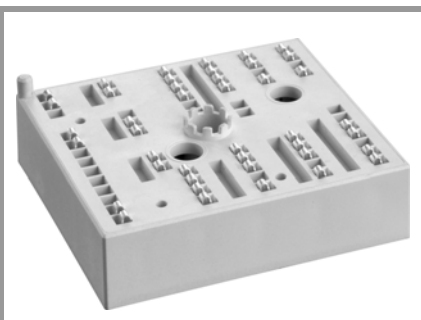


# SKiiP 26MLI07E3V1



MiniSKiiP® 2

## 3-Level NPC Inverter

### SKiiP 26MLI07E3V1

#### Features

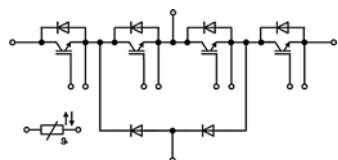
- 650V Trench IGBTs
- Robust and soft diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

#### Typical Applications\*

- Uninterruptible power supplies (UPS)
- Solar inverters

#### Remarks

- Case temperature limited to  $T_C = 125^\circ\text{C}$  max.;  $T_C = T_S$  (valid for baseplateless modules)
- Product reliability results valid for  $T_j \leq 150^\circ\text{C}$  (recommended  $T_{op} = -40 \dots +150^\circ\text{C}$ )

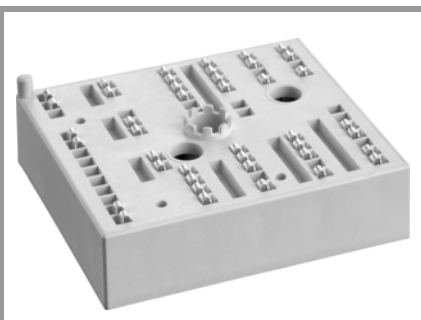


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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
<b>IGBT</b>				
$V_{CES}$			650	V
$I_C$	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	98	A
		$T_s = 70^\circ\text{C}$	79	A
$I_{Cnom}$			75	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$		150	A
$V_{GES}$			-20 ... 20	V
$t_{psc}$	$V_{CC} = 360\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 650\text{ V}$	$T_j = 150^\circ\text{C}$	6	$\mu\text{s}$
$T_j$			-40 ... 175	$^\circ\text{C}$
<b>Inverse diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	75	A
		$T_s = 70^\circ\text{C}$	59	A
$I_{Fnom}$			75	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$		150	A
$I_{FSM}$	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$		550	A
$T_j$			-40 ... 175	$^\circ\text{C}$
<b>Clamping diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	75	A
		$T_s = 70^\circ\text{C}$	59	A
$I_{Fnom}$			75	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$		150	A
$I_{FSM}$	10 ms, sin 180°, $T_j = 25^\circ\text{C}$		550	A
$T_j$			-40 ... 175	$^\circ\text{C}$
<b>Module</b>				
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}, 20\text{A per spring}$		120	A
$T_{stg}$			-40 ... 125	$^\circ\text{C}$
$V_{isol}$	AC sinus 50 Hz, $t = 1\text{ min}$		2500	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>IGBT</b>						
$V_{CE(sat)}$	$I_C = 75\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	1.45	1.77		V
		$T_j = 150^\circ\text{C}$	1.70	2.10		V
$V_{CE0}$	chipelevel	$T_j = 25^\circ\text{C}$	0.9	1		V
		$T_j = 150^\circ\text{C}$	0.82	0.9		V
$r_{CE}$	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	7.3	10		$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	12	16		$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1.2\text{ mA}$		5.1	5.8	6.4	V
$I_{CES}$	$V_{GE} = 0\text{ V}$ $V_{CE} = 650\text{ V}$	$T_j = 25^\circ\text{C}$	0.1	0.3		mA
						mA
$C_{ies}$	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	4.62			nF
$C_{oes}$		$f = 1\text{ MHz}$	0.30			nF
$C_{res}$		$f = 1\text{ MHz}$	0.14			nF
$Q_G$	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		680			nC
$R_{Gint}$	$T_j = 25^\circ\text{C}$		4			$\Omega$

# SKiIP 26MLI07E3V1



MiniSKiIP® 2

## 3-Level NPC Inverter

### SKiIP 26MLI07E3V1

#### Features

- 650V Trench IGBTs
- Robust and soft diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

