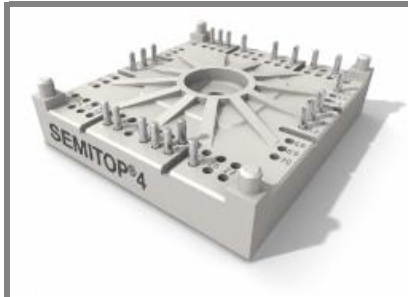


# SK50DGDL12T4T



SEMITOP<sup>®</sup>4

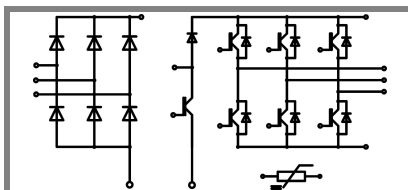
3-phase bridge rectifier +  
brake chopper + 3-phase  
bridge inverter  
SK 50 DGDL 12T4 T

Target Data

## Features

- One screw mounting module
- Fully compatible with SEMITOP<sup>®</sup>1,2,3
- Improved thermal performances by aluminium oxide substrate
- Trench4 IGBT technology
- CAL4 technology free-wheeling diode
- Integrated NTC temperature sensor

1)  $V_{CE,sat}$ ,  $V_F$  = chip level value



DGDL - T

Absolute Maximum Ratings		Ts = 25 °C, unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT - Inverter. For IGBT chopper maximum ratings, please refer to SK35DGDL12T4T</b>			
$V_{CES}$		1200	V
$I_C$	$T_s = 25 (70) ^\circ C$	75 (60)	A
$I_{CRM}$	$I_{CRM} = 3 \times I_{Cnom}$ , $t_p = 1 \text{ ms}$	150	A
$V_{GES}$		$\pm 20$	V
$T_j$		-40 ... +175	$^\circ C$
<b>Diode - Inverter, Chopper</b>			
$I_F$	$T_s = 25 (70) ^\circ C$	60 (45)	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$ , $t_p = 1 \text{ ms}$	150	A
$T_j$		-40 ... +150	$^\circ C$
<b>Rectifier</b>			
$V_{RRM}$		1600	V
$I_F$	$T_s = 70 ^\circ C$	61	A
$I_{FSM} / I_{TSM}$	$t_p = 10 \text{ ms}$ , $\sin 180 ^\circ$ , $T_j = 25 ^\circ C$	700	A
$I_t^2$	$t_p = 10 \text{ ms}$ , $\sin 180 ^\circ$ , $T_j = 25 ^\circ C$	2400	A <sup>2</sup> s
$T_j$		-40 ... +175	$^\circ C$
$T_{sol}$	Terminals, 10 s	260	$^\circ C$
$T_{stg}$		-40 ... +125	$^\circ C$
$V_{isol}$	AC, 1 min. / 1 s	2500 / 3000	V

