IGBT

TRENCHSTOP™ IGBT3 Chip

SIGC40T65R3E

Data Sheet

Industrial Power Control

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SIGC40T65R3E

TRENCHSTOP™ IGBT3 Chip

Features:

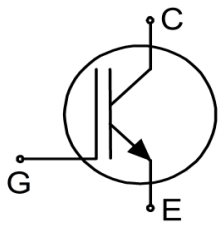
- 650V trench & field stop technology
- Low V_{CEsat}
- Low turn-off losses
- Short tail current
- Positive temperature coefficient
- Easy paralleling

Recommended for:

- Power modules

Applications:

- Drives



Chip Type	V_{CE}	I_{Cn}	Die Size	Package
SIGC40T65R3E	650V	75A	5.74mm x 6.96mm	Sawn on foil

Mechanical Parameters

Die size		5.74 x 6.96	mm^2
Emitter pad size		See chip drawing	
Gate pad size		1.615 x 0.817	
Area total		39.95	
Silicon thickness		70	µm
Wafer size		200	mm
Maximum possible chips per wafer		666	
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		∅ 0.65mm; max. 1.2mm	
Storage environment (<6 months)	for original and sealed MBB bags	Ambient atmosphere air, temperature 17°C – 25°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°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]	$I_{C,puls}$	225	A
Gate-emitter voltage	V_{GE}	±20	V
Junction temperature	T_{vj}	-40 ... +175	°C
Operating junction temperature	$T_{vj\ op}$	-40 ... +150	°C
Short circuit data [1/2/3] V_{GE}=15V, V_{CC}=360V, T_{vj}=150°C	t_{sc}	6	µs

Static Characteristics (tested on wafer), T_{vj}=25°C

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{GE}=0V, I_C=4mA	650	-	-	V
Collector-emitter saturation voltage	V_{CEsat}	V_{GE}=15V, I_C=75A	0.93	1.45	1.77	
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C=1.2mA, V_{GE}=V_{CE}	5.1	5.8	6.4	
Zero gate voltage collector current	I_{CES}	V_{CE}=650V, V_{GE}=0V	-	-	3.8	µA
Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V	-	-	600	nA
Integrated gate resistor	r_G		-	4	-	Ω

Electrical Characteristics [2]

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
Collector-emitter saturation voltage	V_{CEsat}	V_{GE}=15V, I_C=75A, T_{vj}=175°C	-	1.9	-	V
Input capacitance	C_{ies}	V_{CE}=25V, V_{GE}=0V, f=1MHz T_{vj}=25°C	-	4620	-	pF
Reverse transfer capacitance	C_{res}		-	137	-	

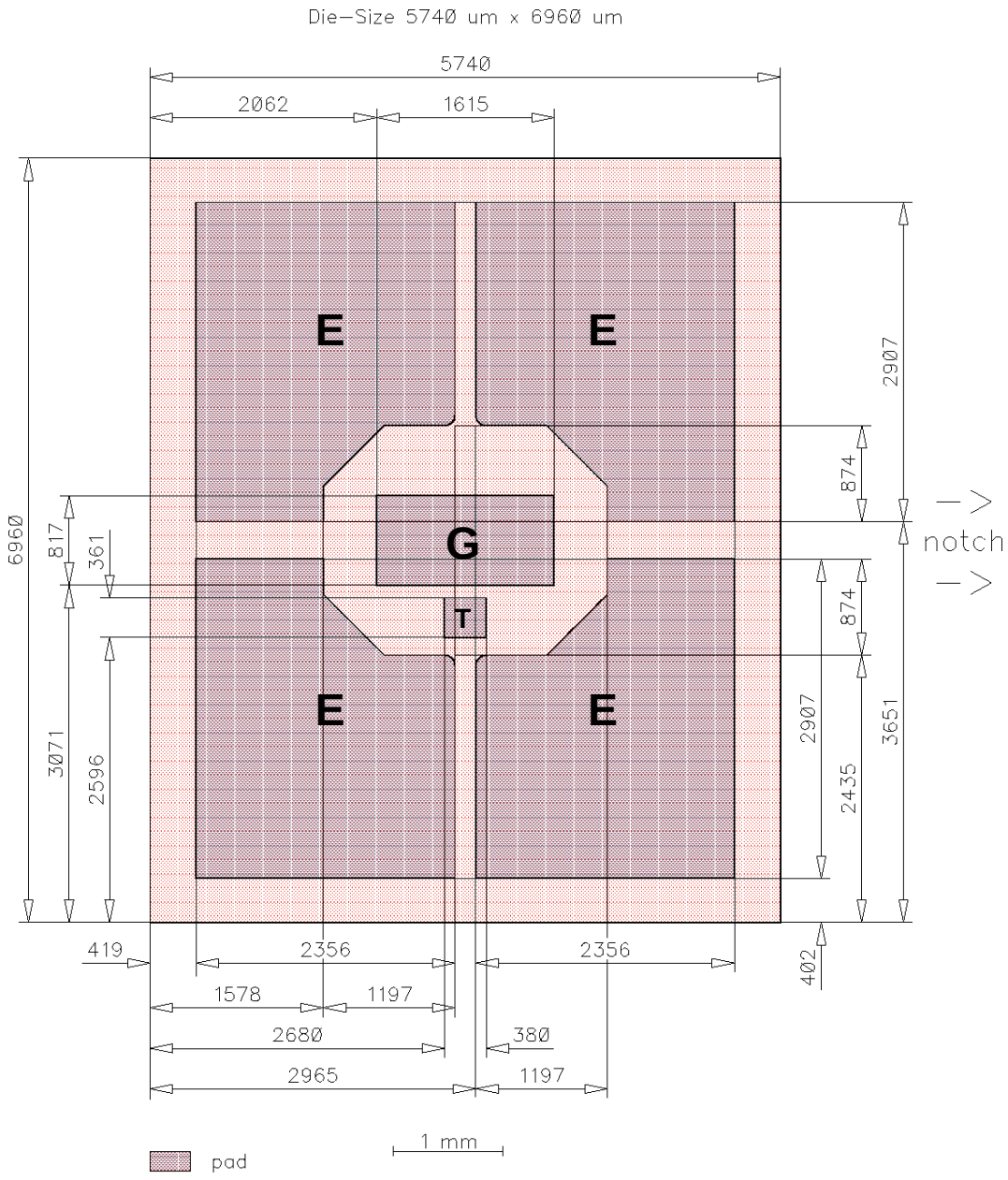
[1] Depending on thermal properties of assembly.
[2] Not subject to production test - verified by design/characterization.
[3] Allowed number of short circuits: <1000; time between short circuits: >1s.

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

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	04.11.2016

Relevant Application Notes

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