

## IGBT<sup>3</sup> Chip

### FEATURES:

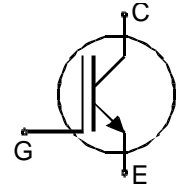
- 600V Trench & Field Stop technology
- low  $V_{CE(sat)}$
- low turn-off losses
- short tail current
- positive temperature coefficient
- easy paralleling

### This chip is used for:

- power module
- discrete components

### Applications:

- drives
- white goods
- resonant applications



| Chip Type  | $V_{CE}$ | $I_{Cn}$ | Die Size                    | Package      | Ordering Code     |
|------------|----------|----------|-----------------------------|--------------|-------------------|
| SIGC06T60G | 600V     | 10A      | 2.44 x 2.42 mm <sup>2</sup> | sawn on foil | Q67050-A4344-A101 |

### MECHANICAL PARAMETER:

|                                 |  |                 |
|---------------------------------|--|-----------------|
| Raster size                     | 2.44 x 2.42  | mm <sup>2</sup> |
| Emitter pad size                | 1.558 x 1.577  |                 |
| Gate pad size                   | 0.361 x 0.513  |                 |
| Area total / active             | 5.9 / 3.6  | mm <sup>2</sup> |
| Thickness                       | 70   | µm              |
| Wafer size                      | 150  | mm              |
| Flat position                   | 0  | deg             |
| Max. possible chips per wafer   | 2485 pcs   |                 |
| Passivation frontside           | Photoimide   |                 |
| Emitter metallization           | 3200 nm AlSiCu   |                 |
| Collector metallization         | 1400 nm Ni Ag –system<br>suitable for epoxy and soft solder die bonding                      |                 |
| Die bond                        | electrically conductive glue or solder   |                 |
| Wire bond                       | Al, <500µm   |                 |
| Reject ink dot size             | Ø 0.65mm ; max 1.2mm   |                 |
| Recommended storage environment | store in original container, in dry nitrogen,<br>< 6 month at an ambient temperature of 23°C |                 |

## MAXIMUM RATINGS:

| Parameter   | Symbol                         | Value        | Unit               |
|---|--------------------------------|--------------|--------------------|
| Collector-emitter voltage, $T_j = 25\text{ °C}$         | $V_{CE}$                       | 600          | V                  |
| DC collector current, limited by $T_{jmax}$             | $I_C$                          | 1)           | A                  |
| Pulsed collector current, $t_p$ limited by $T_{jmax}$   | $I_{cpuls}$                    | 30           | A                  |
| Gate emitter voltage                                    | $V_{GE}$                       | $\pm 20$     | V                  |
| Operating junction and storage temperature              | $T_j, T_{stg}$                 | -40 ... +175 | $^{\circ}\text{C}$ |
| SC data, $V_{GE} = 15\text{V}$ , $V_{CC} = 360\text{V}$ | $T_{vj} = 150^{\circ}\text{C}$ | tp           | $\mu\text{s}$      |
|   | $T_{vj} = 25^{\circ}\text{C}$  |              |                    |
|   |                                | 8            |                    |

1) depending on thermal properties of assembly

## STATIC CHARACTERISTICS (tested on chip), $T_j = 25\text{ °C}$ , unless otherwise specified

| 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 | $V_{CE(sat)}$ | $V_{GE} = 15\text{V}$ , $I_C = 10\text{A}$    | 1.1   | 1.5  | 1.9  |               |
| Gate-emitter threshold voltage       | $V_{GE(th)}$  | $I_C = 150\mu\text{A}$ , $V_{GE} = V_{CE}$    | 5.0   | 5.8  | 6.5  |               |
| Zero gate voltage collector current  | $I_{CES}$     | $V_{CE} = 600\text{V}$ , $V_{GE} = 0\text{V}$ |       |      | 0.6  | $\mu\text{A}$ |
| Gate-emitter leakage current         | $I_{GES}$     | $V_{CE} = 0\text{V}$ , $V_{GE} = 20\text{V}$  |       |      | 300  | nA            |
| Integrated gate resistor             | $R_{Gint}$    |   |       | none |      | $\Omega$      |

## ELECTRICAL CHARACTERISTICS (verified by design/characterization):

| Parameter                    | Symbol     | Conditions   | Value |      |      | Unit |
|------------------------------|------------|--|-------|------|------|------|
|                              |            |  | min.  | typ. | max. |      |
| Input capacitance            | $C_{iss}$  | $V_{CE} = 25\text{V}$ ,<br>$V_{GE} = 0\text{V}$ ,<br>$f = 1\text{MHz}$ |       | 551  |      | pF   |
| Output capacitance           | $C_{oss}$  |  |       | 40   |      |      |
| Reverse transfer capacitance | $C_{riss}$ |  |       | 17   |      |      |