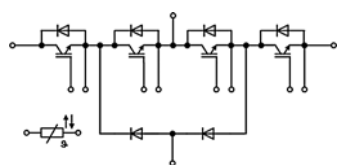
#### Typical Applications\*

- Uninterruptible power supplies (UPS)
- Solar inverters

#### Remarks

- Case temperature limited to  $T_C = 125^\circ\text{C}$  max.;  $T_C = T_S$  (valid for baseplateless modules)
- Product reliability results valid for  $T_j \leq 150^\circ\text{C}$  (recommended  $T_{op} = -40 \dots +150^\circ\text{C}$ )

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>T1 / T4</b>						
$t_{d(on)}$	$V_{CE} = 300\text{ V}$	$T_j = 150^\circ\text{C}$		119		ns
$t_r$	$I_C = 75\text{ A}$	$T_j = 150^\circ\text{C}$		45		ns
$E_{on}$	$V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$		2.8		mJ
$t_{d(off)}$	$R_{G\ on} = 4.1\ \Omega$	$T_j = 150^\circ\text{C}$		250		ns
$t_f$	$R_{G\ off} = 3\ \Omega$	$T_j = 150^\circ\text{C}$		56		ns
$E_{off}$	$di/dt_{on} = 1330\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		2.8		mJ
$R_{th(j-s)}$	$di/dt_{off} = 1140\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		0.6		K/W
	per IGBT					
<b>T2 / T3</b>						
$t_{d(on)}$	$V_{CE} = 300\text{ V}$	$T_j = 150^\circ\text{C}$		113		ns
$t_r$	$I_C = 75\text{ A}$	$T_j = 150^\circ\text{C}$		52		ns
$E_{on}$	$V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$		1.6		mJ
$t_{d(off)}$	$R_{G\ on} = 4.1\ \Omega$	$T_j = 150^\circ\text{C}$		247		ns
$t_f$	$R_{G\ off} = 3\ \Omega$	$T_j = 150^\circ\text{C}$		76		ns
$E_{off}$	$di/dt_{on} = 1550\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		2.7		mJ
$R_{th(j-s)}$	$di/dt_{off} = 1100\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		0.6		K/W
	per Diode					
<b>Inverse diode</b>						
$V_F = V_{EC}$	$I_F = 75\text{ A}$	$T_j = 25^\circ\text{C}$		1.5	2	V
	$V_{GE} = 0\text{ V}$	$T_j = 150^\circ\text{C}$		1.6	2.1	V
	chipelevel					
$V_{F0}$	chipelevel		$T_j = 25^\circ\text{C}$	1	1.2	V
			$T_j = 150^\circ\text{C}$	0.9	1	V
$r_F$	chipelevel		$T_j = 25^\circ\text{C}$	6.7	9.8	m $\Omega$
			$T_j = 150^\circ\text{C}$	10	15	m $\Omega$
$I_{RRM}$	$I_F = 75\text{ A}$	$T_j = 150^\circ\text{C}$		56		A
$Q_{rr}$	$di/dt_{off} = 1500\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		6.3		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15\text{ V}$	$T_j = 150^\circ\text{C}$		1.4		mJ
$R_{th(j-s)}$	per Diode			1		K/W
<b>Clamping diode</b>						
$V_F = V_{EC}$	$I_F = 75\text{ A}$	$T_j = 25^\circ\text{C}$		1.5	2	V
	$V_{GE} = 0\text{ V}$	$T_j = 150^\circ\text{C}$		1.6	2.1	V
	chipelevel					
$V_{F0}$	chipelevel		$T_j = 25^\circ\text{C}$	1	1.2	V
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$Q_{rr}$	$di/dt_{off} = 1350\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		7.1		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15\text{ V}$	$T_j = 150^\circ\text{C}$		1.4		mJ
$R_{th(j-s)}$	per Diode			1		K/W
<b>Module</b>						
$M_s$	to heat sink		2		2.5	Nm
w	weight			55		g
<b>Temperature Sensor</b>						
$R_{25}$	NTC, $T_r = 25^\circ\text{C}^1)$			$5.0 \pm 5\%$		k $\Omega$



