



# IGC50T120T6RL

## IGBT4 Low Power Chip

### FEATURES:

- 1200V Trench + Field Stop technology
- low switching losses
- positive temperature coefficient
- easy paralleling

### This chip is used for:

- low / medium power modules

### Applications:

- low / medium power drives



| Chip Type     | V <sub>CE</sub> | I <sub>CN</sub> | Die Size                    | Package      |
|---------------|-----------------|-----------------|-----------------------------|--------------|
| IGC50T120T6RL | 1200V           | 50A             | 7.25 x 6.84 mm <sup>2</sup> | sawn on foil |

### MECHANICAL PARAMETER

|                                   |  |                 |
|-----------------------------------|--|-----------------|
| Raster size                       | 7.25 x 6.84  | mm <sup>2</sup> |
| Emitter pad size (incl. gate pad) | 5.74 x 5.367   |                 |
| Gate pad size                     | 0.811 x 1.31   |                 |
| Area total / active               | 49.6 / 34.5  |                 |
| Thickness                         | 115  | µm              |
| Wafer size                        | 150  | mm              |
| Flat position                     | 90   | grd             |
| Max.possible chips per wafer      | 285  |                 |
| Passivation frontside             | Photoimide   |                 |
| Pad metal                         | 3200 nm AlSiCu   |                 |
| Backside metal                    | 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 |                 |



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## MAXIMUM RATINGS

| Parameter  | Symbol  | Value         | Unit             |
|--|---|---------------|------------------|
| Collector-Emitter voltage, $T_j=25\text{ }^\circ\text{C}$  | $V_{CE}$  | 1200          | V                |
| DC collector current, limited by $T_{jmax}$  | $I_C$   | <sup>1)</sup> | A                |
| Pulsed collector current, $t_p$ limited by $T_{jmax}$  | $I_{Cpuls}$   | 150           | A                |
| Gate-Emitter voltage   | $V_{GE}$  | $\pm 20$      | V                |
| Operating junction temperature   | $T_j$   | -40 ... +175  | $^\circ\text{C}$ |
| Short circuit data <sup>2)</sup> $V_{GE} = 15\text{V}$ , $V_{CC} = 800\text{V}$ , $T_{vj} = 150^\circ\text{C}$ | $t_p$   | 10            | $\mu\text{s}$    |
| Reverse bias safe operating area <sup>2)</sup> (RBSOA)   | $I_{Cmax} = 100\text{A}$ , $V_{CEmax} = 1200\text{V}$ , $T_{vjmax} = 150^\circ\text{C}$ |               |                  |

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

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

## STATIC CHARACTERISTICS (tested on wafer), $T_j=25\text{ }^\circ\text{C}$

| Parameter                            | Symbol        | Conditions                                 | Value |      |      | Unit          |
|--------------------------------------|---------------|--|-------|------|------|---------------|
|                                      |               |  | min.  | typ. | max. |               |
| Collector-Emitter breakdown voltage  | $V_{(BR)CES}$ | $V_{GE}=0\text{V}$ , $I_C = 1.7\text{ mA}$ | 1200  |      |      | V             |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | $V_{GE}=15\text{V}$ , $I_C=50\text{ A}$    | 1.6   | 1.85 | 2.1  |               |
| Gate-Emitter threshold voltage       | $V_{GE(th)}$  | $I_C=1.7\text{mA}$ , $V_{GE}=V_{CE}$       | 5.0   | 5.8  | 6.5  |               |
| Zero gate voltage collector current  | $I_{CES}$     | $V_{CE}=1200\text{V}$ , $V_{GE}=0\text{V}$ |       |      | 10   | $\mu\text{A}$ |
| Gate-Emitter leakage current         | $I_{GES}$     | $V_{CE}=0\text{V}$ , $V_{GE}=20\text{V}$   |       |      | 600  | nA            |
| Integrated gate resistor             | $R_{Gint}$    |  |       | 4    |      | $\Omega$      |

## ELECTRICAL CHARACTERISTICS (not subject to production test - 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>$f=1\text{ MHz}$ |       | 2770 |      | pF   |
| Output capacitance           | $C_{oss}$ |   |       | 205  |      |      |
| Reverse transfer capacitance | $C_{rss}$ |   |       | 160  |      |      |