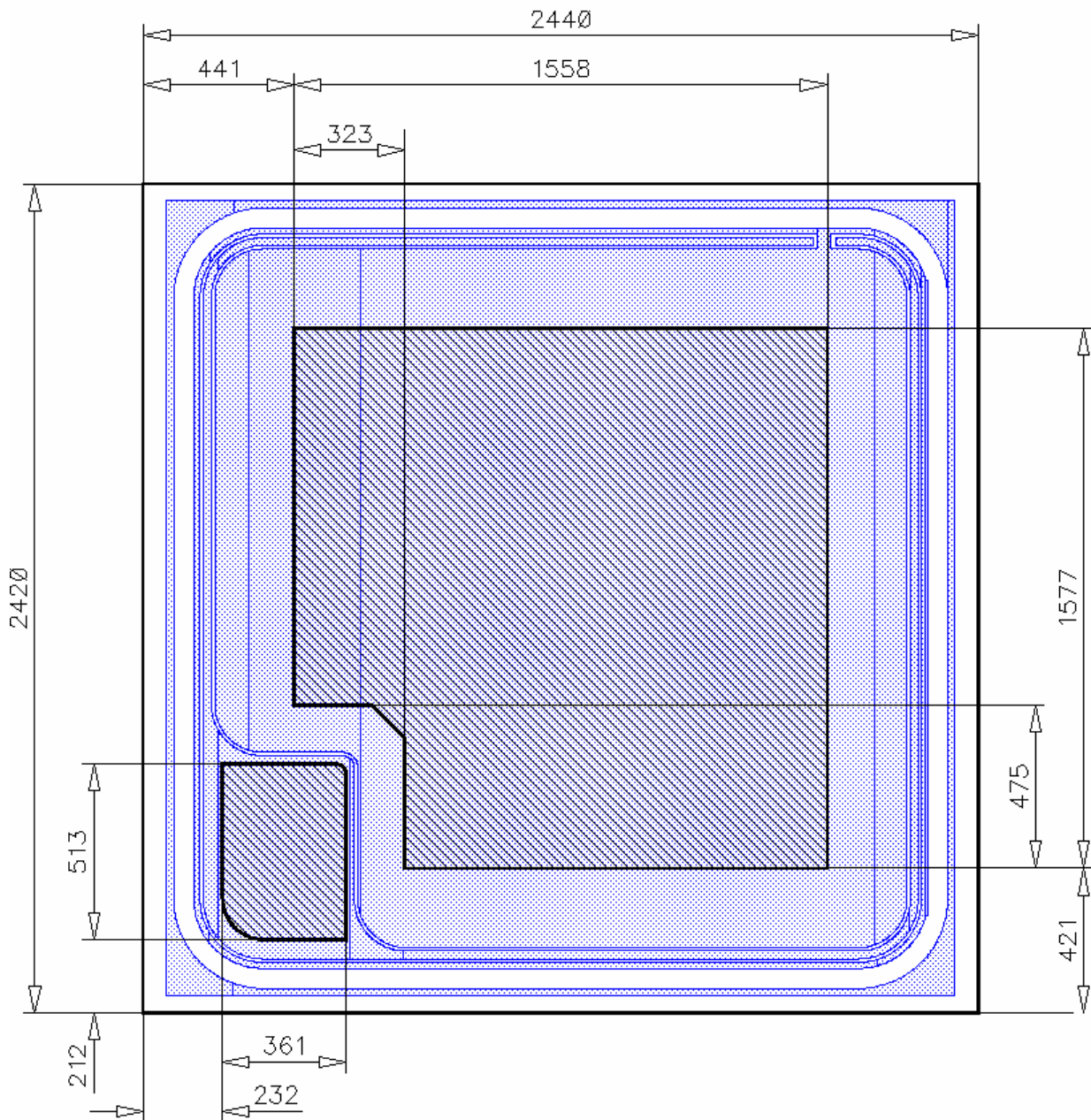
## SWITCHING CHARACTERISTICS (verified by design/characterization), inductive load



| Parameter           | Symbol       | Conditions   | Value <sup>2)</sup> |      |      | Unit |
|---------------------|--------------|--|---------------------|------|------|------|
|                     |              |  | min.                | typ. | max. |      |
| Turn-on delay time  | $t_{d(on)}$  | $T_j = 125\text{ °C}$<br>$V_{CC} = 300\text{V}$ ,<br>$I_C = 10\text{A}$ ,<br>$V_{GE} = -15/15\text{V}$ ,<br>$R_G = 27\Omega$ |                     | 12   |      | ns   |
| Rise time           | $t_r$        |  |                     | 13   |      |      |
| Turn-off delay time | $t_{d(off)}$ |  |                     | 120  |      |      |
| Fall time           | $t_f$        |  |                     | 130  |      |      |

<sup>2)</sup> values also influenced by parasitic L- and C- in measurement and package.

**CHIP DRAWING:**

Die-Size 2440 um x 2420 um



-  metal1
-  no imide

1 mm

↓ Flat ↓

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**FURTHER ELECTRICAL CHARACTERISTICS:**

|  |  |  |
|--|--|--|
| This chip data sheet refers to the device data sheet |  |  |
|--|--|--|

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**DESCRIPTION:**

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AQL 0,65 for visual inspection according to failure catalog

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Electrostatic Discharge Sensitive Device according to MIL-STD 883

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Test-Normen Villach/Prüffeld

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