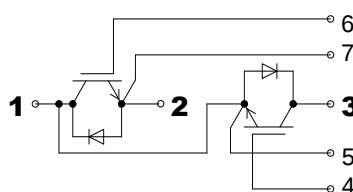


# SGG400T120UC2

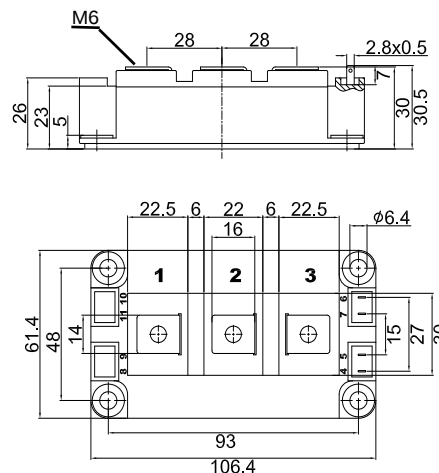
## IGBT Modules



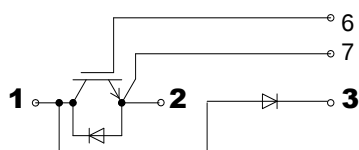
**SGG400T120UC2**



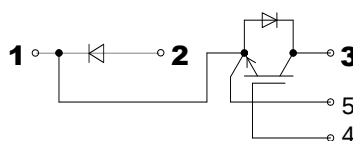
Dimensions in mm (1mm = 0.0394")



**SGD400T120UC2**



**SDG400T120UC2**



$T_c = 25^{\circ}\text{C}$ , unless otherwise specified

| Symbol               | Conditions                                                 | Values           | Units              |
|----------------------|------------------------------------------------------------|------------------|--------------------|
| <b>IGBT</b>          |                                                            |                  |                    |
| $V_{CES}$            |                                                            | 1200             | V                  |
| $I_{Cnom}$           |                                                            | 400              | A                  |
| $I_{CRM}$            | $T_c = 25^{\circ}\text{C}$ , $t_P = 1\text{ms}$            | 1200             | A                  |
| $V_{GES}$            |                                                            | $\pm 20$         | V                  |
| $T_{Vj}$             |                                                            | $-40 \dots +175$ | $^{\circ}\text{C}$ |
| <b>Inverse Diode</b> |                                                            |                  |                    |
| $I_F$                | $T_c = 25(80)^{\circ}\text{C}$                             | 440(330)         | A                  |
| $I_{FRM}$            | $T_c = 25^{\circ}\text{C}$ , $t_P = 1\text{ms}$            | 1200             | A                  |
| $I_{FSM}$            | $t_P = 10\text{ms}$ ; $\sin$ ; $T_j = 150^{\circ}\text{C}$ | 1980             | A                  |
| <b>Module</b>        |                                                            |                  |                    |
| $I_{t(RMS)}$         | $T_{terminal} = 80^{\circ}\text{C}$                        | 500              | A                  |
| $T_{stg}$            |                                                            | $-40 \sim 125$   | $^{\circ}\text{C}$ |
| $V_{isol}$           | AC, 1min                                                   | 4000             | V                  |

### Features

- Infineon Trench IGBT4 technology
- Low switching losses
- Switching frequency up to 20kHz
- Square RBSOA, no latch up
- High short circuit capability
- Positive temperature coefficient for easy paralleling
- MOS input, voltage controlled
- Semikron CAL4 Soft swithcing 4.0 generation CAL diode Technology
- Package with copper base plate
- Isolation voltage 4000V

### Application

- AC and DC motor control
- AC servo and robot drives
- power supplies
- welding inverters



