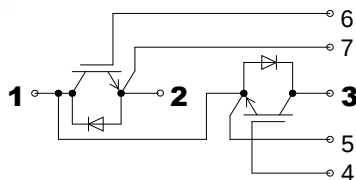


# SGG100T120UC1

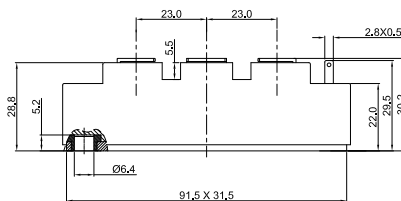
## IGBT Modules



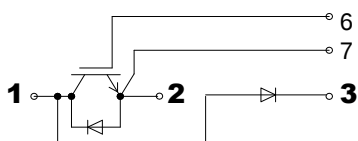
SGG100T120UC1



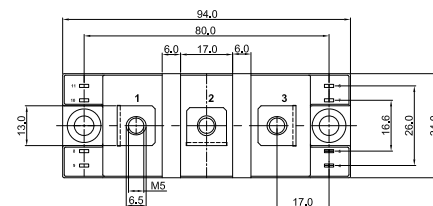
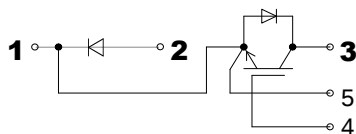
Dimensions in mm (1mm = 0.0394")



SGD100T120UC1



SDG100T120UC1



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

| Symbol               | Conditions                                                 | Values           | Units              |
|----------------------|------------------------------------------------------------|------------------|--------------------|
| <b>IGBT</b>          |                                                            |                  |                    |
| $V_{CES}$            |                                                            | 1200             | V                  |
| $I_C$                | $T_C = 25(80)^{\circ}\text{C}$                             | 160(123)         | A                  |
| $I_{CRM}$            | $T_C = 25^{\circ}\text{C}$ , $t_P = 1\text{ms}$            | 300              | A                  |
| $V_{GES}$            |                                                            | $\pm 20$         | V                  |
| $T_{Vj}$             |                                                            | $-40 \dots +175$ | $^{\circ}\text{C}$ |
| <b>Inverse Diode</b> |                                                            |                  |                    |
| $I_F = -I_C$         | $T_C = 25(80)^{\circ}\text{C}$                             | 125(100)         | A                  |
| $I_{FRM}$            | $T_C = 25^{\circ}\text{C}$ , $t_P = 1\text{ms}$            | 300              | A                  |
| $I_{FSM}$            | $t_P = 10\text{ms}$ ; $\sin$ ; $T_j = 150^{\circ}\text{C}$ | 550              | A                  |
| <b>Module</b>        |                                                            |                  |                    |
| $I_{t(RMS)}$         | $T_{terminal} = 80^{\circ}\text{C}$                        | 200              | A                  |
| $T_{stg}$            |                                                            | $-40 \sim 125$   | $^{\circ}\text{C}$ |
| $V_{isol}$           | AC, 1min                                                   | 4000             | V                  |

### Features

- Trench Field Stop 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
- Soft switching 4.0 generation FRD 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

