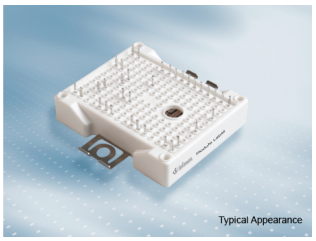
## EasyPIM™ module with fast Trench/Fieldstop IGBT3 and emitter controlled 3 diode and PressFIT / NTC




### Features

- Electrical features
  - $V_{CES}$ = 650 V
  - $I_{C\ nom}$ = 50 A / $I_{CRM}$ = 100 A
  - Trench IGBT 3
  - Low switching losses
- Mechanical features
  - $Al_2O_3$ substrate with low thermal resistance
  - Compact design
  - PressFIT contact technology
  - Rugged mounting due to integrated mounting clamps

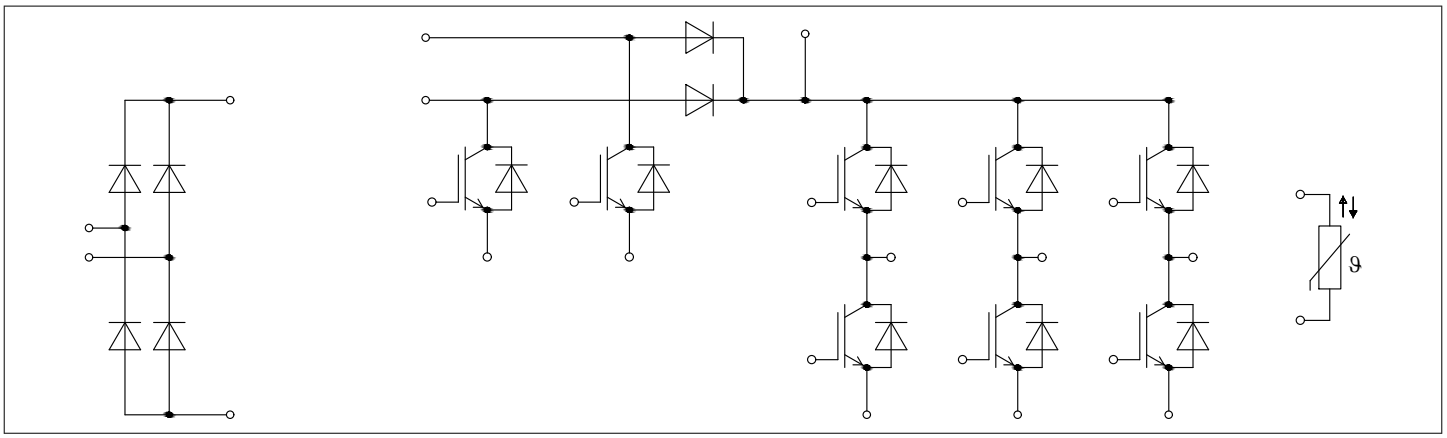
### Potential applications

- Air conditioning

### Product validation

- Qualified for industrial applications according to the relevant tests of IEC 60747, 60749 and 60068

### Description



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# 1 Package

**Table 1 Insulation coordination**

| Parameter | Symbol | Note or test condition | Values | Unit |
|---|---|---|---|---|
| Isolation test voltage | $V_{ISOL}$ | RMS, f = 50 Hz, *t* = 1 min | 2.5 | kV |
| Internal isolation | | basic insulation (class 1, IEC 61140) | $Al_2O_3$ | |
| Creepage distance | $d_{Creep}$ | terminal to heatsink | 11.5 | mm |
| Creepage distance | $d_{Creep}$ | terminal to terminal | 6.3 | mm |
| Clearance | $d_{Clear}$ | terminal to heatsink | 10.0 | mm |
| Clearance | $d_{Clear}$ | terminal to terminal | 5.0 | mm |
| Comparative tracking index | *CTI* | | > 200 | |
| Relative thermal index (electrical) | *RTI* | housing | 140 | °C |

**Table 2 Characteristic values**

| Parameter | Symbol | Note or test condition | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Stray inductance module | $L_{sCE}$ | | | 30 | | nH |
| Module lead resistance, terminals - chip | $R_{AA'+CC'}$ | $T_H$=25°C, per switch | | 6 | | mΩ |
| Module lead resistance, terminals - chip | $R_{CC'+EE'}$ | $T_H$=25°C, per switch | | 5 | | mΩ |
| Storage temperature | $T_{stg}$ | | -40 | | 125 | °C |
| Mounting force per clamp | *F* | | 40 | | 80 | N |
| Weight | *G* | | | 39 | | g |

*Note: The current under continuous operation is limited to 25 A rms per connector pin.*

# 2 IGBT, Inverter

**Table 3 Maximum rated values**

| Parameter | Symbol | Note or test condition | | Values | Unit |
|---|---|---|---|---|---|
| Collector-emitter voltage | $V_{CES}$ | | $T_{vj}$ = 25 °C | 650 | V |
| Implemented collector current | $I_{CN}$ | | | 50 | A |
| Continuous DC collector current | $I_{CDC}$ | $T_{vj\,max}$ = 175 °C | $T_H$ = 65 °C | 45 | A |
| Repetitive peak collector current | $I_{CRM}$ | $t_p$ limited by $T_{vj\,op}$ | | 100 | A |

