



SEMITOP® 3

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

SK 15 DGDL 12T4 ET

Target Data

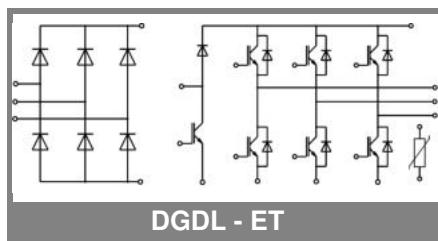
Features

- One screw mounting module
- Trench4 IGBT technology
- CAL4 technology FWD
- Integrated NTC temperature sensor

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

Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT - Inverter,Chopper			
V_{CES}		1200	V
I_C	$T_s = 25 (70)^\circ\text{C}$	27 (21)	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$, $t_p = 1 \text{ ms}$	45	A
V_{GES}		± 20	V
T_j		-40 ... +175	$^\circ\text{C}$
Diode - Inverter,Chopper			
I_F	$T_s = 25 (70)^\circ\text{C}$	21 (17)	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$, $t_p = 1 \text{ ms}$	45	A
T_j		-40 ... +150	$^\circ\text{C}$
Rectifier			
V_{RRM}		1600	V
I_F	$T_s = 70^\circ\text{C}$	28	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 ² s
T_j		-40 ... +175	$^\circ\text{C}$
T_{sol}	Terminals, 10 s	260	$^\circ\text{C}$
T_{stg}		-40 ... +125	$^\circ\text{C}$
V_{isol}	AC, 1 min. / 1 s	2500 / 3000	V

Characteristics		$T_s = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	min.	typ.	max.
IGBT - Inverter				
V_{CEsat}	$I_C = 15 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$		1,85 (2,25)	2,05 (2,45)
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 0,5 \text{ mA}$	5	5,8	6,5
$V_{CE(TO)}$	$T_j = 25^\circ\text{C}$ (150) $^\circ\text{C}$		1,1 (1)	1,3 (1,2)
r_T	$T_j = 25^\circ\text{C}$ (150) $^\circ\text{C}$		50 (83,3)	m Ω
C_{ies}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$		0,9	nF
C_{oes}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$		0,08	nF
C_{res}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$		0,055	nF
$R_{th(j-s)}$	per IGBT		1,65	K/W
$t_{d(on)}$	under following conditions		16	ns
t_r	$V_{CC} = 600 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$		14	ns
$t_{d(off)}$	$I_C = 15 \text{ A}$, $T_j = 150^\circ\text{C}$		273	ns
t_f	$R_{Gon} = R_{Goff} = 16 \Omega$		85	ns
E_{on}	inductive load		0,82	mJ
E_{off}			1,52	mJ
Diode - Inverter,Chopper				
$V_F = V_{EC}$	$I_F = 15 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$		2,38 (2,44)	2,71 (2,77)
$V_{(TO)}$	$T_j = 25^\circ\text{C}$ (150) $^\circ\text{C}$		1,3 (0,9)	1,5 (1,1)
r_T	$T_j = 25^\circ\text{C}$ (150) $^\circ\text{C}$		72 (102,7)	80,6 (111,3)
$R_{th(j-s)}$	per diode		2,34	K/W
I_{RRM}	under following conditions		28	A
Q_{rr}	$I_F = 15 \text{ A}$, $V_R = V$		0,3	μC
E_{rr}	$V_{GE} = 0 \text{ V}$, $T_j = 150^\circ\text{C}$		0,82	mJ
	$di_F/dt = 2750 \text{ A}/\mu\text{s}$			
Diode - Rectifier				
V_F	$I_F = 15 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$		1,1	V
$V_{(TO)}$	$T_j = 150^\circ\text{C}$		0,9	V
r_T	$T_j = 150^\circ\text{C}$		20	m Ω
$R_{th(j-s)}$	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	2,25	2,5	Nm