# IGC50T120T6RL

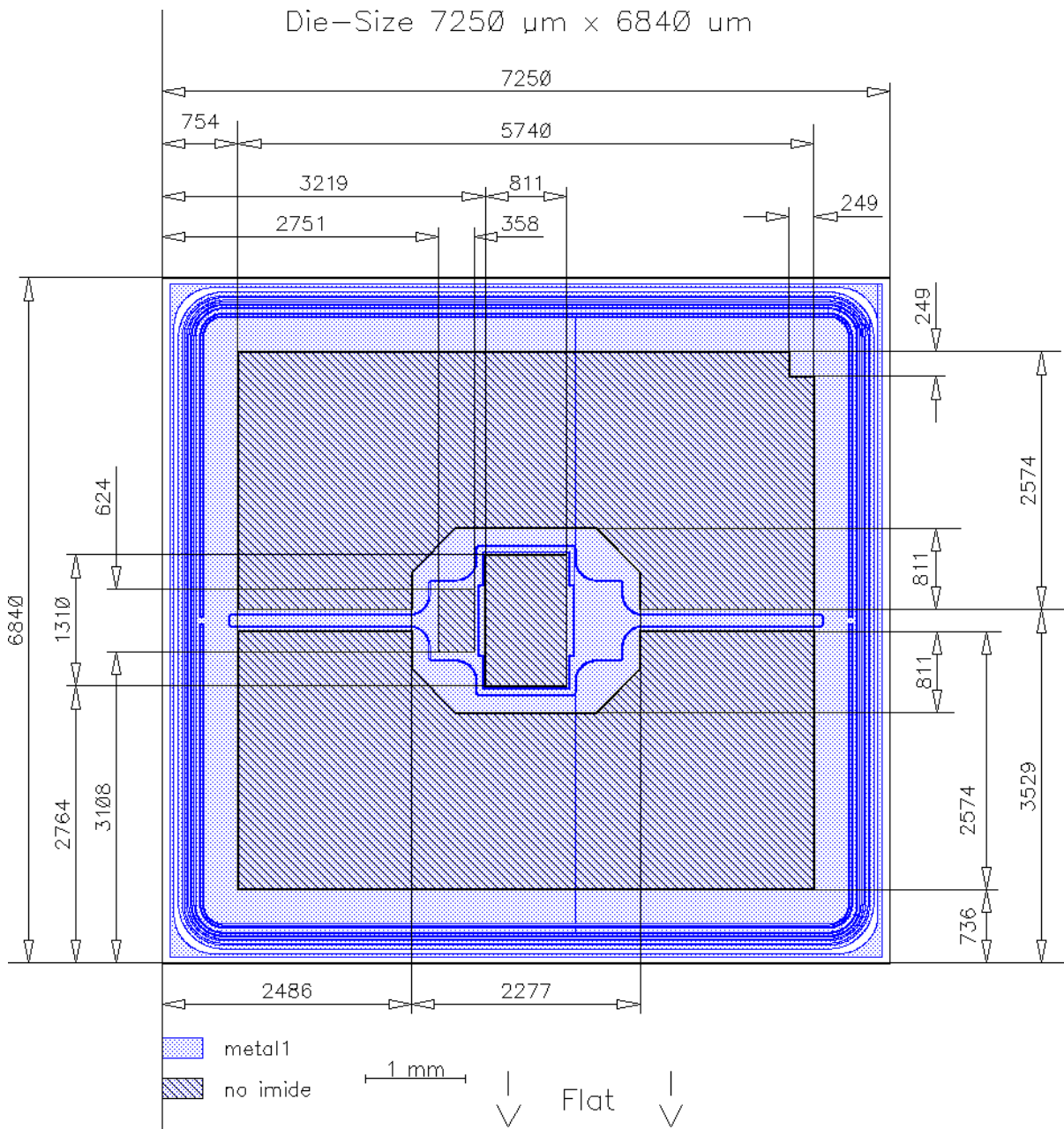
**SWITCHING CHARACTERISTICS** inductive load (not subject to production test - verified by design /characterization)

| Parameter           | Symbol       | Conditions <sup>1)</sup>   | Value |      |      | Unit |
|---------------------|--------------|--|-------|------|------|------|
|                     |              |  | min.  | typ. | max. |      |
| Turn-on delay time  | $t_{d(on)}$  | $T_j = 125^\circ\text{C}$<br>$V_{CC} = 600\text{V},$<br>$I_C = 50\text{ A},$<br>$V_{GE} = -15/15\text{V},$<br>$R_G = \text{---}\Omega$ |       | tbd  |      | ns   |
| Rise time           | $t_r$        |  |       | tbd  |      |      |
| Turn-off delay time | $t_{d(off)}$ |  |       | tbd  |      |      |
| Fall time           | $t_f$        |  |       | tbd  |      |      |

<sup>1)</sup> values also influenced by parasitic L- and C- in measurement and package.

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## CHIP DRAWING





# IGC50T120T6RL

## FURTHER ELECTRICAL CHARACTERISTICS

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

## DESCRIPTION

AQL 0,65 for visual inspection according to failure catalogue

Electrostatic Discharge Sensitive Device according to MIL-STD 883

Test-Normen Villach/Prüffeld

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