Characteristics		Ts = 25 °C, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT - Inverter. For IGBT chopper electrical characteristics, please refer to SK35DGDL12T4T</b>					
$V_{CEsat}$	$I_C = 50 \text{ A}$ , $T_j = 25 (150) ^\circ C$		1,85 (2,2)	2,05 (2,45)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 1,7 \text{ mA}$	5	5,8	6,5	V
$V_{CE(TO)}$	$T_j = 25 ^\circ C (150) ^\circ C$		1,1 (1)	1,3 (1,2)	V
$r_T$	$T_j = 25 ^\circ C (150) ^\circ C$		15 (24)		m $\Omega$
$C_{ies}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		2,77		nF
$C_{oes}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		0,2		nF
$C_{res}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		0,16		nF
$R_{th(j-s)}$	per IGBT		0,65		K/W
$t_{d(on)}$	under following conditions		63		ns
$t_r$	$V_{CC} = 600 \text{ V}$ , $V_{GE} = \pm 15 \text{ V}$		65		ns
$t_{d(off)}$	$I_C = 50 \text{ A}$ , $T_j = 150 ^\circ C$		521		ns
$t_f$	$R_{Gon} = R_{Goff} = 32 \Omega$		80		ns
$E_{on}$	inductive load		8,3		mJ
$E_{off}$			5		mJ
<b>Diode - Inverter, Chopper</b>					
$V_F = V_{EC}$	$I_F = 50 \text{ A}$ , $T_j = 25(150) ^\circ C$		2,22 (2,18)	2,54 (2,5)	V
$V_{(TO)}$	$T_j = 25 ^\circ C (150) ^\circ C$		1,3 (0,9)	1,5 (1,1)	V
$r_T$	$T_j = 25 ^\circ C (150) ^\circ C$		18,4 (25,6)	20,8 (28)	m $\Omega$
$R_{th(j-s)}$	per diode		0,97		K/W
$I_{RRM}$	under following conditions		30		A
$Q_{rr}$	$I_F = 50 \text{ A}$ , $V_R = 300 \text{ V}$		7,2		$\mu C$
$E_{rr}$	$V_{GE} = 0 \text{ V}$ , $T_j = 150 ^\circ C$ $di_F/dt = 920 \text{ A}/\mu s$		2,15		mJ
<b>Diode - Rectifier</b>					
$V_F$	$I_F = 50 \text{ A}$ , $T_j = 25(150) ^\circ C$		1,1		V
$V_{(TO)}$	$T_j = 150 ^\circ C$		0,8		V
$r_T$	$T_j = 150 ^\circ C$		6		m $\Omega$
$R_{th(j-s)}$	per diode		0,9		K/W
<b>Temperatur sensor</b>					
$R_{ts}$	5 %, $T_r = 25 (100) ^\circ C$		5000(493)		$\Omega$
<b>Mechanical data</b>					
w			60		g
$M_s$	Mounting torque		3,5		Nm

