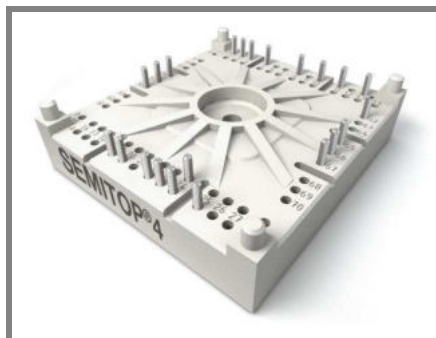




SEMITOP® 4

## IGBT Module

SK75MLI066T

Preliminary Data

## Features

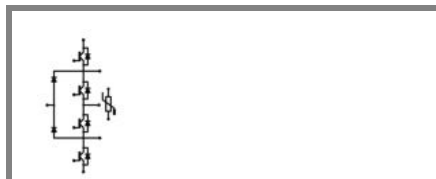
- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- Trench IGBT technology
- CAL technology FWD
- Integrated NTC temperature sensor

## Typical Applications\*

- Multi level inverter

## Remarks

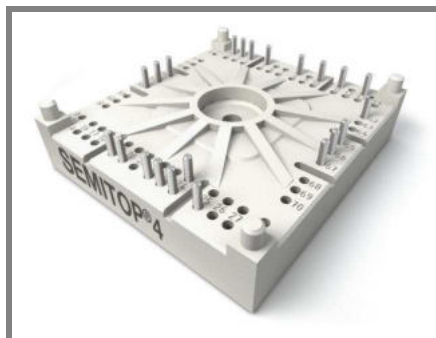
- $V_{isol} = 3000V$  AC, 1s, 50Hz
- Dynamic measure: DUT= IGBT (Gate pin 55) and Neutral Clamp Diode (Kathode pin 56) as free-wheeling diode



MLI-T

| Absolute Maximum Ratings |                                                                                                      | T <sub>s</sub> = 25 °C, unless otherwise specified |              |       |
|--------------------------|------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------|-------|
| Symbol                   | Conditions                                                                                           |                                                    | Values       | Units |
| IGBT                     |                                                                                                      |                                                    |              |       |
| V <sub>CES</sub>         | T <sub>j</sub> = 25 °C                                                                               |                                                    | 600          | V     |
| I <sub>C</sub>           | T <sub>j</sub> = 175 °C                                                                              | T <sub>s</sub> = 25 °C                             | 83           | A     |
|                          |                                                                                                      | T <sub>s</sub> = 70 °C                             | 67           | A     |
| I <sub>CRM</sub>         | I <sub>CRM</sub> = 2 x I <sub>Cnom</sub>                                                             |                                                    | 150          | A     |
| V <sub>GES</sub>         |                                                                                                      |                                                    | ± 20         | V     |
| t <sub>psc</sub>         | V <sub>CC</sub> = 360 V; V <sub>GE</sub> ≤ 20 V; T <sub>j</sub> = 125 °C<br>V <sub>CES</sub> < 600 V |                                                    | 6            | µs    |
| Inverse Diode            |                                                                                                      |                                                    |              |       |
| I <sub>F</sub>           | T <sub>j</sub> = 175 °C                                                                              | T <sub>s</sub> = 25 °C                             | 92           | A     |
|                          |                                                                                                      | T <sub>s</sub> = 70 °C                             | 73           | A     |
| I <sub>FRM</sub>         | I <sub>FRM</sub> = 2 x I <sub>Fnom</sub>                                                             |                                                    | 150          | A     |
| Freewheeling Diode       |                                                                                                      |                                                    |              |       |
| I <sub>F</sub>           | T <sub>j</sub> = 175 °C                                                                              | T <sub>s</sub> = 25 °C                             | 92           | A     |
|                          |                                                                                                      | T <sub>s</sub> = 70 °C                             | 73           | A     |
| I <sub>FRM</sub>         | I <sub>FRM</sub> = 2 x I <sub>Fnom</sub>                                                             |                                                    | 150          | A     |
| Module                   |                                                                                                      |                                                    |              |       |
| I <sub>t(RMS)</sub>      |                                                                                                      |                                                    |              | A     |
| T <sub>vj</sub>          |                                                                                                      |                                                    | -40 ... +175 | °C    |
| T <sub>stg</sub>         |                                                                                                      |                                                    | -40 ... +125 | °C    |
| V <sub>isol</sub>        | AC, 1 min.                                                                                           |                                                    | 2500         | V     |

