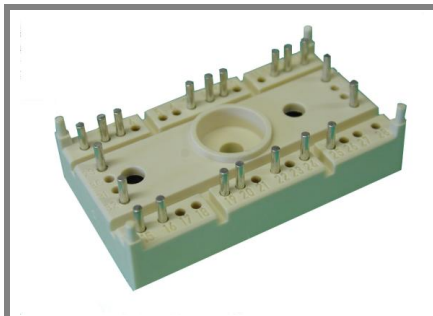


SK 20 DGDL 065 ET



SEMITOP[®] 3

3-phase bridge rectifier + brake chopper +3-phase bridge inverter SK 20 DGDL 065 ET

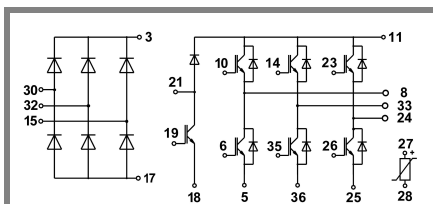
Preliminary Data

Features

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

Typical Applications

- Inverter



DGDL - ET

| Absolute Maximum Ratings | | $T_s = 25^\circ\text{C}$, unless otherwise specified | |
|----------------------------------|---------------------------------------------------------------------|-------------------------------------------------------|----------------------|
| Symbol | Conditions | Values | Units |
| IGBT - Inverter, Chopper | | | |
| V_{CES} | | 600 | V |
| I_C | $T_s = 25 (80)^\circ\text{C}$ | 24 (17) | A |
| I_{CM} | $T_s = 25 (80)^\circ\text{C}$, $t_p \leq 1 \text{ ms}$ | 48 (34) | A |
| V_{GES} | | ± 20 | V |
| T_j | | -40 ... +150 | $^\circ\text{C}$ |
| Diode - Inverter, Chopper | | | |
| I_F | $T_s = 25 (80)^\circ\text{C}$ | 25 (18) | A |
| $I_{FM} = -I_{CM}$ | $T_s = 25 (80)^\circ\text{C}$, $t_p \leq 1 \text{ ms}$ | 50 (36) | A |
| T_j | | -40 ... +150 | $^\circ\text{C}$ |
| Rectifier | | | |
| V_{RRM} | | 800 | V |
| I_{FAV} / I_{TAV} | $T_s = 80^\circ\text{C}$ | 20 | A |
| I_{FSM} / I_{TSM} | $t_p = 10 \text{ ms}$, $\sin 180^\circ$, $T_j = 25^\circ\text{C}$ | 220 | A |
| I_t^2 | $t_p = 10 \text{ ms}$, $\sin 180^\circ$, $T_j = 25^\circ\text{C}$ | 240 | A^2s |
| T_j | | -40 ... +150 | $^\circ\text{C}$ |
| T_{sol} | Terminals, 10s | 260 | $^\circ\text{C}$ |
| T_{stg} | | -40 ... +125 | $^\circ\text{C}$ |
| V_{isol} | AC, 1 min. / 1s | 2500 / 3000 | V |