**(table continues...)**

**Table 3 (continued) Maximum rated values**

| Parameter | Symbol | Note or test condition | Values | Unit |
|---|---|---|---|---|
| Gate-emitter peak voltage | $V_{GES}$ | | ±20 | V |

**Table 4 Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Collector-emitter saturation voltage | $V_{CE\,sat}$ | $I_C$ = 50 A, $V_{GE}$ = 15 V | $T_{vj}$ = 25 °C | | 1.45 | 1.90 | V |
| | | | $T_{vj}$ = 125 °C | | 1.60 | | |
| | | | $T_{vj}$ = 150 °C | | 1.70 | | |
| Gate threshold voltage | $V_{GEth}$ | $I_C$ = 0.8 mA, $V_{CE}$ = $V_{GE}$, $T_{vj}$ = 25 °C | | 5.05 | 5.80 | 6.45 | V |
| Gate charge | $Q_G$ | $V_{GE}$ = ±15 V, $V_{CC}$ = 400 V | | | 0.5 | | µC |
| Internal gate resistor | $R_{Gint}$ | $T_{vj}$ = 25 °C | | | 0 | | Ω |
| Input capacitance | $C_{ies}$ | $f$ = 1000 kHz, $T_{vj}$ = 25 °C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | | 3.1 | | nF |
| Reverse transfer capacitance | $C_{res}$ | $f$ = 1000 kHz, $T_{vj}$ = 25 °C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | | 0.095 | | nF |
| Collector-emitter cut-off current | $I_{CES}$ | $V_{CE}$ = 650 V, $V_{GE}$ = 0 V | $T_{vj}$ = 25 °C | | | 0.018 | mA |
| Gate-emitter leakage current | $I_{GES}$ | $V_{CE}$ = 0 V, $V_{GE}$ = 20 V, $T_{vj}$ = 25 °C | | | | 100 | nA |
| Turn-on delay time (inductive load) | $t_{don}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Gon}$ = 8.2 Ω | $T_{vj}$ = 25 °C | | 0.029 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.030 | | |
| | | | $T_{vj}$ = 150 °C | | 0.031 | | |
| Rise time (inductive load) | $t_r$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Gon}$ = 8.2 Ω | $T_{vj}$ = 25 °C | | 0.059 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.060 | | |
| | | | $T_{vj}$ = 150 °C | | 0.061 | | |
| Turn-off delay time (inductive load) | $t_{doff}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Goff}$ = 8.2 Ω | $T_{vj}$ = 25 °C | | 0.180 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.210 | | |
| | | | $T_{vj}$ = 150 °C | | 0.220 | | |
| Fall time (inductive load) | $t_f$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Goff}$ = 8.2 Ω | $T_{vj}$ = 25 °C | | 0.110 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.140 | | |
| | | | $T_{vj}$ = 150 °C | | 0.150 | | |
| Turn-on energy loss per pulse | $E_{on}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $L_\sigma$ = 35 nH, $V_{GE}$ = ±15 V, $R_{Gon}$ = 8.2 Ω, di/dt = 550 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 1.37 | | mJ |
| | | | $T_{vj}$ = 125 °C | | 1.78 | | |
| | | | $T_{vj}$ = 150 °C | | 1.89 | | |

**(table continues...)**

**Table 4** **(continued) Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Turn-off energy loss per pulse | $E_{off}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $L_\sigma$ = 35 nH, $V_{GE}$ = ±15 V, $R_{Goff}$ = 8.2 Ω, dv/dt = 4000 V/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 1.17 | | mJ |
| | | | $T_{vj}$ = 125 °C | | 1.57 | | |
| | | | $T_{vj}$ = 150 °C | | 1.66 | | |
| SC data | $I_{SC}$ | $V_{GE}$ ≤ 15 V, $V_{CC}$ = 360 V, $V_{CEmax}$=$V_{CES}$-$L_{sCE}$*di/dt | $t_P$ ≤ 6 µs, $T_{vj}$=150 °C | | 250 | | A |
| Thermal resistance, junction to heat sink | $R_{thJH}$ | per IGBT | | | 1.02 | | K/W |
| Temperature under switching conditions | $T_{vj\,op}$ | | | -40 | | 150 | °C |

## 3 Diode, Inverter

**Table 5** **Maximum rated values**

| Parameter | Symbol | Note or test condition | | Values | Unit |
|---|---|---|---|---|---|
| Repetitive peak reverse voltage | $V_{RRM}$ | | $T_{vj}$ = 25 °C | 650 | V |
| Continuous DC forward current | $I_F$ | | | 50 | A |
| Repetitive peak forward current | $I_{FRM}$ | $t_P$ = 1 ms | | 100 | A |
| $I^2t$ - value | $I^2t$ | $t_P$ = 10 ms, $V_R$ = 0 V | $T_{vj}$ = 125 °C | 370 | $A^2s$ |
| | | | $T_{vj}$ = 150 °C | 330 | |

