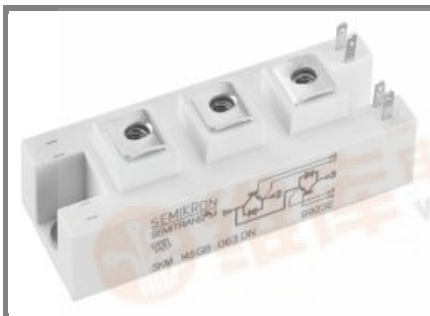


## SKM 145GB174DN



SEMITRANS™ 2N

## Low Loss IGBT Modules

SKM 145GB174DN

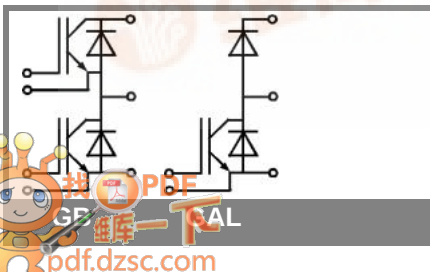
SKM 145GAL174DN

## Features

- N channel, homogeneous Silicon structure (NPT- Non punch-through IGBT)
- Low inductance case
- High short circuit capability, self limiting
- Fast & soft inverse CAL diodes
- Without hard mould
- Large clearance (10 mm) and creepage distances (20 mm)

## Typical Applications

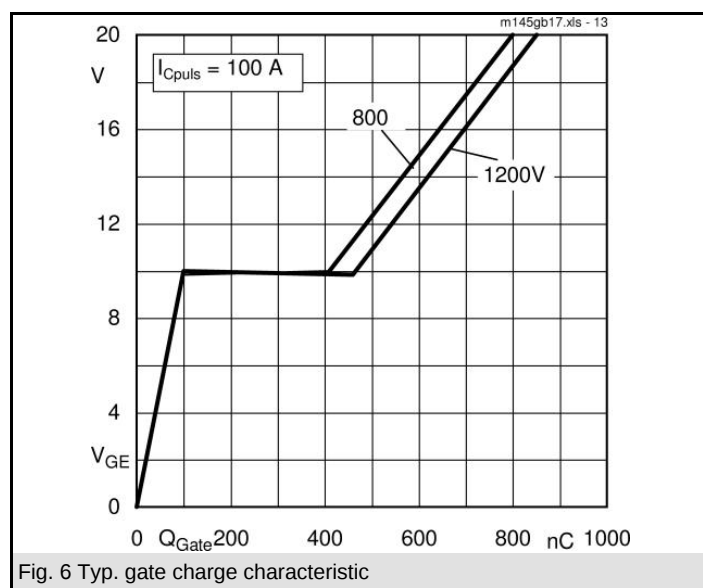
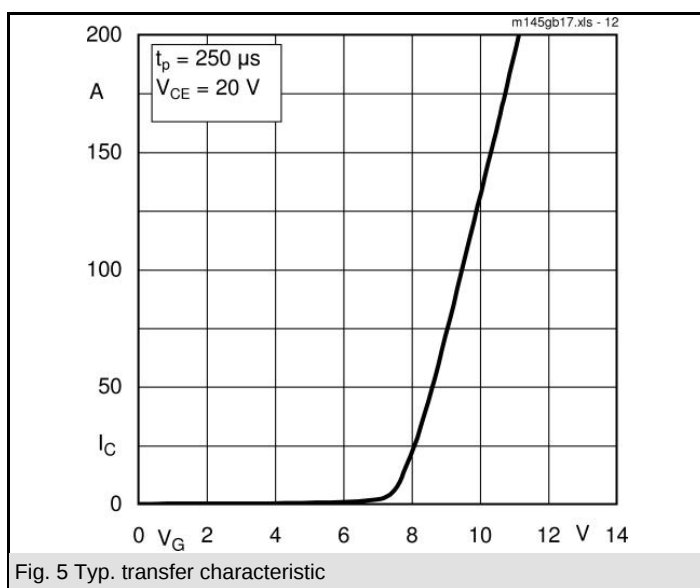
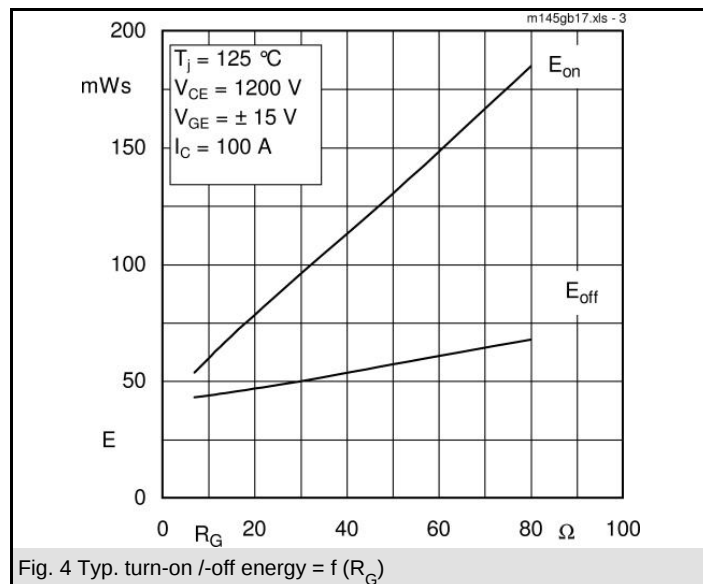
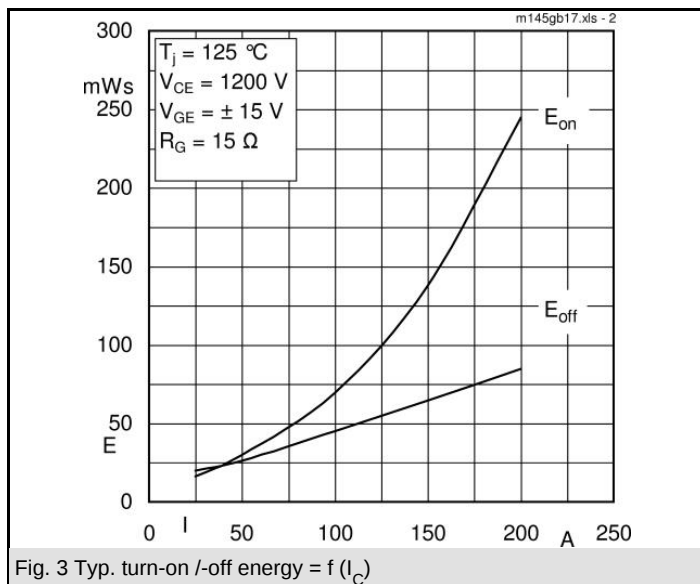
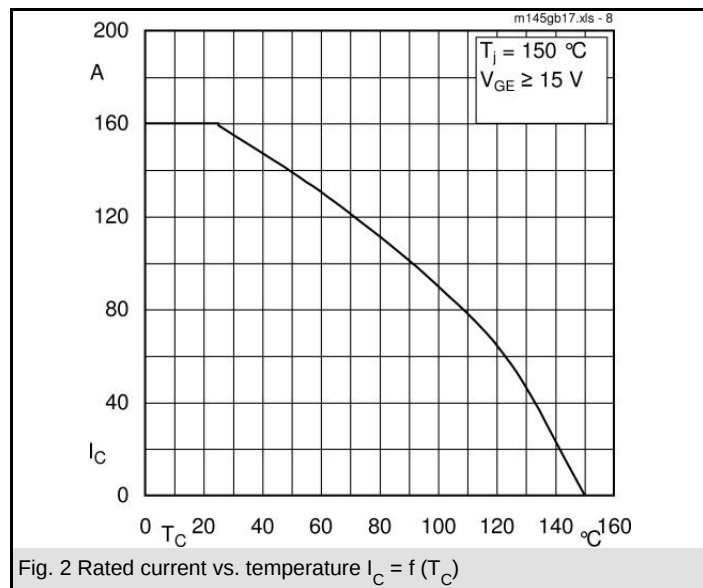
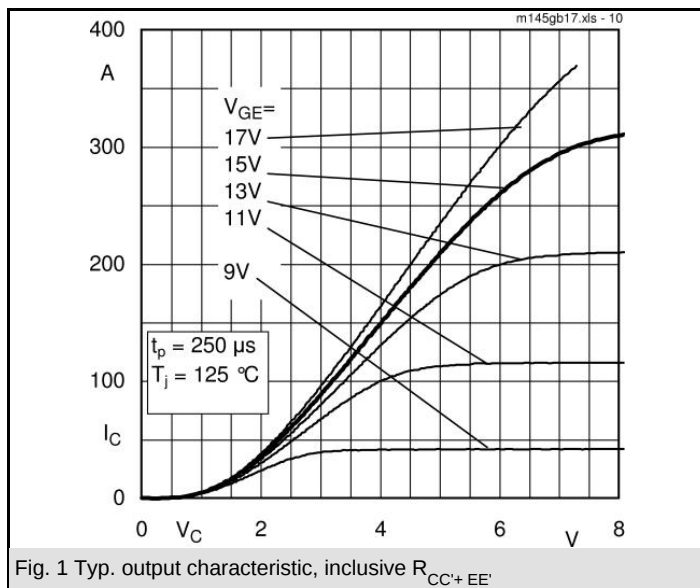
- AC inverter drives on mains
- 575 - 750 V AC
- DC bus voltage 750 - 1200 V<sub>DC</sub>
- Public transport (auxiliary syst.)
- Switching (not for linear use)



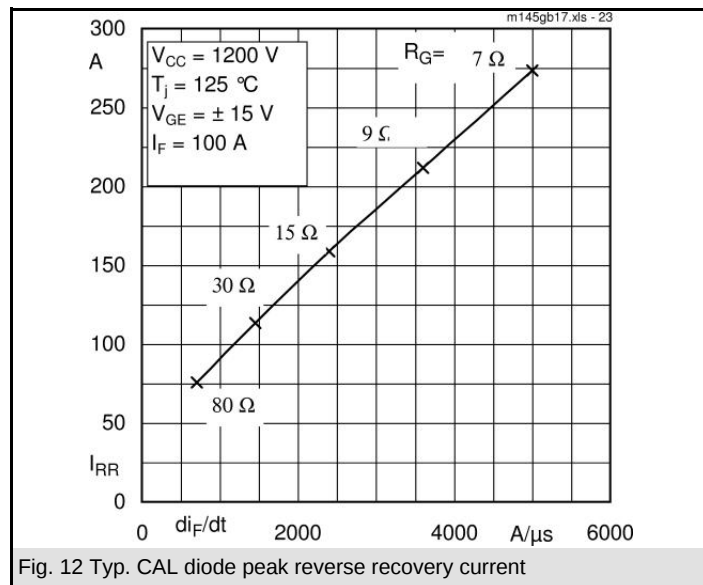
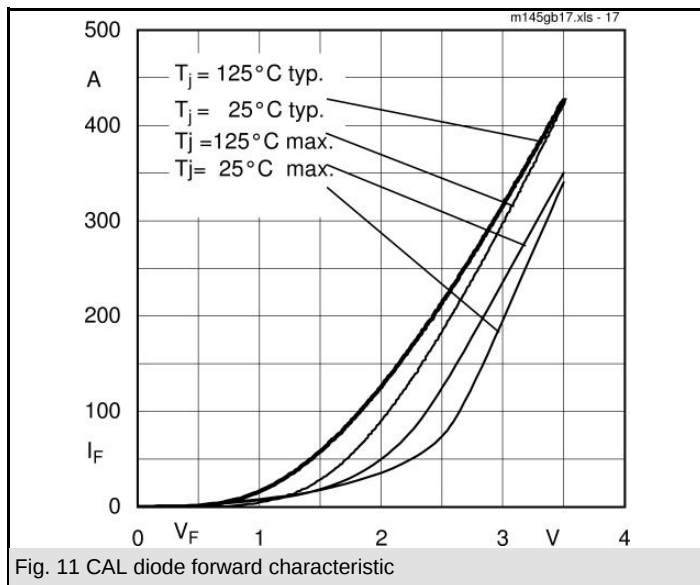
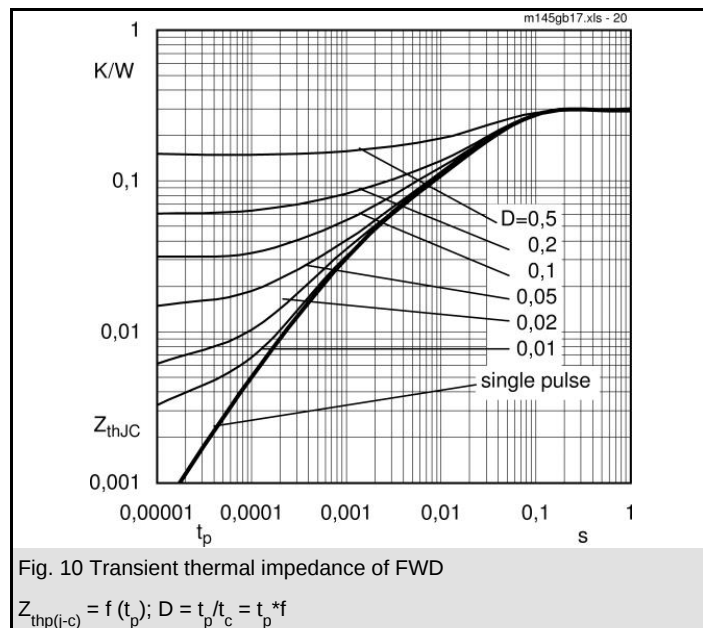
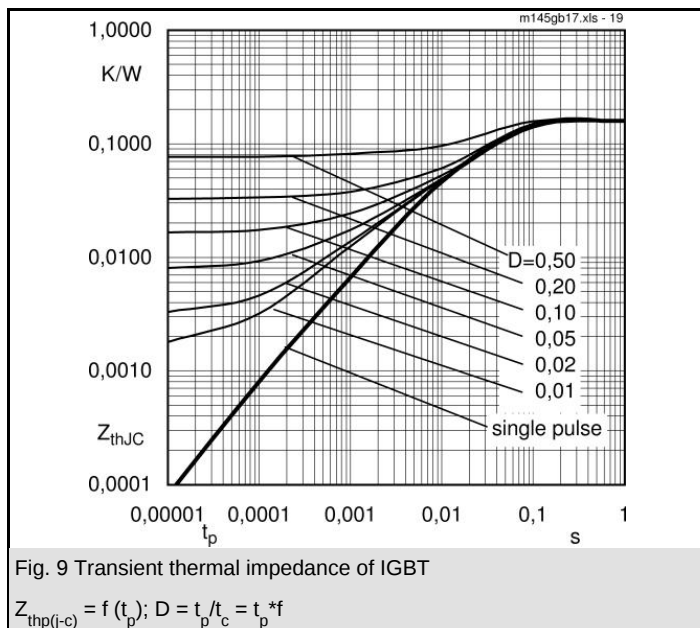
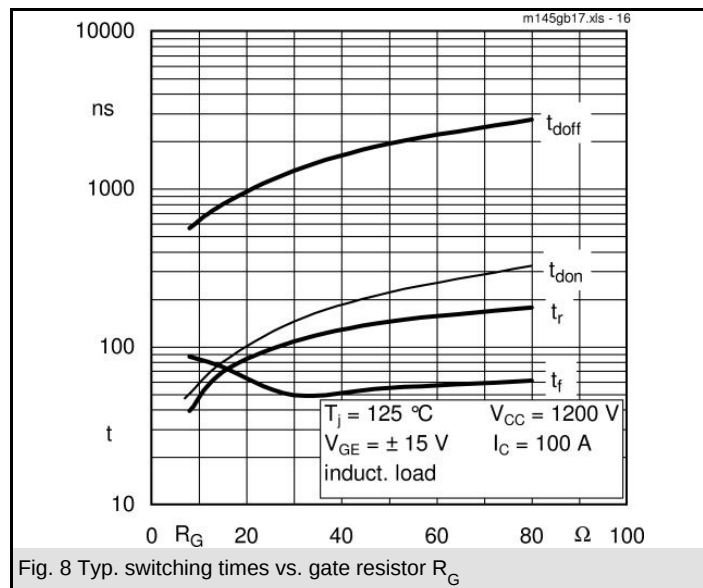
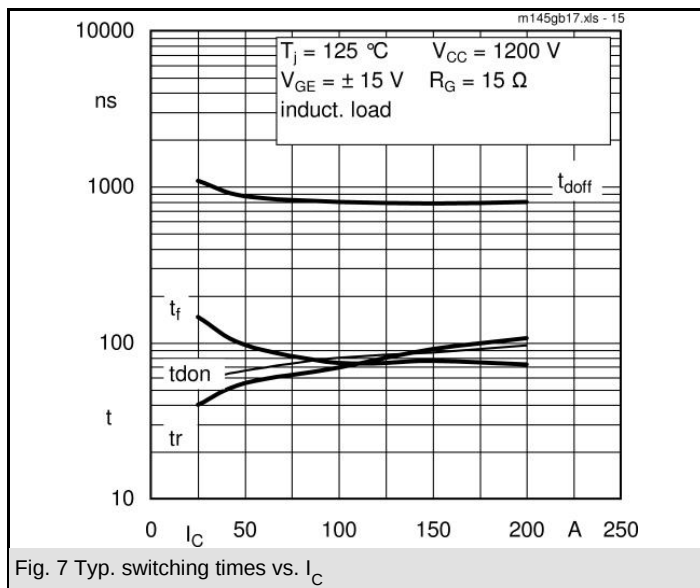
| Absolute Maximum Ratings              |                                                       | T <sub>c</sub> = 25 °C, unless otherwise specified |       |
|---------------------------------------|-------------------------------------------------------|----------------------------------------------------|-------|
| Symbol                                | Conditions                                            | Values                                             | Units |