| Characteristics | | $T_s = 25^\circ\text{C}$, unless otherwise specified | | | |
|----------------------------------|--------------------------------------------------------|-------------------------------------------------------|-----------|------|------------------|
| Symbol | Conditions | min. | typ. | max. | Units |
| IGBT - Inverter, Chopper | | | | | |
| V_{CEsat} | $I_C = 20 \text{ A}$, $T_j = 25 (125)^\circ\text{C}$ | | 2 (2,2) | 2,5 | V |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}$, $I_C = 0,5 \text{ mA}$ | 3 | 4 | 5 | V |
| $V_{CE(TO)}$ | $T_j = ^\circ\text{C} ()^\circ\text{C}$ | | 1,2 (1,1) | 1,3 | V |
| r_T | $T_j = ^\circ\text{C} ()^\circ\text{C}$ | | 40 (55) | 60 | $\text{m}\Omega$ |
| C_{ies} | $V_{CE} = V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$ | | 1,2 | | nF |
| C_{oes} | $V_{CE} = V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$ | | - | | nF |
| C_{res} | $V_{CE} = V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$ | | - | | nF |
| $R_{th(j-s)}$ | per IGBT | | | 1,7 | K/W |
| $t_{d(on)}$ | under following conditions | | 21 | | ns |
| t_r | $V_{CC} = 300 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$ | | 28 | | ns |
| $t_{d(off)}$ | $I_C = 20 \text{ A}$, $T_j = 125^\circ\text{C}$ | | 170 | | ns |
| t_f | $R_{Gon} = R_{Goff} = 30 \Omega$ | | 20 | | ns |
| E_{on} | inductive load | | 0,69 | | mJ |
| E_{off} | | | 0,39 | | mJ |
| Diode - Inverter, Chopper | | | | | |
| $V_F = V_{EC}$ | $I_F = 20 \text{ A}$, $T_j = 25 (125)^\circ\text{C}$ | | 1,6 (1,6) | | V |
| $V_{(TO)}$ | $T_j = ^\circ\text{C} (125)^\circ\text{C}$ | | 1 (0,9) | | V |
| r_T | $T_j = ^\circ\text{C} (125)^\circ\text{C}$ | | 30 (33) | | $\text{m}\Omega$ |
| $R_{th(j-s)}$ | per diode | | | 1,7 | K/W |
| I_{RRM} | under following conditions | | - | | A |
| Q_{rr} | $I_F = \text{A}$, $V_R = \text{V}$ | | - | | μC |
| E_{rr} | $V_{GE} = 0 \text{ V}$, $T_j = 125^\circ\text{C}$ | | - | | mJ |
| | $di_F/dt = - \text{A}/\mu\text{s}$ | | | | |
| Diode rectifier | | | | | |
| V_F | $I_F = 15 \text{ A}$, $T_j = 25^\circ\text{C}$ | | 1,1 | | V |
| $V_{(TO)}$ | $T_j = 150^\circ\text{C}$ | | 0,8 | | V |
| r_T | $T_j = 150^\circ\text{C}$ | | 20 | | $\text{m}\Omega$ |
| $R_{th(j-s)}$ | per diode | | | 2 | K/W |
| Temperatur sensor | | | | | |
| R_{ts} | 5 %, $T_r = 25 (100)^\circ\text{C}$ | | 5000(493) | | Ω |
| Mechanical data | | | | | |
| w | | | 30 | | g |
| M_s | Mounting torque | | | 2,5 | Nm |