### Advantages

- space and weight savings
- reduced protection circuits



# SGG400T120UC2

## IGBT Modules

### Characteristics

$T_C = 25^{\circ}\text{C}$ , unless otherwise specified

| Symbol                                           | Conditions                                                                                                                                                         | min. | typ.       | max.       | Units            |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|------------|------------------|
| <b>IGBT</b>                                      |                                                                                                                                                                    |      |            |            |                  |
| $V_{GE(th)}$                                     | $V_{GE} = V_{CE}, I_C = 15.2\text{mA}$                                                                                                                             | 5.3  | 5.8        | 6.3        | V                |
| $I_{CES}$                                        | $V_{GE} = 0; V_{CE} = V_{CES}; T_j = 25^{\circ}\text{C}$                                                                                                           |      |            | 5.0        | mA               |
| $V_{CE(TO)}$                                     | $T_j = 25^{\circ}\text{C}$                                                                                                                                         |      | 0.8        | 0.9        | V                |
| $r_{CE}$                                         | $V_{GE} = 15\text{V}, T_j = 25(150)^{\circ}\text{C}$                                                                                                               |      | 2.50(3.75) | 2.88(4.00) | $\text{m}\Omega$ |
| $V_{CE(sat)}$                                    | $I_C = 400\text{A}; V_{GE} = 15\text{V}; \text{chip level}$                                                                                                        |      | 1.80       | 2.05       | V                |
| $C_{ies}$                                        | under following conditions<br>$V_{GE} = 0, V_{CE} = 25\text{V}, f = 1\text{MHz}$                                                                                   |      | 24.6       |            | nF               |
| $C_{oes}$                                        |                                                                                                                                                                    |      | 1.62       |            |                  |
| $C_{res}$                                        |                                                                                                                                                                    |      | 1.38       |            |                  |
| $L_{CE}$                                         |                                                                                                                                                                    |      | 15         |            | nH               |
| $R_{CC'+EE'}$                                    | res., terminal-chip $T_C = 25(125)^{\circ}\text{C}$                                                                                                                |      | 0.25(0.55) |            | $\text{m}\Omega$ |
| $t_{d(on)}$                                      | under following conditions:<br>$V_{CC} = 600\text{V}, I_C = 400\text{A}$<br>$R_{Gon} = R_{Goff} = 1\Omega, T_j = 150^{\circ}\text{C}$<br>$V_{GE} = \pm 15\text{V}$ |      | 220        |            | ns               |
| $t_r$                                            |                                                                                                                                                                    |      | 49         |            | ns               |
| $t_{d(off)}$                                     |                                                                                                                                                                    |      | 505        |            | ns               |
| $t_f$                                            |                                                                                                                                                                    |      | 78         |            | ns               |
| $E_{on}(E_{off})$                                |                                                                                                                                                                    |      | 33(42)     |            | mJ               |
| <b>Inverse Diode under following conditions:</b> |                                                                                                                                                                    |      |            |            |                  |
| $V_F = V_{EC}$                                   | $I_F = 400\text{A}; V_{GE} = 0\text{V}; T_j = 25^{\circ}\text{C}$                                                                                                  |      | 2.20       | 2.52       | V                |
| $V_{(FO)}$                                       | $T_j = 25(150)^{\circ}\text{C}$                                                                                                                                    |      | 1.3(0.9)   | 1.5(1.1)   | V                |
| $r_F$                                            | $T_j = 25(150)^{\circ}\text{C}$                                                                                                                                    |      | 2.3(3.1)   | 2.5(3.4)   | $\text{m}\Omega$ |
| $I_{RRM}$                                        | $I_F = 400\text{A}; T_j = 150^{\circ}\text{C}$                                                                                                                     |      | 450        |            | A                |
| $Q_{rr}$                                         | $di/dt = 8800\text{A/us}$                                                                                                                                          |      | 68         |            | $\mu\text{C}$    |
| $E_{rr}$                                         | $V_{GE} = 15\text{V}$                                                                                                                                              |      | 30         |            | mJ               |
| <b>Thermal Characteristics</b>                   |                                                                                                                                                                    |      |            |            |                  |
| $R_{th(j-c)}$                                    | per IGBT                                                                                                                                                           |      |            | 0.072      | K/W              |
| $R_{th(j-c)D}$                                   | per Inverse Diode                                                                                                                                                  |      |            | 0.14       | K/W              |
| $R_{th(c-s)}$                                    | per module                                                                                                                                                         |      |            | 0.038      | K/W              |
| <b>Mechanical Data</b>                           |                                                                                                                                                                    |      |            |            |                  |
| $M_s$                                            | to heatsink M6                                                                                                                                                     | 3    |            | 5          | Nm               |
| $M_t$                                            | to terminals M6                                                                                                                                                    | 2.5  |            | 5          | Nm               |
| Weight                                           | typical                                                                                                                                                            |      |            | 325        | g                |