| <b>IGBT</b>                           |                                                       |                                                    |       |
| V <sub>CES</sub>                      |                                                       | 1700                                               | V     |
| I <sub>C</sub>                        | T <sub>c</sub> = 25 (80) °C                           | 160 (110)                                          | A     |
| I <sub>CRM</sub>                      | t <sub>p</sub> = 1 ms                                 | 200                                                | A     |
| V <sub>GES</sub>                      |                                                       | ± 20                                               | V     |
| T <sub>vj</sub> , (T <sub>stg</sub> ) | T <sub>OPERATION</sub> ≤ T <sub>stg</sub>             | - 40 ... + 150 (125)                               | °C    |
| V <sub>isol</sub>                     | AC, 1 min.                                            | 3400                                               | V     |
| <b>Inverse diode</b>                  |                                                       |                                                    |       |
| I <sub>F</sub>                        | T <sub>c</sub> = 25 (80) °C                           | 145 (100)                                          | A     |
| I <sub>FRM</sub>                      | t <sub>p</sub> = 1 ms                                 | 200                                                | A     |
| I <sub>FSM</sub>                      | t <sub>p</sub> = 10 ms; sin.; T <sub>j</sub> = 150 °C | 720                                                | A     |
| <b>Freewheeling diode</b>             |                                                       |                                                    |       |
| I <sub>F</sub>                        | T <sub>c</sub> = 25 (80) °C                           | 145 (100)                                          | A     |
| I <sub>FRM</sub>                      | t <sub>p</sub> = 1 ms                                 | 200                                                | A     |
| I <sub>FSM</sub>                      | t <sub>p</sub> = 10 ms; sin.; T <sub>j</sub> = 150 °C | 720                                                | A     |

| Characteristics                     |                                                                                        | T <sub>c</sub> = 25 °C, unless otherwise specified |           |           |       |
|-------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------|-----------|-----------|-------|
| Symbol                              | Conditions                                                                             | min.                                               | typ.      | max.      | Units |
| <b>IGBT</b>                         |                                                                                        |                                                    |           |           |       |
| V <sub>GE(th)</sub>                 | V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 5 mA                              | 4,5                                                | 5,5       | 6,5       | V     |
