

**SEMITOP® 3**

## 3-phase bridge rectifier + brake chopper +3-phase bridge inverter

### SK 20 DGDL 065 ET

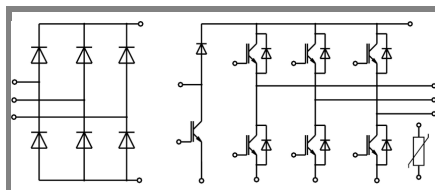
Preliminary Data

### 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
<b>IGBT - Inverter, Chopper</b>			
$V_{CES}$		600	V
$I_C$	$T_s = 25$ (80) $^\circ\text{C}$	24 (17)	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$ , $t_p = 1$ ms	40	A
$V_{GES}$		$\pm 20$	V
$T_j$		-40 ... +150	$^\circ\text{C}$
<b>Diode - Inverter, Chopper</b>			
$I_F$	$T_s = 25$ (80) $^\circ\text{C}$	25 (18)	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$ , $t_p = 1$ ms	50	A
$T_j$		-40 ... +150	$^\circ\text{C}$
<b>Rectifier</b>			
$V_{RRM}$		800	V
$I_F$	$T_s = 80$ $^\circ\text{C}$	30	A
$I_{FSM} / I_{TSM}$	$t_p = 10$ ms, $\sin 180^\circ$ , $T_j = 25$ $^\circ\text{C}$	220	A
$I_t^2$	$t_p = 10$ ms, $\sin 180^\circ$ , $T_j = 25$ $^\circ\text{C}$	240	$\text{A}^2\text{s}$
$T_j$		-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
<b>IGBT - Inverter, Chopper</b>					
$V_{CEsat}$	$I_C = 20$ A, $T_j = 25$ (125) $^\circ\text{C}$		2 (2,2)	2,5	V
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 0,5$ 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	m $\Omega$
$C_{ies}$	$V_{CE} = V_{GE} = 0$ 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, $V_{GE} = \pm 15$ V		28		ns
$t_{d(off)}$	$I_C = 20$ 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
<b>Diode - Inverter, Chopper</b>					
$V_F = V_{EC}$	$I_F = 20$ 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)		m $\Omega$
$R_{th(j-s)}$	per diode			1,7	K/W
$I_{RRM}$	under following conditions		-		A
$Q_{rr}$	$I_F = A$ , $V_R = V$		-		$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0$ V, $T_j = 125$ $^\circ\text{C}$ $di_F/dt = - A/\mu\text{s}$		-		mJ
<b>Diode rectifier</b>					
$V_F$	$I_F = 15$ 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		m $\Omega$
$R_{th(j-s)}$	per diode			2	K/W
<b>Temperatur sensor</b>					
$R_{ts}$	5 %, $T_r = 25$ (100) $^\circ\text{C}$		5000(493)		$\Omega$
<b>Mechanical data</b>					
w			30		g
$M_s$	Mounting torque			2,5	Nm

