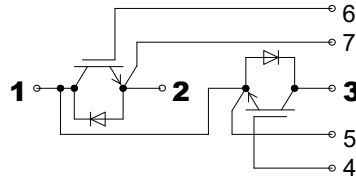


# SGG150T120UC2

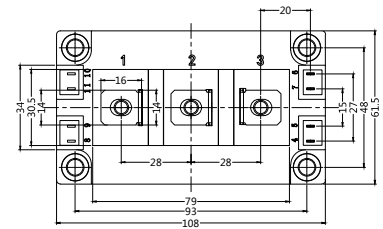
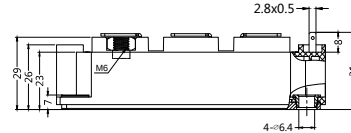
## IGBT Modules



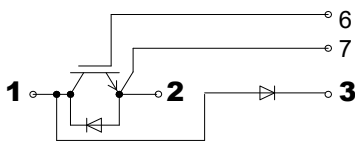
SGG150T120UC2



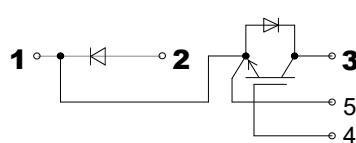
Dimensions in mm (1mm = 0.0394")



SGD150T120UC2



SDG150T120UC2



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

| Symbol               | Conditions                                        | Values        | Units              |
|----------------------|---------------------------------------------------|---------------|--------------------|
| <b>IGBT</b>          |                                                   |               |                    |
| $V_{CES}$            |                                                   | 1200          | V                  |
| $I_C$                | $T_C=25(80)^{\circ}\text{C}$                      | 223(170)      | A                  |
| $I_{CRM}$            | $T_C=25^{\circ}\text{C}, t_P=1\text{ms}$          | 450           | A                  |
| $V_{GES}$            |                                                   | $\pm 20$      | V                  |
| $T_{Vj}$             |                                                   | $-40...+175$  | $^{\circ}\text{C}$ |
| <b>Inverse Diode</b> |                                                   |               |                    |
| $I_F = -I_C$         | $T_C=25(80)^{\circ}\text{C}$                      | 183(137)      | A                  |
| $I_{FRM}$            | $T_C=25^{\circ}\text{C}, t_P=1\text{ms}$          | 450           | A                  |
| $I_{FSM}$            | $t_P=10\text{ms}; \sin.; T_J=150^{\circ}\text{C}$ | 774           | 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

- Trench FS IGBT 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 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®**