| I <sub>CES</sub>                    | V <sub>GE</sub> = 0, V <sub>CE</sub> = V <sub>CES</sub> , T <sub>j</sub> = 25 (125) °C |                                                    | 0,1       | 0,3       | mA    |
| V <sub>CE(TO)</sub>                 | T <sub>j</sub> = 25 (125) °C                                                           |                                                    |           |           | V     |
| r <sub>CE</sub>                     | V <sub>GE</sub> = 15 V, T <sub>j</sub> = 25 (125) °C                                   |                                                    |           |           | mΩ    |
| V <sub>CE(sat)</sub>                | I <sub>Cnom</sub> = 100 A, V <sub>GE</sub> = 15 V, chip level                          |                                                    | 2,6 (3,2) | 3,3 (3,6) | V     |
| C <sub>ies</sub>                    | under following conditions                                                             |                                                    | 7         | 8,5       | nF    |
| C <sub>oes</sub>                    | V <sub>GE</sub> = 0, V <sub>CE</sub> = 25 V, f = 1 MHz                                 |                                                    | 1,1       | 1,5       | nF    |
| C <sub>res</sub>                    |                                                                                        |                                                    | 0,4       | 0,6       | nF    |
| L <sub>CE</sub>                     |                                                                                        |                                                    |           | 25        | nH    |
