

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

### FEATURES:

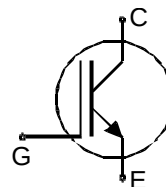
- 600V Trench & Field Stop technology
- low  $V_{CE(sat)}$
- low turn-off losses
- short tail current
- positive temperature coefficient
- easy paralleling

### 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     |
|------------|----------|----------|-----------------------------|--------------|-------------------|
| SIGC08T60S | 600V     | 15A      | 2.86 x 2.82 mm <sup>2</sup> | sawn on foil | Q67050-A4395-A101 |

### MECHANICAL PARAMETER:

|                                 |                                                                                              |                 |
|---------------------------------|----------------------------------------------------------------------------------------------|-----------------|
| Raster size                     | 2.86 x 2.82                                                                                  | mm <sup>2</sup> |
| Emitter pad size                | 2.014 x 2.014                                                                                |                 |
| Gate pad size                   | 0.361 x 0.513                                                                                |                 |
| Area total / active             | 8.0 / 5.2                                                                                    | mm <sup>2</sup> |
| Thickness                       | 70                                                                                           | μm              |
| Wafer size                      | 150                                                                                          | mm              |
| Flat position                   | 0                                                                                            | deg             |
| Max. possible chips per wafer   | 1836 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, $T_j=25^\circ\text{C}$                                    | $V_{CE}$       | 600           | V                |
| DC collector current, limited by $T_{jmax}$                                          | $I_C$          | <sup>1)</sup> | A                |
| Pulsed collector current, $t_p$ limited by $T_{jmax}$                                | $I_{cpuls}$    | 45            | 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, $V_{GE} = 15\text{V}$ , $V_{CC} = 360\text{V}$ , $T_vj = 150^\circ\text{C}$ | $t_p$          | 5             | $\mu\text{s}$    |

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

## STATIC CHARACTERISTICS (tested on chip), $T_j=25^\circ\text{C}$ , 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 | $V_{CE(sat)}$ | $V_{GE}=15\text{V}$ , $I_C=15\text{A}$    |       | 1.5  | 2.05 |               |
| Gate-emitter threshold voltage       | $V_{GE(th)}$  | $I_C=210\mu\text{A}$ , $V_{GE}=V_{CE}$    | 4.1   | 4.9  | 5.7  |               |
| Zero gate voltage collector current  | $I_{CES}$     | $V_{CE}=600\text{V}$ , $V_{GE}=0\text{V}$ |       |      | 0.85 | $\mu\text{A}$ |
| 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>$f=1\text{MHz}$ |       | 860  |      | pF   |
| Output capacitance           | $C_{oss}$ |                                                                  |       | 55   |      |      |
| Reverse transfer capacitance | $C_{rss}$ |                                                                  |       | 24   |      |      |

