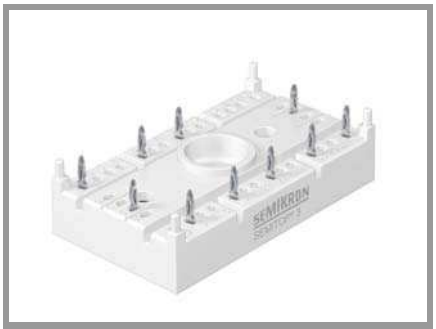
SK50MLI07F3D1p



SEMITOP® 3 Press-Fit

3-Level NPC Inverter

SK50MLI07F3D1p

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
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- CAL4F technology FWD
- Rapid switching clamping diode technology
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Remarks*

- Recommended T_{jop}= -40 ... +150°C
- IGBT1: outer IGBTs T1 & T4
- IGBT2: inner IGBTs T2 & T3
- Diode1: outer Diodes D1 & D4
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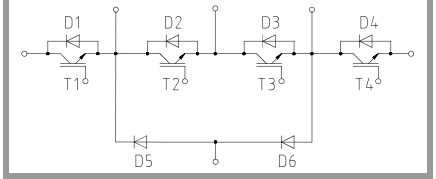

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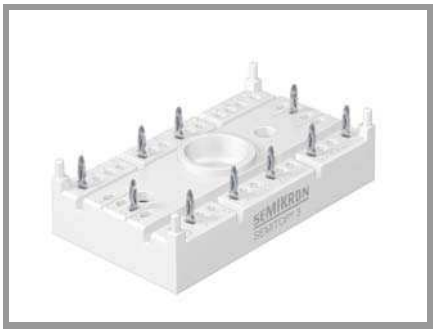
Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
IGBT1				
V_{CES}	T_j = 25 °C		650	V
I_C	T_j = 175 °C	T_s = 25 °C	51	A
		T_s = 70 °C	41	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		150	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 400 V, V_{GE} ≤ 15 V, T_j = 150 °C, V_{CES} ≤ 650 V		5	µs
T_j			-40 ... 175	°C
IGBT2				
V_{CES}	T_j = 25 °C		650	V
I_C	T_j = 175 °C	T_s = 25 °C	58	A
		T_s = 70 °C	46	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		150	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		650	V
I_F	T_j = 175 °C	T_s = 25 °C	56	A
		T_s = 70 °C	44	A
I_{Fnom}			50	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		100	A
I_{FSM}	10 ms, sin 180°, T_j = 25 °C		550	A
T_j			-40 ... 175	°C
Diode2				
V_{RRM}	T_j = 25 °C		650	V
I_F	T_j = 175 °C	T_s = 25 °C	56	A
		T_s = 70 °C	44	A
I_{Fnom}			50	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		100	A
I_{FSM}	10 ms, sin 180°, T_j = 25 °C		550	A
T_j			-40 ... 175	°C
Diode5				
V_{RRM}	T_j = 25 °C		650	V
I_F	T_j = 175 °C	T_s = 25 °C	81	A
		T_s = 70 °C	64	A
I_{Fnom}			60	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		120	A
I_{FSM}	10 ms, sin 180°, T_j = 25 °C		432	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$			40	A
T_{stg}			-40 ... 125	°C
V_{isol}	AC, sinusoidal, t = 1 min		2500	V



SEMITOP® 3 Press-Fit

3-Level NPC Inverter

SK50MLI07F3D1p

Target Data

Features

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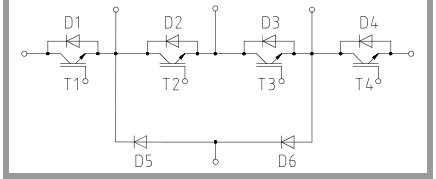