| R <sub>CC'+EE'</sub>                | res., terminal-chip T <sub>c</sub> = 25 (125) °C                                       |                                                    | 0,75 (1)  |           | mΩ    |
| t <sub>d(on)</sub>                  | V <sub>CC</sub> = 1200 V, I <sub>Cnom</sub> = 100 A                                    |                                                    | 90        |           | ns    |
| t <sub>r</sub>                      | R <sub>Gon</sub> = R <sub>Goff</sub> = 15 Ω, T <sub>j</sub> = 125 °C                   |                                                    | 80        |           | ns    |
| t <sub>d(off)</sub>                 | V <sub>GE</sub> = ± 15 V                                                               |                                                    | 900       |           | ns    |
| t <sub>f</sub>                      |                                                                                        |                                                    | 80        |           | ns    |
| E <sub>on</sub> (E <sub>off</sub> ) |                                                                                        |                                                    | 50 (70)   |           | mJ    |
| <b>Inverse diode</b>                |                                                                                        |                                                    |           |           |       |
| V <sub>F</sub> = V <sub>EC</sub>    | I <sub>Fnom</sub> = 100 A; V <sub>GE</sub> = 0 V; T <sub>j</sub> = 25 (125)            |                                                    | 2,2 (1,9) | 2,7 (2,4) | V     |
| V <sub>(TO)</sub>                   | T <sub>j</sub> = 25 (125) °C                                                           |                                                    | 1,3       | 1,5       | V     |
| r <sub>T</sub>                      | T <sub>j</sub> = 25 (125) °C                                                           |                                                    | 9         | 12        | mΩ    |
| I <sub>RRM</sub>                    | I <sub>Fnom</sub> = 100 A; T <sub>j</sub> = 125 ( ) °C                                 |                                                    | 160       |           | A     |
| Q <sub>rr</sub>                     | di/dt = 2400 A/μs                                                                      |                                                    | 32        |           | μC    |
| E <sub>rr</sub>                     | V <sub>GE</sub> = 0 V                                                                  |                                                    | 14        |           | mJ    |
| <b>FWD</b>                          |                                                                                        |                                                    |           |           |       |
| V <sub>F</sub> = V <sub>EC</sub>    | I <sub>F</sub> = 100 A; V <sub>GE</sub> = 0 V, T <sub>j</sub> = 25 (125) °C            |                                                    | 2,2 (1,9) | 2,7 (2,4) | V     |
