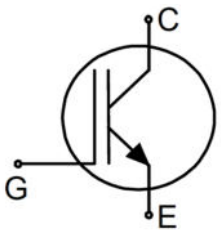
IGC54T65R3QE

High Speed IGBT3 Chip

Features



- V_{CES} = 650 V
- I_{Cn} = 100 A
- 650 V trench & field stop technology
- Low V_{CEsat}
- Low EMI
- Low turn-off losses
- Positive temperature coefficient

Potential applications

- Uninterruptible power supplies
- Welding converters
- Converters with high switching frequency

Product validation

- Technology qualified for industrial applications. Ready for validation in industrial applications according to the relevant tests of IEC 60747 and 60749 or alternatively JEDEC47/20/22

Description

• Recommended for discrete components and modules

Type	Die size	Delivery form
IGC54T65R3QE	5.97 mm x 8.97 mm	Sawn on foil

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1 Mechanical parameters

Table 1 Mechanical parameters

Parameter	Values
Die size	5.97 mm x 8.97 mm
Area total	53.55 mm^2
Emitter pad size	See chip drawing
Gate pad size	See chip drawing
Silicon thickness	70 µm
Wafer size	200 mm
Maximum possible chips per wafer	486
Passivation frontside	Photoimide
Pad metal	3.2 µm AlSiCu
Backside metal	Ni Ag - system
Die attach	Electrically conductive epoxy glue and soft solder
Frontside interconnect	Wire bond: Al ≤ 500 µm
Reject ink dot size (valid for inked delivery form only)	Ø 0.65 mm; max. 1.2 mm
Storage environment (<12 months) for original and sealed MBB bags	Ambient atmosphere air, temperature 17°C – 25°C
Storage environment (<12 months) for open MBB bags	Acc. to IEC62258-3: Atmosphere >99% Nitrogen or inert gas, Humidity <25%RH, Temperature 17°C – 25°C

2 Characteristics

Table 2 Maximum ratings

Parameter	Symbol	Note or test condition		Values	Unit
Collector-emitter voltage	V_{CES}		T_{vj} = 25 °C	650	V
DC collector current, limited by T_{vjmax}	I_C			-[1)]	A
Pulsed collector current, t_p limited by T_{vjmax} [2)]	I_{Cpulse}			300	A
Gate-emitter voltage	V_{GE}			±20	V
Operating junction temperature	T_{vjop}			-40...175	°C
Short-circuit withstand time[2) 3)]	t_{SC}	V_{CC} = 400 V, V_{GE} = 15 V	T_{vj} = 150 °C	5	µs

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

Table 3 Static characteristics (tested on wafer), Tvj = 25°C

Parameter	Symbol	Note or test condition	Values			Unit
			Min.	Typ.	Max.	
Collector-emitter breakdown voltage	V_{BRCES}	I_C = 2 mA, V_{GE} = 0 V	650			V
Collector-emitter saturation voltage	V_{CEsat}	V_{GE} = 15 V, I_C = 100 A	1.38	1.85	2.22	V
Gate-emitter threshold voltage	V_{GEth}	I_C = 1.6 mA, V_{GE} = V_{CE}	4.2	5.1	5.6	V
Zero gate-voltage collector current	I_{CES}	V_{CE} = 650 V, V_{GE} = 0 V			5	µA
Gate-emitter leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V			150	nA
Internal gate resistance	$R_{G,int}$			2		Ω

Table 4 Electrical characteristics

Parameter	Symbol	Note or test condition		Values			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	V_{CEsat}	V_{GE} = 15 V, I_C = 100 A	T_{vj} = 175 °C		2.25		V
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1000 kHz, T_{vj} = 25 °C			6100		pF
Reverse transfer capacitance	C_{res}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1000 kHz, T_{vj} = 25 °C			180		pF

Note: In general, from reliability and lifetime point of view, the lower the operating junction temperature and/or the applied voltage, the greater the expected lifetime of any semiconductor device.
For "Maximum ratings" and "Electrical characteristics": Not subject to production test, specified by design.