**Table 6** **Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Forward voltage | $V_F$ | $I_F$ = 50 A, $V_{GE}$ = 0 V | $T_{vj}$ = 25 °C | | 1.56 | 1.95 | V |
| | | | $T_{vj}$ = 125 °C | | 1.49 | | |
| | | | $T_{vj}$ = 150 °C | | 1.45 | | |
| Peak reverse recovery current | $I_{RM}$ | $V_{CC}$ = 300 V, $I_F$ = 50 A, $V_{GE}$ = -15 V, -di$_F$/dt = 550 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 34 | | A |
| | | | $T_{vj}$ = 125 °C | | 48 | | |
| | | | $T_{vj}$ = 150 °C | | 53 | | |
| Recovered charge | $Q_r$ | $V_{CC}$ = 300 V, $I_F$ = 50 A, $V_{GE}$ = -15 V, -di$_F$/dt = 550 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 2.4 | | µC |
| | | | $T_{vj}$ = 125 °C | | 4.4 | | |
| | | | $T_{vj}$ = 150 °C | | 5.1 | | |

**(table continues...)**

**Table 6 (continued) Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Reverse recovery energy | $E_{rec}$ | $V_{CC}$ = 300 V, $I_F$ = 50 A, $V_{GE}$ = -15 V, -di$_F$/dt = 550 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 0.62 | | mJ |
| | | | $T_{vj}$ = 125 °C | | 1.11 | | |
| | | | $T_{vj}$ = 150 °C | | 1.28 | | |
| Thermal resistance, junction to heat sink | $R_{thJH}$ | per diode | | | 1.45 | | K/W |
| Temperature under switching conditions | $T_{vj\,op}$ | | | -40 | | 150 | °C |

## 4 Diode, Rectifier

**Table 7 Maximum rated values**

| Parameter | Symbol | Note or test condition | | Values | Unit |
|---|---|---|---|---|---|
| Repetitive peak reverse voltage | $V_{RRM}$ | | $T_{vj}$ = 25 °C | 1600 | V |
| Maximum RMS forward current per chip | $I_{FRMSM}$ | $T_H$ = 80 °C | | 50 | A |
| Maximum RMS current at rectifier output | $I_{RMSM}$ | $T_H$ = 80 °C | | 50 | A |
| Surge forward current | $I_{FSM}$ | $t_P$ = 10 ms | $T_{vj}$ = 25 °C | 665 | A |
| | | | $T_{vj}$ = 150 °C | 526 | |
| $I^2t$ - value | $I^2t$ | $t_P$ = 10 ms | $T_{vj}$ = 25 °C | 2210 | $A^2s$ |
| | | | $T_{vj}$ = 150 °C | 1380 | |

**Table 8 Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Forward voltage | $V_F$ | $I_F$ = 50 A | $T_{vj}$ = 150 °C | | 0.93 | | V |
| Reverse current | $I_r$ | $T_{vj}$ = 150 °C, $V_R$ = 1600 V | | | 1.1 | | mA |
| Thermal resistance, junction to heat sink | $R_{thJH}$ | per diode | | | 1.03 | | K/W |
| Temperature under switching conditions | $T_{vj,\,op}$ | | | -40 | | 150 | °C |

# 5 IGBT, Boost

**Table 9 Maximum rated values**

| Parameter | Symbol | Note or test condition | | Values | Unit |
|---|---|---|---|---|---|
| Collector-emitter voltage | $V_{CES}$ | | $T_{vj}$ = 25 °C | 650 | V |
| Implemented collector current | $I_{CN}$ | | | 50 | A |
| Continuous DC collector current | $I_{CDC}$ | $T_{vj\,max}$ = 175 °C | $T_H$ = 65 °C | 35 | A |
| Repetitive peak collector current | $I_{CRM}$ | $t_p$ limited by $T_{vj\,op}$ | | 100 | A |
| Gate-emitter peak voltage | $V_{GES}$ | | | ±20 | V |

**Table 10 Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Collector-emitter saturation voltage | $V_{CE\,sat}$ | $I_C$ = 50 A, $V_{GE}$ = 15 V | $T_{vj}$ = 25 °C | | 1.60 | 2.20 | V |
| | | | $T_{vj}$ = 125 °C | | 1.75 | | |
| | | | $T_{vj}$ = 150 °C | | 1.79 | | |
| Gate threshold voltage | $V_{GEth}$ | $I_C$ = 0.5 mA, $V_{CE}$ = $V_{GE}$, $T_{vj}$ = 25 °C | | 3.85 | 4.60 | 5.35 | V |
| Gate charge | $Q_G$ | $V_{GE}$ = ±15 V, $V_{CC}$ = 400 V | | | 0.217 | | µC |
| Internal gate resistor | $R_{Gint}$ | $T_{vj}$ = 25 °C | | | 0 | | Ω |
| Input capacitance | $C_{ies}$ | $f$ = 1000 kHz, $T_{vj}$ = 25 °C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | | 2.75 | | nF |
| Reverse transfer capacitance | $C_{res}$ | $f$ = 1000 kHz, $T_{vj}$ = 25 °C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | | 0.01 | | nF |
| Collector-emitter cut-off current | $I_{CES}$ | $V_{CE}$ = 650 V, $V_{GE}$ = 0 V | $T_{vj}$ = 25 °C | | | 0.014 | mA |
| Gate-emitter leakage current | $I_{GES}$ | $V_{CE}$ = 0 V, $V_{GE}$ = 20 V, $T_{vj}$ = 25 °C | | | | 100 | nA |
| Turn-on delay time (inductive load) | $t_{don}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Gon}$ = 18 Ω | $T_{vj}$ = 25 °C | | 0.054 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.051 | | |
| | | | $T_{vj}$ = 150 °C | | 0.050 | | |
| Rise time (inductive load) | $t_r$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Gon}$ = 18 Ω | $T_{vj}$ = 25 °C | | 0.064 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.064 | | |
| | | | $T_{vj}$ = 150 °C | | 0.065 | | |
| Turn-off delay time (inductive load) | $t_{doff}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Goff}$ = 18 Ω | $T_{vj}$ = 25 °C | | 0.130 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.140 | | |
| | | | $T_{vj}$ = 150 °C | | 0.150 | | |

