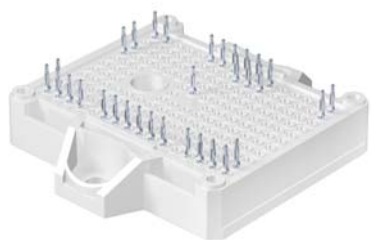


SK 35 DGDL 12T4 ETE2



SEMITOP®E2

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

Engineering Sample

SK 35 DGDL 12T4 ETE2

Target Data

Features

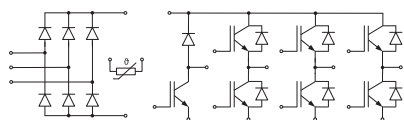
- Low inductive design
- Press-Fit contact technology
- Rugged mounting due to integrated mounting clamps
- Heat transfer and insulation through direct copper bonded aluminium oxide ceramic (DBC)
- Trench4 IGBT technology
- Robust and soft freewheeling diode CAL4F technology
- UL recognized file no. E 63 532
- Integrated NTC temperature sensor

Typical Applications*

- Inverter up to 30kVA
- Typical motor power 15kW

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}	$T_j = 25\text{ °C}$	1200	V
I_C	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	43
		$T_s = 70\text{ °C}$	35
I_{Cnom}		35	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	105	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150\text{ °C}$	10
T_j		-40 ... 175	°C

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
IGBT 2			
V_{CES}	$T_j = 25\text{ °C}$	1200	V
I_C	$T_j = 175\text{ °C}$	$T_c = 25\text{ °C}$	43
		$T_c = 70\text{ °C}$	35
I_{Cnom}		35	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	105	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150\text{ °C}$	10
T_j		-40 ... 175	°C

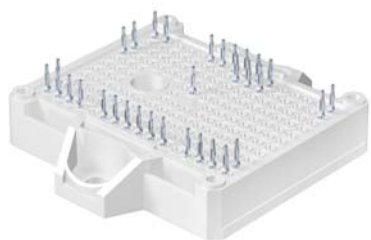
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Diode 1			
V_{RRM}	$T_j = 25\text{ °C}$	1600	V
I_F	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	53
		$T_s = 70\text{ °C}$	39
I_{Fnom}		18	A
I_{FSM}	10 ms, sin 180°, $T_j = 150\text{ °C}$	350	A
i^2t	10 ms, sin 180°, $T_j = 150\text{ °C}$	612	A ² s
T_j		-40 ... 150	°C

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Diode 2			
V_{RRM}	$T_j = 25\text{ °C}$	1200	V
I_F	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	38
		$T_s = 70\text{ °C}$	30
I_{Fnom}		35	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	70	A
I_{FSM}	10 ms, sin 180°, $T_j = 150\text{ °C}$	170	A
T_j		-40 ... 175	°C

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- Typical motor power 15kW

Remarks

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

Absolute Maximum Ratings

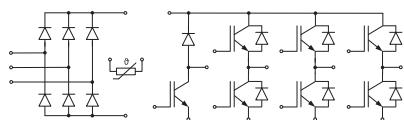
Symbol	Conditions		Values	Unit
Diode 3				
V _{RRM}	T _j = 25 °C		1200	V
I _F	T _j = 175 °C	T _s = 25 °C	38	A
		T _s = 70 °C	30	A
I _{Fnom}			35	A
I _{FRM}	I _{FRM} = 2 x I _{Fnom}		70	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		170	A
T _j			-40 ... 175	°C

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Module			
$I_{t(RMS)}$	$T_{terminal} = 100\text{ °C}$, $T_s = 60\text{ °C}$, per pin	t.b.d.	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC, sinusoidal, $t = 1\text{ min}$	2500	V