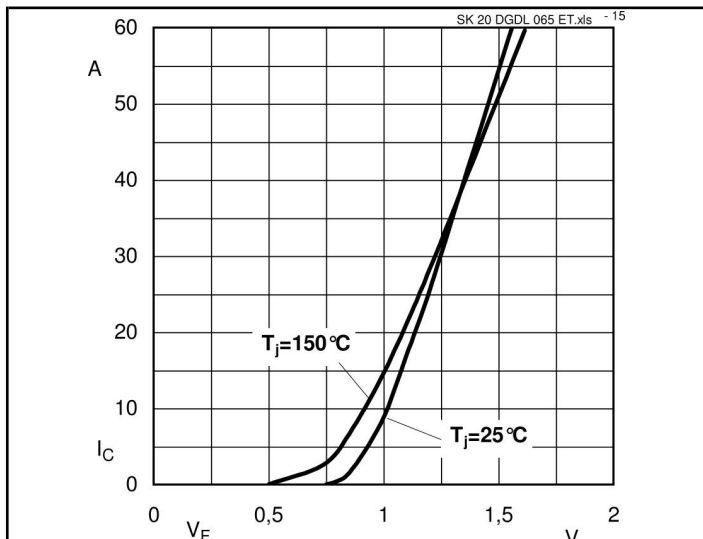


Fig. 15 Input Bridge Diode forward characteristic

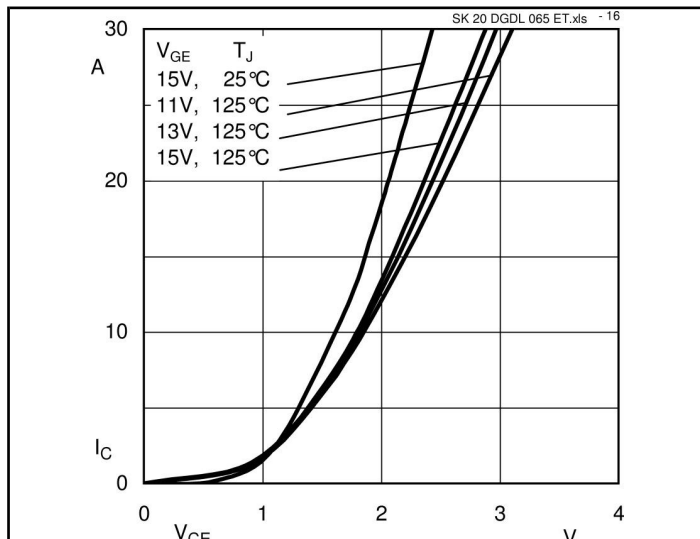


Fig. 16 Typical Output Characteristic

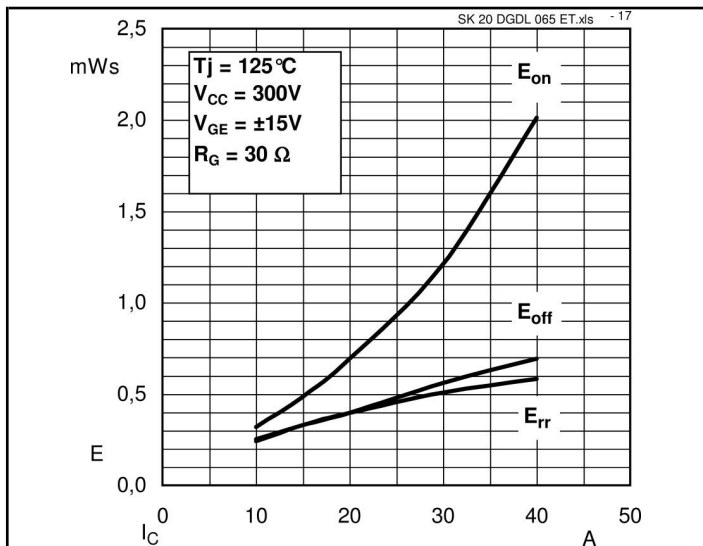


Fig. 17 Turn-on/-off energy =  $f(I_c)$