MLI

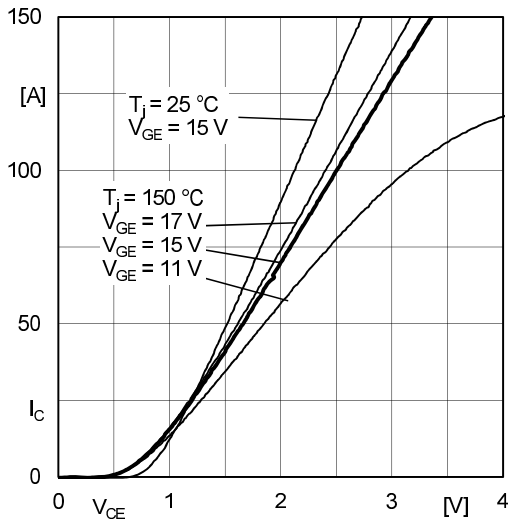


Fig. 1: Typ. output characteristic, inclusive  $R_{CC+EE}$

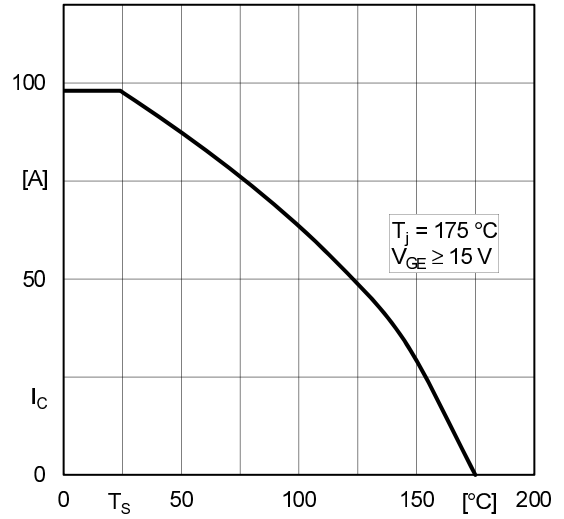


Fig. 2: Rated current vs. temperature  $I_C = f(T_S)$

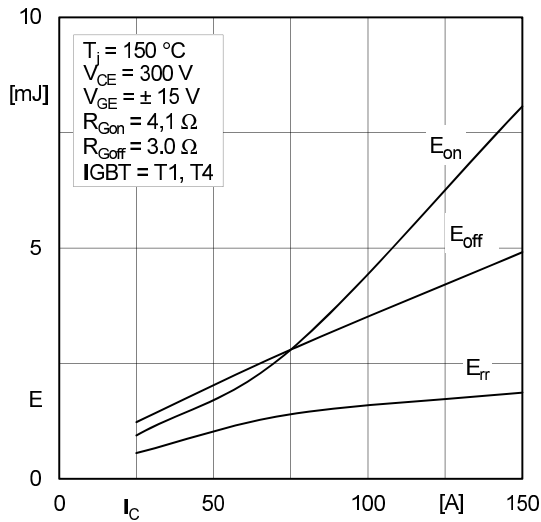