# SGG150T120UC2

## 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          |
| $I_{CES}$                                        | $V_{GE}=0; V_{CE}=V_{CES}; T_j=25^{\circ}\text{C}$                                                                                                     |      |            | 2.0       | mA         |
| $V_{CE(TO)}$                                     | $T_j=25^{\circ}\text{C}$                                                                                                                               |      | 0.8        | 0.9       | V          |
| $r_{CE}$                                         | $V_{GE}=15\text{V}, T_j=25(150)^{\circ}\text{C}$                                                                                                       |      | 7.0(10.3)  | 8.0(11.0) | m $\Omega$ |
| $V_{CE(sat)}$                                    | $I_c=150\text{A}; V_{GE}=15\text{V}; \text{chip level}$                                                                                                |      | 1.85       | 2.10      | V          |
| $C_{ies}$                                        | under following conditions<br>$V_{GE}=0, V_{CE}=25\text{V}, f=1\text{MHz}$                                                                             |      | 8.8        |           | nF         |
| $C_{oes}$                                        |                                                                                                                                                        |      | 0.58       |           |            |
| $C_{res}$                                        |                                                                                                                                                        |      | 0.47       |           |            |
| $L_{CE}$                                         |                                                                                                                                                        |      |            | 20        | nH         |
| $R_{CC'+EE'}$                                    | res., terminal-chip $T_c=25(125)^{\circ}\text{C}$                                                                                                      |      | 0.25(0.5)  |           | m $\Omega$ |
| $t_{d(on)}$                                      | under following conditions:<br>$V_{CC}=600\text{V}, I_c=150\text{A}$<br>$R_{Gon}=R_{Goff}=1\Omega, T_j=150^{\circ}\text{C}$<br>$V_{GE}=\pm 15\text{V}$ |      | 175        |           | ns         |
| $t_r$                                            |                                                                                                                                                        |      | 38         |           | ns         |
| $t_{d(off)}$                                     |                                                                                                                                                        |      | 400        |           | ns         |
| $t_f$                                            |                                                                                                                                                        |      | 78         |           | ns         |
| $E_{on}(E_{off})$                                |                                                                                                                                                        |      | 18.7(14.1) |           | mJ         |
| <b>Inverse Diode</b> under following conditions: |                                                                                                                                                        |      |            |           |            |
| $V_F = V_{EC}$                                   | $I_F=150\text{A}; V_{GE}=0\text{V}; T_j=25^{\circ}\text{C}$                                                                                            |      | 2.18       | 2.50      | V          |
| $V_{(FO)}$                                       | $T_j=25(150)^{\circ}\text{C}$                                                                                                                          |      | 1.3(0.95)  | 1.5(1.1)  | V          |
| $r_F$                                            | $T_j=25(150)^{\circ}\text{C}$                                                                                                                          |      | 5.8(8.0)   | 6.4(8.8)  | m $\Omega$ |
| $I_{RRM}$                                        | $I_F=150\text{A}; T_j=150^{\circ}\text{C}$                                                                                                             |      | 116        |           | A          |
| $Q_{rr}$                                         | $di/dt=3100\text{A/us}$                                                                                                                                |      | 26         |           | uC         |
| $E_{rr}$                                         | $V_{GE}=\pm 15\text{V}$                                                                                                                                |      | 9          |           | mJ         |
| <b>Thermal Characteristics</b>                   |                                                                                                                                                        |      |            |           |            |
| $R_{th(j-c)}$                                    | per IGBT                                                                                                                                               |      |            | 0.20      | K/W        |
| $R_{th(j-c)D}$                                   | per Inverse Diode                                                                                                                                      |      |            | 0.32      | 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                                                                                                                                                |      |            | 320       | g          |