**(table continues...)**

**Table 10 (continued) Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Fall time (inductive load) | $t_f$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $V_{GE}$ = ±15 V, $R_{Goff}$ = 18 Ω | $T_{vj}$ = 25 °C | | 0.016 | | µs |
| | | | $T_{vj}$ = 125 °C | | 0.027 | | |
| | | | $T_{vj}$ = 150 °C | | 0.029 | | |
| Turn-on energy loss per pulse | $E_{on}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $L_\sigma$ = 35 nH, $V_{GE}$ = ±15 V, $R_{Gon}$ = 18 Ω, di/dt = 650 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 1.52 | | mJ |
| | | | $T_{vj}$ = 125 °C | | 1.79 | | |
| | | | $T_{vj}$ = 150 °C | | 1.84 | | |
| Turn-off energy loss per pulse | $E_{off}$ | $I_C$ = 50 A, $V_{CC}$ = 300 V, $L_\sigma$ = 35 nH, $V_{GE}$ = ±15 V, $R_{Goff}$ = 18 Ω, dv/dt = 1100 V/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 0.41 | | mJ |
| | | | $T_{vj}$ = 125 °C | | 0.54 | | |
| | | | $T_{vj}$ = 150 °C | | 0.57 | | |
| SC data | $I_{SC}$ | $V_{GE}$ ≤ 15 V, $V_{CC}$ = 400 V, $V_{CEmax}$=$V_{CES}$-$L_{sCE}$*di/dt | $t_P$ ≤ 0 µs, $T_{vj}$=150 °C | | 250 | | A |
| Thermal resistance, junction to heat sink | $R_{thJH}$ | per IGBT | | | 1.42 | | K/W |
| Temperature under switching conditions | $T_{vj\,op}$ | | | -40 | | 150 | °C |

# 6 Diode, Boost

**Table 11 Maximum rated values**

| Parameter | Symbol | Note or test condition | | Values | Unit |
|---|---|---|---|---|---|
| Repetitive peak reverse voltage | $V_{RRM}$ | | $T_{vj}$ = 25 °C | 650 | V |
| Implemented forward current | $I_{FN}$ | | | 50 | A |
| Continuous DC forward current | $I_F$ | | | 50 | A |
| Repetitive peak forward current | $I_{FRM}$ | $t_P$ = 1 ms | | 100 | A |
| $I^2t$ - value | $I^2t$ | $t_P$ = 10 ms, $V_R$ = 0 V | $T_{vj}$ = 125 °C | 225 | $A^2s$ |
| | | | $T_{vj}$ = 150 °C | 215 | |

**Table 12 Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Forward voltage | $V_F$ | $I_F$ = 50 A, $V_{GE}$ = 0 V | $T_{vj}$ = 25 °C | | 1.65 | 2.15 | V |
| | | | $T_{vj}$ = 125 °C | | 1.55 | | |
| | | | $T_{vj}$ = 150 °C | | 1.50 | | |
| Peak reverse recovery current | $I_{RM}$ | $V_{CC}$ = 300 V, $I_F$ = 50 A, $V_{GE}$ = 15 V, -di$_F$/dt = 650 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 14.9 | | A |
| | | | $T_{vj}$ = 125 °C | | 24.5 | | |
| | | | $T_{vj}$ = 150 °C | | 26.5 | | |
| Recovered charge | $Q_r$ | $V_{CC}$ = 300 V, $I_F$ = 50 A, $V_{GE}$ = 15 V, -di$_F$/dt = 650 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 1.1 | | µC |
| | | | $T_{vj}$ = 125 °C | | 2.2 | | |
| | | | $T_{vj}$ = 150 °C | | 2.6 | | |
| Reverse recovery energy | $E_{rec}$ | $V_{CC}$ = 300 V, $I_F$ = 50 A, $V_{GE}$ = 15 V, -di$_F$/dt = 650 A/µs ($T_{vj}$ = 150 °C) | $T_{vj}$ = 25 °C | | 0.18 | | mJ |
| | | | $T_{vj}$ = 125 °C | | 0.38 | | |
| | | | $T_{vj}$ = 150 °C | | 0.46 | | |
| Thermal resistance, junction to heat sink | $R_{thJH}$ | per diode | | | 1.61 | | K/W |
| Temperature under switching conditions | $T_{vj\,op}$ | | | -40 | | 150 | °C |

