SK50DGDL066ETE2

SEMITOP®E2

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

Engineering Sample

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Target Data

Features

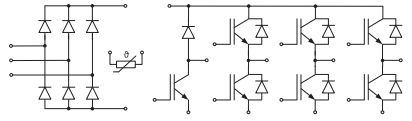
- Low inductive design
- Press-Fit contact technology
- Rugged mounting due to integrated mounting clamps
- Heat transfer and insulation through direct copper bonded aluminium oxide ceramic (DBC)
- Trench3 600V IGBT technology
- CAL technology FWD
- UL recognized file no. E 63 532
- Integrated NTC temperature sensor

Typical Applications*

- Inverter up to 18kVA
- Typical motor power 7.5kW

Remarks

- IGBT1: inverter IGBT
- IGBT2: brake IGBT
- Diode1: rectifier diode section
- Diode2: APD inverter
- Diode3: FWD brake



DGDL-ET

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
IGBT 1				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 175 °C	T_s = 25 °C	53	A
		T_s = 70 °C	42	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 2 x I_{Cnom}		100	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 600 V	T_j = 150 °C	6	µs
T_j			-40 ... 175	°C

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
IGBT 2				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 175 °C	T_c = 25 °C	53	A
		T_c = 70 °C	42	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 2 x I_{Cnom}		100	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 600 V	T_j = 150 °C	6	µs
T_j			-40 ... 175	°C

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Diode 1				
V_{RRM}	T_j = 25 °C		1600	V
I_F	T_j = 150 °C	T_s = 25 °C	51	A
		T_s = 70 °C	38	A
I_{Fnom}			18	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		350	A
i^2t	10 ms, sin 180°, T_j = 150 °C		612	A^2s
T_j			-40 ... 150	°C

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Diode 2				
V_{RRM}	T_j = 25 °C		600	V
I_F	T_j = 175 °C	T_s = 25 °C	49	A
		T_s = 70 °C	39	A
I_{Fnom}			50	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		100	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		320	A
T_j			-40 ... 175	°C

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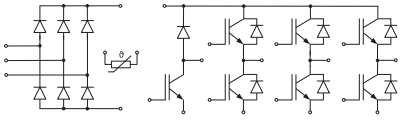

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Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Diode 3				
V_{RRM}	T_j = 25 °C		600	V
I_F	T_j = 175 °C	T_s = 25 °C	49	A
		T_s = 70 °C	39	A
I_{Fnom}			50	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		100	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		320	A
T_j			-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	**Conditions**	**Values**	**Unit**
Module			
$I_{t(RMS)}$	$T_{terminal}$ = 100 °C, T_S = 60°C	t.b.d.	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC, sinusoidal, t = 1 min	2500	V

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
IGBT 1						
$V_{CE(sat)}$	I_C = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.85	V
		T_j = 150 °C		1.65	2.05	V
V_{CE0}	chiplevel	T_j = 25 °C		0.90	1.10	V
		T_j = 150 °C		0.80	1.00	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		11	15	mΩ
		T_j = 150 °C		17	21	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 0.8 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 600 V	T_j = 25 °C			-	mA
				-		mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		3.14		nF
C_{oes}		f = 1 MHz		0.2		nF
C_{res}		f = 1 MHz		0.093		nF
Q_G	- 8 V...+ 15 V			270		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 300 V I_C = 50 A $R_{G\ on}$ = 8.2 Ω $R_{G\ off}$ = 8.2 Ω	T_j = 150 °C				ns
t_r		T_j = 150 °C				ns
E_{on}		T_j = 150 °C		0.85		mJ
$t_{d(off)}$		T_j = 150 °C				ns
t_f		T_j = 150 °C				ns
E_{off}	$V_{GE\ neg}$ = -15 V $V_{GE\ pos}$ = 15 V	T_j = 150 °C		1.6		mJ
$R_{th(j-s)}$	per IGBT			1.31		K/W

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- Diode1: rectifier diode section
- Diode2: APD inverter
- Diode3: FWD brake