| Characteristics |                                                               | $T_s = 25\text{ °C}$ , unless otherwise specified |      |        |                                       |
|-----------------|---------------------------------------------------------------|---------------------------------------------------|------|--------|---------------------------------------|
| Symbol          | Conditions                                                    | min.                                              | typ. | max.   | Units                                 |
| <b>IGBT</b>     |                                                               |                                                   |      |        |                                       |
| $V_{GE(th)}$    | $V_{GE} = V_{CE}$ , $I_C = 1,2\text{ mA}$                     | 5                                                 | 5,8  | 6,5    | V                                     |
| $I_{CES}$       | $V_{GE} = 0\text{ V}$ , $V_{CE} = V_{CES}$                    |                                                   |      | 0,0038 | $T_j = 25\text{ °C}$<br>mA            |
|                 |                                                               |                                                   |      |        | $T_j = 125\text{ °C}$<br>mA           |
| $I_{GES}$       | $V_{CE} = 0\text{ V}$ , $V_{GE} = 20\text{ V}$                |                                                   |      | 600    | nA                                    |
| $V_{CE0}$       |                                                               |                                                   | 0,8  | 1,1    | $T_j = 25\text{ °C}$<br>V             |
|                 |                                                               |                                                   |      |        | $T_j = 150\text{ °C}$<br>V            |
| $r_{CE}$        | $V_{GE} = 15\text{ V}$                                        |                                                   | 8    | 10     | $T_j = 25\text{ °C}$<br>m $\Omega$    |
|                 |                                                               |                                                   |      |        | $T_j = 150\text{ °C}$<br>m $\Omega$   |
| $V_{CE(sat)}$   | $I_{Cnom} = 75\text{ A}$ , $V_{GE} = 15\text{ V}$             |                                                   | 1,45 | 1,85   | $T_j = 25\text{ °C}_{chiplev.}$<br>V  |
|                 |                                                               |                                                   |      |        | $T_j = 150\text{ °C}_{chiplev.}$<br>V |
| $C_{ies}$       | $V_{CE} = 25$ , $V_{GE} = 0\text{ V}$                         |                                                   | 4,7  |        | nF                                    |
| $C_{oes}$       |                                                               |                                                   |      |        | nF                                    |
| $C_{res}$       |                                                               |                                                   |      |        | nF                                    |
| $Q_G$           | $V_{GE} = -7V \dots +15V$                                     |                                                   | 650  |        | nC                                    |
| $R_{Gint}$      | $T_j = 150\text{ °C}$                                         |                                                   | 4    |        | $\Omega$                              |
| $t_{d(on)}$     | $R_{Gon} = 4\text{ }\Omega$<br>$di/dt = 4100\text{ A}/\mu s$  |                                                   | 97   |        | ns                                    |
| $t_r$           |                                                               |                                                   |      |        | ns                                    |
| $E_{on}$        | $R_{Goff} = 4\text{ }\Omega$<br>$di/dt = 4100\text{ A}/\mu s$ |                                                   | 1,7  |        | mJ                                    |
| $t_{d(off)}$    |                                                               |                                                   |      |        | ns                                    |
| $t_f$           |                                                               |                                                   |      |        | ns                                    |
| $E_{off}$       |                                                               |                                                   | 2,8  |        | mJ                                    |
| $R_{th(j-s)}$   |                                                               |                                                   |      |        | K/W                                   |
|                 | per IGBT                                                      |                                                   | 0,75 |        |                                       |



**SEMITOP® 4**

## IGBT Module

**SK75MLI066T**

Preliminary Data

### Features

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### Typical Applications\*

- Multi level inverter

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- Dynamic measure: DUT= IGBT (Gate pin 55) and Neutral Clamp Diode (Kathode pin 56) as free-wheeling diode