Fig. 3: Typ. turn-on /-off energy =  $f(I_C)$

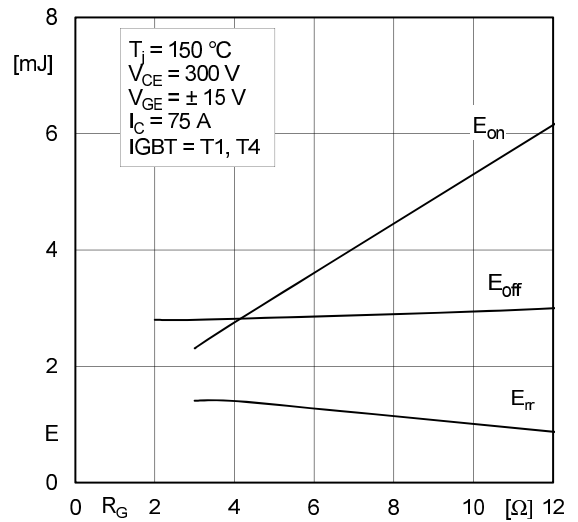


Fig. 4: Typ. turn-on /-off energy =  $f(R_G)$

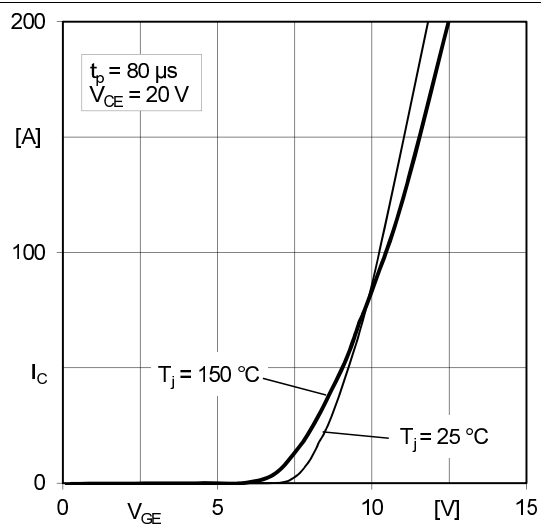


Fig. 5: Typ. transfer characteristic

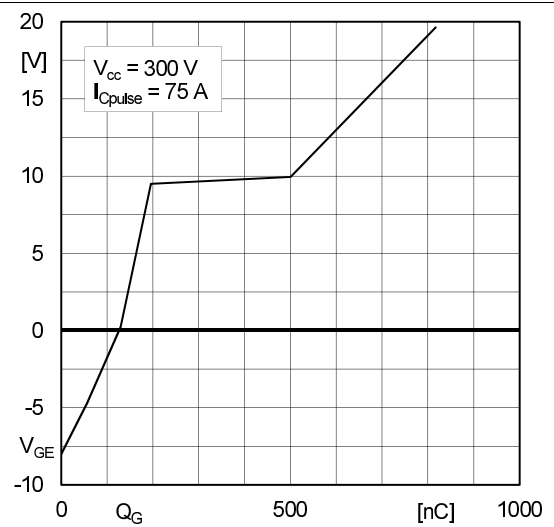
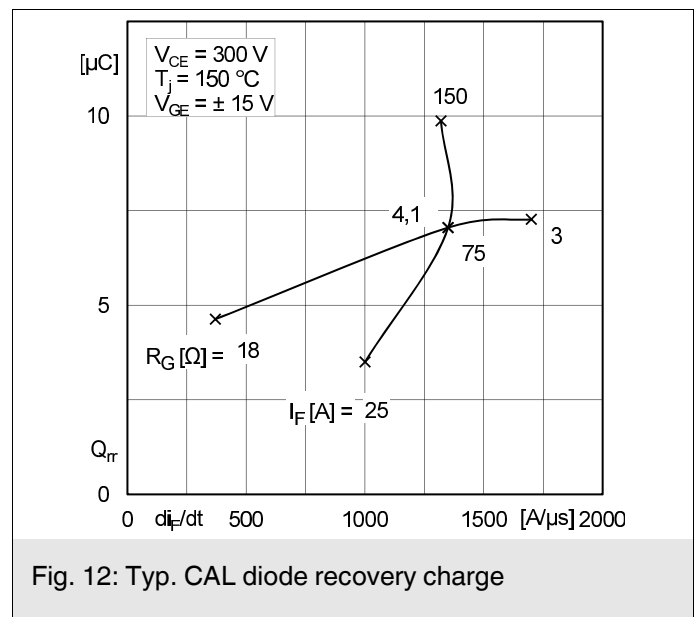
