

SK35MLI12T4p



SEMITOP® 3 Press-Fit

3-Level NPC Inverter

SK35MLI12T4p

Target Data

Features

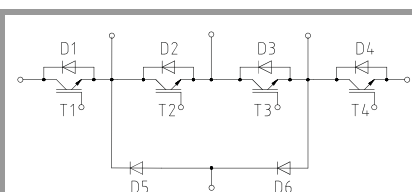
- One screw mounting module
- Solder free mounting with Press-Fit terminals
- Fully compatible with other SEMITOP® Press-Fit types
- Improved thermal performances by aluminium oxide substrate
- 1200V Trench IGBT technology
- CAL4F technology FWD
- UL recognized, file no. E 63 532

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
- Diode5: clamping diodes D5 & D6

Footnote

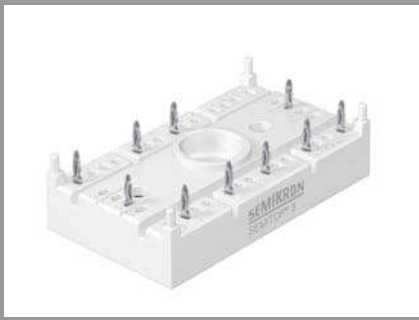
¹⁾ Please find further technical information on the SEMIKRON website.



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Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
IGBT1			
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	43
		$T_s = 70^\circ\text{C}$	35
I_{Cnom}		35	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	105	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}, V_{GE} \leq 15\text{ V}, T_j = 150^\circ\text{C}, V_{CES} \leq 1200\text{ V}$	10	μs
T_j		-40 ... 175	$^\circ\text{C}$
IGBT2			
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	43
		$T_s = 70^\circ\text{C}$	35
I_{Cnom}		35	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	105	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}, V_{GE} \leq 15\text{ V}, T_j = 150^\circ\text{C}, V_{CES} \leq 1200\text{ V}$	10	μs
T_j		-40 ... 175	$^\circ\text{C}$
Diode1			
V_{RRM}	$T_j = 25^\circ\text{C}$	1200	V
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	38
		$T_s = 70^\circ\text{C}$	30
I_{Fnom}		35	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	105	A
I_{FSM}	10 ms, sin 180°, $T_j = 25^\circ\text{C}$	170	A
T_j		-40 ... 175	$^\circ\text{C}$
Diode2			
V_{RRM}	$T_j = 25^\circ\text{C}$	1200	V
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	38
		$T_s = 70^\circ\text{C}$	30
I_{Fnom}		35	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	105	A
I_{FSM}	10 ms, sin 180°, $T_j = 25^\circ\text{C}$	170	A
T_j		-40 ... 175	$^\circ\text{C}$
Diode5			
V_{RRM}	$T_j = 25^\circ\text{C}$	1200	V
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	38
		$T_s = 70^\circ\text{C}$	30
I_{Fnom}		35	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	105	A
I_{FSM}	10 ms, sin 180°, $T_j = 25^\circ\text{C}$	170	A
T_j		-40 ... 175	$^\circ\text{C}$
Module			
$I_{t(RMS)}$	$T_{terminal} = 100^\circ\text{C}, T_s = 60^\circ\text{C}$	40	A
T_{stg}		-40 ... 125	$^\circ\text{C}$
V_{isol}	AC, sinusoidal, $t = 1\text{ min}$	2500	V



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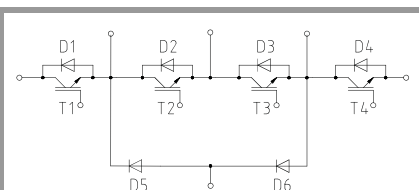
Remarks*

- Recommended $T_{jop} = -40 \dots +150^\circ\text{C}$
- IGBT1: outer IGBTs T1 & T4
- IGBT2: inner IGBTs T2 & T3
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Footnote

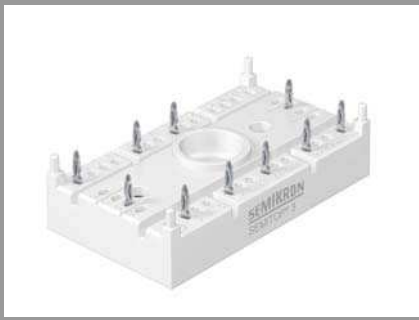
¹⁾ Please find further technical information on the SEMIKRON website.