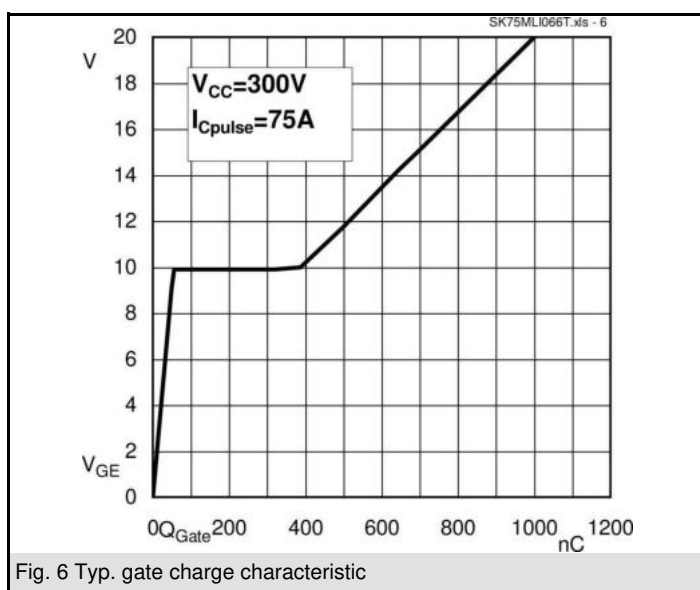
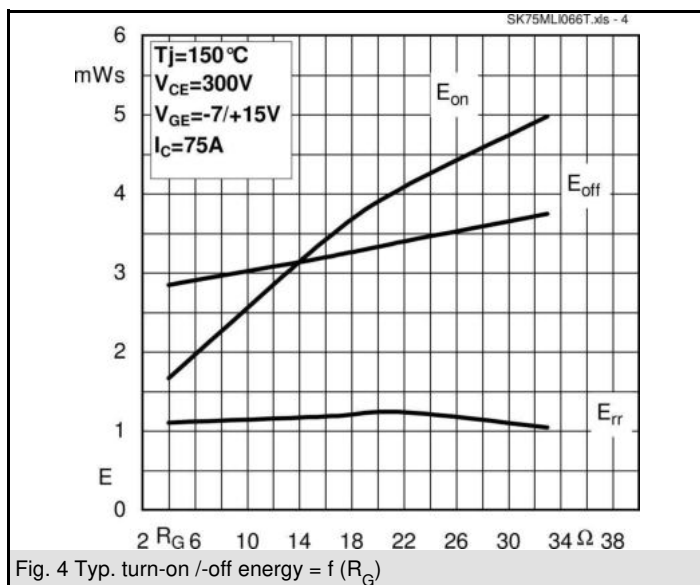
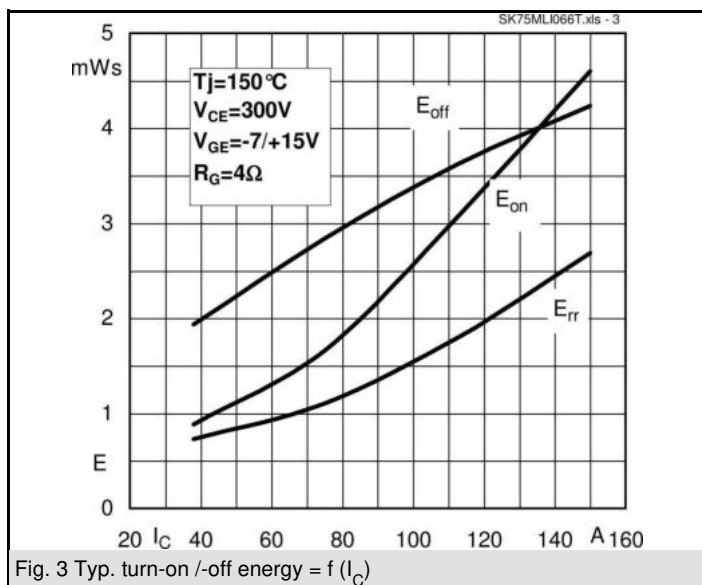
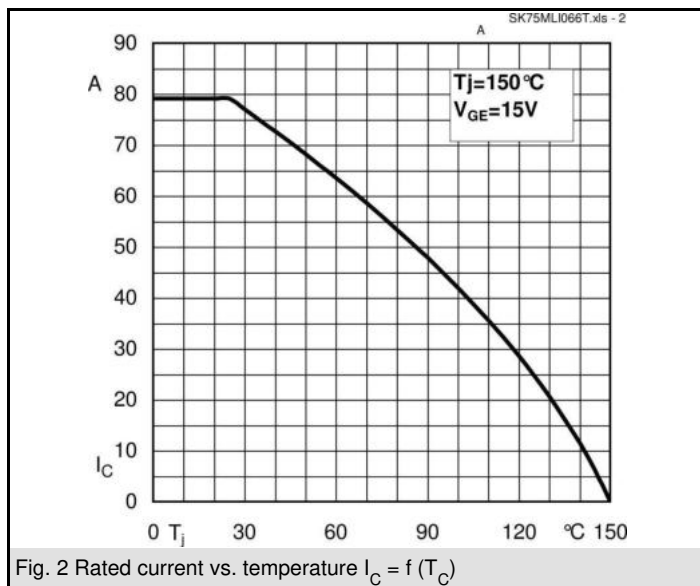
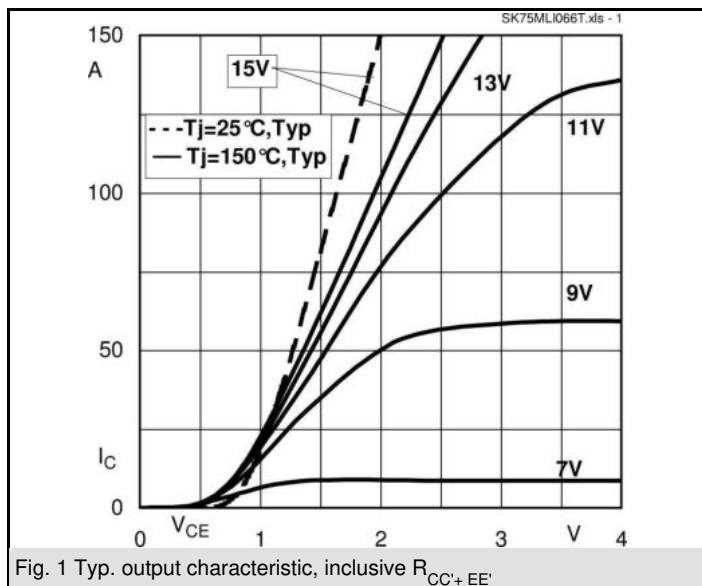


