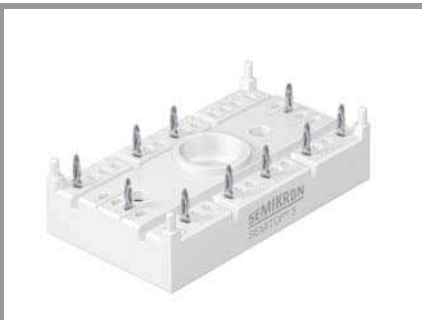


SK50MLI07F3D1p



SEMITOP® 3 Press-Fit

3-Level NPC Inverter

SK50MLI07F3D1p

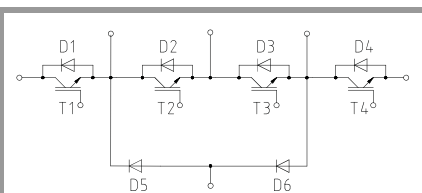
Target Data

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
- 650V Fast Trench IGBT technology
- CAL4F technology FWD
- Rapid switching clamping diode technology
- UL recognized, file no. E 63 532

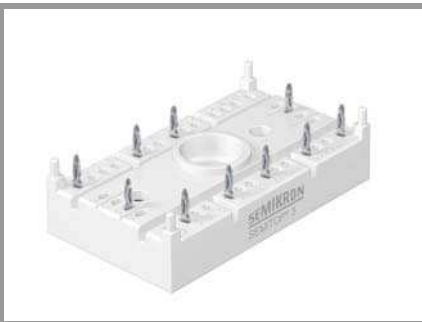
Remarks*

- 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



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Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
IGBT1				
V_{CES}	$T_j = 25^\circ\text{C}$	650	V	
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	51	A
		$T_s = 70^\circ\text{C}$	41	A
I_{Cnom}		50	A	
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	150	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 400\text{ V}, V_{GE} \leq 15\text{ V}, T_j = 150^\circ\text{C}, V_{CES} \leq 650\text{ V}$	5	μs	
T_j		-40 ... 175	$^\circ\text{C}$	
IGBT2				
V_{CES}	$T_j = 25^\circ\text{C}$	650	V	
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	58	A
		$T_s = 70^\circ\text{C}$	46	A
I_{Cnom}		50	A	
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	150	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 360\text{ V}, V_{GE} \leq 15\text{ V}, T_j = 150^\circ\text{C}, V_{CES} \leq 650\text{ V}$	6	μs	
T_j		-40 ... 175	$^\circ\text{C}$	
Diode1				
V_{RRM}	$T_j = 25^\circ\text{C}$	650	V	
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	56	A
		$T_s = 70^\circ\text{C}$	44	A
I_{Fnom}		50	A	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	100	A	
I_{FSM}	10 ms, sin 180°, $T_j = 25^\circ\text{C}$	550	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Diode2				
V_{RRM}	$T_j = 25^\circ\text{C}$	650	V	
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	56	A
		$T_s = 70^\circ\text{C}$	44	A
I_{Fnom}		50	A	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	100	A	
I_{FSM}	10 ms, sin 180°, $T_j = 25^\circ\text{C}$	550	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Diode5				
V_{RRM}	$T_j = 25^\circ\text{C}$	650	V	
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	81	A
		$T_s = 70^\circ\text{C}$	64	A
I_{Fnom}		60	A	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	120	A	
I_{FSM}	10 ms, sin 180°, $T_j = 25^\circ\text{C}$	432	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Module				
$I_{t(RMS)}$		40	A	
T_{stg}		-40 ... 125	$^\circ\text{C}$	
V_{isol}	AC, sinusoidal, t = 1 min	2500	V	



SEMITOP® 3 Press-Fit

3-Level NPC Inverter

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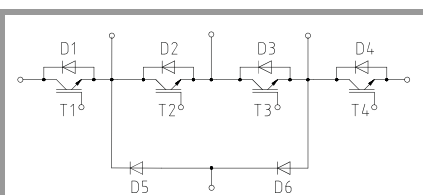
Target Data

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
- 650V Fast Trench IGBT technology
- CAL4F technology FWD
- Rapid switching clamping diode technology
- UL recognized, file no. E 63 532

