^\circ\text{C}$		

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

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter breakdown voltage	$V_{(BR)CES}$	$V_{GE}=0\text{V}$, $I_C=3.8\text{mA}$	1700	-	-	V
Collector-emitter saturation voltage	V_{CESat}	$V_{GE}=15\text{V}$, $I_C=37.5\text{A}$	1.1	1.27	1.45	
Gate-emitter threshold voltage	$V_{GE(\text{th})}$	$I_C=6\text{mA}$, $V_{GE}=V_{CE}$	5.2	5.8	6.4	
Zero gate voltage collector current	I_{CES}	$V_{CE}=1700\text{V}$, $V_{GE}=0\text{V}$	-	-	6.9	μA
Gate-emitter leakage current	I_{GES}	$V_{CE}=0\text{V}$, $V_{GE}=20\text{V}$	-	-	600	nA
Integrated gate resistor	r_G		5			Ω

Electrical Characteristics ³

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter saturation voltage	V_{CESat}	$V_{GE}=15\text{V}$, $I_C=125\text{A}$	1.6	2	2.4	V
			-	2.4	-	
Input capacitance	C_{ies}	$V_{CE}=25\text{V}$, $V_{GE}=0\text{V}$, $f=1\text{MHz}$ $T_{vj}=25^\circ\text{C}$	-	11001	-	pF
Reverse transfer capacitance	C_{res}		-	365	-	

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.

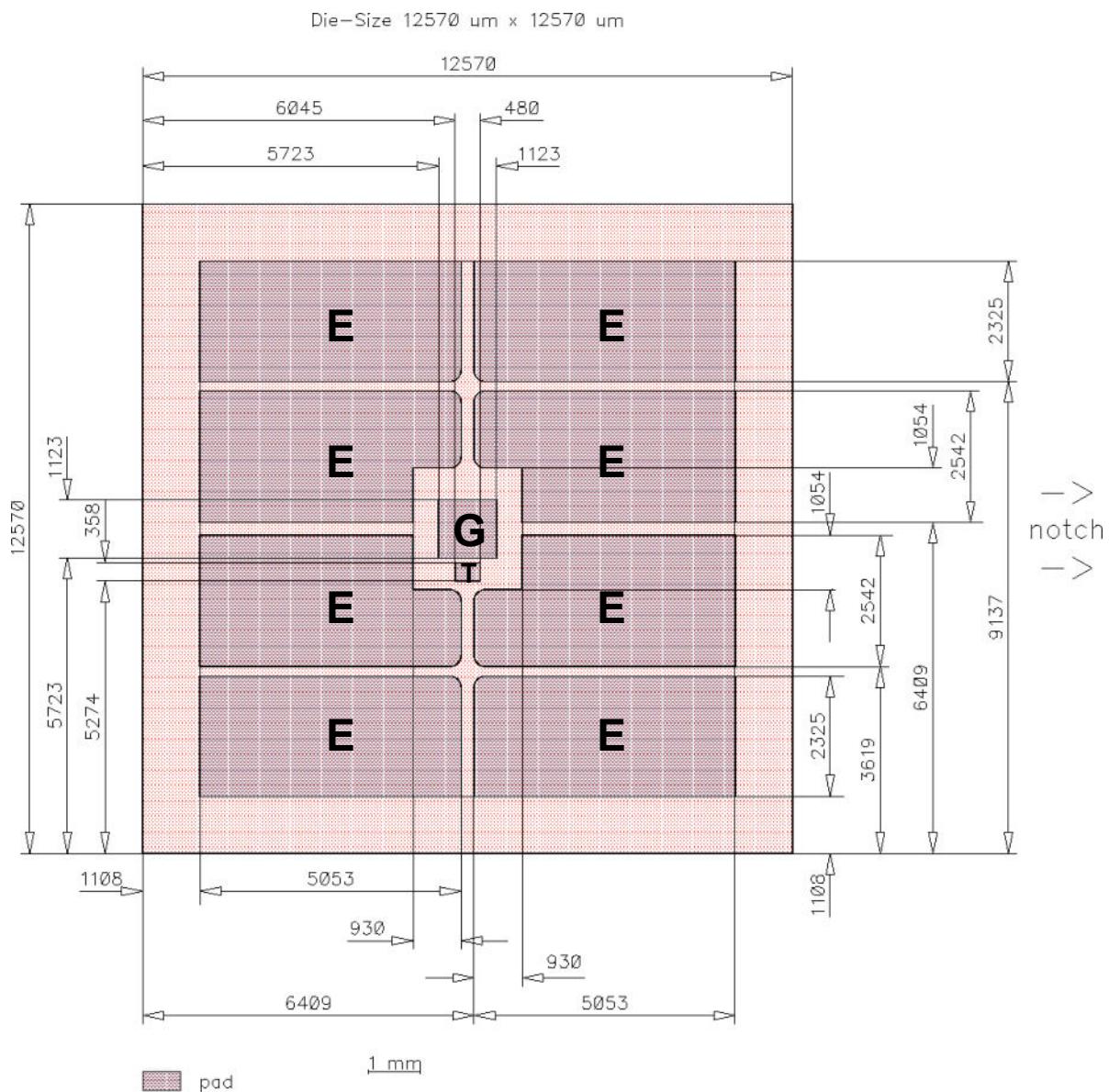


SIGC158T170R3E

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	-	-
---------------------	---	---

Chip Drawing

E = Emitter

G = Gate

T = Test pad do not contact



SIGC158T170R3E

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
2.1	Change wafer size to 200mm	14.04.2010
2.2	Additional basic types L7801M, L7801T, L7801E	01.07.2014
2.3	Minor changes, chip drawing, 100% V_{CEsat} test conditions	06.02.2015
2.4	Update disclaimer	19.08.2015

Relevant Application Notes

--	--



SIGC158T170R3E

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