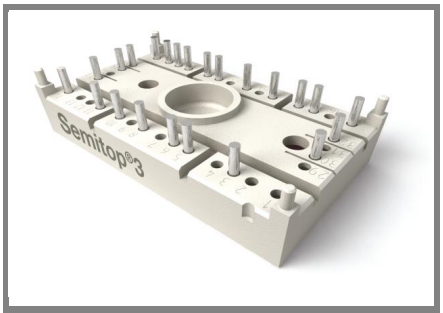
# SK 20 DGD 065 ET






## SEMITOP® 3

3-phase bridge rectifier
+3-phase bridge inverter

**SK 20 DGD 065 ET**

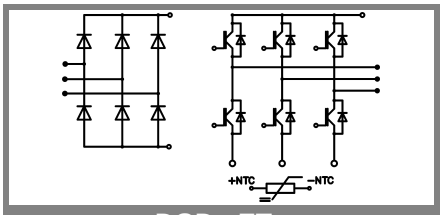
Preliminary Data

### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through
  direct copper bonded alumium oxide ceramic (DCB)
- Ultrafast NPT technology IGBT
- CAL Technology FWD
- Integrated NTC temperature sensor

### Typical Applications

- Inverter




DGD - ET

| Absolute Maximum Ratings | | $T_s$= 25°C, unless otherwise specified | |
|---|---|---|---|
| **Symbol** | **Conditions** | **Values** | **Units** |
| **IGBT - Inverter, Chopper** | | | |
| $V_{CES}$ | | 600 | V |
| $I_C$ | $T_s$ = 25 (80) °C | 26 (18) | A |
| $I_{CRM}$ | $I_{CRM}$= 2 x $I_{Cnom}$, $t_p$ = 1 ms | 40 | A |
| $V_{GES}$ | | ±20 | V |
| $T_j$ | | -40 ... +150 | °C |
| **Diode - Inverter, Chopper** | | | |
| $I_F$ | $T_s$ = 25 (80) °C | 25 (18) | A |
| $I_{FRM}$ | $I_{FRM}$ = 2x$I_{Fnom}$, $t_p$ = 1 ms | 50 | A |
| $T_j$ | | -40 ... +150 | °C |
| **Rectifier** | | | |
| $V_{RRM}$ | | 800 | V |
| $I_F$ | $T_s$ = 80 °C | 31 | A |
| $I_{FSM}$ / $I_{TSM}$ | $t_p$ = 10 ms , sin 180 ° ,$T_j$ = 25 °C | 370 | A |
| $I^2t$ | $t_p$ = 10 ms , sin 180 ° ,$T_j$ = 25 °C | 685 | A²s |
| $T_j$ | | -40 ... +150 | °C |
| $T_{sol}$ | Terminals, 10s | 260 | °C |
| $T_{stg}$ | | -40 ... +125 | °C |
| $V_{isol}$ | AC, 1 min. / 1s | 2500 / 3000 | V |