Remarks*

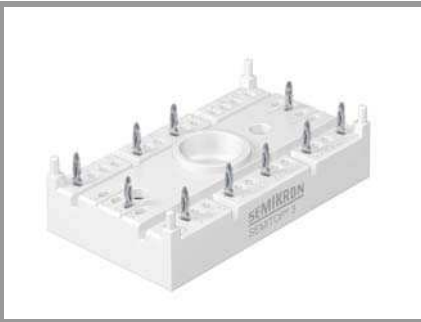
- Recommended $T_{jop} = -40 \dots +150^\circ\text{C}$
- IGBT1: outer IGBTs T1 & T4
- IGBT2: inner IGBTs T2 & T3
- Diode1: outer Diodes D1 & D4
- Diode2: inner Diodes D2 & D3
- Diode5: clamping diodes D5 & D6



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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT1						
$V_{CE(sat)}$	$I_C = 50\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		1.85	2.22	V
		$T_j = 150^\circ\text{C}$		2.18	2.55	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$		1.10	1.20	V
		$T_j = 150^\circ\text{C}$		1.00	1.10	V
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		15	20	m Ω
		$T_j = 150^\circ\text{C}$		24	29	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 0.8\text{ mA}$		4.2	5.1	5.6	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = 650\text{ V}, T_j = 25^\circ\text{C}$				0.15	mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		3.1		nF
C_{oes}		$f = 1\text{ MHz}$				nF
C_{res}		$f = 1\text{ MHz}$		0.09		nF
Q_G	$-8\text{ V} \dots +15\text{ V}$			315		nC
R_{Gint}	$T_j = 25^\circ\text{C}$			0		Ω
$t_{d(on)}$	$V_{CE} = 300\text{ V}$	$T_j = 150^\circ\text{C}$				ns
t_r	$I_C = 50\text{ A}$	$T_j = 150^\circ\text{C}$				ns
E_{on}	$V_{GE} = +15/-8\text{ V}$	$T_j = 150^\circ\text{C}$		1		mJ
$t_{d(off)}$	$R_{G on} = 8\ \Omega$	$T_j = 150^\circ\text{C}$				ns
t_f	$R_{G off} = 8\ \Omega$	$T_j = 150^\circ\text{C}$				ns
E_{off}		$T_j = 150^\circ\text{C}$		1.18		mJ
$R_{th(j-s)}$	per IGBT			1.11		K/W
IGBT2						
$V_{CE(sat)}$	$I_C = 50\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		1.45	1.85	V
		$T_j = 150^\circ\text{C}$		1.70	2.10	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$		0.90	1.00	V
		$T_j = 150^\circ\text{C}$		0.82	0.90	V
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		11	17	m Ω
		$T_j = 150^\circ\text{C}$		18	24	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 0.8\text{ mA}$		5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = 650\text{ V}, T_j = 25^\circ\text{C}$				0.15	mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		3.14		nF
C_{oes}		$f = 1\text{ MHz}$		0.2		nF
C_{res}		$f = 1\text{ MHz}$		0.093		nF
Q_G	$-8\text{ V} \dots +15\text{ V}$			250		nC
R_{Gint}	$T_j = 25^\circ\text{C}$			0		Ω
$t_{d(on)}$	$V_{CE} = 300\text{ V}$	$T_j = 150^\circ\text{C}$				ns
t_r	$I_C = 50\text{ A}$	$T_j = 150^\circ\text{C}$				ns
E_{on}	$V_{GE} = +15/-8\text{ V}$	$T_j = 150^\circ\text{C}$		1.09		mJ
$t_{d(off)}$	$R_{G on} = 8\ \Omega$	$T_j = 150^\circ\text{C}$				ns
t_f	$R_{G off} = 8\ \Omega$	$T_j = 150^\circ\text{C}$				ns
E_{off}		$T_j = 150^\circ\text{C}$		1.63		mJ
$R_{th(j-s)}$	per IGBT			1.11		K/W

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SEMITOP® 3 Press-Fit

3-Level NPC Inverter

SK50MLI07F3D1p

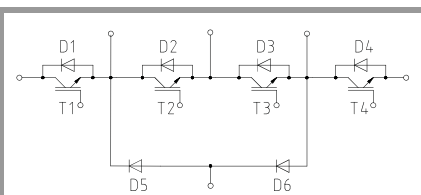
Target Data

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
- 650V Fast Trench IGBT technology
- CAL4F technology FWD
- Rapid switching clamping diode technology
- UL recognized, file no. E 63 532