**Sirectifier®**

# SGG100T120UC1

## IGBT Modules

### Characteristics

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

| Symbol                                           | Conditions                                                                                                                                                               | min. | typ.       | max.       | Units            |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|------------|------------------|
| <b>IGBT</b>                                      |                                                                                                                                                                          |      |            |            |                  |
| $V_{GE(th)}$                                     | $V_{GE} = V_{CE}$ , $I_C = 6\text{mA}$                                                                                                                                   | 5.0  | 5.8        | 6.5        | V                |
| $I_{CES}$                                        | $V_{GE} = 0$ ; $V_{CE} = V_{CES}$ ; $T_J = 25^{\circ}\text{C}$                                                                                                           |      |            | 1.0        | mA               |
| $V_{CE(TO)}$                                     | $T_J = 25^{\circ}\text{C}$                                                                                                                                               |      | 0.8        | 0.9        | V                |
| $r_{CE}$                                         | $V_{GE} = 15\text{V}$ , $T_J = 25(150)^{\circ}\text{C}$                                                                                                                  |      | 10.0(15.0) | 11.5(16.0) | $\text{m}\Omega$ |
| $V_{CE(sat)}$                                    | $I_C = 100\text{A}$ ; $V_{GE} = 15\text{V}$ ; chip level                                                                                                                 |      | 1.80       | 2.05       | V                |
| $C_{ies}$                                        | under following conditions<br>$V_{GE} = 0$ , $V_{CE} = 25\text{V}$ , $f = 1\text{MHz}$                                                                                   |      | 6.15       |            | nF               |
| $C_{oes}$                                        |                                                                                                                                                                          |      | 0.40       |            |                  |
| $C_{res}$                                        |                                                                                                                                                                          |      | 0.345      |            |                  |
| $L_{CE}$                                         |                                                                                                                                                                          |      |            | 30         | nH               |
| $R_{CC'+EE'}$                                    | res., terminal-chip $T_C = 25(125)^{\circ}\text{C}$                                                                                                                      |      | 0.65(1.0)  |            | $\text{m}\Omega$ |
| $t_{d(on)}$                                      | under following conditions:<br>$V_{CC} = 600\text{V}$ , $I_C = 100\text{A}$<br>$R_{Gon} = R_{Goff} = 1\Omega$ , $T_J = 150^{\circ}\text{C}$<br>$V_{GE} = \pm 15\text{V}$ |      | 165        |            | ns               |
| $t_r$                                            |                                                                                                                                                                          |      | 47         |            | ns               |
| $t_{d(off)}$                                     |                                                                                                                                                                          |      | 400        |            | ns               |
| $t_f$                                            |                                                                                                                                                                          |      | 75         |            | ns               |
| $E_{on}(E_{off})$                                |                                                                                                                                                                          |      | 15(10.2)   |            | mJ               |
| <b>Inverse Diode</b> under following conditions: |                                                                                                                                                                          |      |            |            |                  |
| $V_F = V_{EC}$                                   | $I_F = 100\text{A}$ ; $V_{GE} = 0\text{V}$ ; $T_J = 25^{\circ}\text{C}$                                                                                                  |      | 2.18       | 2.50       | V                |
| $V_{(FO)}$                                       | $T_J = 25(150)^{\circ}\text{C}$                                                                                                                                          |      | 1.3(0.95)  | 1.5(1.1)   | V                |
| $r_F$                                            | $T_J = 25(150)^{\circ}\text{C}$                                                                                                                                          |      | 9.0(12.5)  | 10.2(13.7) | $\text{m}\Omega$ |
| $I_{RRM}$                                        | $I_F = 100\text{A}$ ; $T_J = 150^{\circ}\text{C}$                                                                                                                        |      | 54         |            | A                |
| $Q_{rr}$                                         | $di/dt = 1600\text{A/us}$                                                                                                                                                |      | 15.7       |            | $\mu\text{C}$    |
| $E_{rr}$                                         | $V_{GE} = \pm 15\text{V}$                                                                                                                                                |      | 5.9        |            | mJ               |
| <b>Thermal Characteristics</b>                   |                                                                                                                                                                          |      |            |            |                  |
| $R_{th(j-c)}$                                    | per IGBT                                                                                                                                                                 |      |            | 0.27       | K/W              |
| $R_{th(j-c)D}$                                   | per Inverse Diode                                                                                                                                                        |      |            | 0.48       | K/W              |
| $R_{th(c-s)}$                                    | per module                                                                                                                                                               |      |            | 0.05       | K/W              |
| <b>Mechanical Data</b>                           |                                                                                                                                                                          |      |            |            |                  |
| $M_s$                                            | to heatsink M5                                                                                                                                                           | 3    |            | 5          | Nm               |
| $M_t$                                            | to terminals M5                                                                                                                                                          | 2.5  |            | 5          | Nm               |
| Weight                                           | typical                                                                                                                                                                  |      |            | 160        | g                |

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# SGG100T120UC1

## IGBT Modules

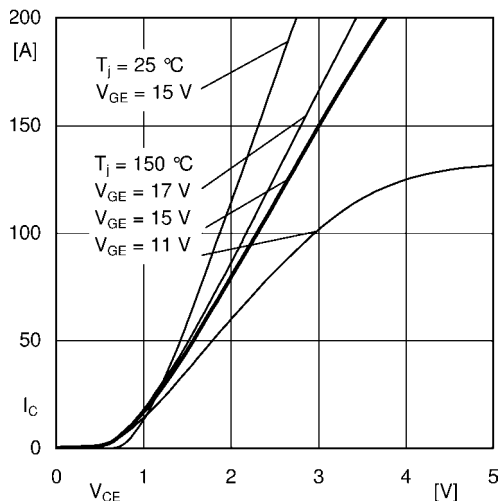


Fig. 1: Typ. output characteristic, inclusive RCC' + EE'