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT1						
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, V _{CE} = 1200 V, T _j = 25 °C				0.065	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	-7 V ... +15 V			190		nC
R _{Gint}	T _j = 25 °C			0		Ω
t _{d(on)}	V _{CE} = 600 V	T _j = 150 °C				ns
t _r	I _C = 35 A	T _j = 150 °C				ns
E _{on}	V _{GE} = +15/-7 V	T _j = 150 °C		1.6		mJ
t _{d(off)}	R _{G on} = 8 Ω	T _j = 150 °C				ns
t _f	R _{G off} = 8 Ω	T _j = 150 °C				ns
E _{off}		T _j = 150 °C		3.27		mJ
R _{th(j-s)}	per IGBT			1.21		K/W
IGBT2						
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, V _{CE} = 1200 V, T _j = 25 °C				0.065	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		1.95		nF
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R _{Gint}	T _j = 25 °C			0		Ω
t _{d(on)}	V _{CE} = 600 V	T _j = 150 °C				ns
t _r	I _C = 35 A	T _j = 150 °C				ns
E _{on}	V _{GE} = +15/-7 V	T _j = 150 °C		1.6		mJ
t _{d(off)}	R _{G on} = 8 Ω	T _j = 150 °C				ns
t _f	R _{G off} = 8 Ω	T _j = 150 °C				ns
E _{off}		T _j = 150 °C		3.27		mJ
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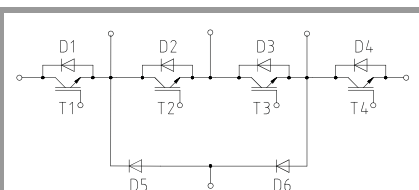
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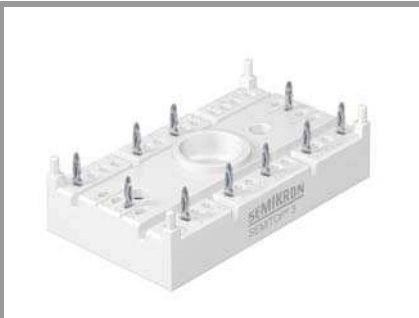
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode1						
V _F = V _{EC}	I _F = 35 A	T _j = 25 °C		2.30	2.62	V
	V _{GE} = 15 V	T _j = 150 °C		2.29	2.62	V
	chiplevel					
V _{F0}		T _j = 25 °C		1.30	1.50	V
	chiplevel	T _j = 150 °C		0.90	1.10	V
r _F		T _j = 25 °C		29	32	mΩ
	chiplevel	T _j = 150 °C		40	43	mΩ
I _{RRM}	I _F = 35 A	T _j = 150 °C				A
Q _{rr}		T _j = 150 °C				μC
E _{rr}	V _R = 600 V	T _j = 150 °C		1.73		mJ
R _{th(j-s)}	per Diode			1.55		K/W