| Characteristics | | $T_s$= 25°C, unless otherwise specified | | | |
|---|---|---|---|---|---|
| **Symbol** | **Conditions** | **min.** | **typ.** | **max.** | **Units** |
| **IGBT - Inverter, Chopper** | | | | | |
| $V_{CEsat}$ | $I_C$ = 20 A, $T_j$ = 25 (125) °C | | 2 (2,2) | 2,5 | V |
| $V_{GE(th)}$ | $V_{GE}$ = $V_{CE}$, $I_C$ = 0,5 mA | 3 | 4 | 5 | V |
| $V_{CE(TO)}$ | $T_j$ = 25 °C (125) °C | | 1,2 (1,1) | 1,3 | V |
| $r_T$ | $T_j$ = 25 °C (125) °C | | 40 (55) | 60 | mΩ |
| $C_{ies}$ | $V_{CE}$ = $V_{GE}$ = 0 V, f = 1 MHz | | 1,2 | | nF |
| $C_{oes}$ | $V_{CE}$ = $V_{GE}$ = 0 V, f = 1 MHz | | - | | nF |
| $C_{res}$ | $V_{CE}$ = $V_{GE}$ = 0 V, f = 1 MHz | | - | | nF |
| $R_{th(j-s)}$ | per IGBT | | | 1,7 | K/W |
| $t_{d(on)}$ | under following conditions | | 21 | | ns |
| $t_r$ | $V_{CC}$ = 300 V, $V_{GE}$ = ± 15 V | | 28 | | ns |
| $t_{d(off)}$ | $I_C$ = 20 A, $T_j$ = 125 °C | | 170 | | ns |
| $t_f$ | $R_{Gon}$ = $R_{Goff}$ = 30 Ω | | 20 | | ns |
| $E_{on}$ | inductive load | | 0,66 | | mJ |
| $E_{off}$ | | | 0,4 | | mJ |
| **Diode - Inverter, Chopper** | | | | | |
| $V_F$ = $V_{EC}$ | $I_F$ = 20 A, $T_j$ = 25 (125) °C | | 1,6 (1,6) | | V |
| $V_{(TO)}$ | $T_j$ = 25 °C (125) °C | | 1 (0,9) | | V |
| $r_T$ | $T_j$ = 25 °C (125) °C | | 30 (33) | | mΩ |
| $R_{th(j-s)}$ | per diode | | | 1,7 | K/W |
| $I_{RRM}$ | under following conditions | | - | | A |
| $Q_{rr}$ | $I_F$ = A, $V_R$ = V | | - | | µC |
| $E_{rr}$ | $V_{GE}$ = 0 V, $T_j$ = 125 °C | | | | mJ |
| | $di_F/dt$ = - A/µs | | | | |
| **Diode rectifier** | | | | | |
| $V_F$ | $I_F$ = 15 A, $T_j$ = 25 °C | | 1,1 | | V |
| $V_{(TO)}$ | $T_j$ = 150 °C | | 0,8 | | V |
| $r_T$ | $T_j$ = 150 °C | | 15 | | mΩ |
| $R_{th(j-s)}$ | per diode | | | 1,7 | K/W |
| **Temperatur sensor** | | | | | |
| $R_{ts}$ | 5 %, $T_r$ = 25 (100 ) °C | | 5000(493) | | Ω |
| **Mechanical data** | | | | | |
| w | | | 30 | | g |
| $M_s$ | Mounting torque | | | 2,5 | Nm |