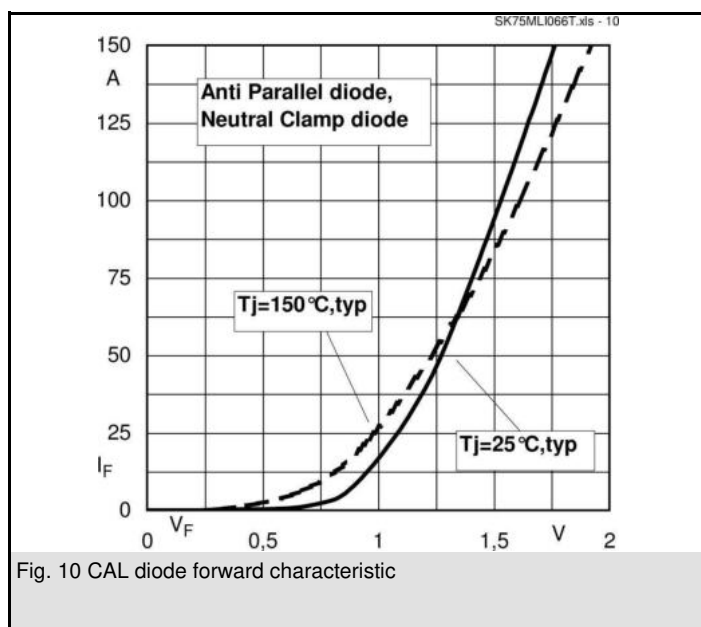
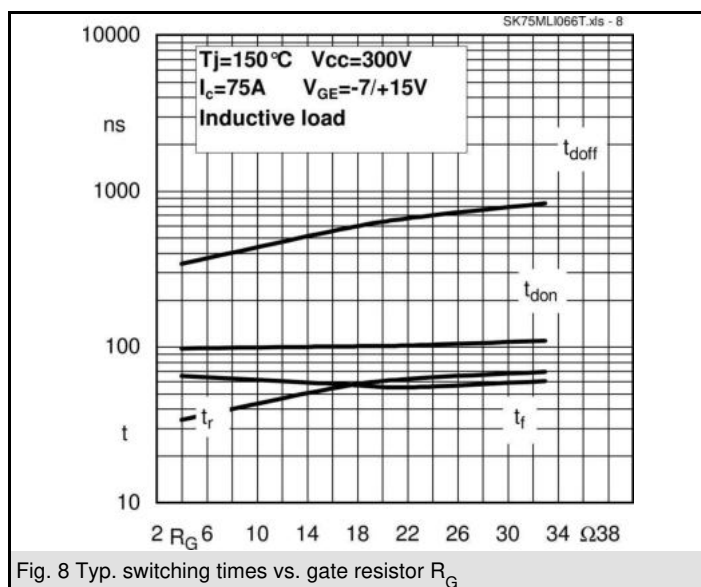
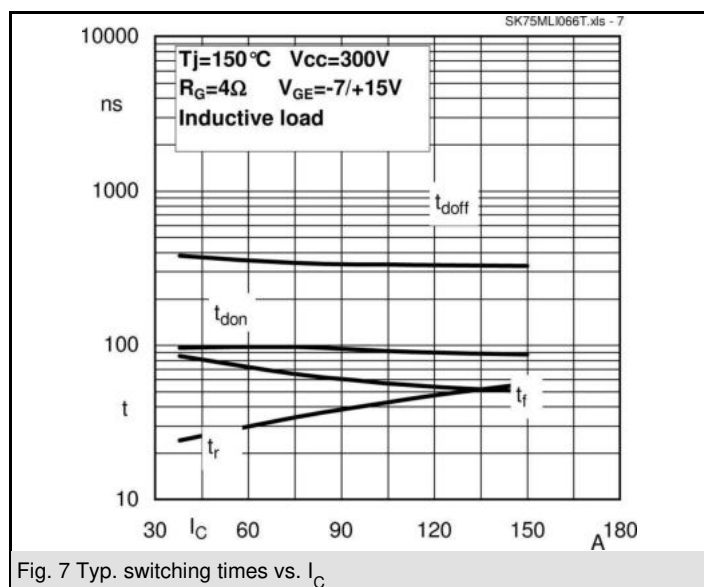
**MLI-T**

