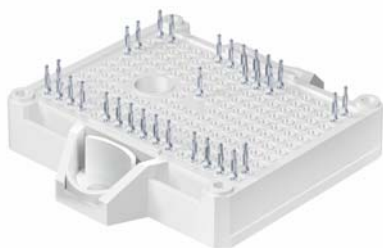


SK25TMLID12F4TE2



SEMITOP®E2

3-phase 3-Level TNPC

Engineering Sample SK25TMLID12F4TE2

Target Data

Features*

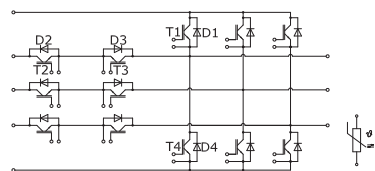
- Optimized design for superior thermal performance
- Low inductive design
- Press-Fit contact technology
- 1200V Trench IGBT4 Fast (F4)
- 650V Trench IGBT3 (E3)
- Robust and soft switching CAL4F diode technology
- Integrated NTC temperature sensor
- UL recognized file no. E 63 532

Typical Applications

- UPS
- Solar

Remarks*

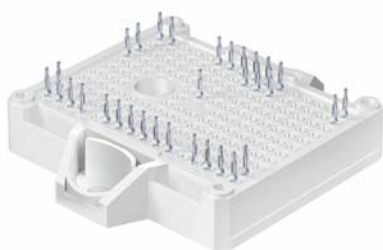
- Recommended $T_{jop} = -40 \dots +150^{\circ}\text{C}$
- IGBT1: outer IGBTs T1 & T4
- IGBT2: inner IGBTs T2 & T3
- Diode1: outer Diodes D1 & D4
- Diode2: inner Diodes D2 & D3



TMLID-T

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT1				
V _{CES}	T _J = 25 °C		1200	V
I _C	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	34	A
	T _J = 175 °C	T _s = 70 °C	27	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	41	A
	T _J = 175 °C	T _s = 70 °C	33	A
I _{Cnom}			25	A
I _{CRM}			50	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V, V _{GE} ≤ 15 V, T _J = 150 °C, V _{CES} ≤ 1200 V		6	μs
T _J			-40 ... 175	°C
IGBT2				
V _{CES}	T _J = 25 °C		650	V
I _C	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	36	A
	T _J = 175 °C	T _s = 70 °C	29	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	42	A
	T _J = 175 °C	T _s = 70 °C	34	A
I _{Cnom}			30	A
I _{CRM}			50	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 360 V, V _{GE} ≤ 15 V, T _J = 150 °C, V _{CES} ≤ 650 V		6	μs
T _J			-40 ... 175	°C
Diode1				
V _{RRM}	T _J = 25 °C		1200	V
I _F	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	30	A
	T _J = 175 °C	T _s = 70 °C	24	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	35	A
	T _J = 175 °C	T _s = 70 °C	28	A
I _{FRM}			50	A
I _{FSM}	10 ms, sin 180°, T _J = 25 °C		100	A
T _J			-40 ... 175	°C
Diode2				
V _{RRM}	T _J = 25 °C		650	V
I _F	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	31	A
	T _J = 175 °C	T _s = 70 °C	24	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	35	A
	T _J = 175 °C	T _s = 70 °C	28	A
I _{FRM}			50	A
I _{FSM}	10 ms, sin 180°, T _J = 25 °C		180	A
T _J			-40 ... 175	°C
Module				
I _{t(RMS)}	ΔT _{terminal} at PCB joint = 30 K, per pin		30	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC, sinusoidal, t = 1 min		2500	V



SEMITOP®E2

3-phase 3-Level TNPC

Engineering Sample SK25TMLID12F4TE2

Target Data

Features*

- Optimized design for superior thermal performance
- Low inductive design
- Press-Fit contact technology
- 1200V Trench IGBT4 Fast (F4)
- 650V Trench IGBT3 (E3)
- Robust and soft switching CAL4F diode technology
- Integrated NTC temperature sensor
- UL recognized file no. E 63 532