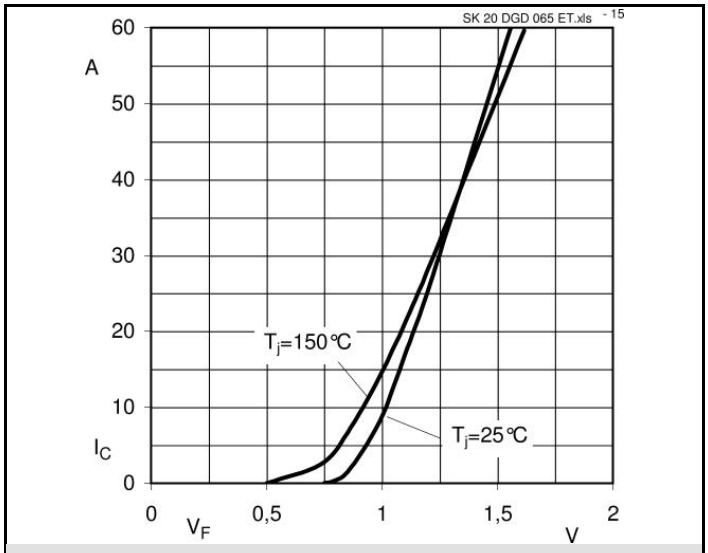



Fig. 15 Typ. Input Bridge Diode forward characteristic

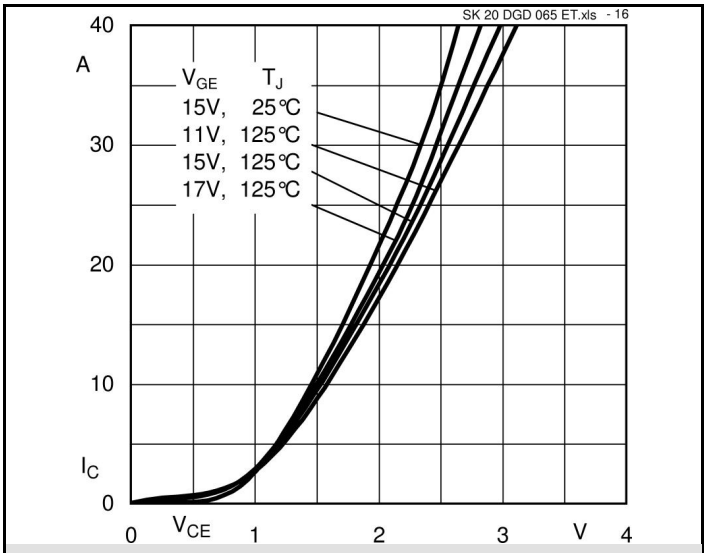



Fig. 16 Typical Output Characteristic

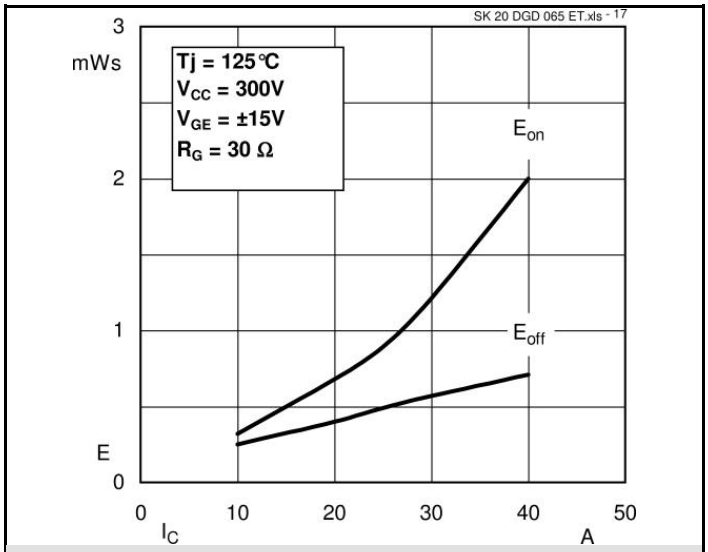



Fig. 17 Turn-On/Off Energy = f($I_C$)

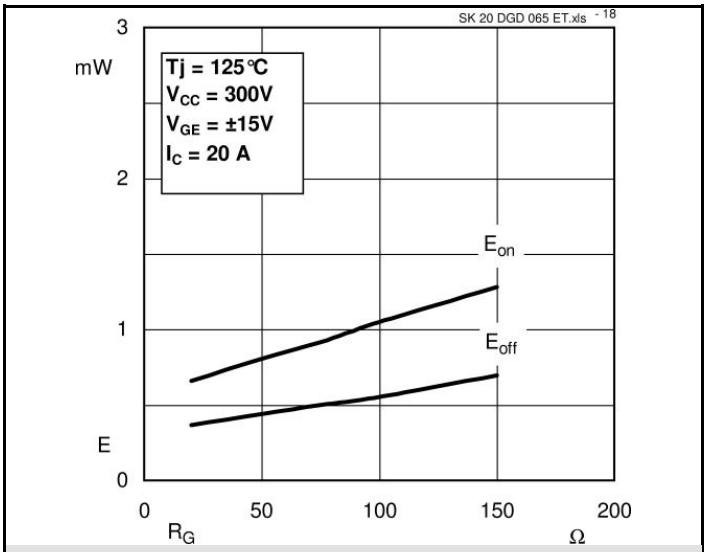



Fig. 18 Turn-On/Off Energy = f($R_G$)

