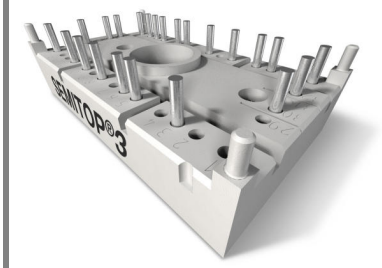
SK50MLI066



SEMITOP® 3

IGBT Module

SK50MLI066

Target Data

Features

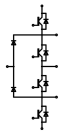
- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- Trench IGBT technology
- CAL technology FWD

Typical Applications*

- 3 Level Inverter
- UPS

Remarks

- Visol = 3000V AC, 1s, 50Hz
- Dynamic measure: DUT= IGBT (Gate pin 1) and Neutral Clamp Diode (Kathode pin 16) as free-wheeling diode



MLI

Absolute Maximum Ratings			T_s = 25 °C, unless otherwise specified	
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 175 °C	T_s = 25 °C	60	A
		T_s = 70 °C	50	A
I_{CRM}	I_{CRM}= 2 x I_{Cnom}		100	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 360 V; $V_{GE} \leq$ 20 V; V_{CES} < 600 V	T_j = 150 °C	6	µs
Inverse Diode				
I_F	T_j = 175 °C	T_s = 25 °C	56	A
		T_s = 70 °C	44	A
I_{FRM}	I_{FRM}= 2 x I_{Fnom}		100	A
I_{FSM}	t_p = 10 ms; half sine wave	T_j = 150 °C	320	A
Freewheeling Diode				
I_F	T_j = 175 °C	T_s = 25 °C	56	A
		T_s = 70 °C	44	A
I_{FRM}	I_{FRM}= 2 x I_{Fnom}		60	A
I_{FSM}	t_p = 10 ms; half sine wave	T_j = 150 °C	320	A
Module				
$I_{t(RMS)}$				A
T_{vj}			-40 ... +175	°C
T_{stg}			-40 ... +125	°C
V_{isol}	AC, 1 min.		2500	V

Characteristics			T_s = 25 °C, unless otherwise specified			
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 0,8 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C			0,0026	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V	T_j = 25 °C			600	nA
V_{CE0}		T_j = 25 °C		0,9	1,1	V
		T_j = 150 °C		0,8	1	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		11		mΩ
		T_j = 150°C		17		mΩ
$V_{CE(sat)}$	I_{Cnom} = 50 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,45		V
		T_j = 150°C$_{chiplev.}$		1,65		V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		3,1		nF
C_{oes}				0,2		nF
C_{res}				0,093		nF
$t_{d(on)}$	R_{Gon} = 16 Ω	V_{CC} = 300V		30		ns
t_r		I_C= 50A		31		ns
E_{on}		T_j = 150 °C		1,46		mJ
$t_{d(off)}$	R_{Goff} = 16 Ω	V_{GE}= -7/+15 V		351		ns
t_f				45		ns
E_{off}				2,02		mJ
$R_{th(j-s)}$	per IGBT			1,11		K/W

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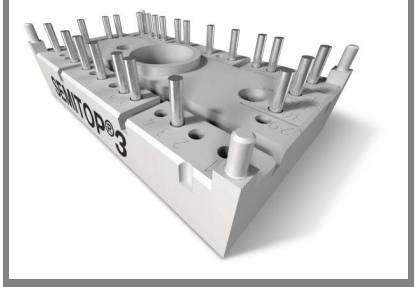

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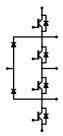

MLI

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode (Antiparallel Diode)						
$V_F = V_{EC}$	I_{Fnom} = 50 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,5		V
		T_j = 150 °$C_{chiplev.}$		1,5		V
V_{F0}		T_j = 25 °C		1		V
		T_j = 150 °C		0,9		V
r_F		T_j = 25 °C		10		mΩ
		T_j = 150 °C		12		mΩ
I_{RRM}	I_F = 50 A	T_j = 150 °C				A
Q_{rr}						µC
E_{rr}	V_R= 300V			1,07		mJ
$R_{th(j-s)D}$	per diode			1,7		K/W
Freewheeling Diode (Neutral Clampo diode)						
$V_F = V_{EC}$	I_{Fnom} = 50 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,5		V
		T_j = 150 °$C_{chiplev.}$		1,5		V
V_{F0}		T_j = 25 °C		1		V
		T_j = 150 °C		0,9		V
r_F		T_j = 25 °C		10		V
		T_j = 150 °C		12		V
I_{RRM}	I_F = 50 A	T_j = 150 °C		40		A
Q_{rr}	di/dt = -2670 A/µs			2,2		µC
E_{rr}	V_R=300V			1,07		mJ
$R_{th(j-s)FD}$	per diode			1,7		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.

