



# IGBT Chip

Die in Wafer Form

**1700V**

**IC (nom) =150A**

**Vce(sat)typ=2.0V@IC(nom)@25°C**

**Low Vce(sat)**

**ShortCircuit Rated**

**200mm Wafer**

## Applications

- Inverter for motor driver
- UPS systems
- High power converters
- Wind turbines

## Features

Trench FS Technology

Low Vce(sat)

10μs Short Circuit Capability

Parallel suitable

Positive Vce(sat) Temperature Coefficient

| Chip Type      | ICn  | Vce   | Die size                    | Wafer size |
|----------------|------|-------|-----------------------------|------------|
| SYC150P170H4WK | 150A | 1700V | 11.40*12.36 mm <sup>2</sup> | 8 inch     |

## Mechanical Parameters

|                                                                     |                                                                                                |
|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Die size                                                            | 11.40mm*12.36mm                                                                                |
| Emitter pad size                                                    | See chip drawing                                                                               |
| Gate pad size                                                       | 1.3mm*1.3mm                                                                                    |
| Area total                                                          | 139.21mm <sup>2</sup>                                                                          |
| Silicon thickness                                                   | 170um                                                                                          |
| Wafer size                                                          | 200mm                                                                                          |
| Maximum possible chips per wafer                                    | 158 pcs                                                                                        |
| Passivation frontside                                               | Polyimide                                                                                      |
| Pad metal                                                           | 4000nm AlSiCu                                                                                  |
| Backside metal                                                      | Al - Ti - Ni/V - Ag, (1kA - 1kA - 2kA - 8kA)<br>suitable for epoxy and soft solder die bonding |
| Die bond                                                            | Soft solder                                                                                    |
| Wire bond                                                           | Al, ≤500um                                                                                     |
| Reject ink dot size                                                 | ø 0.65mm; max. 1.2mm                                                                           |
| Storage environment (<6 months) for<br>original and sealed MBB bags | Ambient atmosphere air, temperature 17°C – 25°C                                                |
| Storage environment (<6 months) for<br>open MBB bags                | Acc. IEC 62258-3; Section 9.4 Storage Environment.                                             |