# SGG150T120UC2

## IGBT Modules

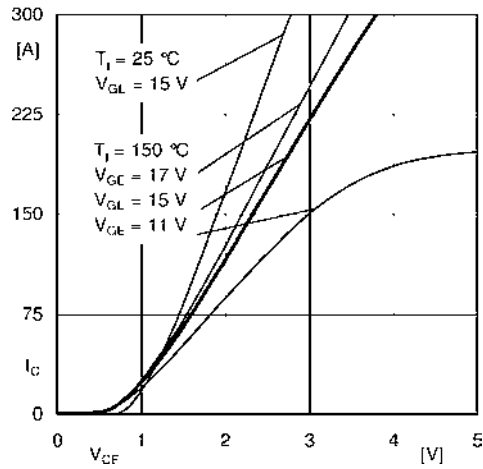


Fig. 1: Typ. output characteristic, inclusive  $R_{CC} + E_{E'}$

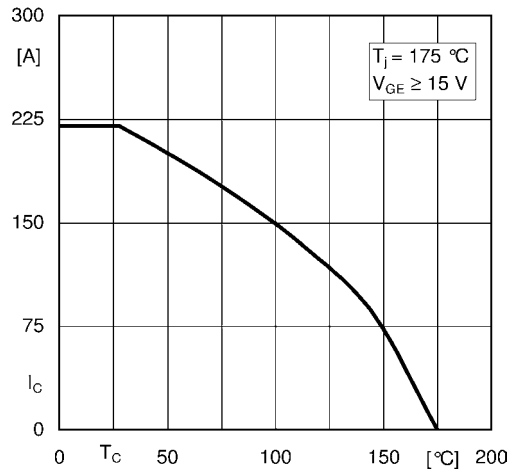


Fig. 2: Rated current vs. temperature  $I_C = f(T_C)$

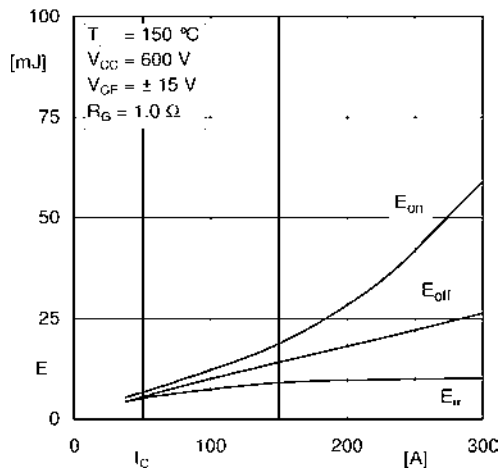


Fig. 3: Typ. turn-on /-off energy  $= f(I_C)$

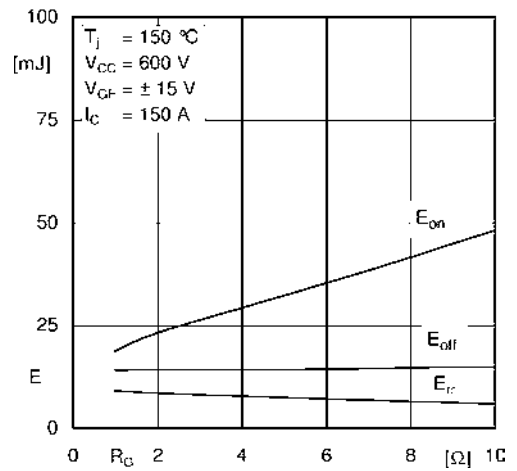


Fig. 4: Typ. turn-on /-off energy  $= f(R_G)$

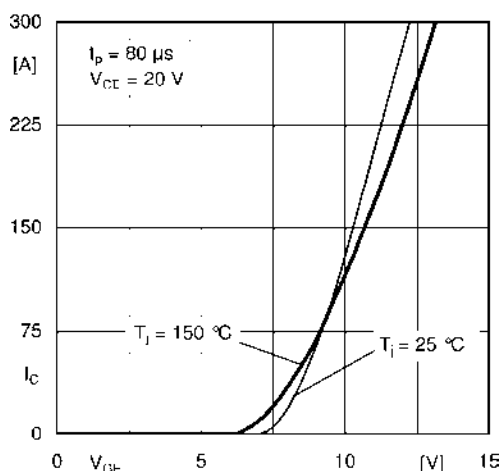


Fig. 5: Typ. transfer characteristic

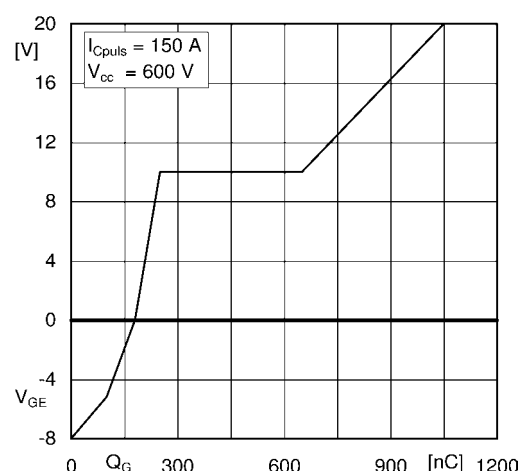


Fig. 6: Typ. gate charge characteristic

