

## IGBT 3 Chip

### Features:

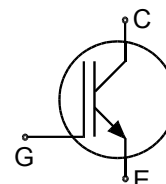
- 600V Trench & Field Stop technology
- low  $V_{CE(sat)}$
- low turn-off losses
- short tail current
- positive temperature coefficient
- easy paralleling
- Qualified according to JEDEC for target applications

### Recommended for:

- power module
- discrete components

### Applications:

- drives
- white goods
- resonant applications



| Chip Type   | $V_{CE}$ | $I_{Cn}^{(1)}$ | Die Size                    | Package      |
|-------------|----------|----------------|-----------------------------|--------------|
| SIGC19T60SE | 600V     | 40A            | 4.84 x 3.98 mm <sup>2</sup> | sawn on foil |

<sup>1)</sup> nominal collector current at  $T_c = 100^\circ\text{C}$ , not subject to production test - verified by design/characterization

### Mechanical Parameters

|                                   |                                                    |                                                                                                                                           |
|-----------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Die size                          | 4.84 x 3.98                                        |                                                                                                                                           |
| Emitter pad size (incl. gate pad) | See chip drawing                                   |                                                                                                                                           |
| Gate pad size                     | 0.608 x 0.646                                      |                                                                                                                                           |
| Area total                        | 19.26                                              |                                                                                                                                           |
| Thickness                         | 70                                                 | $\mu\text{m}$                                                                                                                             |
| Wafer size                        | 200                                                | mm                                                                                                                                        |
| Max.possible chips per wafer      | 1403                                               |                                                                                                                                           |
| Passivation frontside             | Photoimide                                         |                                                                                                                                           |
| Pad metal                         | 3200 nm AlSiCu                                     |                                                                                                                                           |
| Backside metal                    | Ni Ag –system                                      |                                                                                                                                           |
| Die bond                          | Electrically conductive epoxy glue and soft solder |                                                                                                                                           |
| Wire bond                         | Al, <500 $\mu\text{m}$                             |                                                                                                                                           |
| Reject ink dot size               | $\varnothing$ 0.65mm ; max 1.2mm                   |                                                                                                                                           |
| Storage environment               | for original and sealed MBB bags                   | Ambient atmosphere air, Temperature $17^\circ\text{C} - 25^\circ\text{C}$ , < 6 month                                                     |
|                                   | for open MBB bags                                  | Acc. to IEC62258-3: Atmosphere >99% Nitrogen or inert gas, Humidity <25%RH, Temperature $17^\circ\text{C} - 25^\circ\text{C}$ , < 6 month |

## Maximum Ratings

| Parameter                                                                                                        | Symbol       | Value            | Unit             |
|------------------------------------------------------------------------------------------------------------------|--------------|------------------|------------------|
| Collector-Emitter voltage, $T_{vj} = 25^\circ\text{C}$                                                           | $V_{CE}$     | 600              | V                |
| DC collector current, limited by $T_{vj\text{ max}}$                                                             | $I_C$        | <sup>1)</sup>    | A                |
| Pulsed collector current, $t_p$ limited by $T_{vj\text{ max}}$ <sup>2)</sup>                                     | $I_{C,puls}$ | 120              | A                |
| Gate emitter voltage                                                                                             | $V_{GE}$     | $\pm 20$         | V                |
| Operating junction temperature                                                                                   | $T_{vj}$     | $-40 \dots +150$ | $^\circ\text{C}$ |
| Short circuit data <sup>2)3)</sup> $V_{GE} = 15\text{V}$ , $V_{CC} = 380\text{V}$ , $T_{vj} = 150^\circ\text{C}$ | $t_{SC}$     | 5                | $\mu\text{s}$    |

<sup>1)</sup> depending on thermal properties of assembly

<sup>2)</sup> not subject to production test - verified by design/characterization

<sup>3)</sup> allowed number of short circuits: <1000; time between short circuits: >1s.

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

| Parameter                            | Symbol        | Conditions                                | Value |      |      | Unit          |
|--------------------------------------|---------------|-------------------------------------------|-------|------|------|---------------|
|                                      |               |                                           | min.  | typ. | max. |               |
| Collector-Emitter breakdown voltage  | $V_{(BR)CES}$ | $V_{GE}=0\text{V}$ , $I_C=2\text{ mA}$    | 600   |      |      | V             |
| Collector-Emitter saturation voltage | $V_{CEsat}$   | $V_{GE}=15\text{V}$ , $I_C=40\text{A}$    | 1.13  | 1.55 | 1.97 |               |
| Gate-Emitter threshold voltage       | $V_{GE(th)}$  | $I_C=0.58\text{mA}$ , $V_{GE}=V_{CE}$     | 4.2   | 4.9  | 5.6  |               |
| Zero gate voltage collector current  | $I_{CES}$     | $V_{CE}=600\text{V}$ , $V_{GE}=0\text{V}$ |       |      | 1.6  | $\mu\text{A}$ |
| Gate-Emitter leakage current         | $I_{GES}$     | $V_{CE}=0\text{V}$ , $V_{GE}=20\text{V}$  |       |      | 300  | nA            |
| Integrated gate resistor             | $r_G$         |                                           |       | none |      | $\Omega$      |