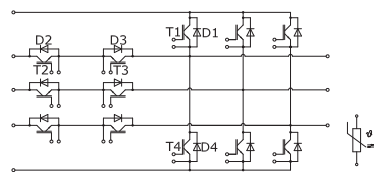
Typical Applications

- UPS
- Solar

Remarks*

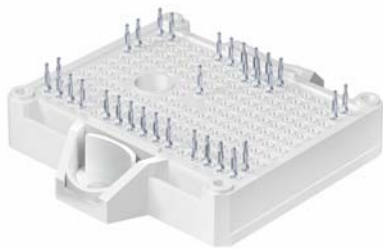
- Recommended $T_{jop} = -40 \dots +150^\circ\text{C}$
- IGBT1: outer IGBTs T1 & T4
- IGBT2: inner IGBTs T2 & T3
- Diode1: outer Diodes D1 & D4
- Diode2: inner Diodes D2 & D3

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT1						
V _{CE(sat)}	I _C = 25 A	T _j = 25 °C		2.05	2.42	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.59	2.96	V
V _{CE0}	chiplevel	T _j = 25 °C		1.10	1.28	V
		T _j = 150 °C		0.95	1.13	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		38	46	mΩ
	chiplevel	T _j = 150 °C		66	73	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 0.85 mA		5.2	5.8	6.4	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C				1	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		1.43		nF
C _{oes}		f = 1 MHz		t.b.d.		nF
C _{res}		f = 1 MHz		0.085		nF
Q _G	V _{GE} = - 8 V...+ 15 V			142		nC
R _{Gint}	T _j = 25 °C			0		Ω
t _{d(on)}	V _{CE} = 300 V	T _j = 150 °C		55		ns
t _r	I _C = 25 A	T _j = 150 °C		35		ns
E _{on}	V _{GE} = +15/-15 V	T _j = 150 °C		0.85		mJ
t _{d(off)}	R _{G on} = 20 Ω	T _j = 150 °C		240		ns
t _f	R _{G off} = 20 Ω	T _j = 150 °C		50		ns
E _{off}		T _j = 150 °C		0.9		mJ
R _{th(j-s)}	per IGBT, λ _{paste} =0.8 W/(mK)			1.17		K/W
R _{th(j-s)}	per IGBT, λ _{paste} =2.5 W/(mK)			0.85		K/W
IGBT2						
V _{CE(sat)}	I _C = 25 A	T _j = 25 °C		1.36	1.725	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		1.55	1.90	V
V _{CE0}	chiplevel	T _j = 25 °C		0.90	1.00	V
		T _j = 150 °C		0.82	0.90	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		18	29	mΩ
	chiplevel	T _j = 150 °C		29	40	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 0.43 mA		5.1	5.8	6.4	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 650 V, T _j = 25 °C				1	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		1.63		nF
C _{oes}		f = 1 MHz		0.108		nF
C _{res}		f = 1 MHz		0.05		nF
Q _G	V _{GE} = - 8 V...+ 15 V			240		nC
R _{Gint}	T _j = 25 °C			0		Ω
t _{d(on)}	V _{CE} = 300 V	T _j = 150 °C		35		ns
t _r	I _C = 25 A	T _j = 150 °C		13		ns
E _{on}	V _{GE} = +15/-15 V	T _j = 150 °C		0.39		mJ
t _{d(off)}	R _{G on} = 15 Ω	T _j = 150 °C		390		ns
t _f	R _{G off} = 15 Ω	T _j = 150 °C		75		ns
E _{off}		T _j = 150 °C		0.91		mJ
R _{th(j-s)}	per IGBT, λ _{paste} =0.8 W/(mK)			1.73		K/W
R _{th(j-s)}	per IGBT, λ _{paste} =2.5 W/(mK)			1.36		K/W



TMLID-T

SK25TMLID12F4TE2



SEMITOP®E2

3-phase 3-Level TNPC

Engineering Sample

SK25TMLID12F4TE2

Target Data

Features*

- Optimized design for superior thermal performance
- Low inductive design
- Press-Fit contact technology
- 1200V Trench IGBT4 Fast (F4)
- 650V Trench IGBT3 (E3)
- Robust and soft switching CAL4F diode technology
- Integrated NTC temperature sensor
- UL recognized file no. E 63 532

