

**SEMITOP<sup>®</sup> 3**

## IGBT Module

**SK50MLI065**

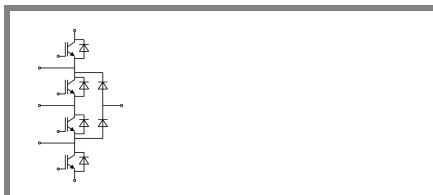
Target Data

### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- Ultra Fast NPT IGBT technology
- CAL technology FWD

### Typical Applications

- Multi level inverter



MLI

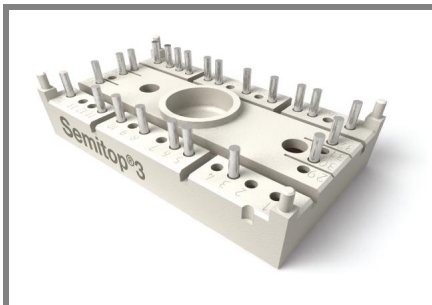
Absolute Maximum Ratings		$T_s = 25\text{ °C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$	$T_j = 25\text{ °C}$	600	V
$I_C$	$T_j = 125\text{ °C}$	$T_s = 25\text{ °C}$	54
		$T_s = 80\text{ °C}$	40
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	120	A
$V_{GES}$		$\pm 20$	V
$t_{psc}$	$V_{CC} = 300\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 600\text{ V}$	10	$\mu\text{s}$

Inverse Diode		$T_s = 25\text{ °C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
$I_F$	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	36
		$T_s = 80\text{ °C}$	24
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$		A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ °C}$	200	A

Freewheeling Diode		$T_s = 25\text{ °C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
$I_F$	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	64
		$T_{case} = 80\text{ °C}$	42
$I_{FRM}$			A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ °C}$	440	A

Module		$T_s = 25\text{ °C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
$I_{t(RMS)}$			A
$T_{vj}$		-40 ... +150	$^{\circ}\text{C}$
$T_{stg}$		-40 ... +125	$^{\circ}\text{C}$
$V_{isol}$	AC, 1 min.	2500	V

Characteristics		$T_s = 25\text{ °C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1,4\text{ mA}$	3	4	5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES} T_j = 25\text{ °C}$			0,0044	mA
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V } T_j = 25\text{ °C}$			240	nA
$V_{CE0}$		$T_j = 25\text{ °C}$	1,4	1,9	V
		$T_j = 125\text{ °C}$	1,7	2,2	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$			$\text{m}\Omega$
		$T_j = 125\text{ °C}$		22	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 60\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}_{chiplev.}$	1,8		V
		$T_j = 125\text{ °C}_{chiplev.}$	2,1		V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V} \quad f = 1\text{ MHz}$		3,2		nF
$C_{oes}$			0,3		nF
$C_{res}$			0,18		nF
$t_{d(on)}$	$R_{Gon} = 15\ \Omega$	$V_{CC} = 300\text{ V}$ $I_{Cnom} = 40\text{ A}$	60		ns
$t_r$			30		ns
$E_{on}$	$R_{Goff} = 15\ \Omega$	$T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$	1,07		mJ
$t_{d(off)}$			223		ns
$t_f$			20		ns
$E_{off}$			0,76		mJ
$R_{th(j-s)}$	per IGBT			0,85	K/W



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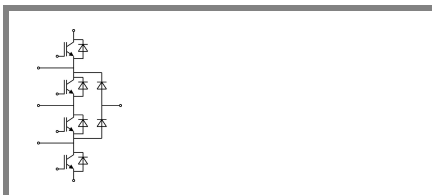
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### Typical Applications