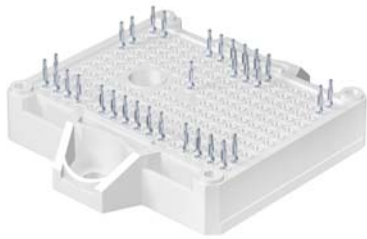
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1						
V _{CE(sat)}	I _C = 35 A	T _j = 25 °C		1.85	2.10	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.25	2.45	V
V _{CE0}	chiplevel	T _j = 25 °C		0.80	0.90	V
		T _j = 150 °C		0.70	0.80	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		30	34	mΩ
	chiplevel	T _j = 150 °C		44	47	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 1.2 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C		1		mA
	V _{CE} = 1200 V			-		mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		1.95		nF
C _{oes}		f = 1 MHz		0.155		nF
C _{res}		f = 1 MHz		0.115		nF
Q _G	V _{GE} = - 8 V...+ 15 V			270		nC
R _{Gint}	T _j = 25 °C			0		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 150 °C		-		ns
t _r	I _C = 35 A	T _j = 150 °C		-		ns
E _{on}	V _{GE neg} = -7 V	T _j = 150 °C		3.15		mJ
t _{d(off)}	V _{GE pos} = 15 V	T _j = 150 °C		-		ns
t _f	R _{G on} = 12 Ω	T _j = 150 °C		-		ns
E _{off}		T _j = 150 °C		3.2		mJ
R _{th(j-s)}	per IGBT			1.2		K/W



DGDL-ET

SK 35 DGDL 12T4 ETE2



SEMITOP®E2

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

Engineering Sample

SK 35 DGDL 12T4 ETE2

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)
- Trench4 IGBT technology
- Robust and soft freewheeling diode CAL4F technology
- UL recognized file no. E 63 532
- Integrated NTC temperature sensor

Typical Applications*

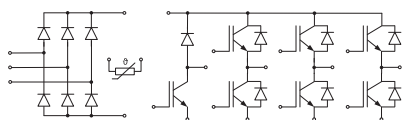
- Inverter up to 30kVA
- Typical motor power 15kW

Remarks

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

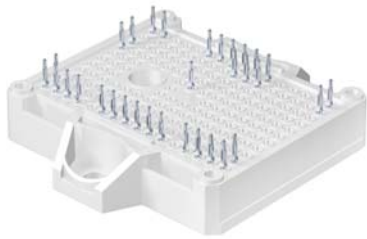
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT 2						
V _{CE(sat)}	I _C = 35 A	T _j = 25 °C		1.85	2.10	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.25	2.45	V
V _{CE0}	chiplevel	T _j = 25 °C		0.80	0.90	V
		T _j = 150 °C		0.70	0.80	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		30	34	mΩ
	chiplevel	T _j = 150 °C		44	47	mΩ
V _{GE(th)}	V _{GE} = V _{CE} V, I _C = 1.2 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			1	mA
	V _{CE} = 1200 V	T _j = 150 °C		-		mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		1.95		nF
C _{oes}		f = 1 MHz		0.155		nF
C _{res}		f = 1 MHz		0.115		nF
Q _G	V _{GE} = - 8 V...+ 15 V			270		nC
R _{Gint}	T _j = 25 °C			0		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 150 °C				ns
t _r	I _C = 35 A	T _j = 150 °C				ns
E _{on}	V _{GE neg} = -7 V V _{GE pos} = 15 V	T _j = 150 °C		3.15		mJ
t _{d(off)}	R _{G on} = 12 Ω	T _j = 150 °C				ns
t _f	R _{G off} = 12 Ω	T _j = 150 °C				ns
E _{off}		T _j = 150 °C		3.2		mJ
R _{th(i-s)}	per IGBT			1.2		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 = 125 °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



DGDL-ET

SK 35 DGDL 12T4 ETE2



SEMITOP®E2

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

Engineering Sample SK 35 DGDL 12T4 ETE2

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)
- Trench4 IGBT technology
- Robust and soft freewheeling diode CAL4F technology
- UL recognized file no. E 63 532
- Integrated NTC temperature sensor

Typical Applications*

- Inverter up to 30kVA
- Typical motor power 15kW

Remarks

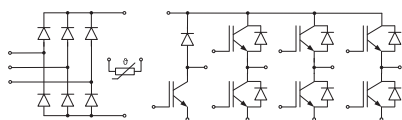
- IGBT1: inverter IGBT
- IGBT2: brake IGBT
- Diode1: rectifier diode section
- Diode2: APD inverter
- Diode3: FWD brake