3 Chip drawing

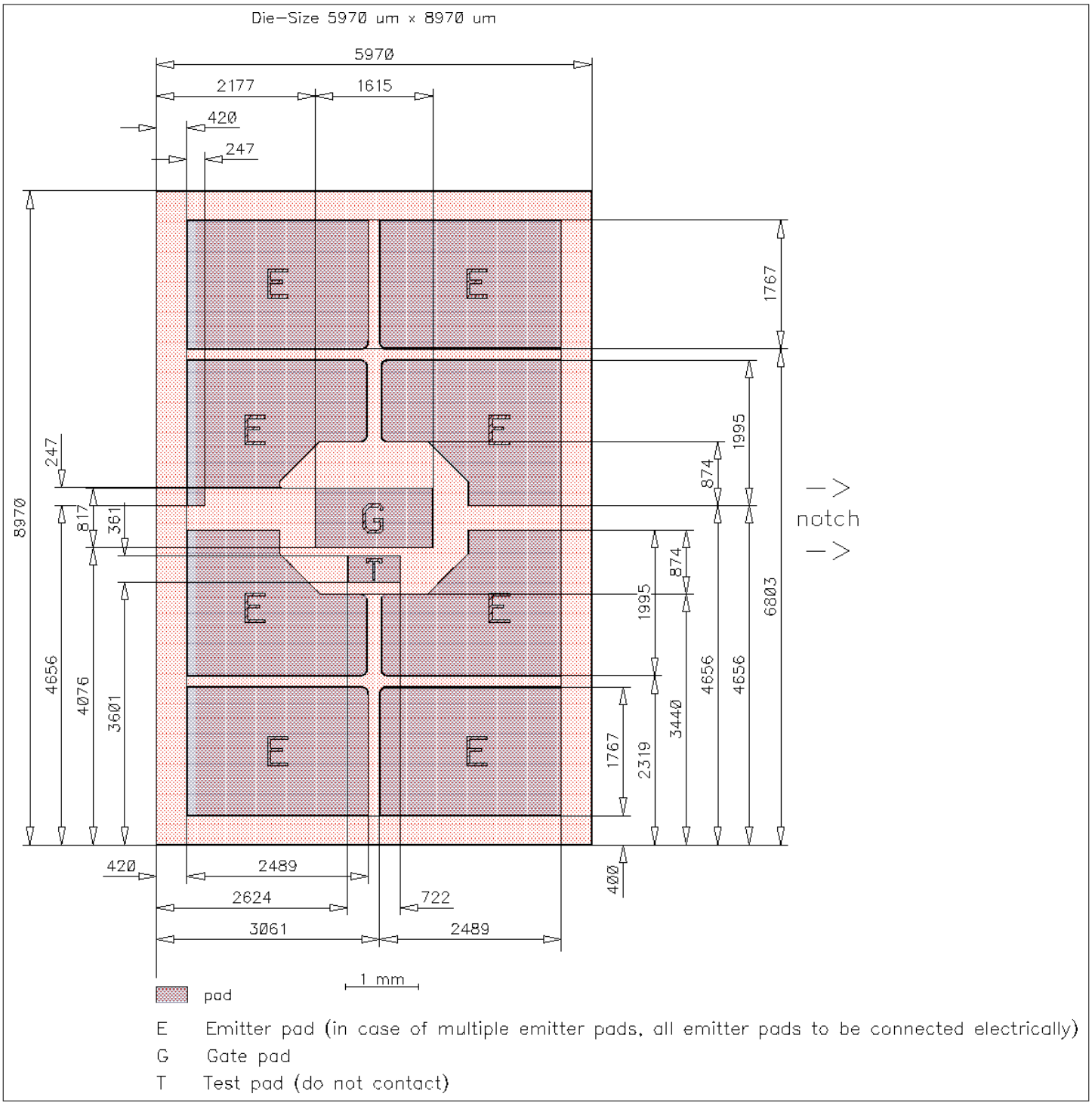

Figure 1

4 Bare die product specifics

- Switching characteristics and thermal properties are dependent on module design and mounting technology and can therefore not be specified for a bare die.
- AQL 0.65 for visual inspection according to failure catalogue.
- Electrostatic discharge sensitive device according to MIL-STD 883.
- Example application: -

Revision history

Document revision	Date of release	Description of changes
1.00	2023-04-28	Final datasheet ***Legacy Revisions*** V1.1 2012-09-20

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