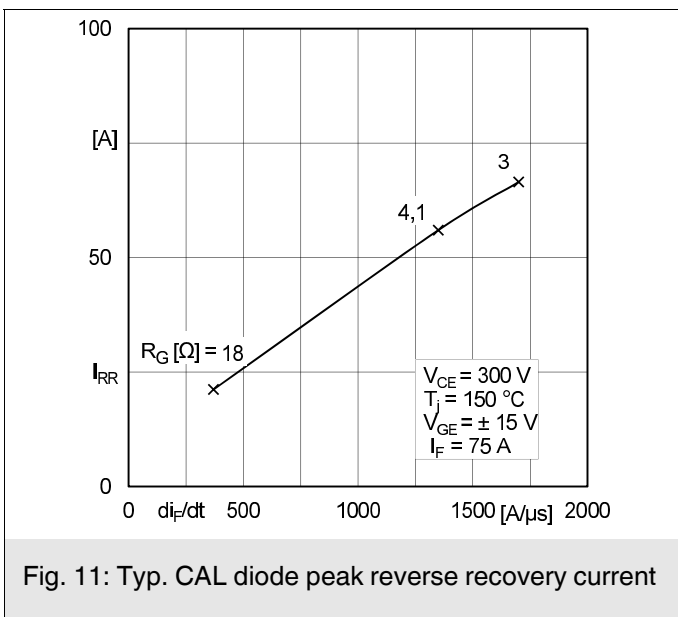
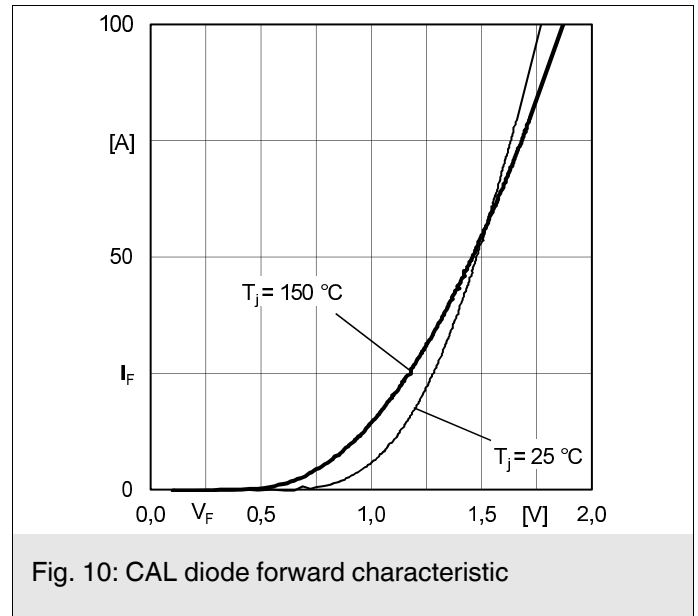
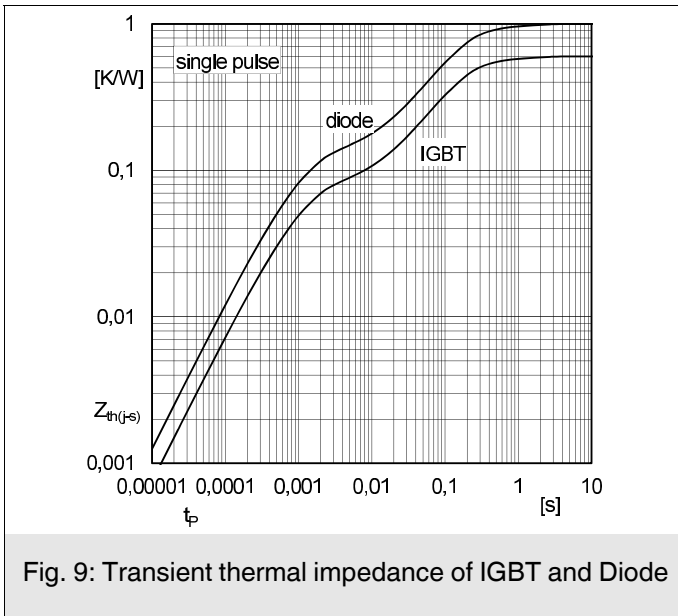
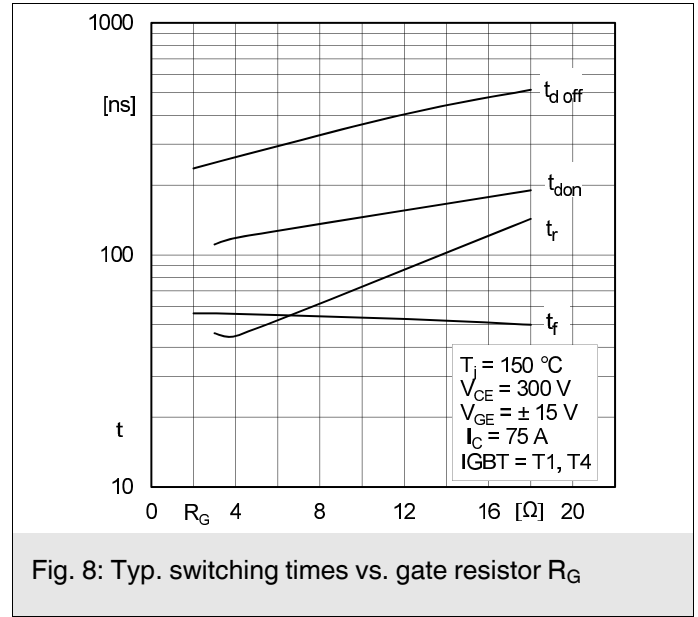
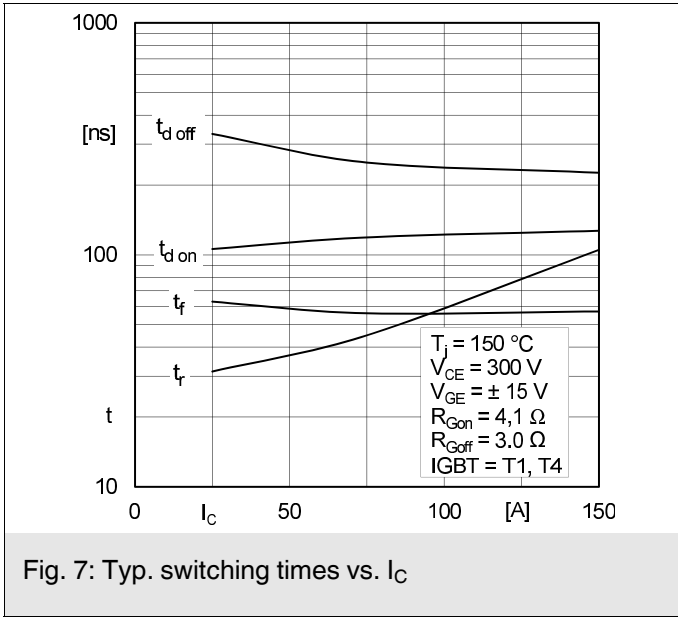
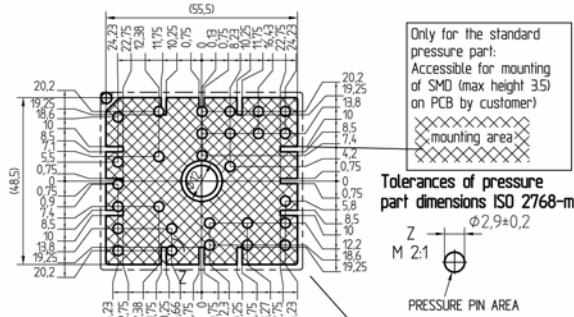