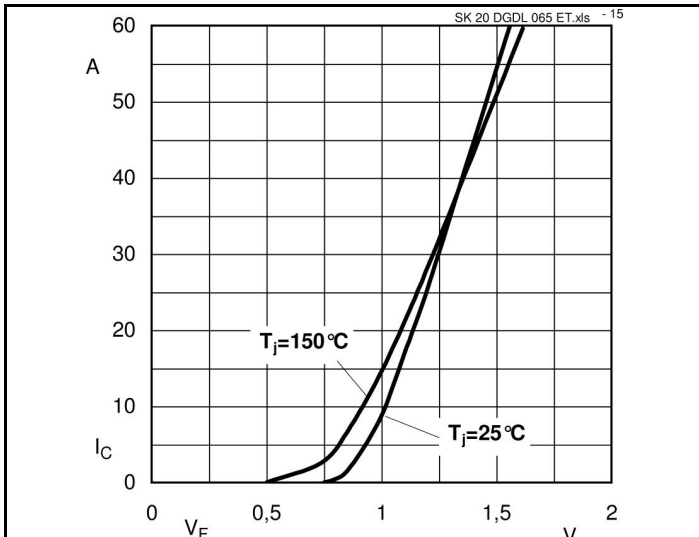


Fig. 15 Input Bridge Diode forward characteristic

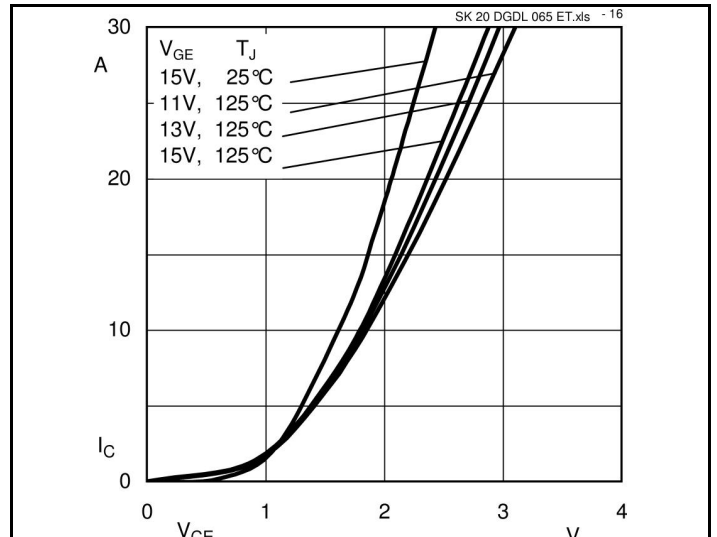


Fig. 16 Typical Output Characteristic

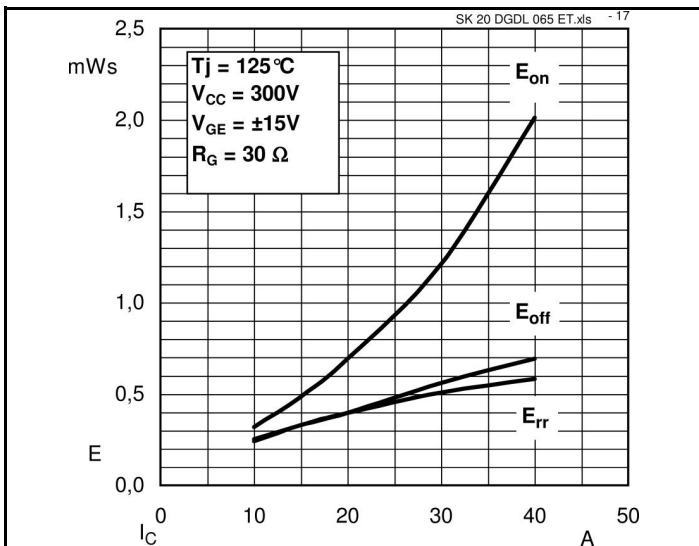


Fig. 17 Turn-on/-off energy = $f(I_C)$

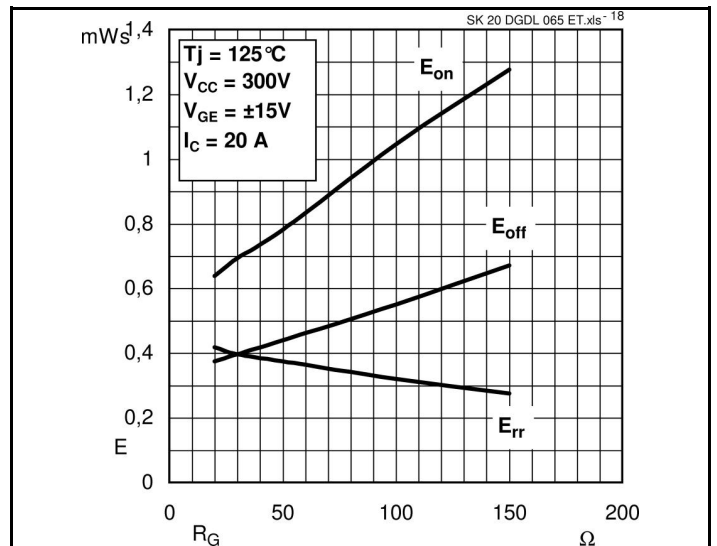