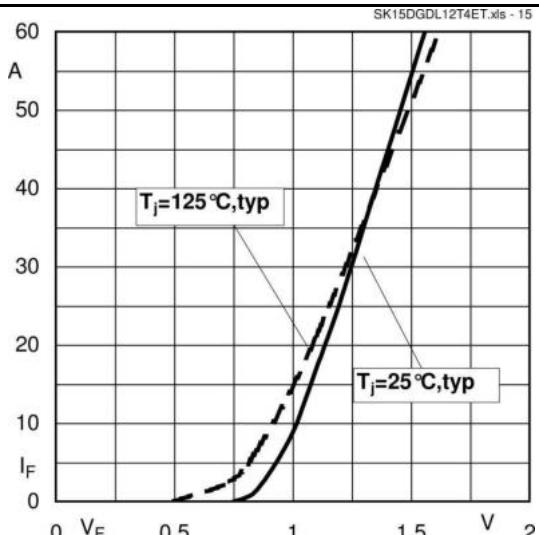


Fig.15 Input bridge Diode forward characteristic

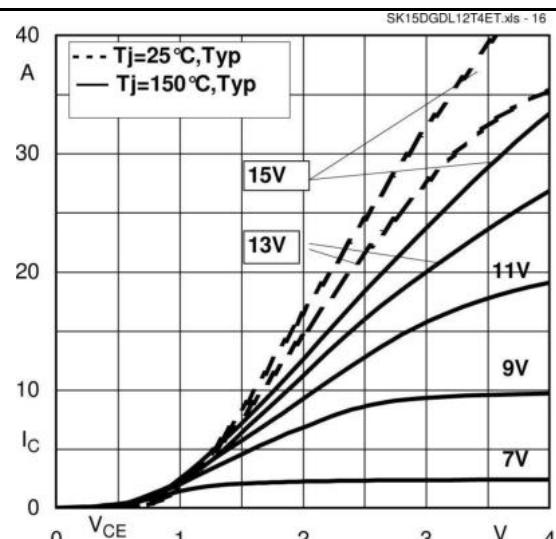


Fig.16 Typical Output characteristic

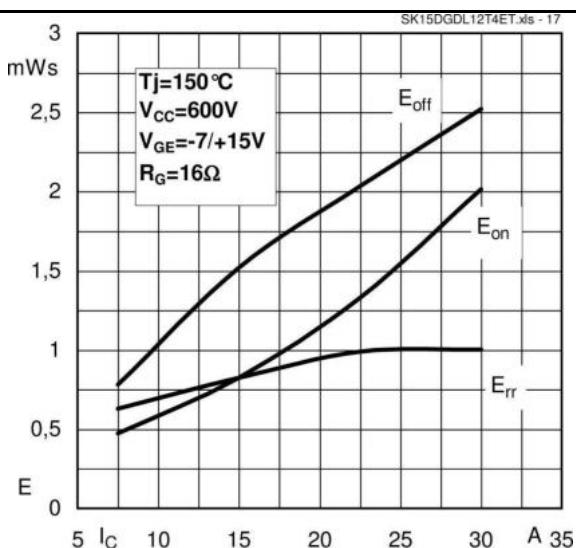


Fig.17 Turn-on/-off energy= $f(I_c)$

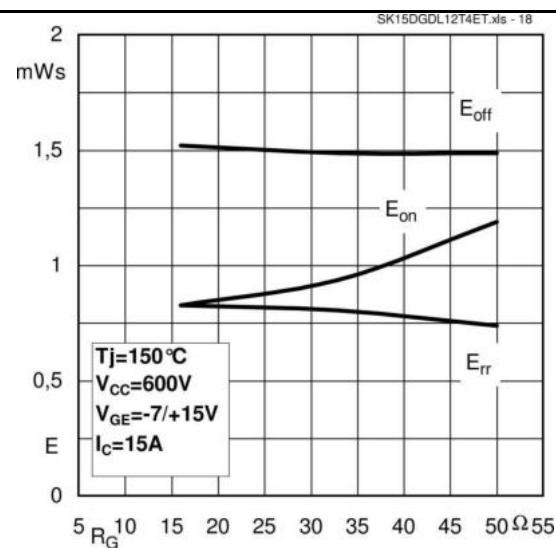


Fig.18 Turn-on/-off energy= $f(R_g)$