# 7 Diode, Reverse

**Table 13 Maximum rated values**

| Parameter | Symbol | Note or test condition | | Values | Unit |
|---|---|---|---|---|---|
| Repetitive peak reverse voltage | $V_{RRM}$ | | $T_{vj}$ = 25 °C | 650 | V |
| Continuous DC forward current | $I_F$ | | | 10 | A |
| Repetitive peak forward current | $I_{FRM}$ | $t_P$ = 1 ms | | 20 | A |
| $I^2t$ - value | $I^2t$ | $t_P$ = 10 ms, $V_R$ = 0 V | $T_{vj}$ = 125 °C | 12.5 | $A^2s$ |
| | | | $T_{vj}$ = 150 °C | 9.5 | |

**Table 14 Characteristic values**

| Parameter | Symbol | Note or test condition | | Values | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | |
| Forward voltage | $V_F$ | $I_F$ = 10 A, $V_{GE}$ = 0 V | $T_{vj}$ = 25 °C | | 1.60 | 2.00 | V |
| | | | $T_{vj}$ = 125 °C | | 1.55 | | |
| | | | $T_{vj}$ = 150 °C | | 1.52 | | |
| Thermal resistance, junction to heat sink | $R_{thJH}$ | per diode | | | 2.72 | | K/W |
| Temperature under switching conditions | $T_{vj\,op}$ | | | -40 | | 150 | °C |

# 8 NTC-Thermistor

**Table 15 Characteristic values**

| Parameter | Symbol | Note or test condition | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Rated resistance | $R_{25}$ | $T_{NTC}$ = 25 °C | | 5 | | kΩ |
| Deviation of $R_{100}$ | $\Delta R/R$ | $T_{NTC}$ = 100 °C, $R_{100}$ = 493 Ω | -5 | | 5 | % |
| Power dissipation | $P_{25}$ | $T_{NTC}$ = 25 °C | | | 20 | mW |
| B-value | $B_{25/50}$ | $R_2 = R_{25} \exp[B_{25/50}(1/T_2-1/(298{,}15\ K))]$ | | 3375 | | K |
| B-value | $B_{25/80}$ | $R_2 = R_{25} \exp[B_{25/80}(1/T_2-1/(298{,}15\ K))]$ | | 3411 | | K |
| B-value | $B_{25/100}$ | $R_2 = R_{25} \exp[B_{25/100}(1/T_2-1/(298{,}15\ K))]$ | | 3433 | | K |

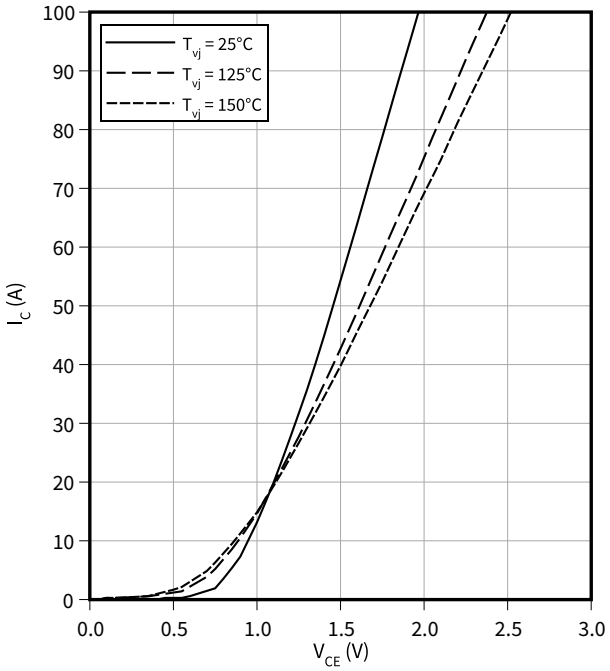
*Note: Specification according to the valid application note.*