Remarks*

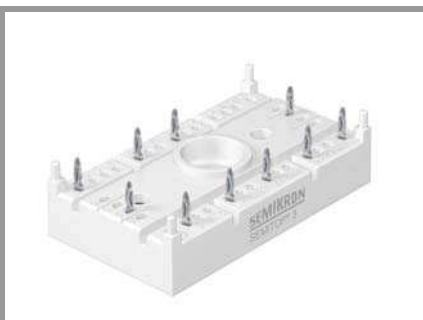
- Recommended $T_{jop} = -40 \dots +150^\circ\text{C}$
- IGBT1: outer IGBTs T1 & T4
- IGBT2: inner IGBTs T2 & T3
- Diode1: outer Diodes D1 & D4
- Diode2: inner Diodes D2 & D3
- Diode5: clamping diodes D5 & D6



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

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SEMITOP® 3 Press-Fit

3-Level NPC Inverter

SK50MLI07F3D1p

Target Data

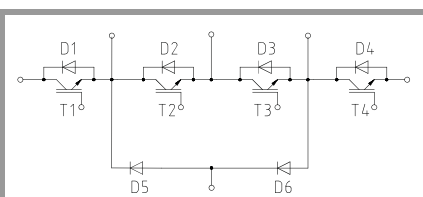
Features

- 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
- 650V Fast Trench IGBT technology
- CAL4F technology FWD
- Rapid switching clamping diode technology
- 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

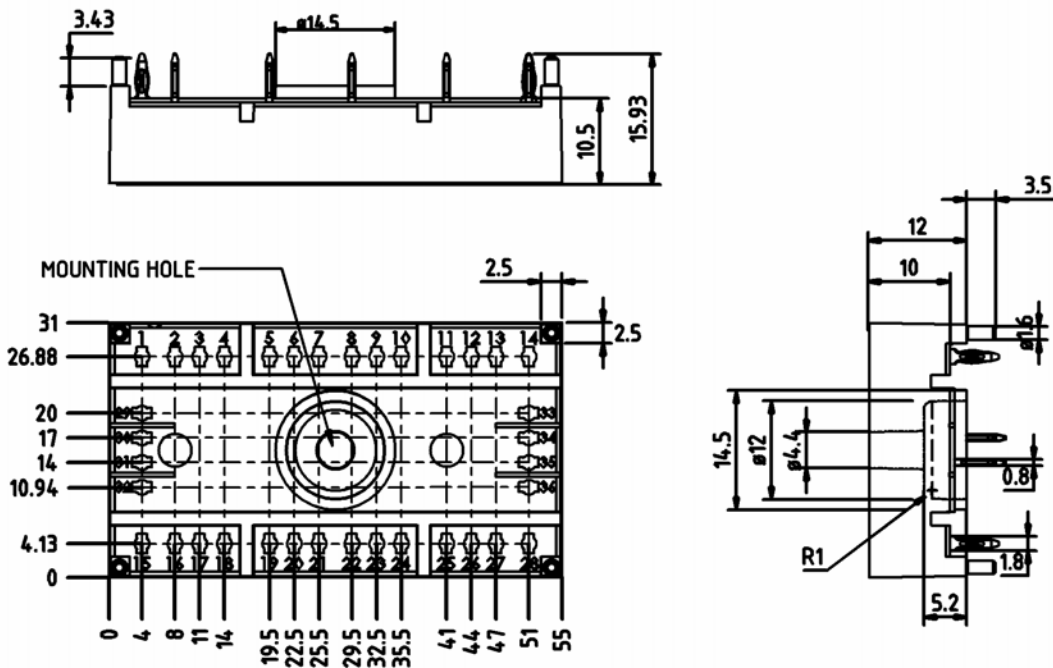
Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
L_{sCE1}			t.b.d.		nH
L_{sCE2}			t.b.d.		nH
$R_{CC'+EE'}$					$T_s = 25^{\circ}\text{C}$ mΩ
					mΩ
M_s	to heatsink		2.25	2.5	Nm
M_t					Nm
					Nm
w			30		g



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dimensions in mm
tolerance system: ISO 2768-m



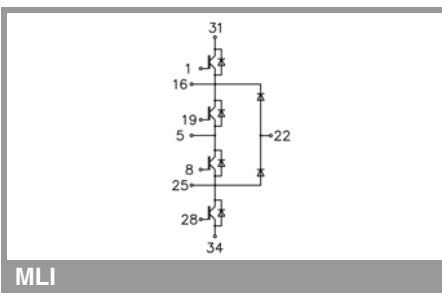
Suggested drilled hole diameter for terminal pins in the circuit board:

- 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.

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