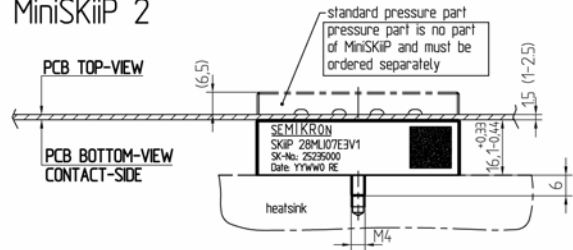
Fig. 6: Typ. gate charge characteristic



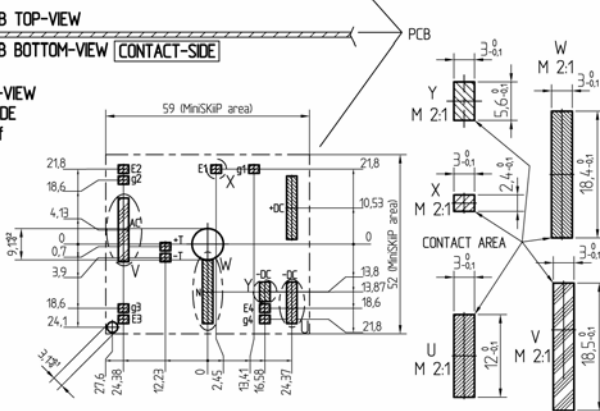
## PCB PCB TOP-VIEW



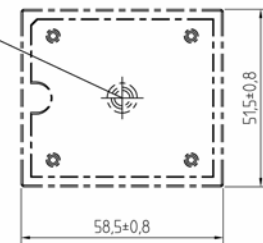
## MiniSKiIP 2



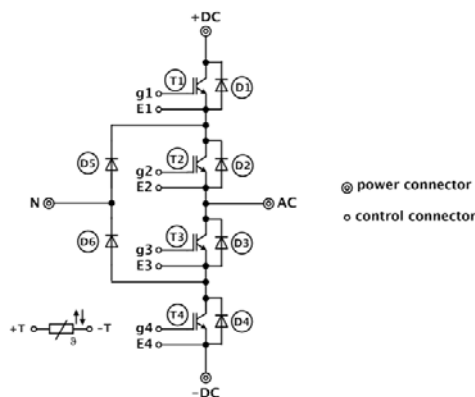
## PCB TOP-VIEW PCB BOTTOM-VIEW CONTACT-SIDE ISO 2768-f



For mounting please follow the assembly instruction



## pinout, dimensions



## pinout

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.

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