## Electrical Characteristics (not subject to production test - verified by design / characterization)

| Parameter                            | Symbol      | Conditions                                                                                   | Value |      |      | Unit |
|--------------------------------------|-------------|----------------------------------------------------------------------------------------------|-------|------|------|------|
|                                      |             |                                                                                              | min.  | typ. | max. |      |
| Collector-Emitter saturation voltage | $V_{CEsat}$ | $V_{GE}=15\text{V}$ , $I_C=40\text{A}$ ,<br>$T_{vj}=175^\circ\text{C}$                       |       | 1.9  |      | V    |
| Input capacitance                    | $C_{ies}$   | $V_{CE}=25\text{V}$ ,<br>$V_{GE}=0\text{V}$ , $f=1\text{MHz}$ ,<br>$T_{vj}=25^\circ\text{C}$ |       | 2423 |      | pF   |
| Output capacitance                   | $C_{oes}$   |                                                                                              |       | 113  |      |      |
| Reverse transfer capacitance         | $C_{res}$   |                                                                                              |       | 72   |      |      |



# SIGC19T60SE

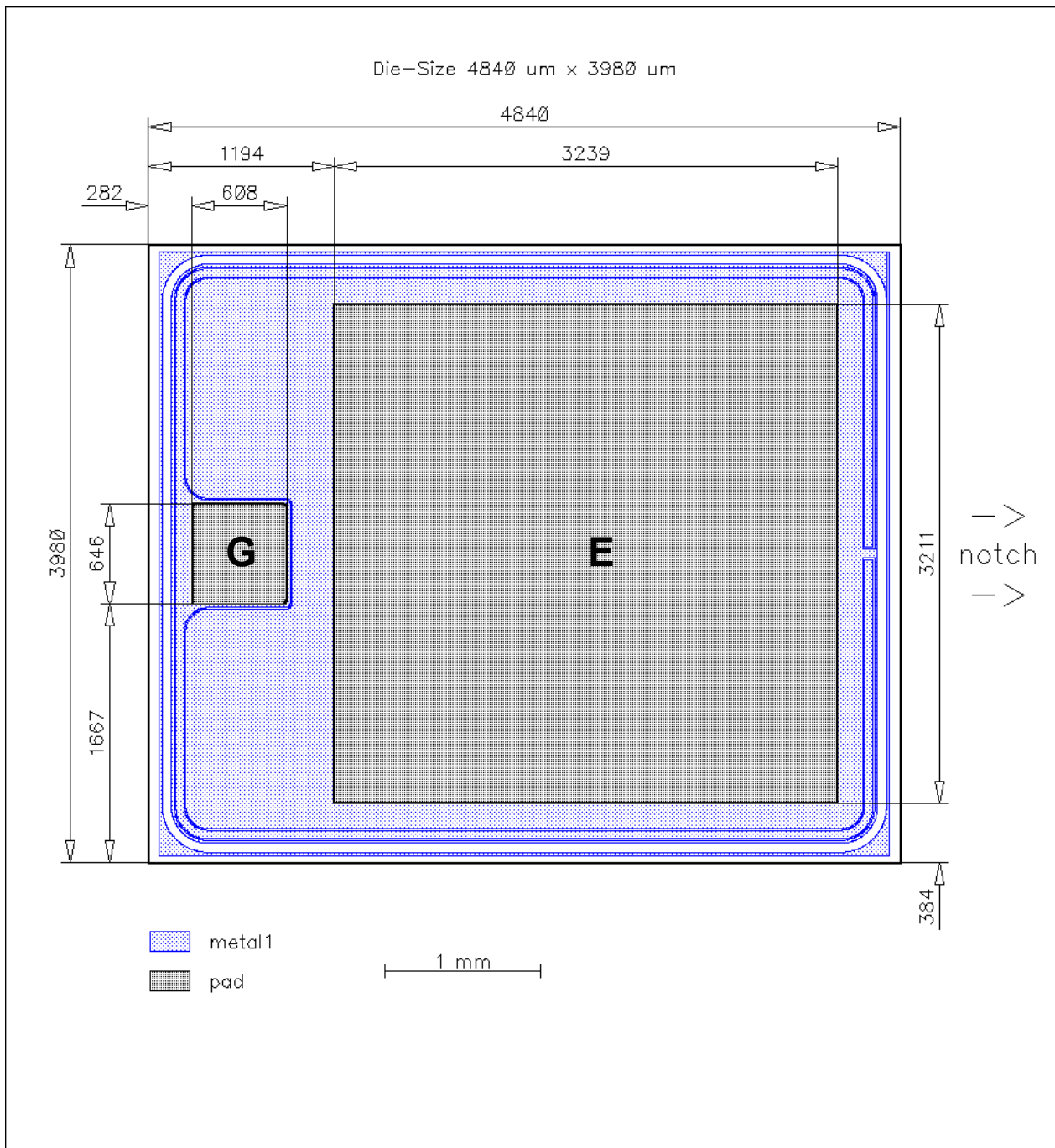
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## Further Electrical Characteristic

Switching characteristics and thermal properties are depending strongly on module design and mounting technology and can therefore not be specified for a bare die.

|                                                      |          |          |
|------------------------------------------------------|----------|----------|
| This chip data sheet refers to the device data sheet | IHW40T60 | Rev. 2.0 |
|------------------------------------------------------|----------|----------|

## Chip Drawing



**E** = Emitter

**G** = Gate



# SIGC19T60SE

## Description

AQL 0,65 for visual inspection according to failure catalogue

Electrostatic Discharge Sensitive Device according to MIL-STD 883

## Revision History

| Version | Subjects (major changes since last revision) | Date |
|---------|----------------------------------------------|------|
|         |                                              |      |
|         |                                              |      |

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