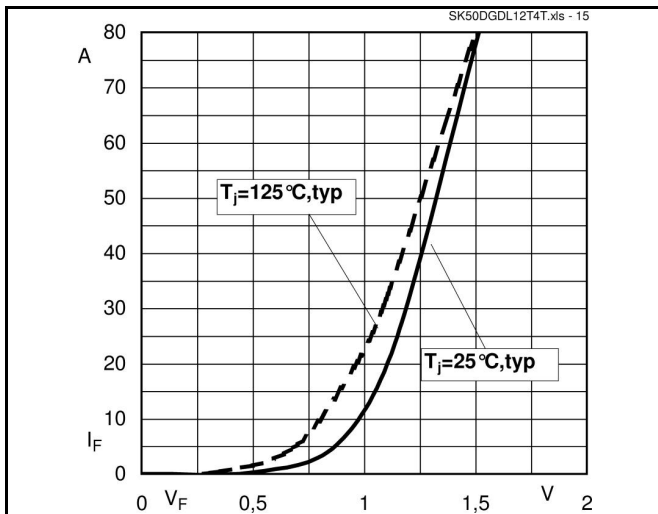


Fig.15 Input bridge Diode forward characteristic

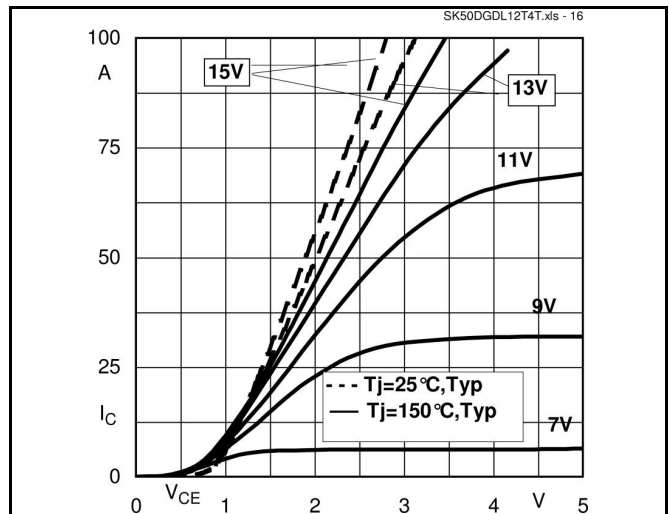


fig.16 Typical Output characteristic

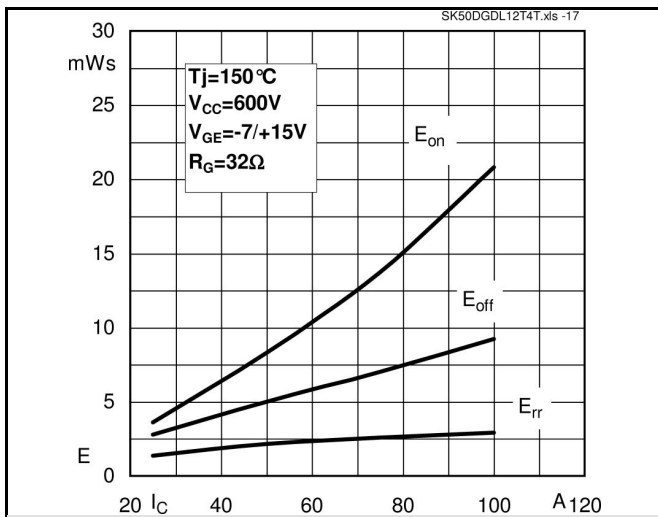


Fig.17 Turn-on/-off energy=f(Ic)

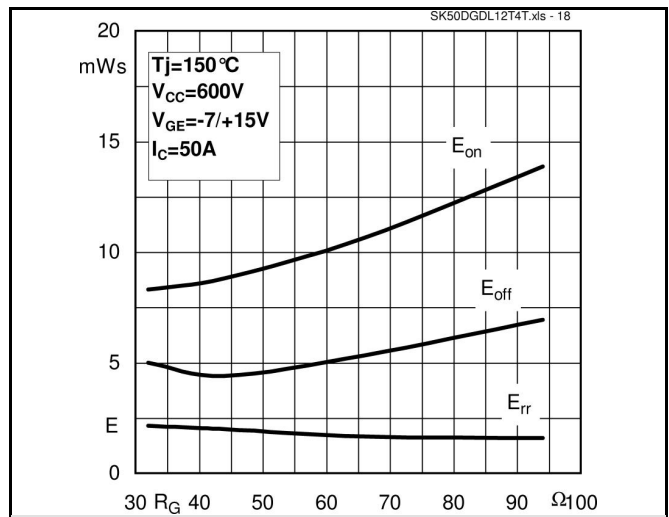


Fig.18 Turn-on/-off energy=f(Rg)