Diode2						
V _F = V _{EC}	I _F = 35 A	T _j = 25 °C		2.30	2.62	V
	V _{GE} = 15 V	T _j = 150 °C		2.29	2.62	V
	chiplevel					
V _{F0}		T _j = 25 °C		1.30	1.50	V
	chiplevel	T _j = 150 °C		0.90	1.10	V
r _F		T _j = 25 °C		29	32	mΩ
	chiplevel	T _j = 150 °C		40	43	mΩ
I _{RRM}	I _F = 35 A	T _j = 150 °C				A
Q _{rr}		T _j = 150 °C				μC
E _{rr} 1)	V _R = 600 V	T _j = 150 °C		-		mJ
R _{th(j-s)}	per Diode			1.55		K/W
Diode5						
V _F = V _{EC}	I _F = 35 A	T _j = 25 °C		2.30	2.62	V
	V _{GE} = 15 V	T _j = 150 °C		2.29	2.62	V
	chiplevel					
V _{F0}		T _j = 25 °C		1.30	1.50	V
	chiplevel	T _j = 150 °C		0.90	1.10	V
r _F		T _j = 25 °C		29	32	mΩ
	chiplevel	T _j = 150 °C		40	43	mΩ
I _{RRM}	I _F = 35 A	T _j = 150 °C				A
Q _{rr}		T _j = 150 °C				μC
E _{rr}	V _R = 600 V	T _j = 150 °C		1.73		mJ
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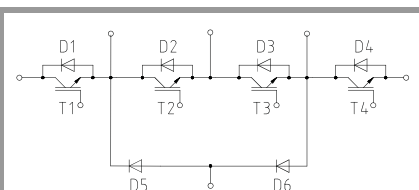
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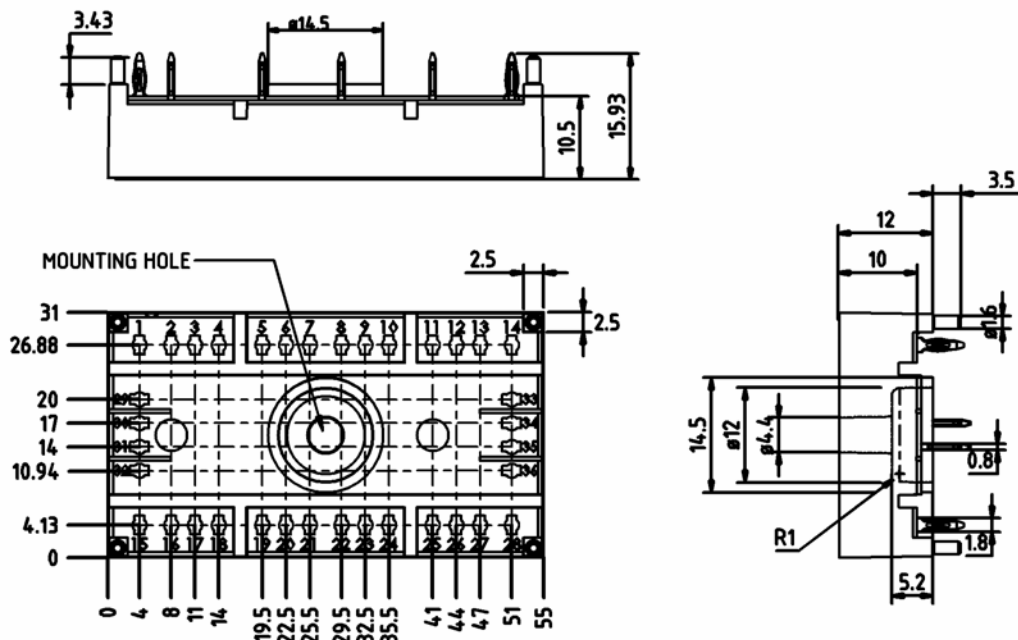
Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
L_{sCE1}			t.b.d.		nH
L_{sCE2}			t.b.d.		nH
$R_{CC'+EE'}$	$T_s = 25^{\circ}\text{C}$				mΩ
					mΩ
M_s	to heatsink	2.25		2.5	Nm
M_t					Nm
					Nm
w			30		g



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dimensions in mm

tolerance system: ISO 2768-m



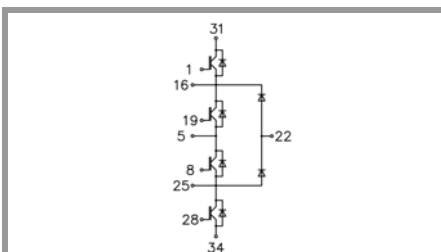
Suggested drilled hole diameter for terminal pins in the circuit board:

- minimum: 1,575mm
- typical: 1,6mm
- maximum: 1,625mm

Suggested hole diameter for the mounting pins in the circuit board: 2mm

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SEMITOP 3 Press-Fit



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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 staff.