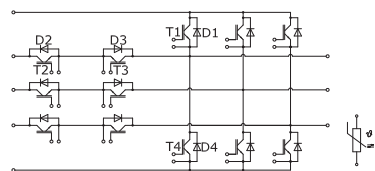
Typical Applications

- UPS
- Solar

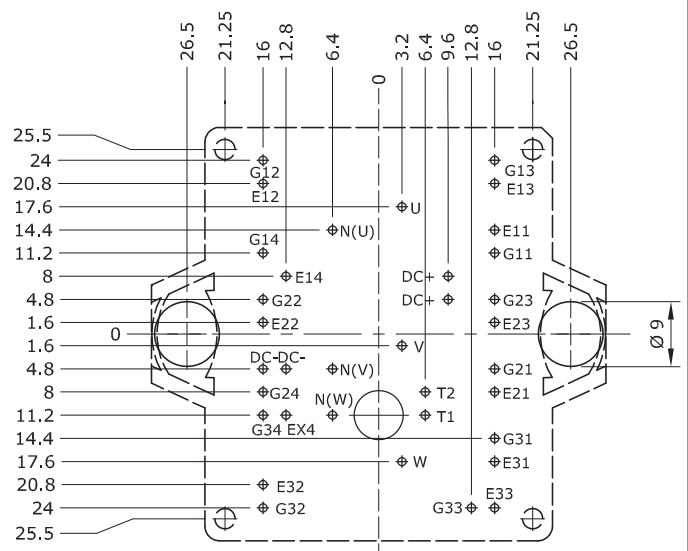
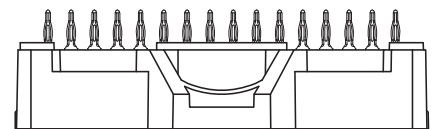
Remarks*

- Recommended $T_{jop} = -40 \dots +150^{\circ}\text{C}$
- IGBT1: outer IGBTs T1 & T4
- IGBT2: inner IGBTs T2 & T3
- Diode1: outer Diodes D1 & D4
- Diode2: inner Diodes D2 & D3

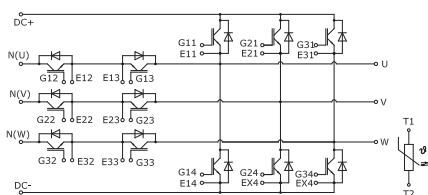
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode1						
V _F = V _{EC}	I _F = 25 A	T _j = 25 °C		2.41	2.74	V
	chiplevel	T _j = 150 °C		2.45	2.79	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		44	50	mΩ
		T _j = 150 °C		62	68	mΩ
I _{RRM}	I _F = 25 A	T _j = 150 °C		t.b.d.		A
Q _{rr}	V _R = 300 V	T _j = 150 °C		t.b.d.		μC
E _{rr}	V _{GE} = +15/-15 V	T _j = 150 °C		0.75		mJ
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			1.66		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			1.29		K/W
Diode2						
V _F = V _{EC}	I _F = 25 A	T _j = 25 °C		1.50	1.92	V
	chiplevel	T _j = 150 °C		1.55	2.01	V
V _{F0}	chiplevel	T _j = 25 °C		1.04	1.24	V
		T _j = 150 °C		0.85	0.99	V
r _F	chiplevel	T _j = 25 °C		19	27	mΩ
		T _j = 150 °C		28	41	mΩ
I _{RRM}	I _F = 25 A	T _j = 150 °C		t.b.d.		A
Q _{rr}	V _R = 300 V	T _j = 150 °C		t.b.d.		μC
E _{rr}	V _{GE} = +15/-15 V	T _j = 150 °C		0.21		mJ
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			2.27		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			1.88		K/W
Module						
L _{sCE1}				t.b.d.		nH
L _{CE}				t.b.d.		nH
R _{CC'+EE'}		T _s = 25 °C		-		mΩ
		T _s = 150 °C		-		mΩ
M _s	to heatsink		1.6	2.3		Nm
M _t				-		Nm
						Nm
w				35		g
Temperature Sensor						
R ₁₀₀	T _c =100°C (R ₂₅ =5 kΩ)			493 ± 5%		Ω
B _{100/125}	R _(T) =R ₁₀₀ exp[B _{100/125} (1/T-1/T ₁₀₀)]; T[K];			3550 ±2%		K



TMLID-T



- Pin-Grid 3.2 mm
- Tolerance of PCB hole pattern $\boxed{\oplus \varnothing 0.1}$
- Diameters of drill \varnothing 1.15mm
- Copper thickness in hole 25 - 50 μ m
- Hole specification for contacts:
refer to SEMITOP E1/E2 Mounting Instruction



TMLID-T

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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