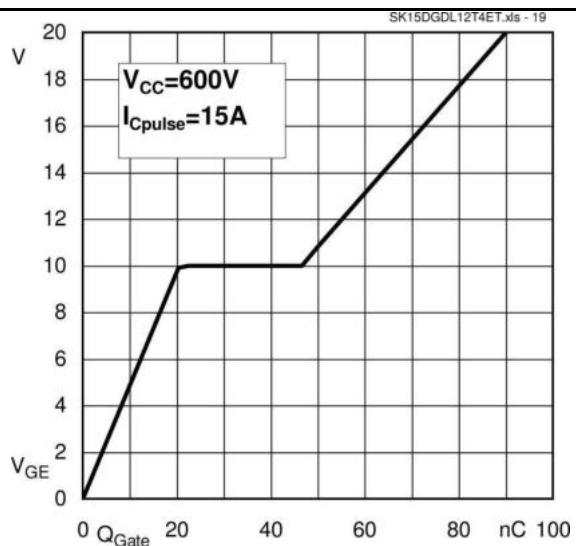


Fig.19 Typical gate charge characteristic

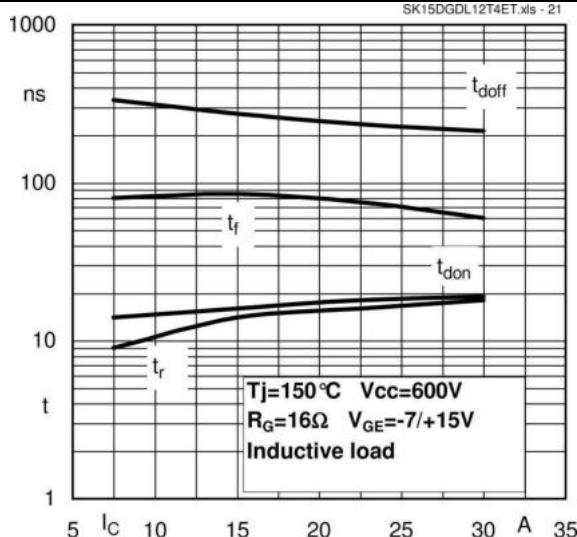


Fig.21 Typical switching times vs.Ic

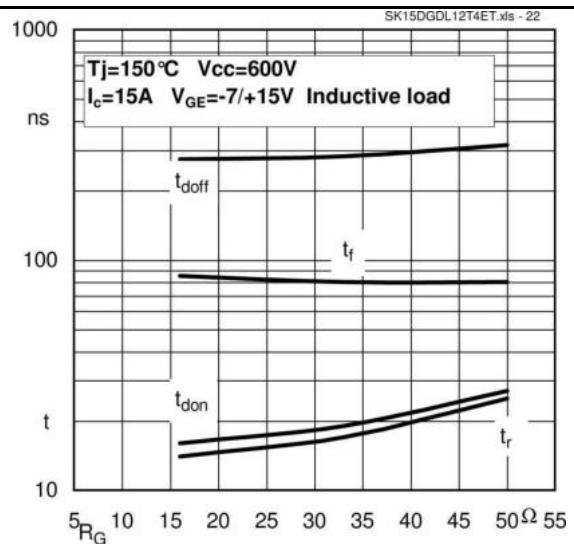


Fig.22 Typical switching times vs.Rg

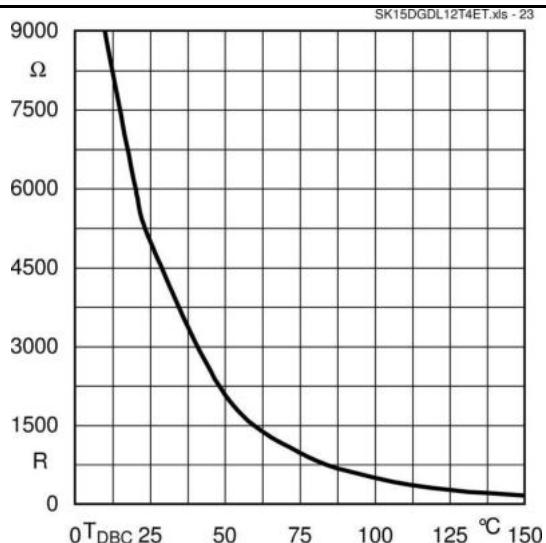