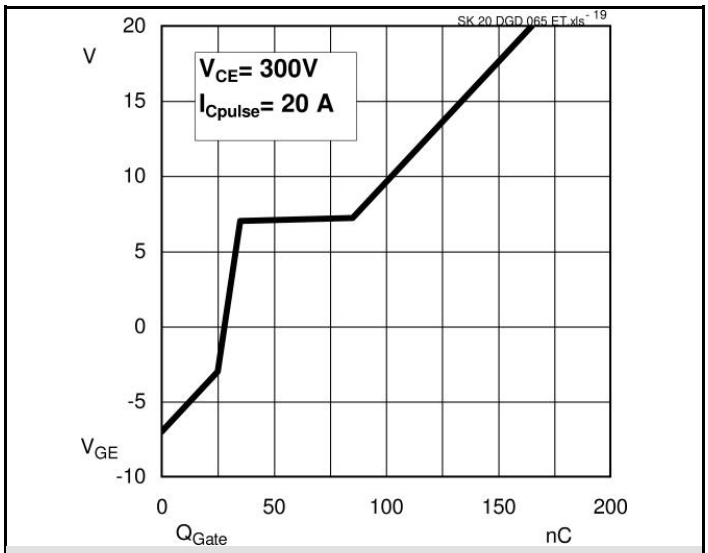



Fig. 19 Typical Gate Charge Characteristic

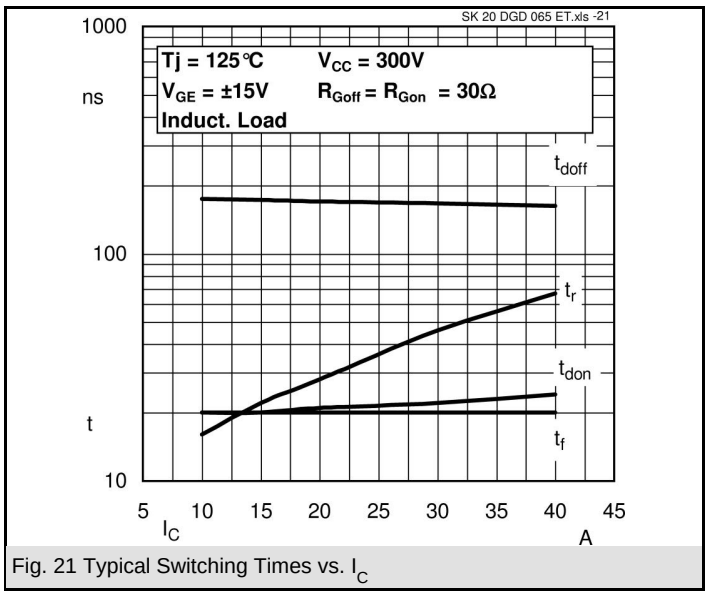



Fig. 21 Typical Switching Times vs. $I_C$

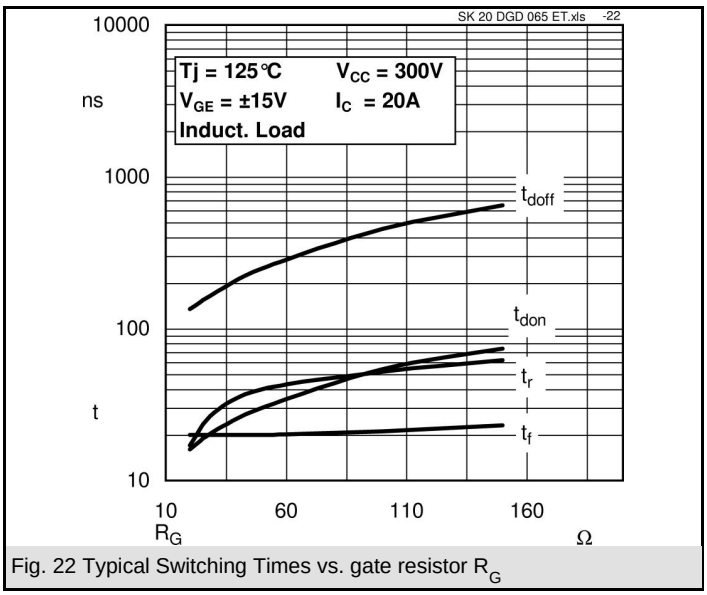