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT 2						
$V_{CE(sat)}$	I_C = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.85	V
		T_j = 150 °C		1.65	2.05	V
V_{CE0}	chiplevel	T_j = 25 °C		0.90	1.10	V
		T_j = 150 °C		0.80	1.00	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		11	15	mΩ
		T_j = 150 °C		17	21	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE} V, I_C = 0.8 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 600 V	T_j = 25 °C			-	mA
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C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		3.14		nF
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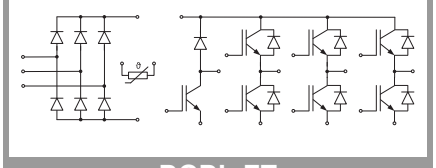
C_{res}		f = 1 MHz		0.093		nF
Q_G	- 8 V...+ 15 V			270		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 300 V I_C = 50 A $R_{G\ on}$ = 8.2 Ω $R_{G\ off}$ = 8.2 Ω	T_j = 150 °C				ns
t_r		T_j = 150 °C				ns
E_{on}		T_j = 150 °C		0.85		mJ
$t_{d(off)}$		T_j = 150 °C				ns
t_f		T_j = 150 °C				ns
E_{off}	$V_{GE\ neg}$ = -15 V $V_{GE\ pos}$ = 15 V	T_j = 150 °C		1.6		mJ
$R_{th(j-s)}$	per IGBT			1.31		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Diode 1						
V_F	I_F = 18 A	T_j = 25 °C		1.00	1.21	V
	chiplevel	T_j = 150 °C		0.90	1.10	V
V_{F0}	chiplevel	T_j = 25 °C		0.88	0.98	V
		T_j = 125 °C		0.73	0.83	V
r_F	chiplevel	T_j = 25 °C		6.7	13	mΩ
		T_j = 125 °C		9.4	15	mΩ
I_{RRM}	I_F = 18 A			-		A
Q_{rr}				-		µC
E_{rr}				-		mJ
$R_{th(j-s)}$	per Diode			1.46		K/W



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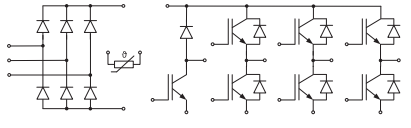

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Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Diode 2						
V_F	I_F = 50 A	T_j = 25 °C		1.47	1.87	V
	chiplevel	T_j = 150 °C		1.50	1.78	V
V_{F0}	chiplevel	T_j = 25 °C		0.99	1.10	V
		T_j = 150 °C		0.80	0.89	V
r_F	chiplevel	T_j = 25 °C		9.6	15	mΩ
		T_j = 150 °C		14	18	mΩ
I_{RRM}	I_F = 50 A	T_j = 150 °C				A
Q_{rr}	V_{GE} = -15 V	T_j = 150 °C				µC
E_{rr}	V_{CC} = 300 V	T_j = 150 °C		0.9		mJ
$R_{th(j-s)}$	per Diode			1.8		K/W