Fig.23 Typical NTC characteristic

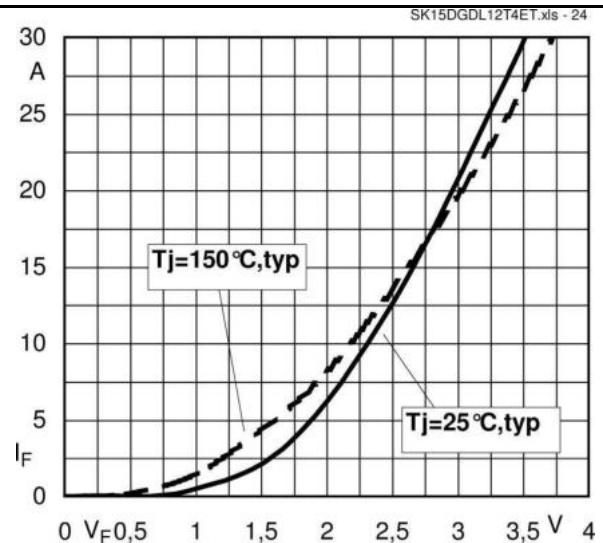
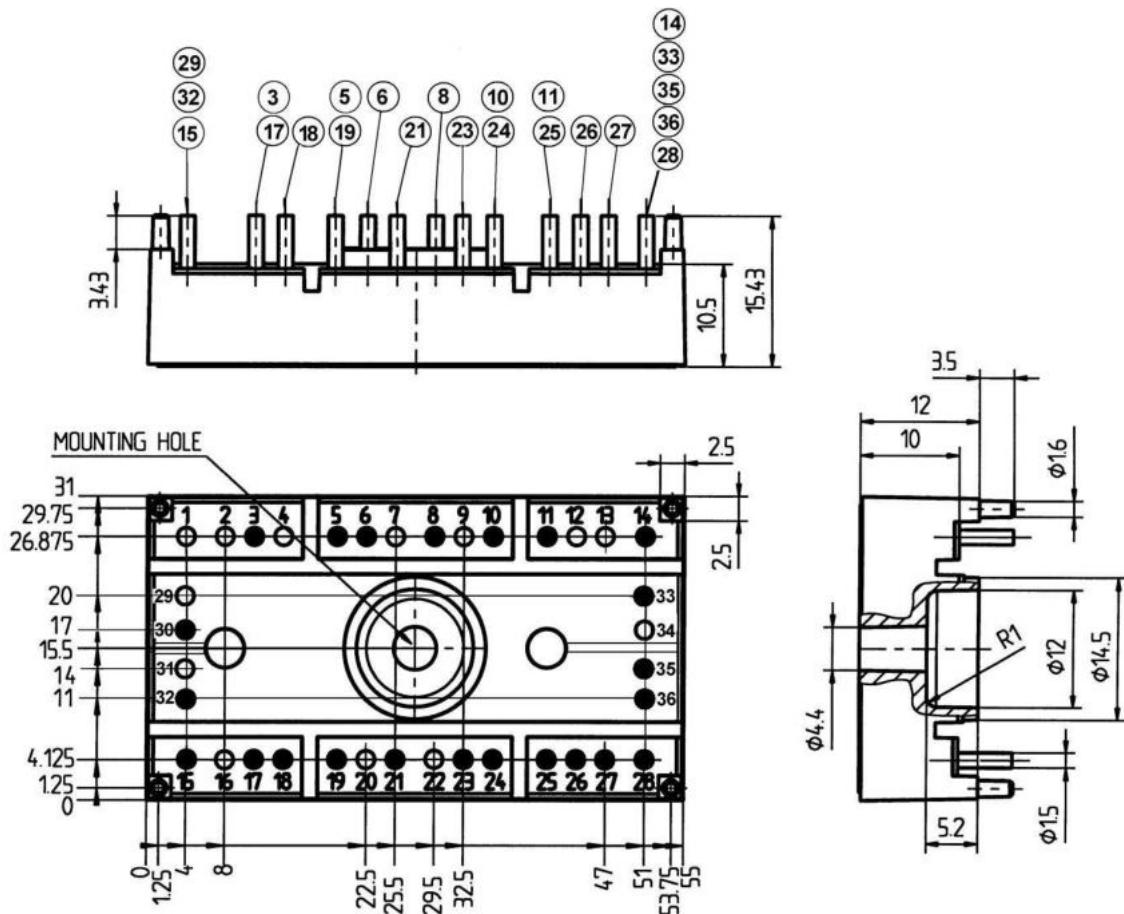
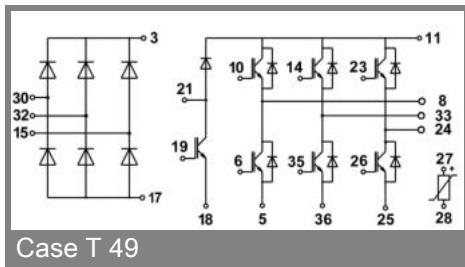


Fig.24 Typical FWD forward characteristic

Dimensions in mm



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



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.