- Multi level inverter

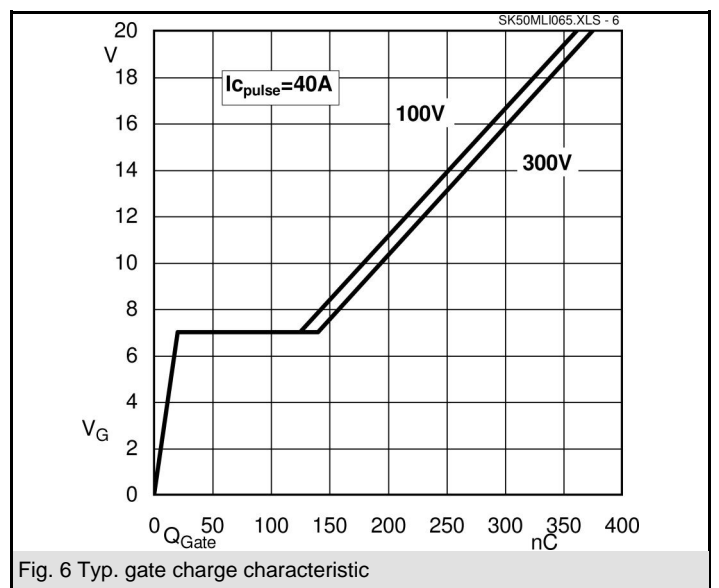
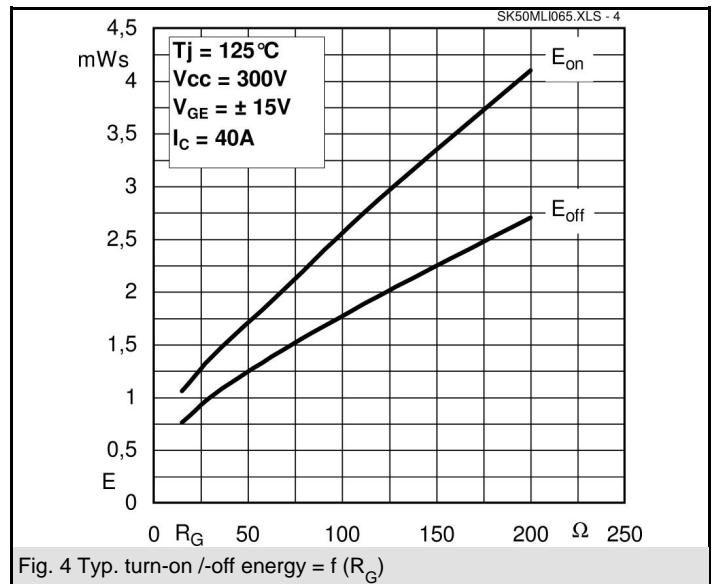
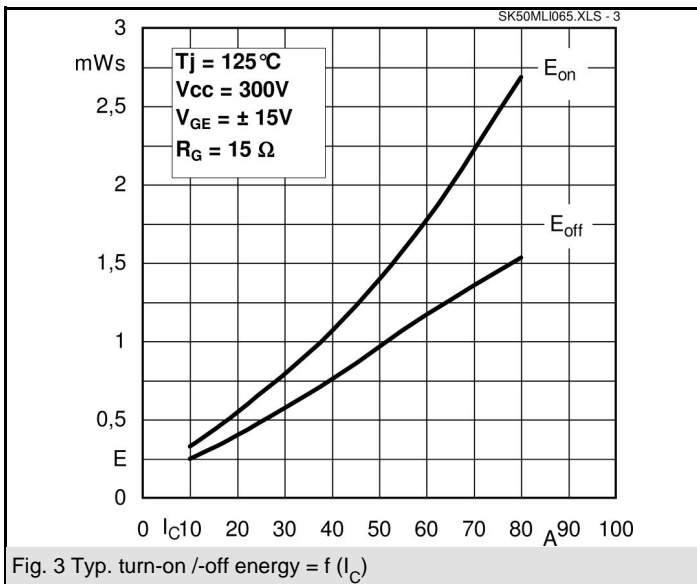
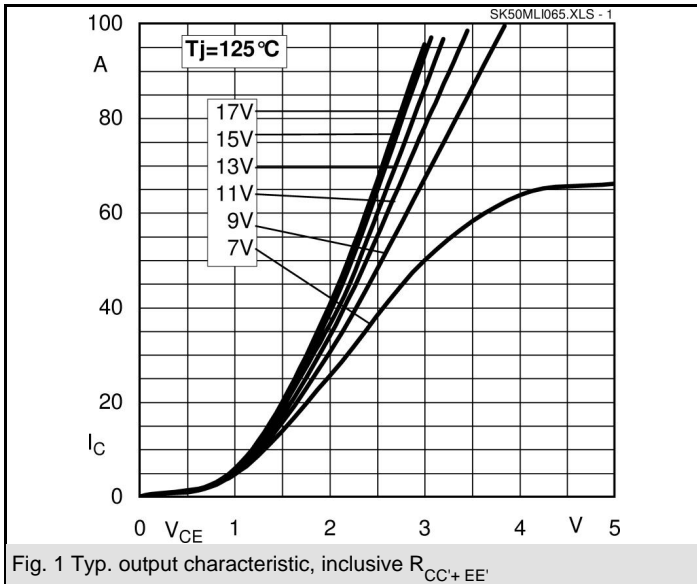