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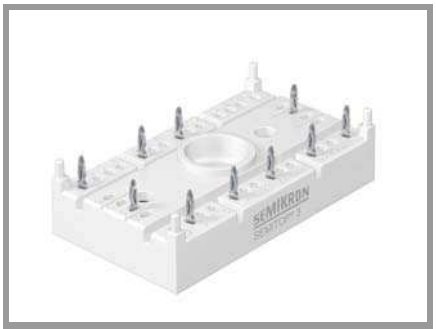
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT1						
$V_{CE(sat)}$	I_C = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.22	V
		T_j = 150 °C		2.18	2.55	V
V_{CE0}	chiplevel	T_j = 25 °C		1.10	1.20	V
		T_j = 150 °C		1.00	1.10	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		15	20	mΩ
		T_j = 150 °C		24	29	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 0.8 mA		4.2	5.1	5.6	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 650 V, T_j = 25 °C				0.15	mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		3.1		nF
C_{oes}		f = 1 MHz				nF
C_{res}		f = 1 MHz		0.09		nF
Q_G	-8V ... +15 V			315		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CE} = 300 V I_C = 50 A V_{GE} = +15/-8 V $R_{G\ on}$ = 8 Ω $R_{G\ off}$ = 8 Ω	T_j = 150 °C				ns
t_r		T_j = 150 °C				ns
E_{on}		T_j = 150 °C		1		mJ
$t_{d(off)}$		T_j = 150 °C				ns
t_f		T_j = 150 °C				ns
E_{off}		T_j = 150 °C		1.18		mJ
$R_{th(j-s)}$	per IGBT			1.11		K/W
IGBT2						
$V_{CE(sat)}$	I_C = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.85	V
		T_j = 150 °C		1.70	2.10	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 chiplevel	T_j = 25 °C		11	17	mΩ
		T_j = 150 °C		18	24	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} = 650 V, T_j = 25 °C				0.15	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			250		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CE} = 300 V I_C = 50 A V_{GE} = +15/-8 V $R_{G\ on}$ = 8 Ω $R_{G\ off}$ = 8 Ω	T_j = 150 °C				ns
t_r		T_j = 150 °C				ns
E_{on}		T_j = 150 °C		1.09		mJ
$t_{d(off)}$		T_j = 150 °C				ns
t_f		T_j = 150 °C				ns
E_{off}		T_j = 150 °C		1.63		mJ
$R_{th(j-s)}$	per IGBT			1.11		K/W



SEMITOP® 3 Press-Fit

3-Level NPC Inverter

SK50MLI07F3D1p

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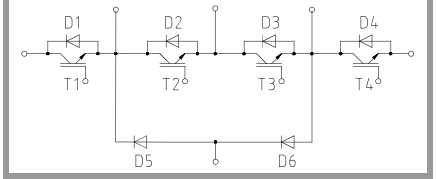

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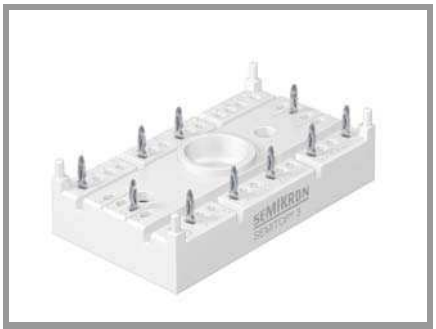
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode1						
$V_F = V_{EC}$	I_F = 50 A	T_j = 25 °C		1.37	1.73	V
	chiplevel	T_j = 150 °C		1.35	1.72	V
V_{F0}	chiplevel	T_j = 25 °C		1.04	1.24	V
		T_j = 150 °C		0.85	0.99	V
r_F	chiplevel	T_j = 25 °C		6.7	9.8	mΩ
		T_j = 150 °C		10	15	mΩ
I_{RRM}	I_F = 50 A	T_j = 150 °C				A
Q_{rr}	V_R = 300 V	T_j = 150 °C				µC
E_{rr}	V_{GE} = +15/-8 V	T_j = 150 °C		0.95		mJ
$R_{th(j-s)}$	per Diode			1.55		K/W
Diode2						
$V_F = V_{EC}$	I_F = 50 A	T_j = 25 °C		1.37	1.73	V
	chiplevel	T_j = 150 °C		1.35	1.72	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		6.7	9.8	mΩ
		T_j = 150 °C		10	15	mΩ
I_{RRM}	I_F = 50 A	T_j = 150 °C				A
Q_{rr}	V_R = 300 V	T_j = 150 °C				µC
E_{rr} [1)]	V_{GE} = +15/-8 V	T_j = 150 °C		-		mJ
$R_{th(j-s)}$	per Diode			1.55		K/W
Diode5						
$V_F = V_{EC}$	I_F = 60 A	T_j = 25 °C		1.35	1.77	V
	chiplevel	T_j = 150 °C		1.30	1.72	V
V_{F0}	chiplevel	T_j = 25 °C		0.95	1.15	V
		T_j = 150 °C		0.75	0.95	V
r_F	chiplevel	T_j = 25 °C		6.7	10	mΩ
		T_j = 150 °C		9.2	13	mΩ
I_{RRM}	I_F = 60 A	T_j = 150 °C				A
Q_{rr}	V_R = 300 V	T_j = 150 °C				µC
E_{rr}	V_{GE} = +15/-8 V	T_j = 150 °C		0.69		mJ
$R_{th(j-s)}$	per Diode			0.93		K/W