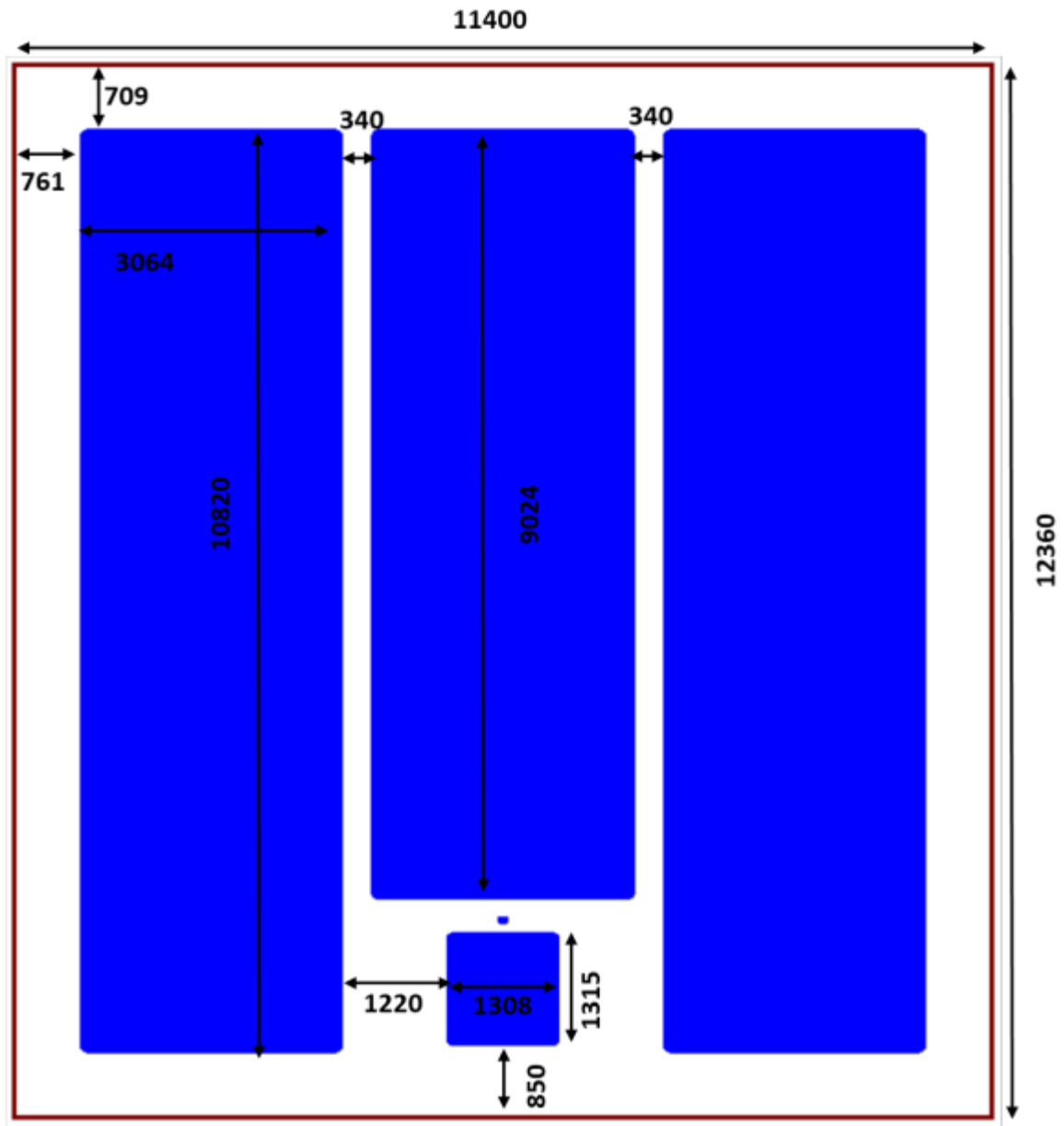
## Maximum Ratings

| Parameter                                                                                                      | Symbol             | Value     | Unit               |
|----------------------------------------------------------------------------------------------------------------|--------------------|-----------|--------------------|
| Collector-emitter voltage, $T_{vj}=25^{\circ}\text{C}$                                                         | VCE                | 1700      | V                  |
| DC collector current, limited by $T_{vj}$ max <sup>1</sup>                                                     | IC                 | 150       | A                  |
| Pulsed collector current, $t_p$ limited by $T_{vj}$ max <sup>2</sup>                                           | IC,puls            | 300       | A                  |
| Gate-emitter voltage                                                                                           | VGE                | $\pm 20$  | V                  |
| Junction temperature                                                                                           | $T_{vj}$           | 150       | $^{\circ}\text{C}$ |
| Operating junction temperature                                                                                 | $T_{vj\text{ op}}$ | -40 - 125 | $^{\circ}\text{C}$ |
| Short circuit data <sup>2/3</sup> $V_{GE}=15\text{V}$ , $V_{CC}=600\text{V}$ ,<br>$T_{vj}=150^{\circ}\text{C}$ | tsc                | 10        | $\mu\text{s}$      |

## Static Characteristics (tested on chip)

| Parameter                            | Symbol        | Conditions                                                                  | Value |      |      | Unit          |
|--------------------------------------|---------------|-----------------------------------------------------------------------------|-------|------|------|---------------|
|                                      |               |                                                                             | Min.  | Typ. | Max. |               |
| Collector-emitter breakdown voltage  | $V_{(BR)CES}$ | $V_{GE}=0\text{V}$ , $I_C=250\mu\text{A}$                                   | 1700  |      |      | V             |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=150\text{A}$ , $V_{GE}=15\text{V}$ ,<br>$T_{vj}=25^{\circ}\text{C}$    | 1.75  | 2.0  | 2.25 | V             |
| Gate-emitter threshold voltage       | $V_{GE(th)}$  | $V_{GE}=V_{CE}$ , $I_C=1.0\text{mA}$ ,<br>$T_{vj}=25^{\circ}\text{C}$       | 5.1   | 5.6  | 6.1  | V             |
| Collector-emitter cut-off current    | $I_{CES}$     | $V_{CE}=1200\text{V}$ , $V_{GE}=0\text{V}$ ,<br>$T_{vj}=25^{\circ}\text{C}$ |       |      | 20   | $\mu\text{A}$ |
| Gate-emitter leakage current         | $I_{GES}$     | $V_{CE}=0$ , $V_{GE}=20\text{V}$ ,<br>$T_{vj}=25^{\circ}\text{C}$           |       |      | 100  | nA            |
| Internal gate resistor               | $R_{gint}$    | $T_{vj}=25^{\circ}\text{C}$                                                 |       | 6    |      | $\Omega$      |

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





## 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.

## Revision History

| Revision | Subjects(major changes since last revision) | Date      |
|----------|---------------------------------------------|-----------|
| 1.0      | Final date sheet                            | 2023.2.3  |
| 1.1      | Change Applications                         | 2023.3.16 |