| Characteristics                                 |                                             |      |        |      |       |
|-------------------------------------------------|---------------------------------------------|------|--------|------|-------|
| Symbol                                          | Conditions                                  | min. | typ.   | max. | Units |
| <b>Inverse Diode</b>                            |                                             |      |        |      |       |
| $V_F = V_{EC}$                                  | $I_{Fnom} = 75 A$ ; $V_{GE} = 0 V$          |      |        |      |       |
|                                                 | $T_j = 25 ^\circ C_{chiplev.}$              |      | 1,5    | 1,7  | V     |
|                                                 | $T_j = 150 ^\circ C_{chiplev.}$             |      | 1,5    | 1,7  | V     |
| $V_{F0}$                                        |                                             |      |        |      |       |
|                                                 | $T_j = 25 ^\circ C$                         |      | 1      | 1,1  | V     |
|                                                 | $T_j = 150 ^\circ C$                        |      | 0,9    | 1    | V     |
| $r_F$                                           |                                             |      |        |      |       |
|                                                 | $T_j = 25 ^\circ C$                         |      | 6,7    | 8    | mΩ    |
|                                                 | $T_j = 150 ^\circ C$                        |      | 8      | 9,3  | mΩ    |
| $I_{RRM}$                                       | $I_F = 75 A$                                |      | 65     |      | A     |
| $Q_{rr}$                                        | $di/dt = 4100 A/\mu s$                      |      | 4      |      | μC    |
| $E_{rr}$                                        | $V_R = 300V$                                |      | 1,1    |      | mJ    |
| $R_{th(j-s)D}$                                  | per diode                                   |      | 1,2    |      | K/W   |
| <b>Freewheeling Diode (Neutral Clamp Diode)</b> |                                             |      |        |      |       |
| $V_F = V_{EC}$                                  | $I_{Fnom} = 75 A$ ; $V_{GE} = 0 V$          |      |        |      |       |
|                                                 | $T_j = 25 ^\circ C_{chiplev.}$              |      | 1,5    | 1,7  | V     |
|                                                 | $T_j = 150 ^\circ C_{chiplev.}$             |      | 1,5    | 1,7  | V     |
| $V_{F0}$                                        |                                             |      |        |      |       |
|                                                 | $T_j = 25 ^\circ C$                         |      | 1      | 1,1  | V     |
|                                                 | $T_j = 150 ^\circ C$                        |      | 0,9    | 1    | V     |
| $r_F$                                           |                                             |      |        |      |       |
|                                                 | $T_j = 25 ^\circ C$                         |      | 6,7    | 8    | V     |
|                                                 | $T_j = 150 ^\circ C$                        |      | 8      | 9,3  | V     |
| $I_{RRM}$                                       | $I_F = 75 A$                                |      | 65     |      | A     |
| $Q_{rr}$                                        | $di/dt = 3100 A/\mu s$                      |      | 4      |      | μC    |
| $E_{rr}$                                        | $V_R = 300V$                                |      | 1,1    |      | mJ    |
| $R_{th(j-s)FD}$                                 | per diode                                   |      | 1,2    |      | K/W   |
| $M_s$                                           | to heat sink                                | 2,5  |        | 2,75 | Nm    |
| w                                               |                                             |      | 60     |      | g     |
| <b>Temperature sensor</b>                       |                                             |      |        |      |       |
| $R_{100}$                                       | $T_s = 100^\circ C$ ( $R_{25} = 5k\Omega$ ) |      | 493±5% |      | Ω     |