# SGG400T120UC2

## IGBT Modules

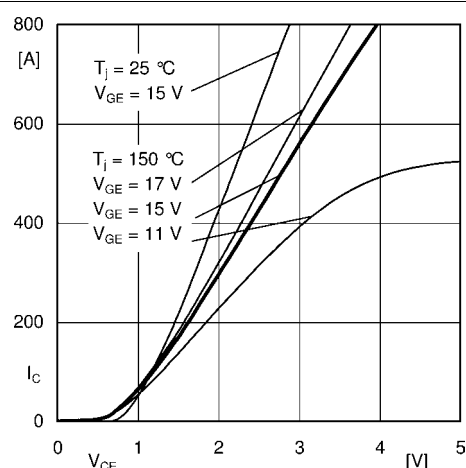


Fig. 1: Typ. output characteristic, inclusive  $R_{CC'+EE'}$

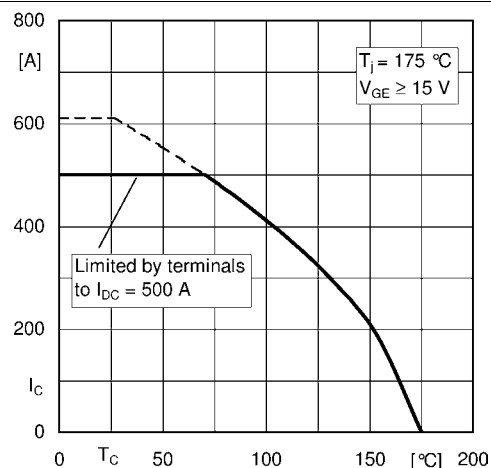


Fig. 2: Rated current vs. temperature  $I_C = f(T_C)$

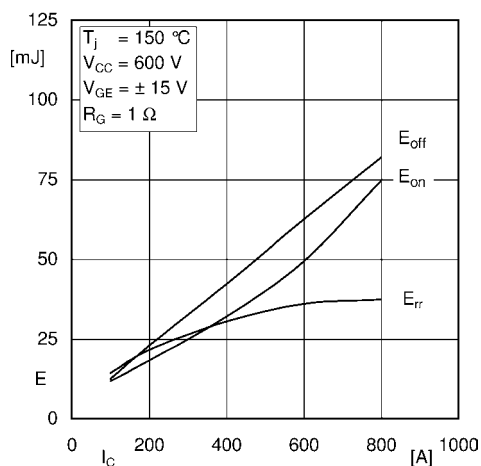


Fig. 3: Typ. turn-on /-off energy =  $f(I_C)$

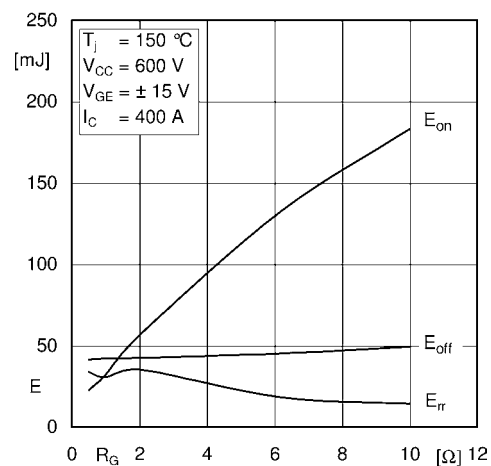


Fig. 4: Typ. turn-on /-off energy =  $f(R_G)$

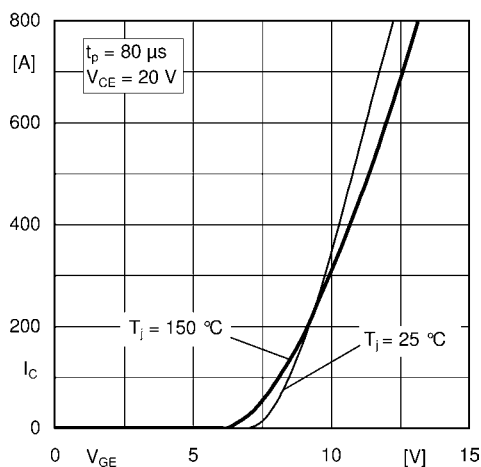


Fig. 5: Typ. transfer characteristic

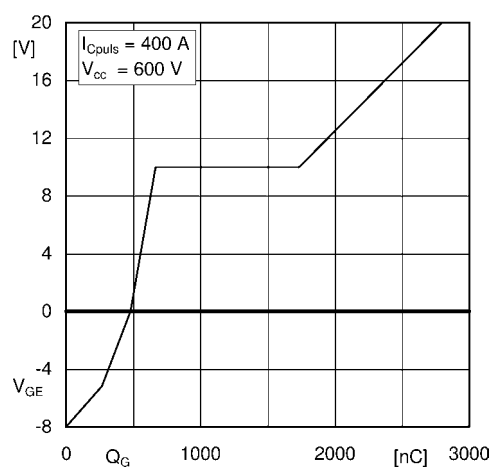


Fig. 6: Typ. gate charge characteristic

# SGG400T120UC2

## IGBT Modules