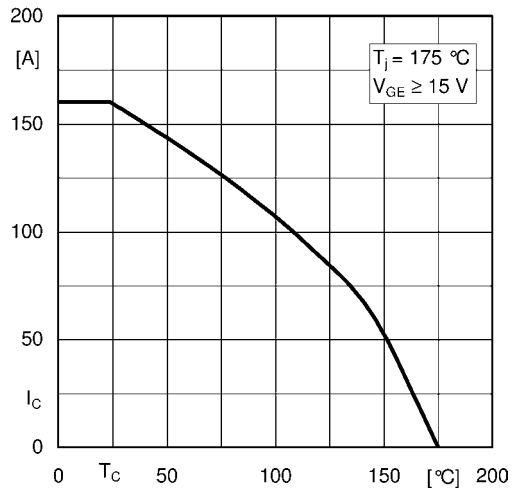


Fig. 2: Rated current vs. temperature  $I_C = f(T_C)$

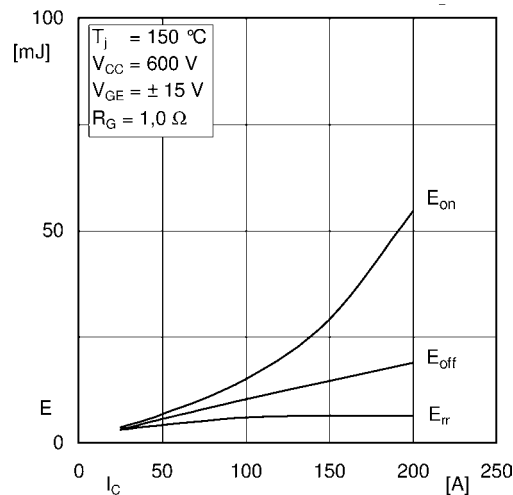


Fig. 3: Typ. turn-on /-off energy =  $f(I_C)$

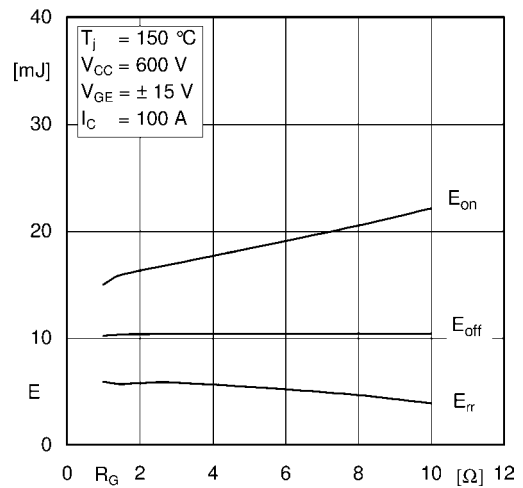


Fig. 4: Typ. turn-on /-off energy =  $f(R_G)$

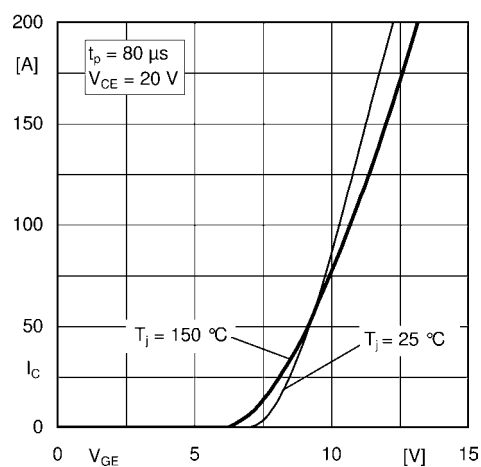


Fig. 5: Typ. transfer characteristic

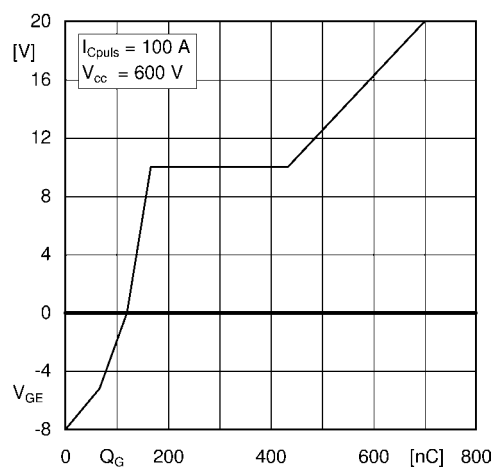


Fig. 6: Typ. gate charge characteristic

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# SGG100T120UC1

## IGBT Modules

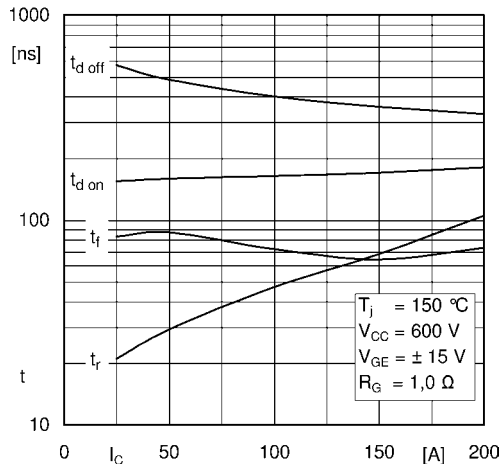