* 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 personal.

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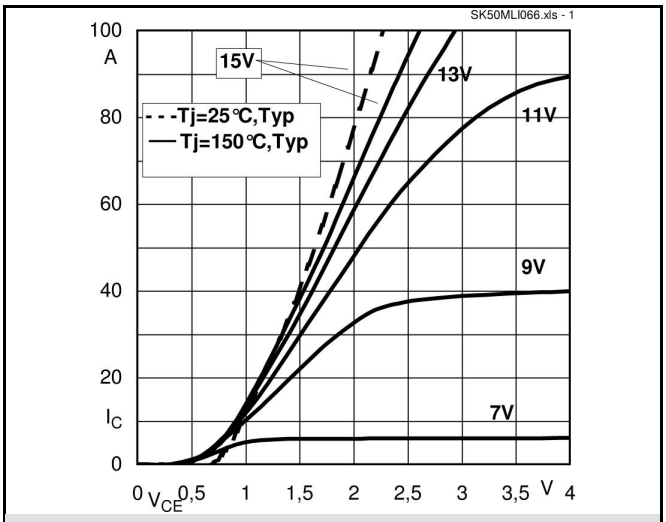

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

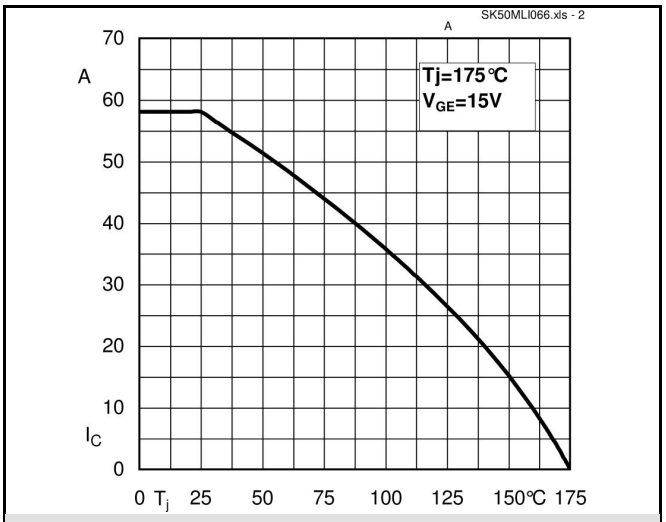

Fig. 2 Rated current vs. temperature $I_C = f(T_s)$

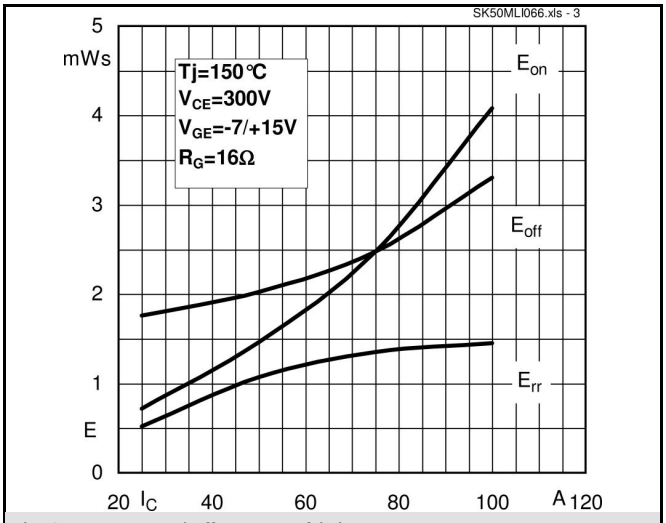

Fig. 3 Typ. turn-on /-off energy = f (I_C)