| V <sub>(TO)</sub>                   | T <sub>j</sub> = 25 (125) °C                                                           |                                                    | 1,3       | 1,5       | V     |
| r <sub>T</sub>                      | T <sub>j</sub> = 25 (125) °C                                                           |                                                    | 9         | 12        | mΩ    |
| I <sub>RRM</sub>                    | I <sub>F</sub> = 100 A; T <sub>j</sub> = 125 ( ) °C                                    |                                                    | 160       |           | A     |
| Q <sub>rr</sub>                     | di/dt = 2400 A/μs                                                                      |                                                    | 32        |           | μC    |
| E <sub>rr</sub>                     | V <sub>GE</sub> = 0 V                                                                  |                                                    | 14        |           | mJ    |
| <b>Thermal characteristics</b>      |                                                                                        |                                                    |           |           |       |
| R <sub>th(j-c)</sub>                | per IGBT                                                                               |                                                    |           | 0,16      | K/W   |
| R <sub>th(j-c)D</sub>               | per Inverse Diode                                                                      |                                                    |           | 0,3       | K/W   |
| R <sub>th(j-c)FD</sub>              | per FWD                                                                                |                                                    |           | 0,3       | K/W   |
| R <sub>th(c-s)</sub>                | per module                                                                             |                                                    |           | 0,05      | K/W   |
| <b>Mechanical data</b>              |                                                                                        |                                                    |           |           |       |
| M <sub>s</sub>                      | to heatsink M6                                                                         | 3                                                  |           | 5         | Nm    |
| M <sub>t</sub>                      | to terminals M5                                                                        | 2,5                                                |           | 5         | Nm    |
| w                                   |                                                                                        |                                                    |           | 160       | g     |

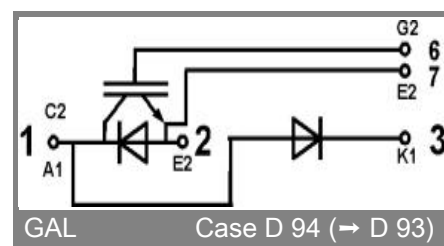
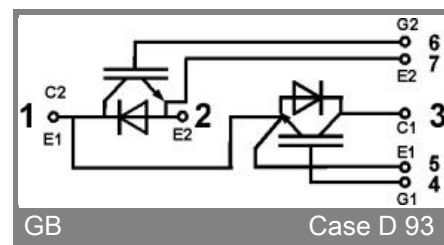
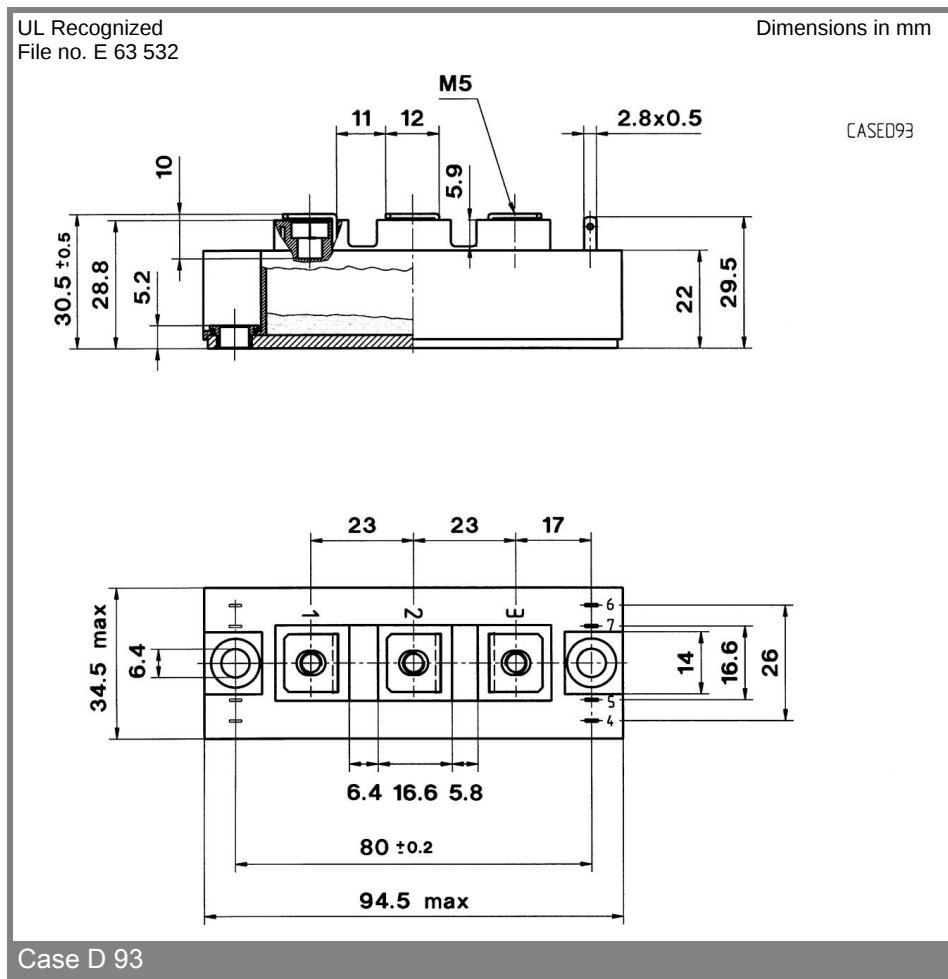
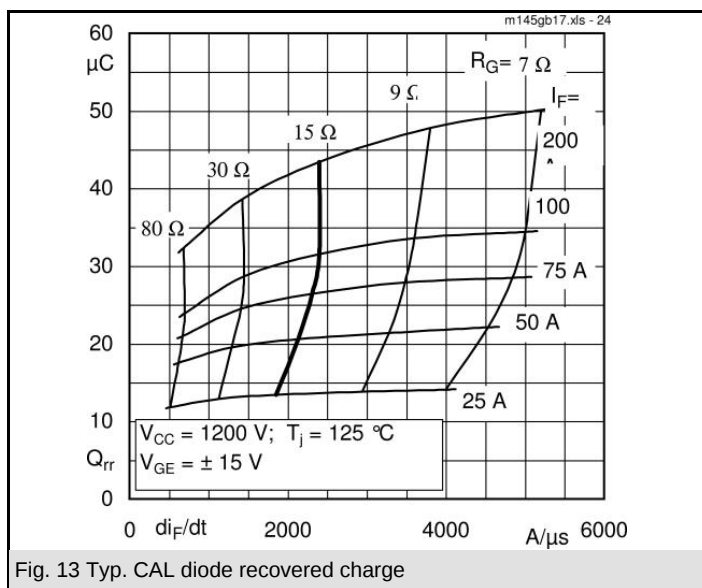
# SKM 145GB174DN



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

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