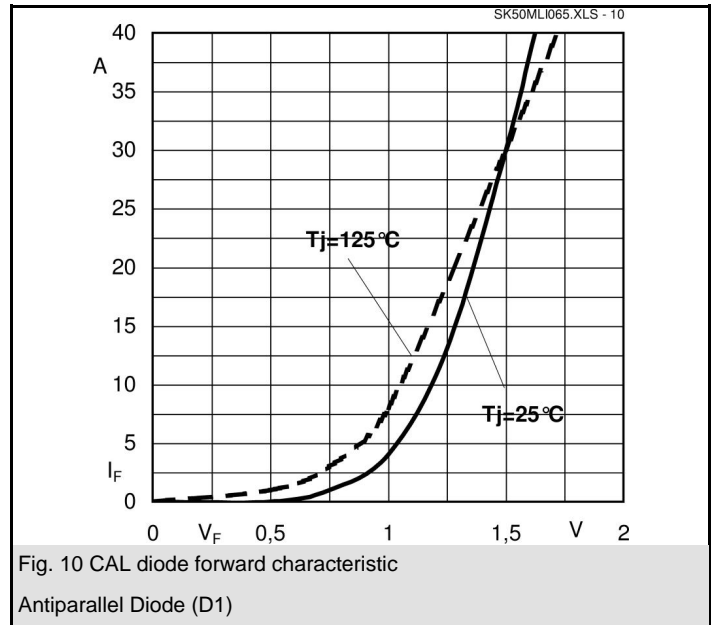
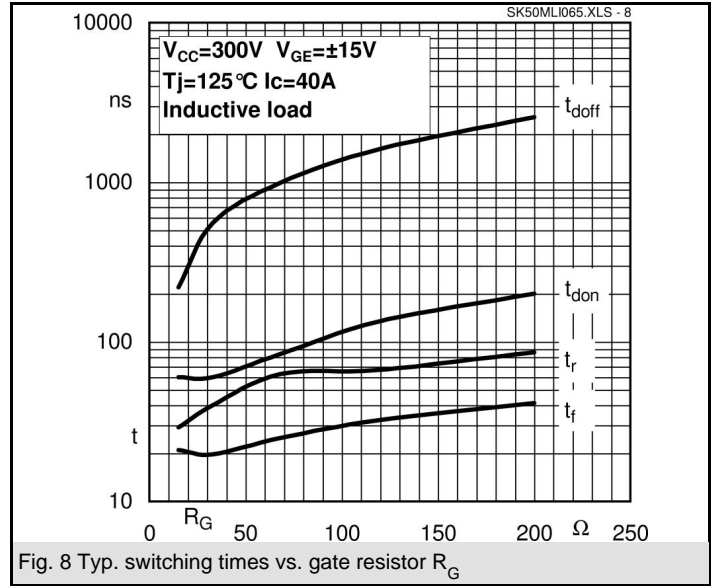
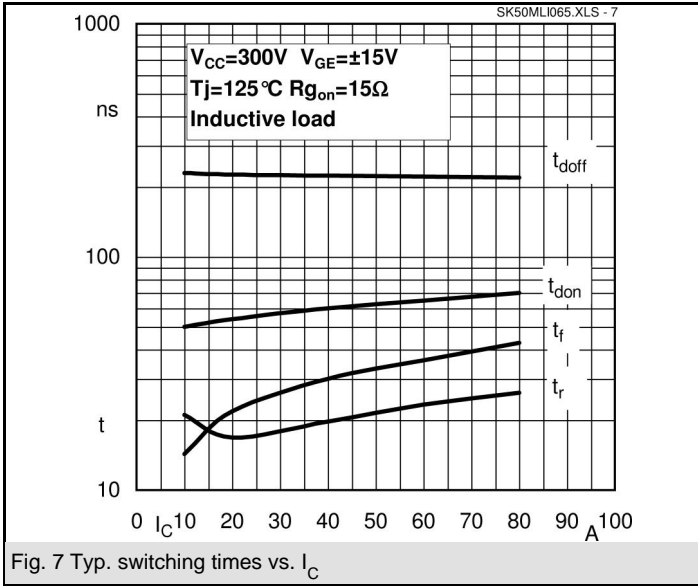
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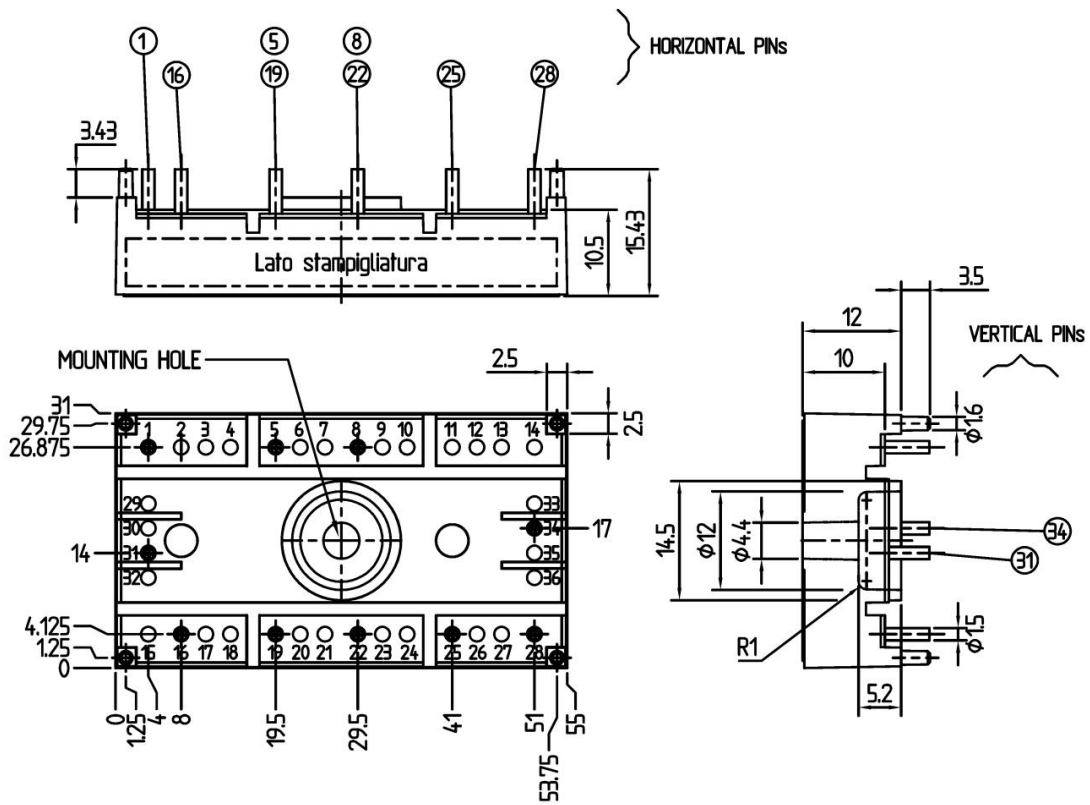
Characteristics							
Symbol	Conditions			min.	typ.	max.	Units
<b>Antiparallel Diode (D1)</b>							
$V_F = V_{EC}$	$I_{Fnom} = 25 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$			1,45		V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$			1,4		V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$					V
		$T_j = 125 \text{ }^\circ\text{C}$			0,85		V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$					mΩ
		$T_j = 125 \text{ }^\circ\text{C}$			22		mΩ
$I_{RRM}$	$I_{Fnom} = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$					A
$Q_{rr}$	$di/dt = -2400 \text{ A}/\mu\text{s}$						μC
$E_{rr}$	$V_R = 300 \text{ V}$						mJ