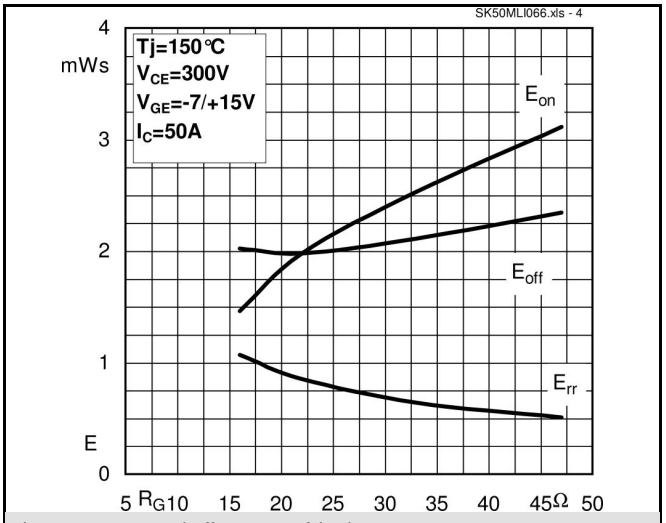

Fig. 4 Typ. turn-on /-off energy = f (R_G)

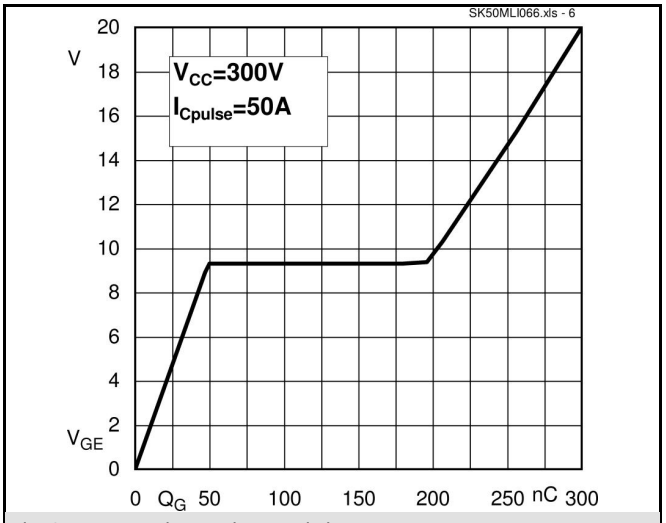

Fig. 6 Typ. gate charge characteristic

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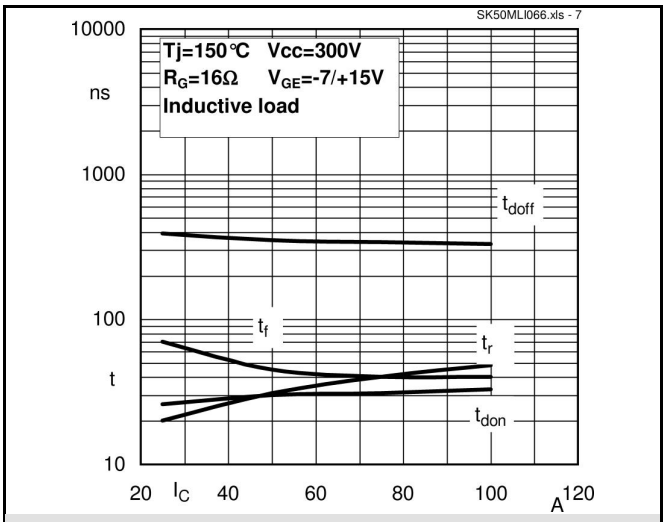