Characteristics

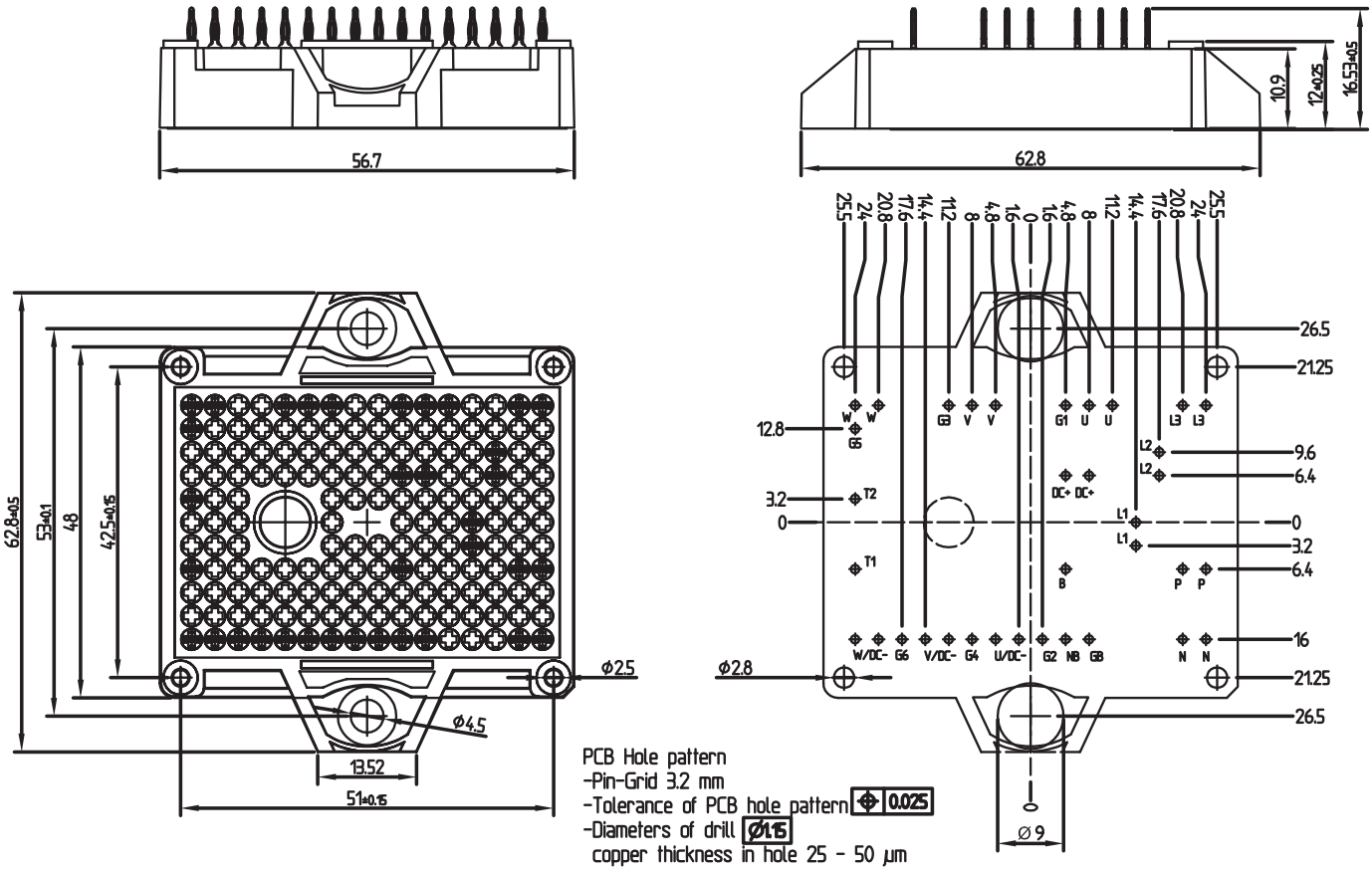
Symbol	Conditions		min.	typ.	max.	Unit
Diode 3						
V_F	I_F = 50 A	T_j = 25 °C		1.47	1.87	V
	chiplevel	T_j = 150 °C		1.50	1.78	V
V_{F0}	chiplevel	T_j = 25 °C		0.99	1.10	V
		T_j = 150 °C		0.80	0.89	V
r_F	chiplevel	T_j = 25 °C		9.6	15	mΩ
		T_j = 150 °C		14	18	mΩ
I_{RRM}	I_F = 50 A	T_j = 150 °C				A
Q_{rr}	V_{GE} = -15 V	T_j = 150 °C				µC
E_{rr}	V_{CC} = 300 V	T_j = 150 °C		0.9		mJ
$R_{th(j-s)}$				1.8		K/W

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Module					
M_s	to heatsink	2		2.1	Nm
w	weight		34		g

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R_{100}	T_r = 100 °C		493 ± 5%		Ω
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; T[K];		3550 ±2%		K



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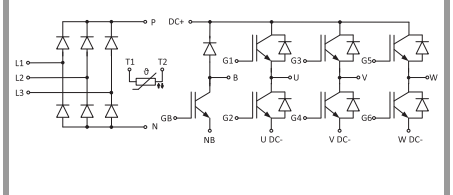

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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