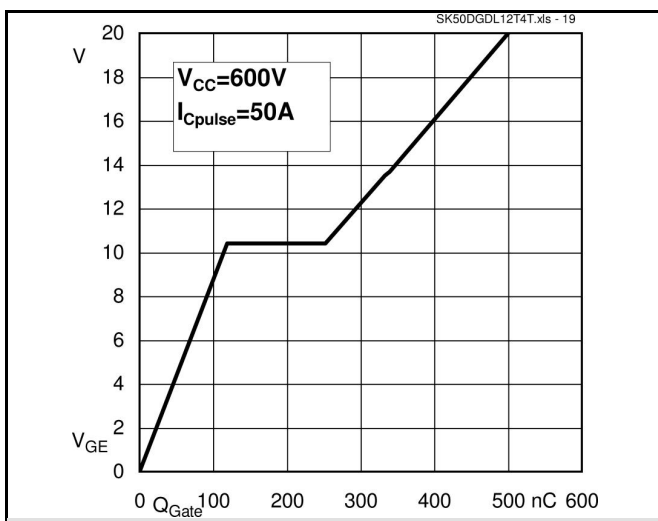
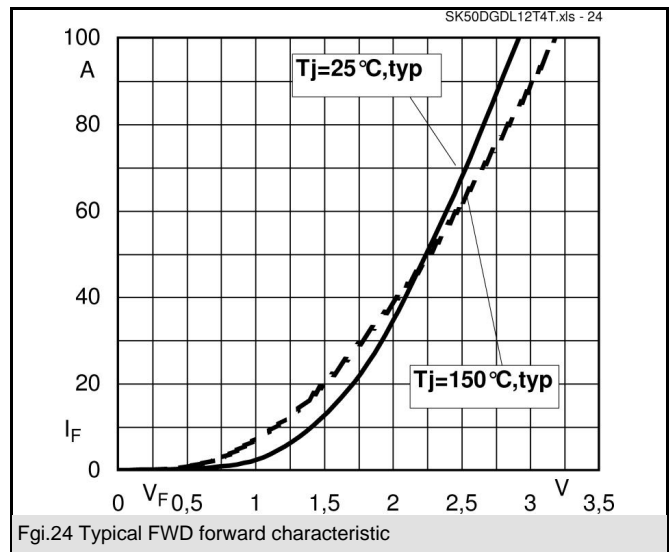
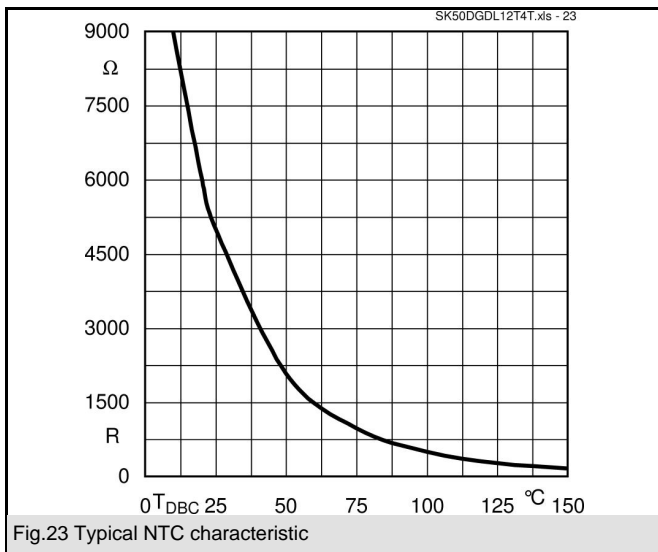
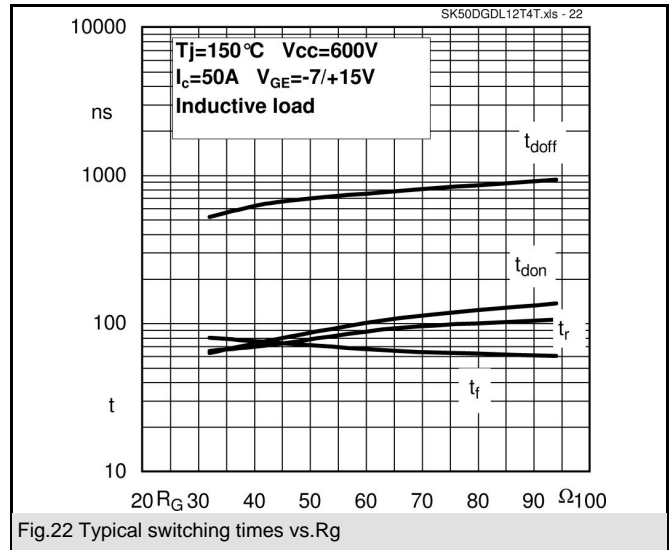
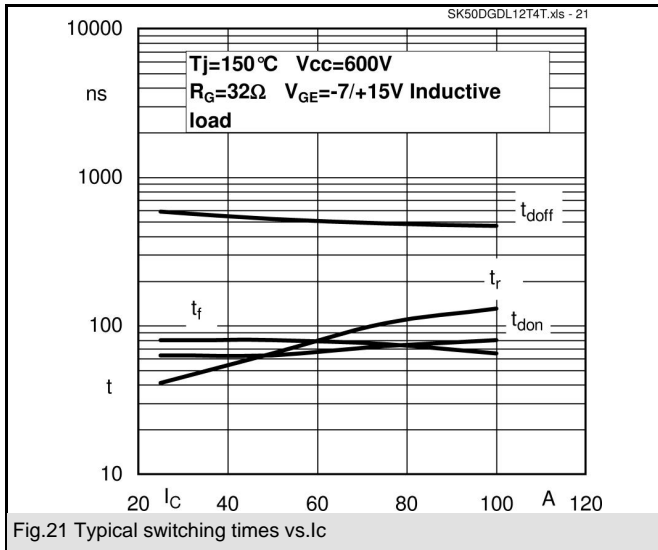
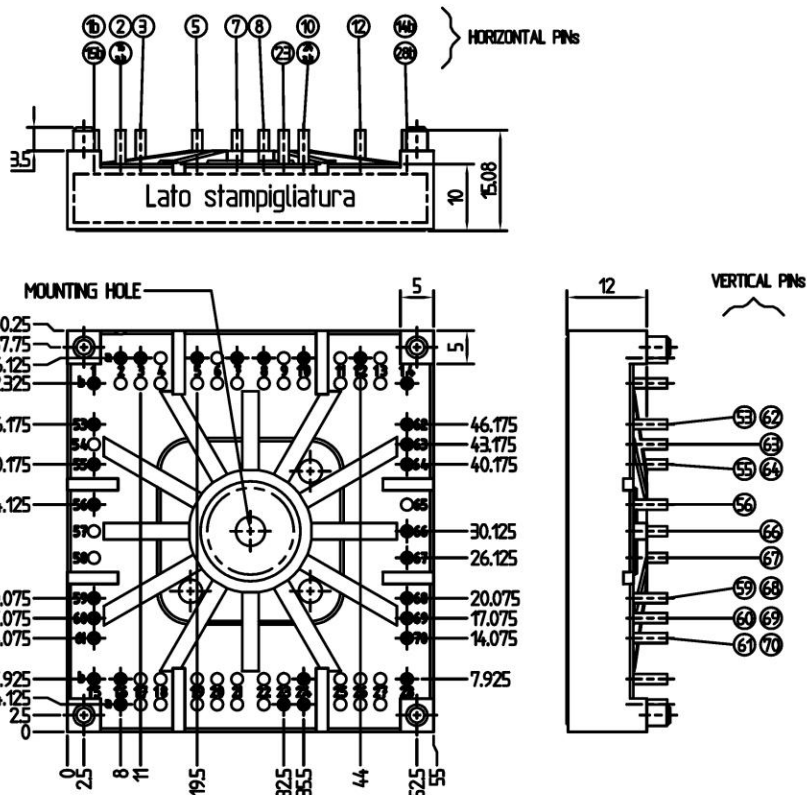
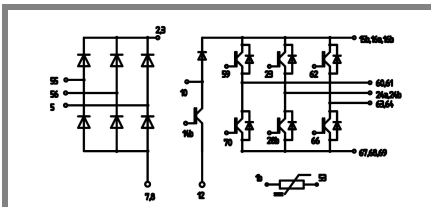


Fig.19 Typical gate charge characteristic





Case T 75 (Suggested hole diameter for the solder pins in the circuit board: 2mm. Suggested hole diameter for the mounting pins in the circuit board: 3,6mm )



Case T 75 (pin without letter refers to row "a", unless otherwise specified)

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

\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.