# 9 Characteristics diagrams

**Output characteristic (typical), IGBT, Inverter**

$I_C = f(V_{CE})$

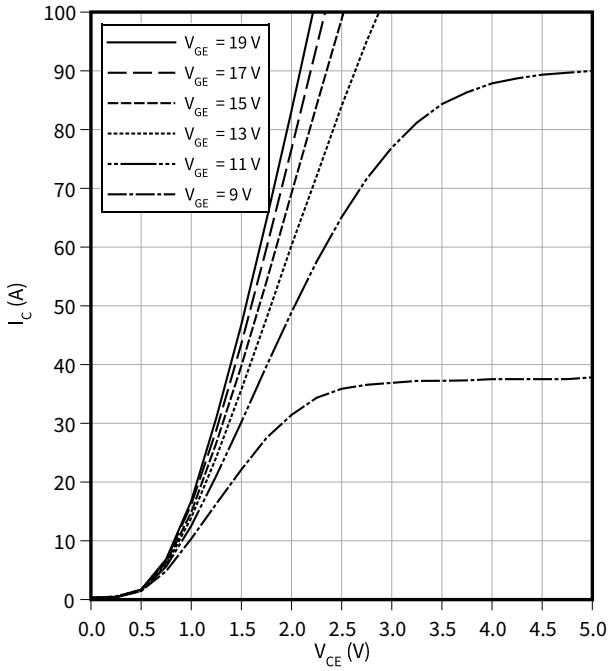
$V_{GE}$ = 15 V




**Output characteristic field (typical), IGBT, Inverter**

$I_C = f(V_{CE})$

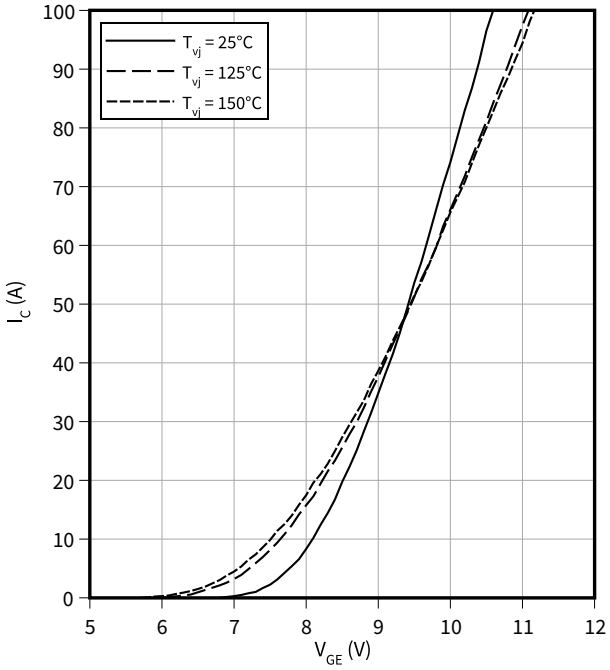
$T_{vj}$ = 150 °C




**Transfer characteristic (typical), IGBT, Inverter**

$I_C = f(V_{GE})$

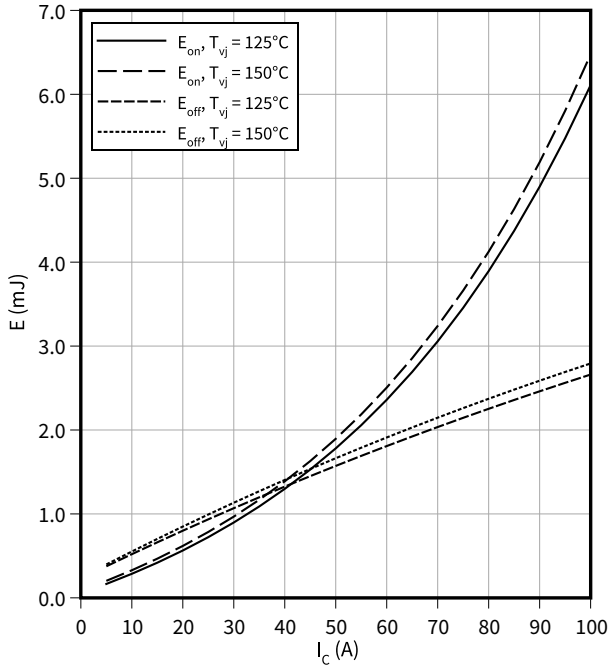
$V_{CE}$ = 20 V




**Switching losses (typical), IGBT, Inverter**

$E = f(I_C)$

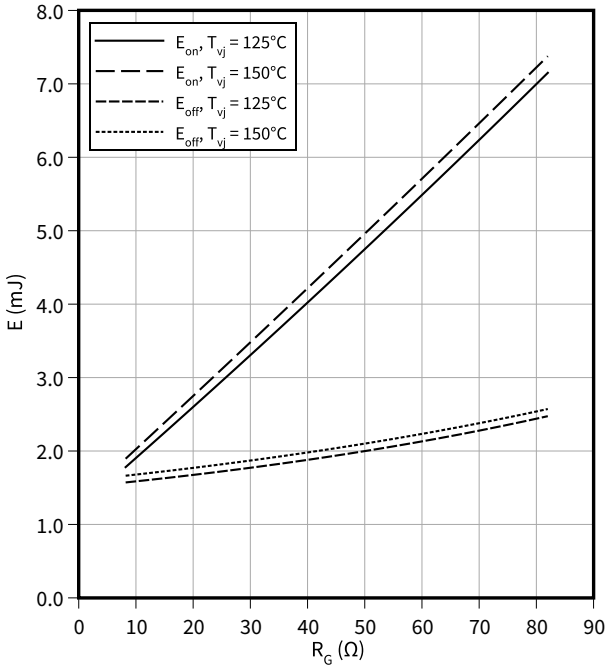
$R_{Goff}$ = 8.2 Ω, $R_{Gon}$ = 8.2 Ω, $V_{CC}$ = 300 V, $V_{GE}$ = ± 15 V