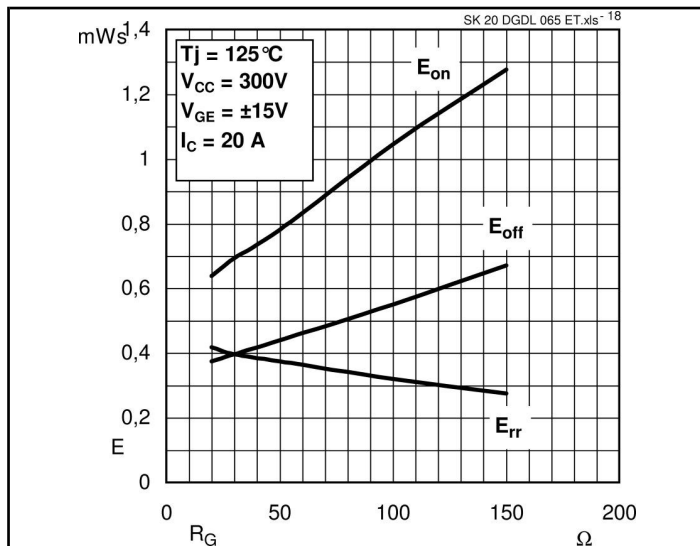


Fig. 18 Turn-on/-off energy =  $f(R_g)$

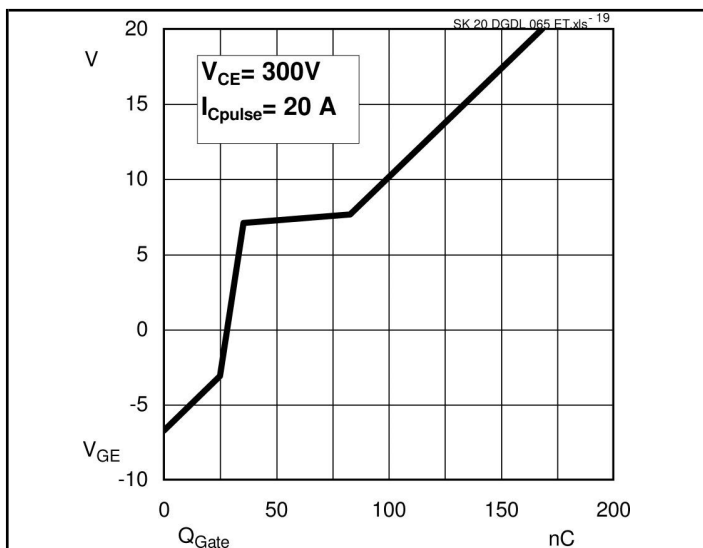
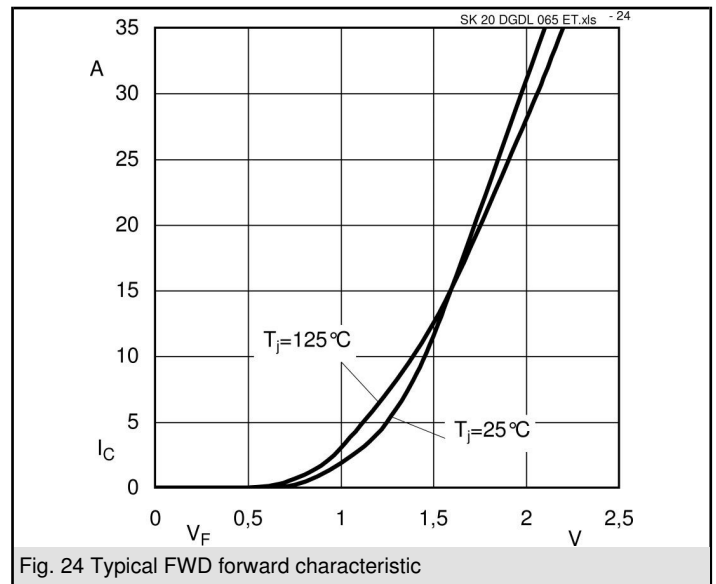
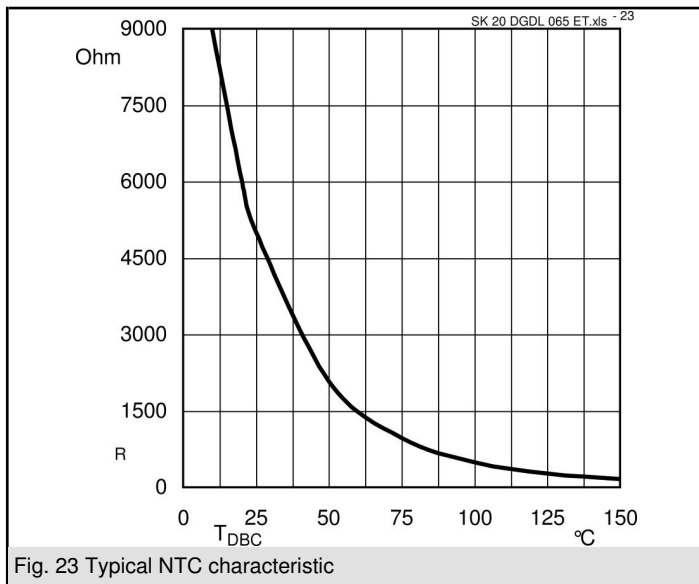
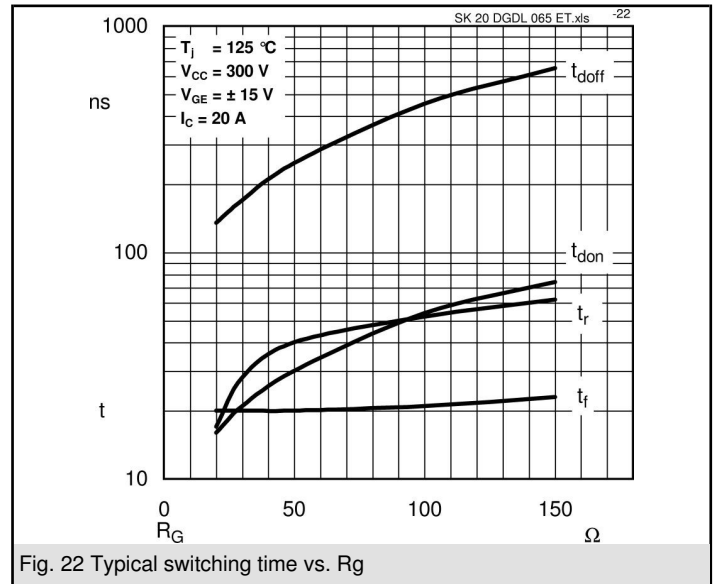
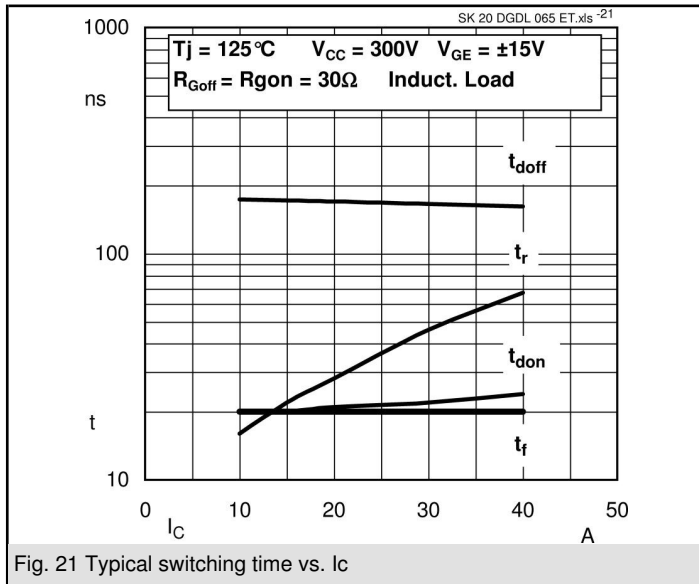