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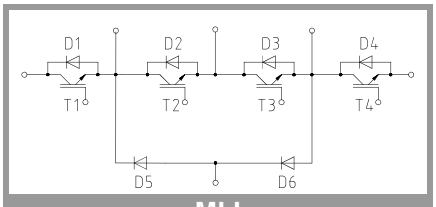
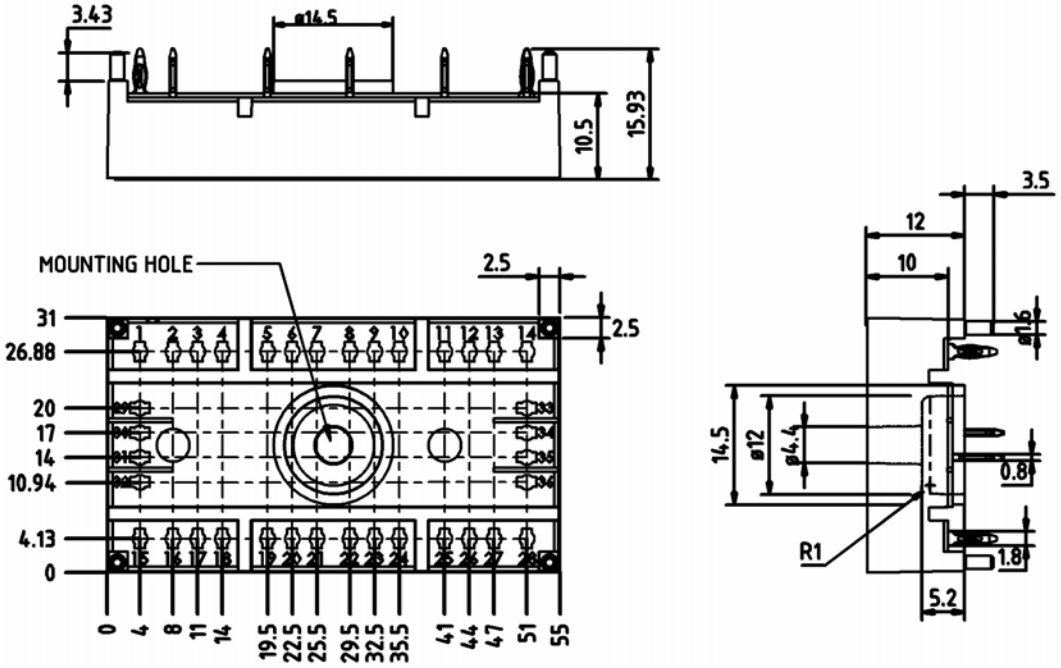


MLI

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 °C				mΩ
						mΩ
M_s	to heatsink		2.25		2.5	Nm
M_t						Nm
						Nm
w				30		g

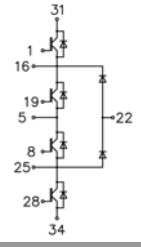
dimensions in mm
tolerance system: ISO 2768-m



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

SEMITOP 3 Press-Fit



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

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