### Switching losses (typical), IGBT, Inverter

$E = f(R_G)$

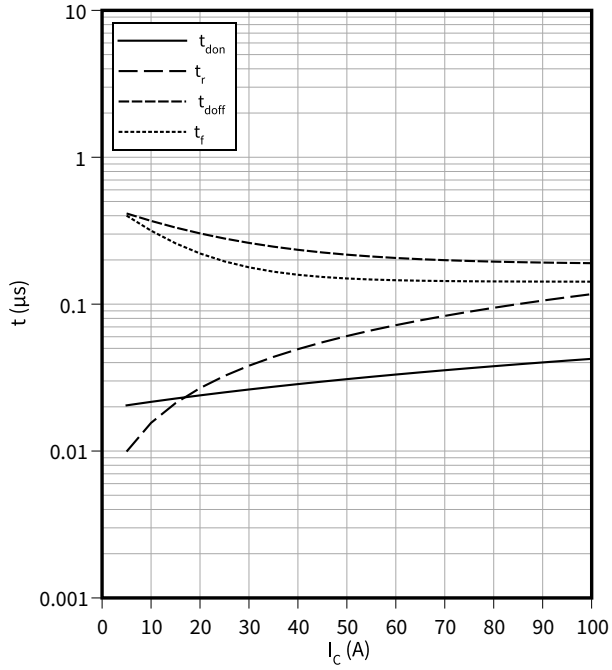
$V_{GE} = \pm 15$ V, $I_C = 50$ A, $V_{CC} = 300$ V




### Switching times (typical), IGBT, Inverter

$t = f(I_C)$

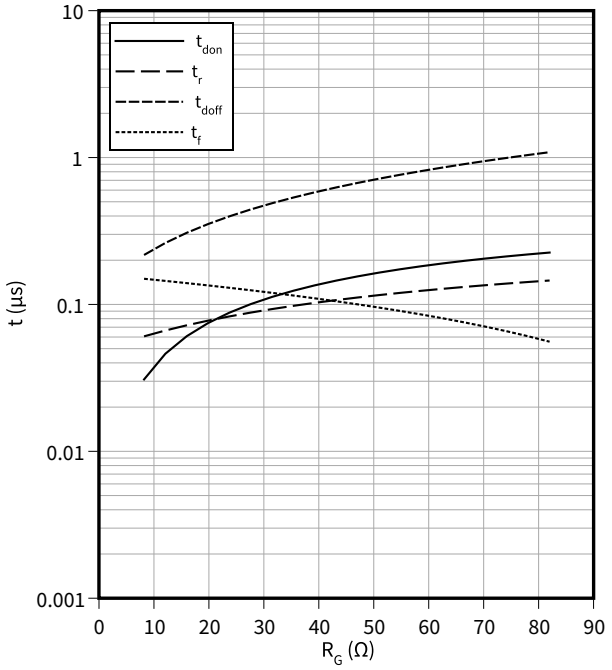
$R_{Goff} = 8.2\ \Omega$, $R_{Gon} = 8.2\ \Omega$, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C