Fig. 18 Turn-on/-off energy = $f(R_G)$

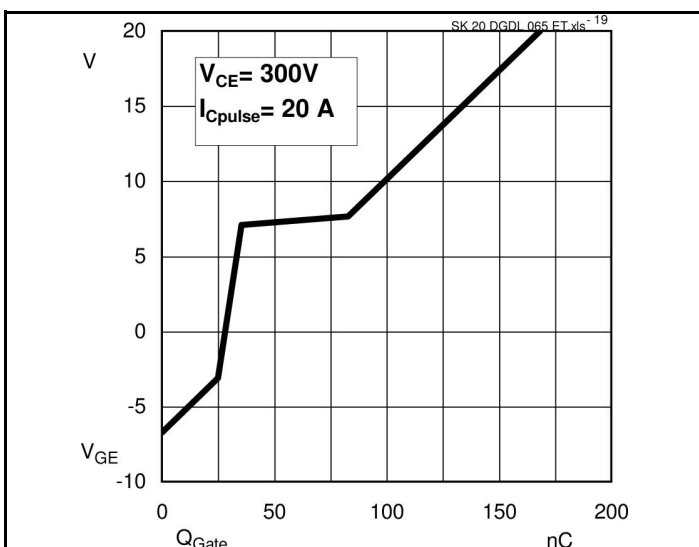
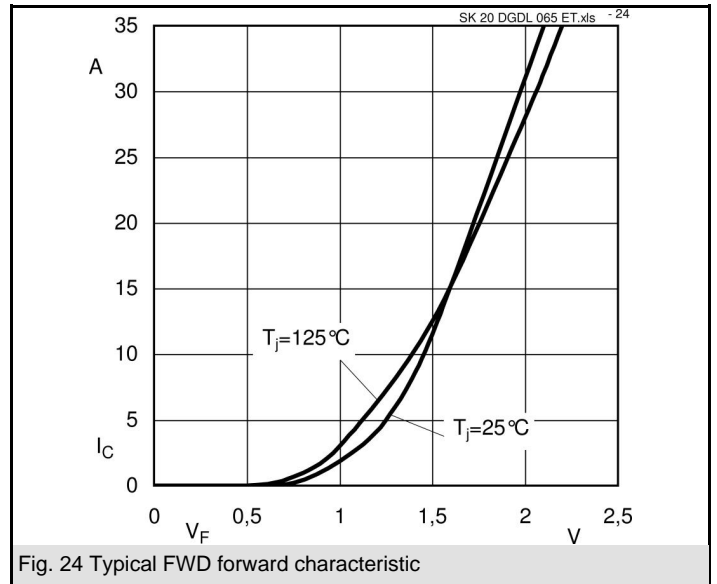
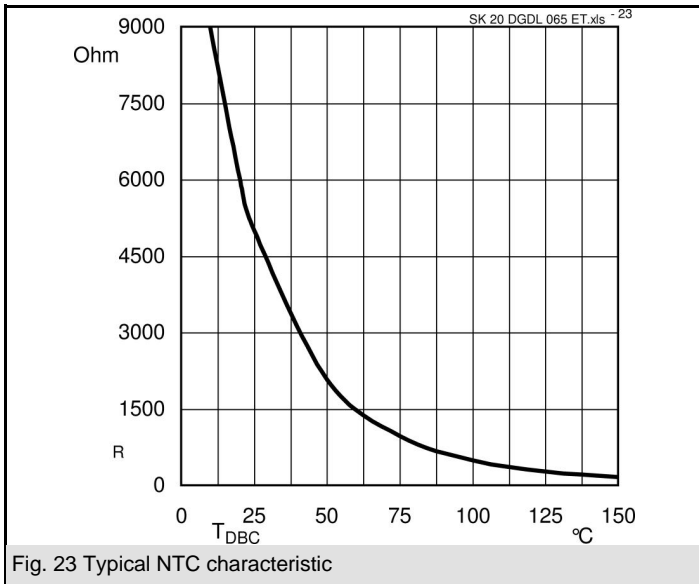
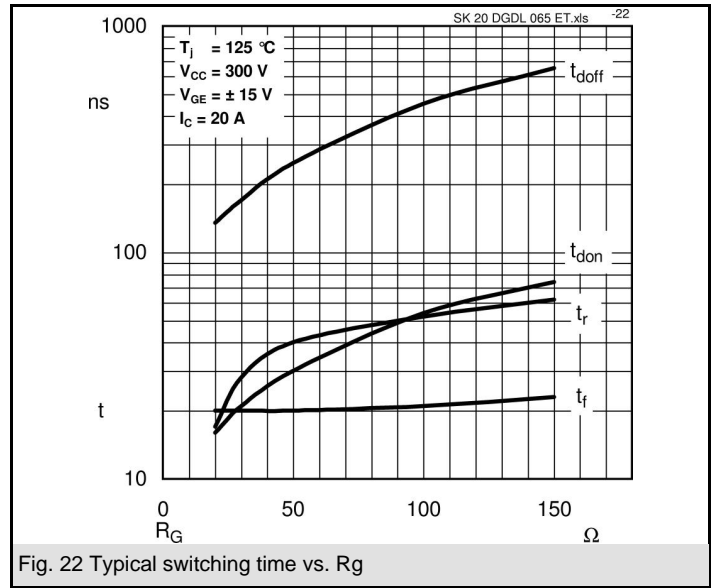
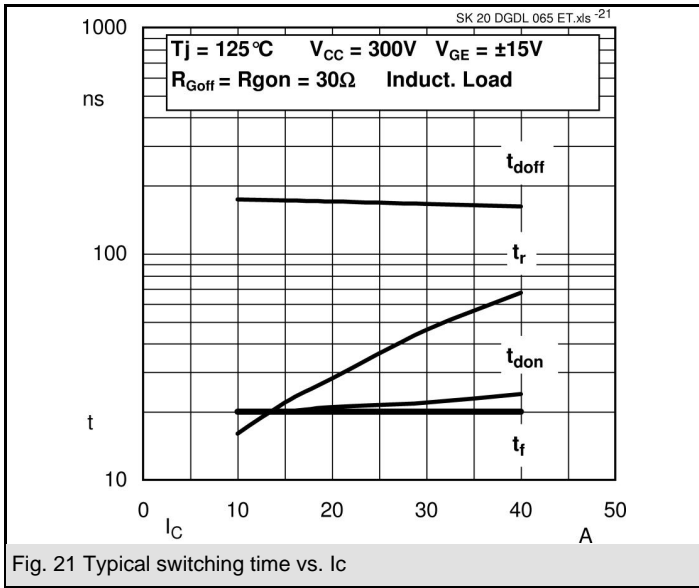
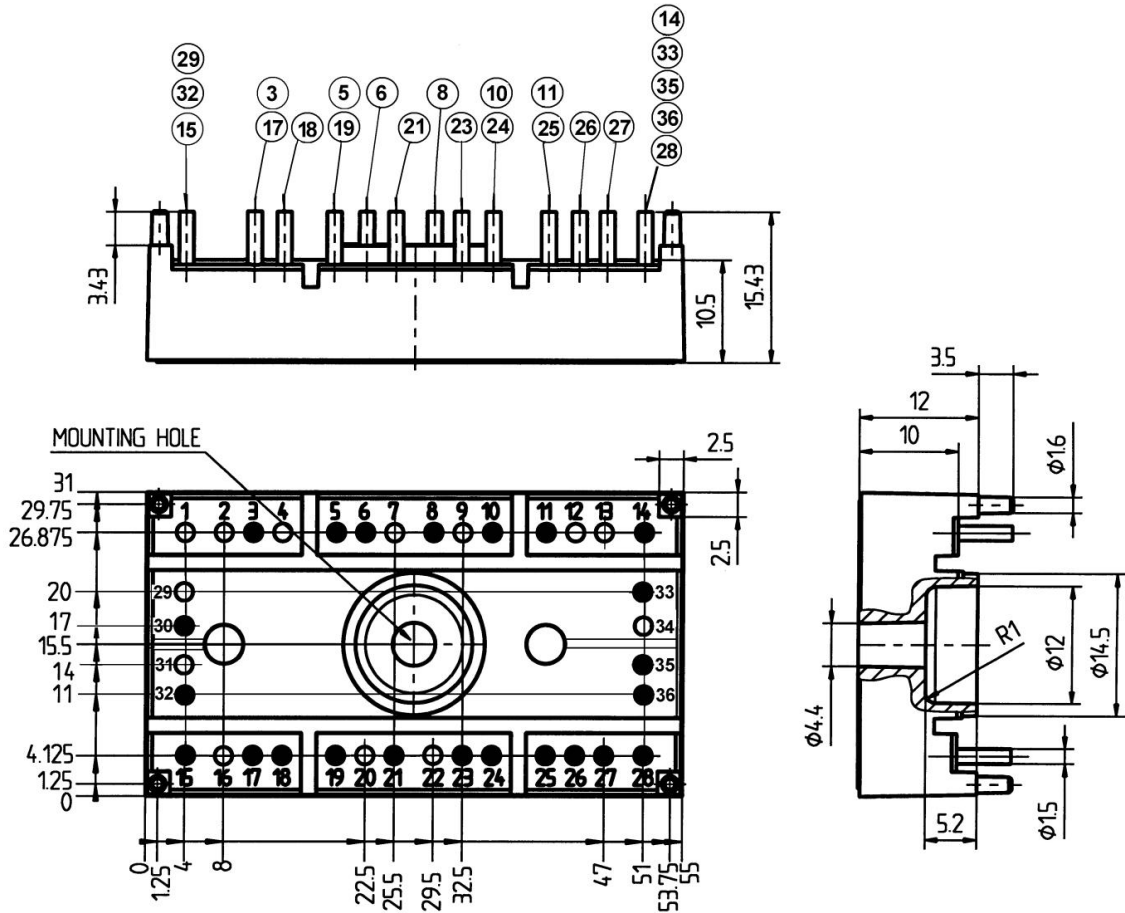
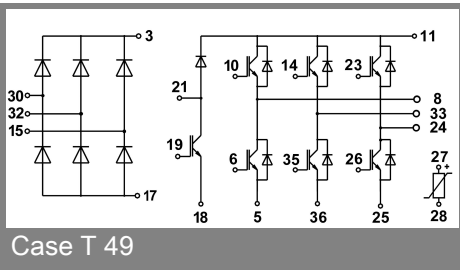


Fig. 19 Typical gate charge characteristic





Case T 49 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T 49

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

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