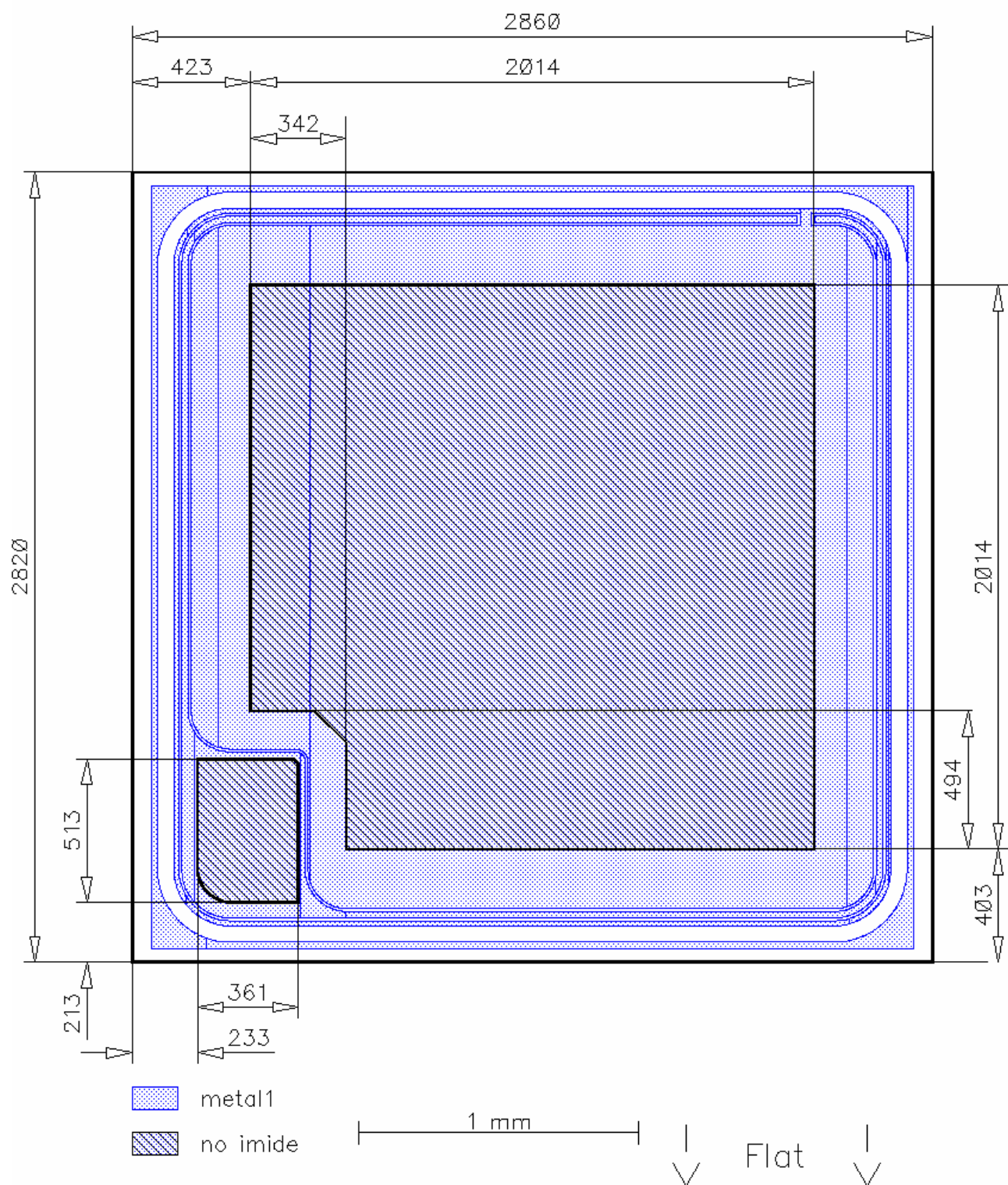
## SWITCHING CHARACTERISTICS (verified by design/characterization), inductive load

| Parameter           | Symbol       | Conditions                                                                                                           | Value <sup>2)</sup> |      |      | Unit |
|---------------------|--------------|----------------------------------------------------------------------------------------------------------------------|---------------------|------|------|------|
|                     |              |                                                                                                                      | min.                | typ. | max. |      |
| Turn-on delay time  | $t_{d(on)}$  | $T_j=175^\circ\text{C}$<br>$V_{CC}=400\text{V}$ ,<br>$I_C=15\text{A}$ ,<br>$V_{GE}=0/15\text{V}$ ,<br>$R_G=15\Omega$ |                     | 17   |      | ns   |
| Rise time           | $t_r$        |                                                                                                                      |                     | 15   |      |      |
| Turn-off delay time | $t_{d(off)}$ |                                                                                                                      |                     | 212  |      |      |
| Fall time           | $t_f$        |                                                                                                                      |                     | 79   |      |      |

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

## CHIP DRAWING:

Die-Size 2860  $\mu\text{m}$  x 2820  $\mu\text{m}$



**FURTHER ELECTRICAL CHARACTERISTICS:**

|                                                      |           |  |
|------------------------------------------------------|-----------|--|
| This chip data sheet refers to the device data sheet | IKB15N60T |  |
|------------------------------------------------------|-----------|--|

**DESCRIPTION:**

AQL 0,65 for visual inspection according to failure catalog

Electrostatic Discharge Sensitive Device according to MIL-STD 883

Test-Normen Villach/Prüffeld

**Published by**  
**Infineon Technologies AG,**  
**Bereich Kommunikation**  
**St.-Martin-Strasse 53,**  
**D-81541 München**  
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