# SGG150T120UC2

## IGBT Modules

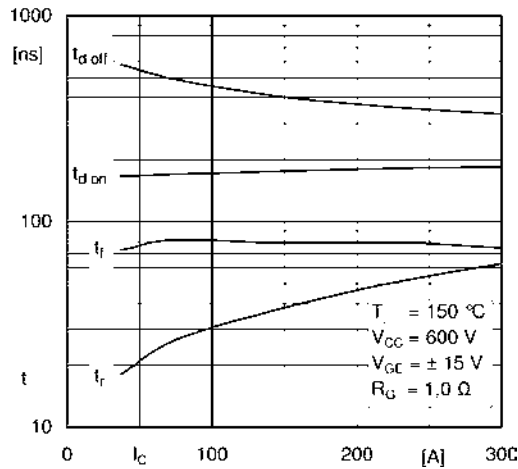


Fig. 7: Typ. switching times vs.  $I_C$

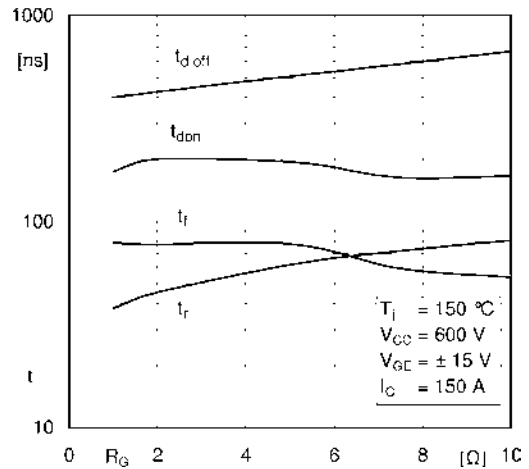


Fig. 8: Typ. switching times vs. gate resistor  $R_G$

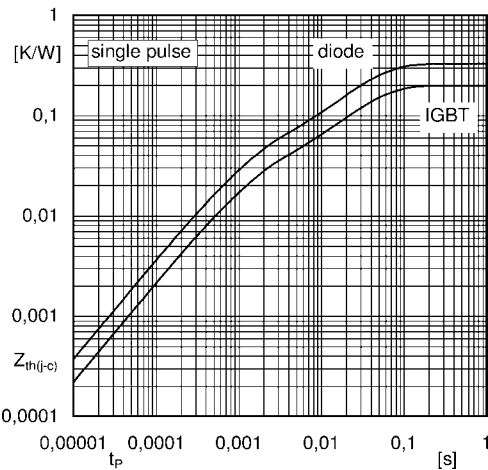


Fig. 9: Transient thermal impedance

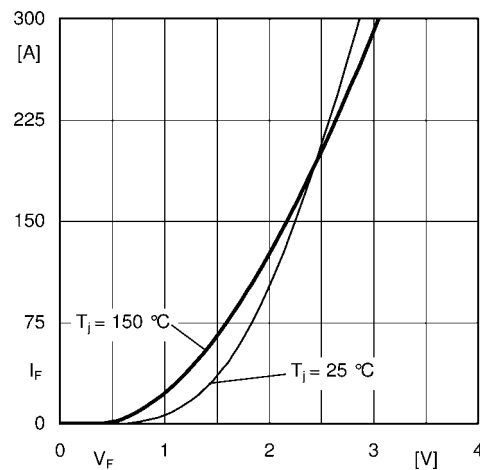


Fig. 10: Typ. FRD diode forward charact., incl.  $R_{CC}+EE'$

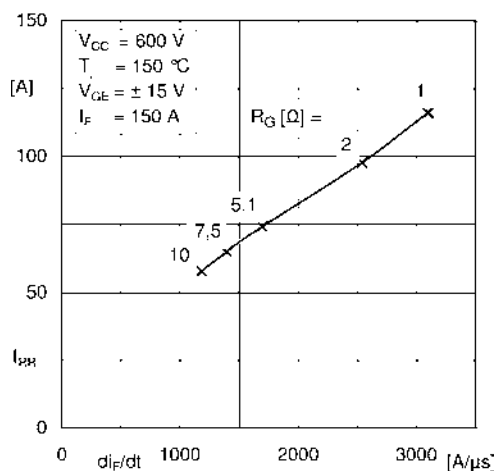


Fig. 11: FRD diode peak reverse recovery current

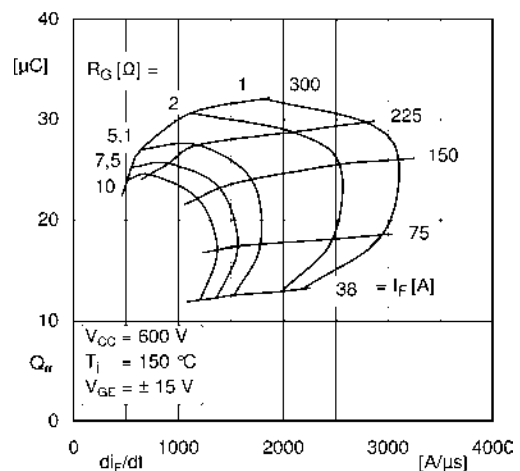


Fig. 12: Typ. FRD diode peak reverse recovery charge