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 2						
V _F	I _F = 35 A	T _j = 25 °C		2.30	2.62	V
	chiplevel	T _j = 150 °C		2.29	2.62	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		29	32	mΩ
		T _j = 150 °C		40	43	mΩ
I _{RRM}	I _F = 35 A	T _j = 150 °C		-		A
Q _{rr}	V _{GE} = -7 V	T _j = 150 °C		-		μC
E _{rr}	V _{CC} = 600 V	T _j = 150 °C		2.6		mJ
R _{th(j-s)}	per Diode			1.55		K/W

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 3						
V _F	I _F = 35 A	T _j = 25 °C		2.30	2.62	V
	chiplevel	T _j = 150 °C		2.29	2.62	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		29	32	mΩ
		T _j = 150 °C		40	43	mΩ
I _{RRM}	I _F = 35 A	T _j = 150 °C				A
Q _{rr}	V _{GE} = -7 V	T _j = 150 °C				μC
E _{rr}	V _{CC} = 600 V	T _j = 150 °C		2.6		mJ
R _{th(j-s)}	per Diode			1.55		K/W

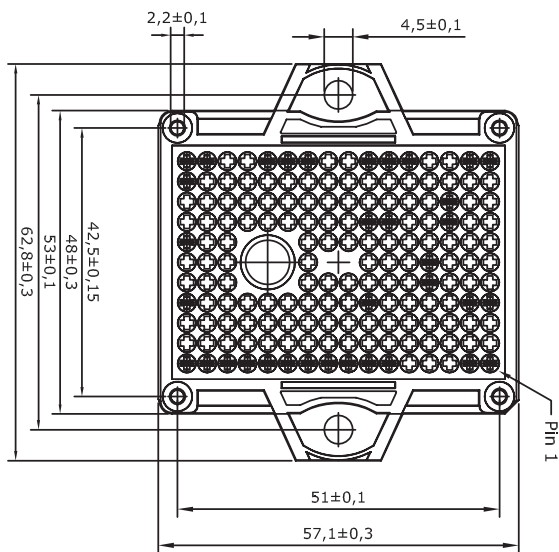
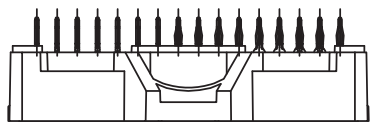
Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
M _s	to heatsink	2		2.1	Nm
w	weight		34		g

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

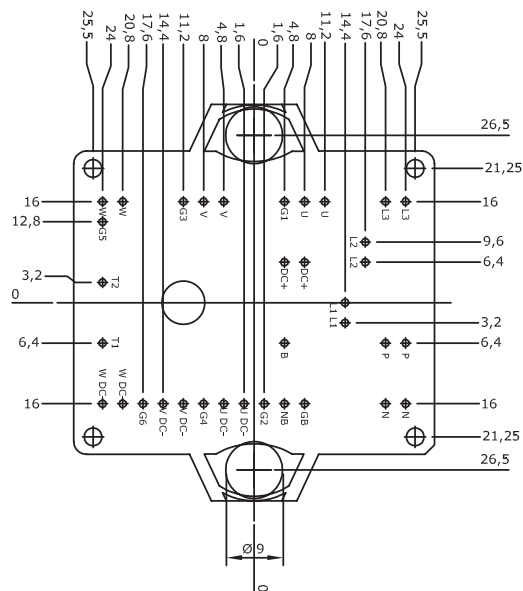


DGDL-ET

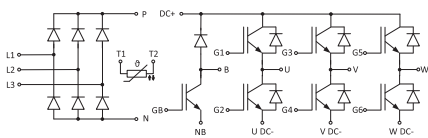
SK 35 DGDL 12T4 ETE2



- Pin-Grid 3.2 mm
- Tolerance of PCB hole pattern ± 0.025
- Diameters of drill $\varnothing 1.15\text{mm}$
- Copper thickness in hole 25 - 50 μm
- Hole specification for contacts: refer to SEMITOP E1, E2 mounting instruction



SEMITOP® E2



DGDL-ET

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

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