Fig. 22 Typical Switching Times vs. gate resistor $R_G$

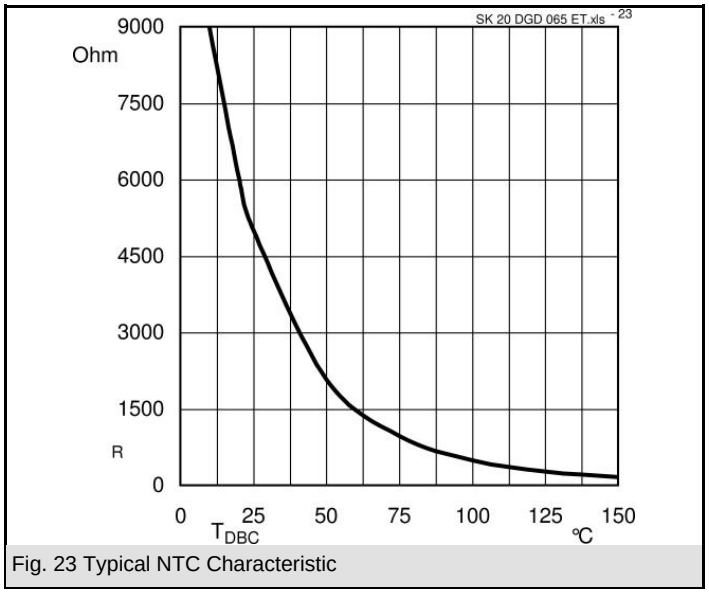



Fig. 23 Typical NTC Characteristic

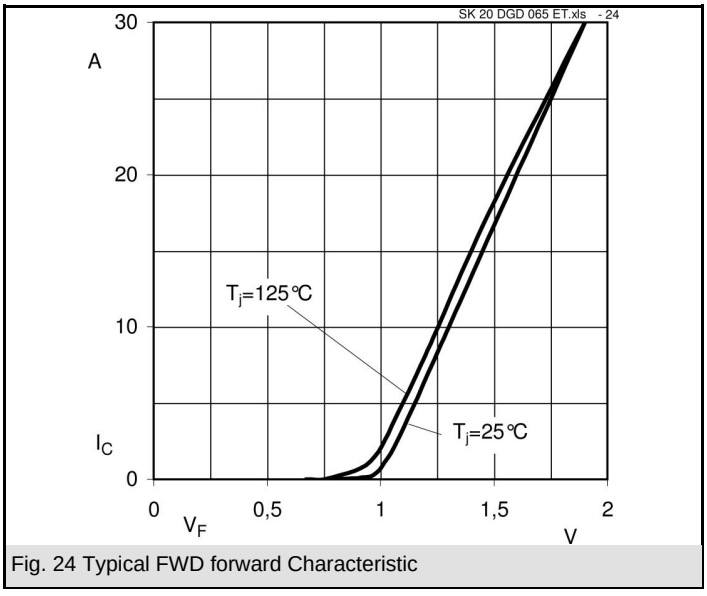
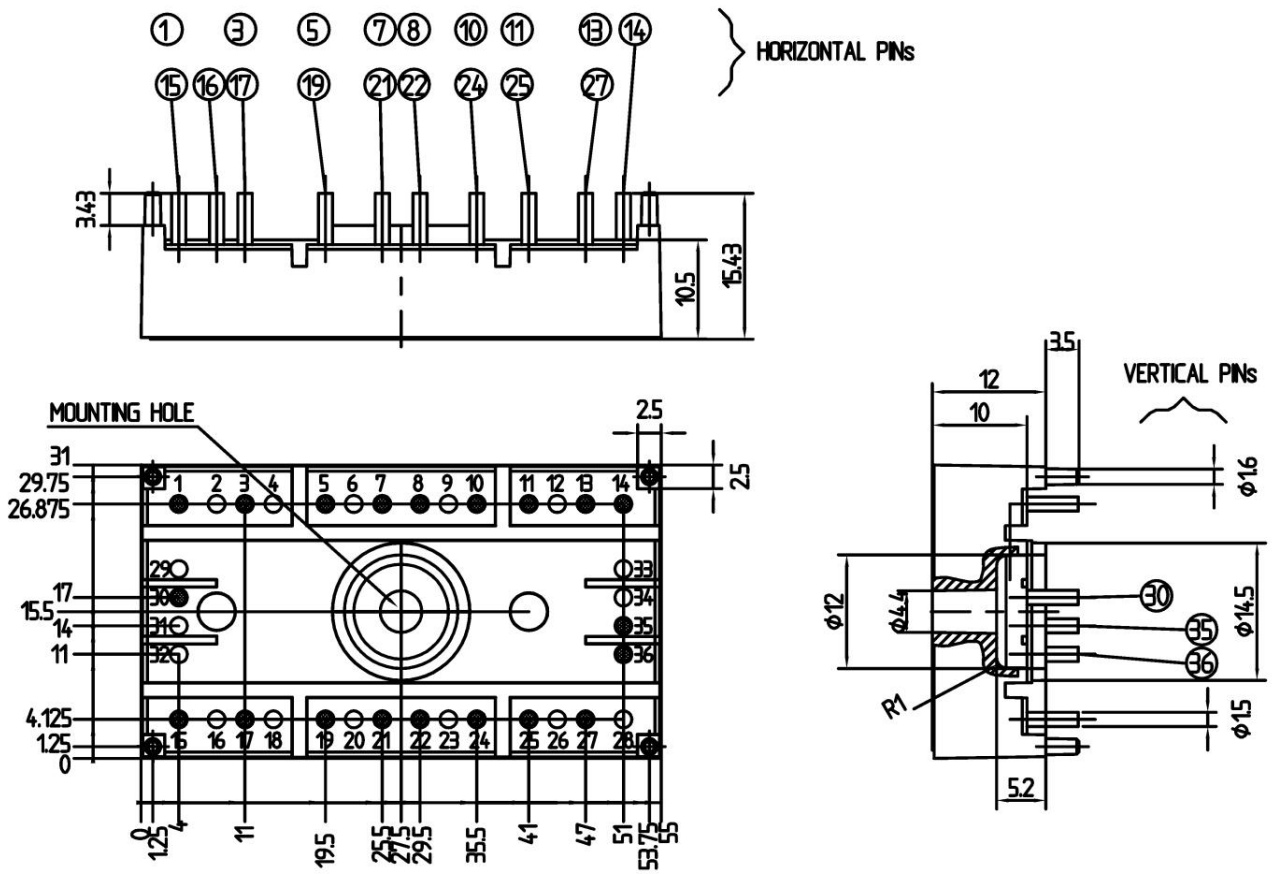


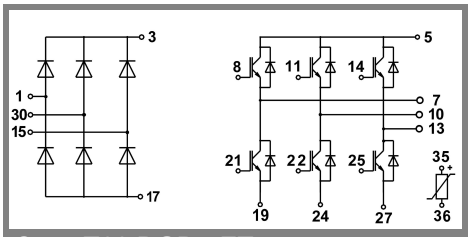

Fig. 24 Typical FWD forward Characteristic

Dimensions in mm




Case T60 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T60 DGD - ET

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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