Fig. 7: Typ. switching times vs.  $I_C$

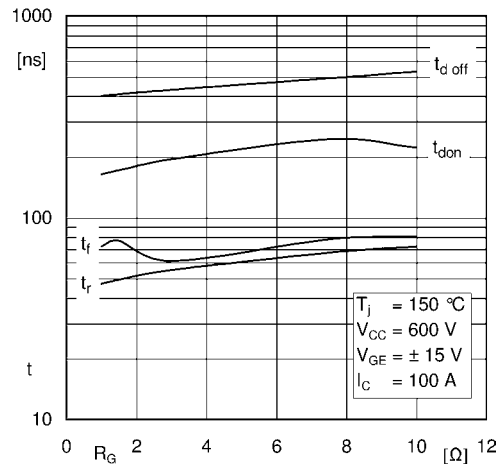


Fig. 8: Typ. switching times vs. gate resistor  $R_G$

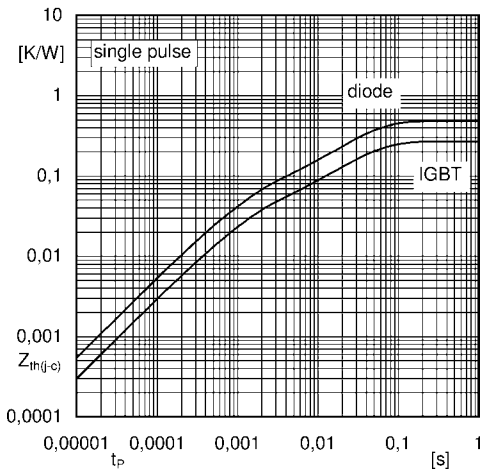


Fig. 9: Transient thermal impedance

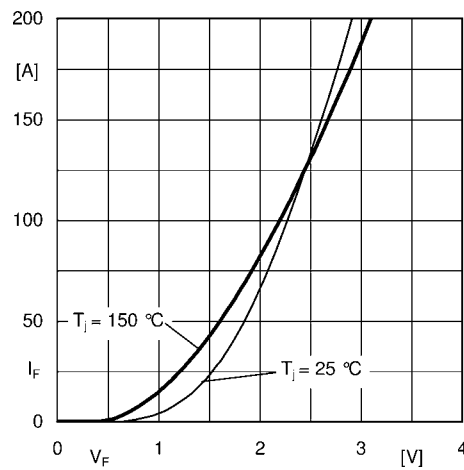


Fig. 10: Typ. FRD diode forward charact., incl.  $R_{CC} + E E'$

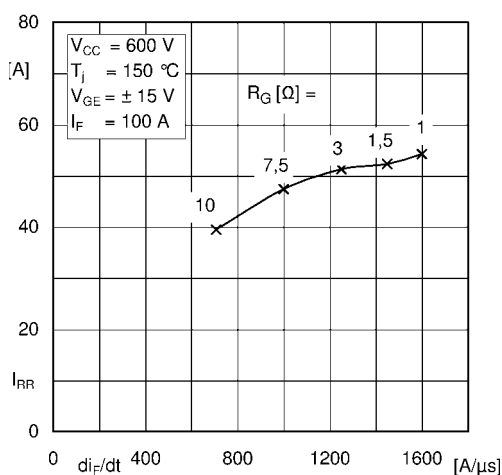


Fig. 11: FRD diode peak reverse recovery current

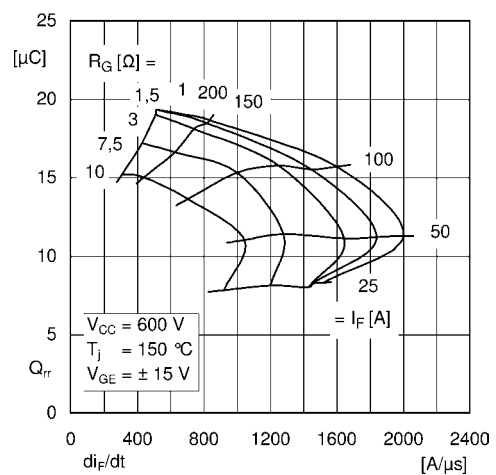


Fig. 12: Typ. FRD diode peak reverse recovery charge