Fig. 7 Typ. switching times vs. I_C

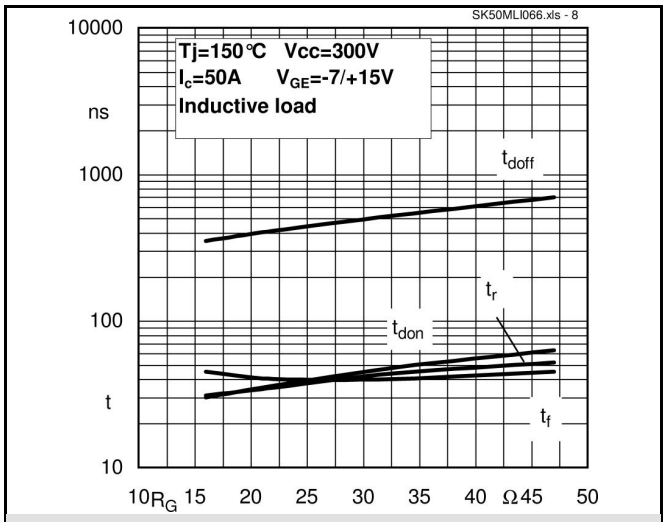

Fig. 8 Typ. switching times vs. gate resistor R_G

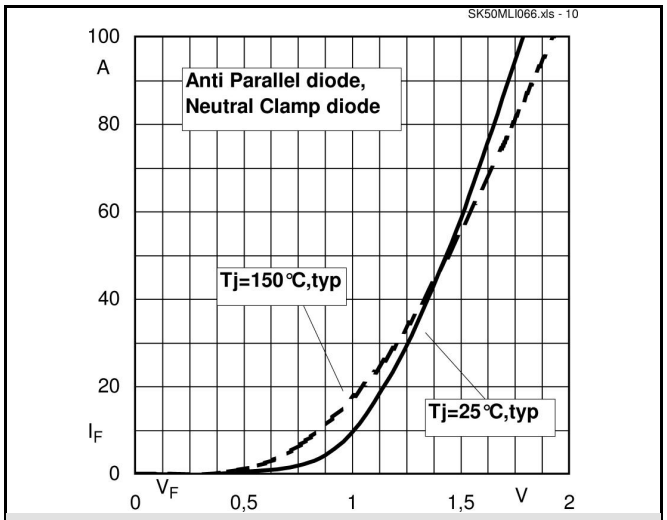

Fig. 10 CAL diode forward characteristic

Antiparallel Diode (D1)

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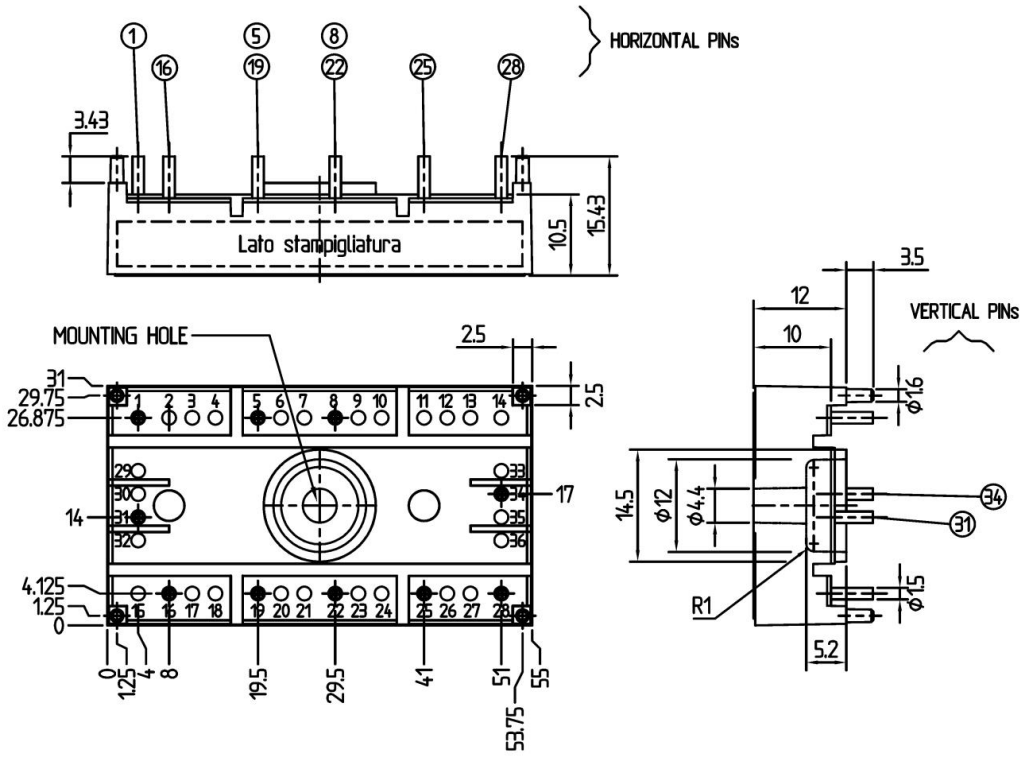
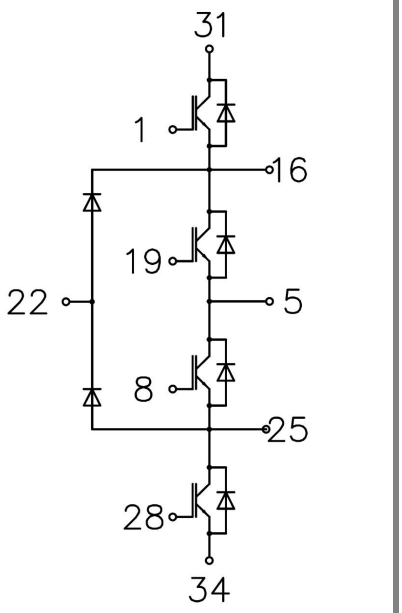


Case T 76 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T 76 MLI

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