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

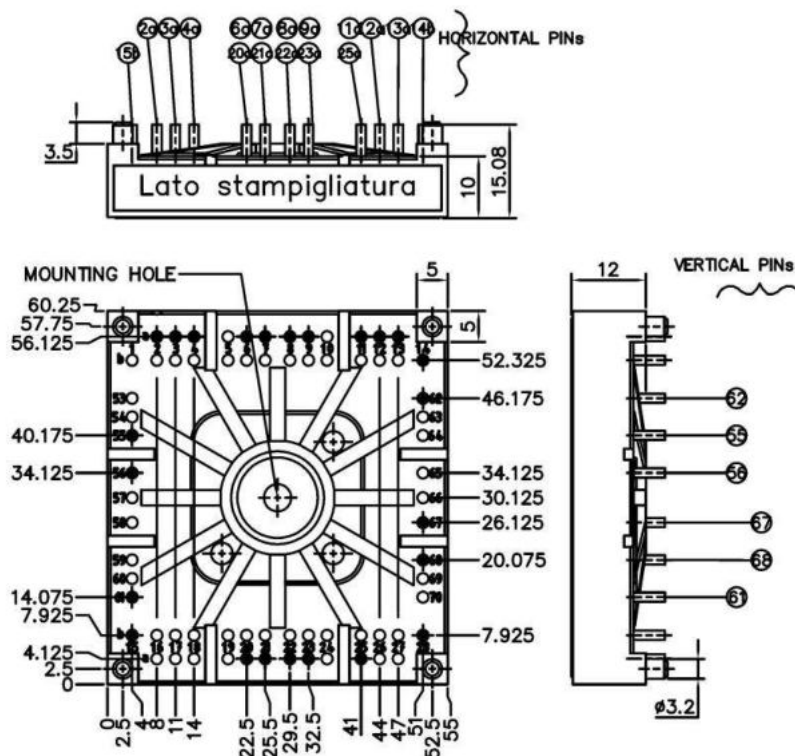
\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



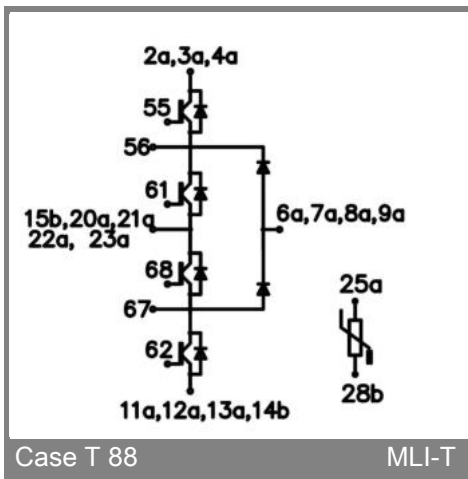


UL recognized

file no. E 63 532



Case T 88 (Suggested hole diameter for the solder pins in the circuit board: 2mm. Suggested hole diameter for the mounting pins in the circuit board: 3,6mm )



Case T 88

MLI-T