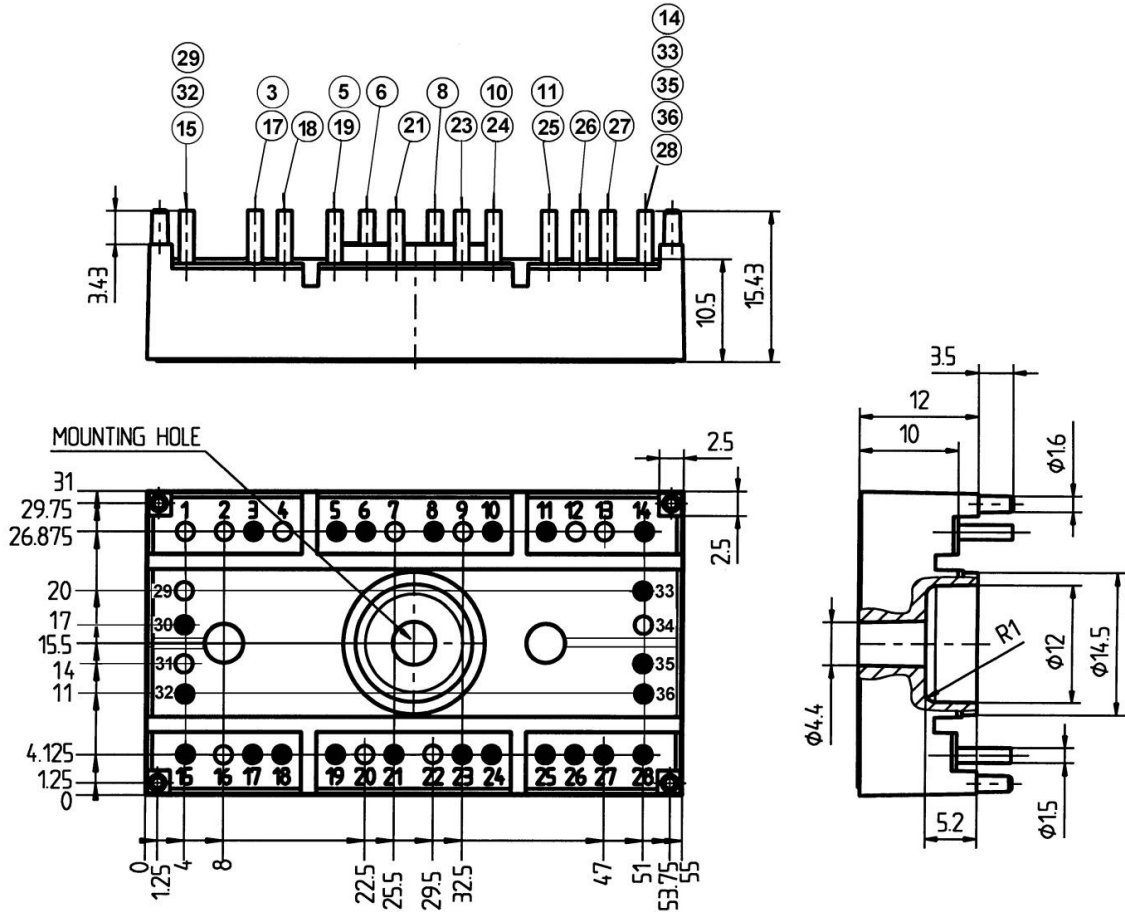
Fig. 19 Typical gate charge characteristic



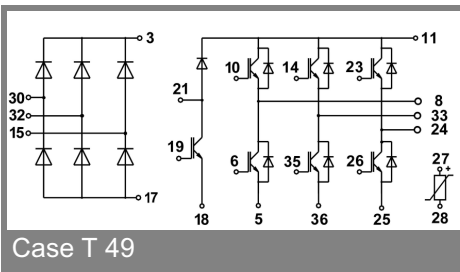
# SK 20 DGDL 065 ET

UL Recognized File  
no. E 63532

Dimensions in mm



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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