$R_{th(j-s)D}$	per diode					1,7	K/W
<b>Freewheeling Diode (D2)</b>							
$V_F = V_{EC}$	$I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$			1,45		V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$			1,4		V
$V_{F0}$		$T_j = 125 \text{ }^\circ\text{C}$			0,85		V
$r_F$		$T_j = 125 \text{ }^\circ\text{C}$			11		V
$I_{RRM}$	$I_{Fnom} = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$					A
$Q_{rr}$	$di/dt = -2400 \text{ A}/\mu\text{s}$						μC
$E_{rr}$	$V_R = 300 \text{ V}$						mJ
$R_{th(j-s)FD}$	per diode					1,1	K/W
$M_s$	to heat sink			2,25		2,5	Nm
w					30		g

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

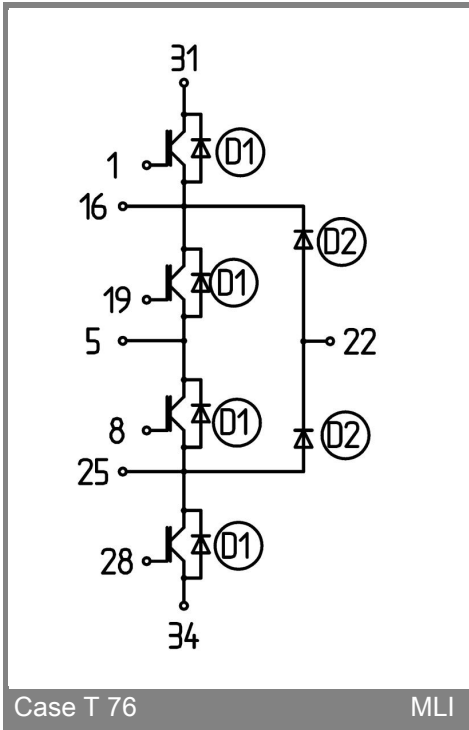
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Case T 76 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T 76

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