### Switching times (typical), IGBT, Inverter

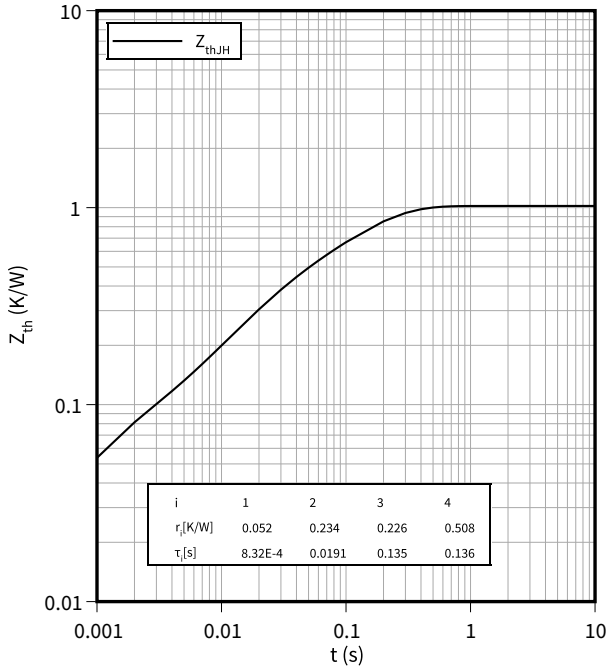
$t = f(R_G)$

$I_C = 50$ A, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C




### Transient thermal impedance , IGBT, Inverter

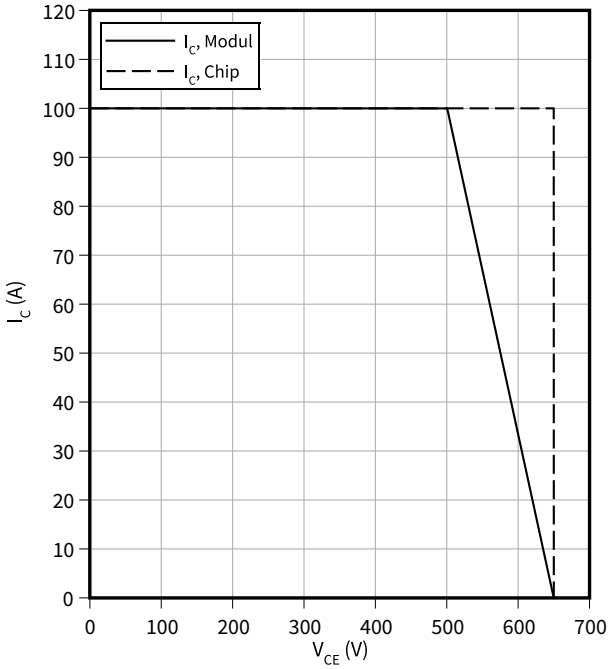
$Z_{th} = f(t)$



### Reverse bias safe operating area (RBSOA), IGBT, Inverter

$I_C = f(V_{CE})$

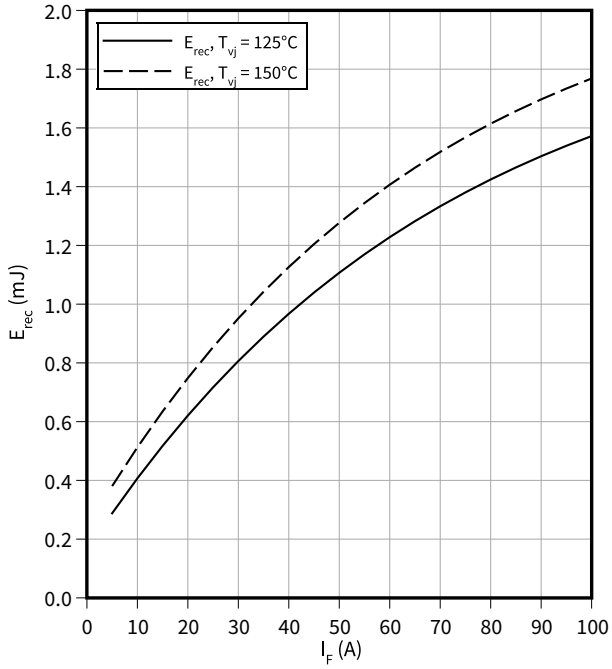
$R_{Goff}$ = 8.2 Ω, $V_{GE}$ = ±15 V, $T_{vj}$ = 150 °C




### Switching losses (typical), Diode, Inverter

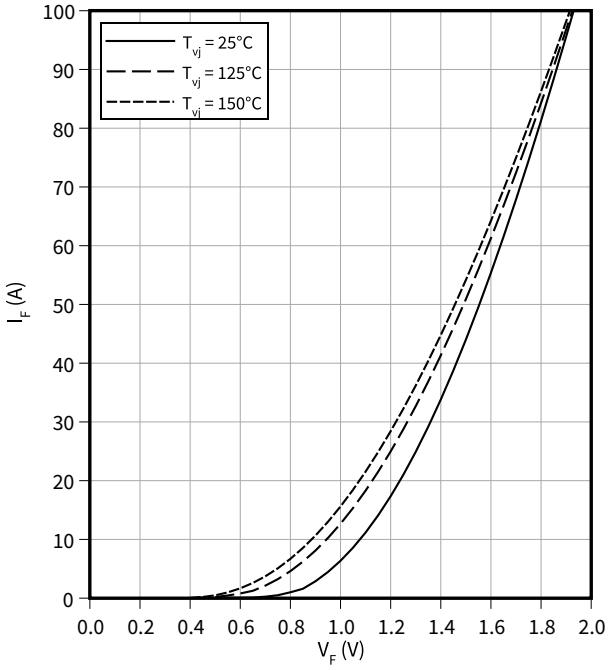
$E_{rec} = f(I_F)$

$R_{Gon} = R_{Gon}(IGBT)$ , $V_{CC}$ = 300 V




### Forward characteristic (typical), Diode, Inverter

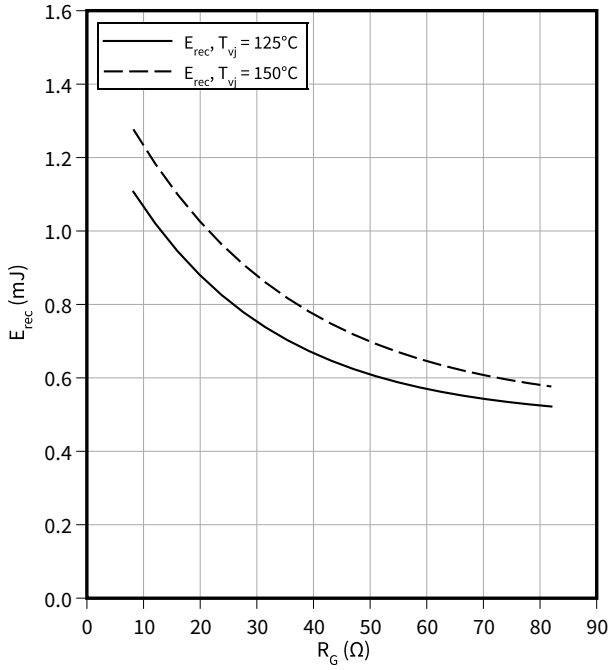
$I_F = f(V_F)$




### Switching losses (typical), Diode, Inverter

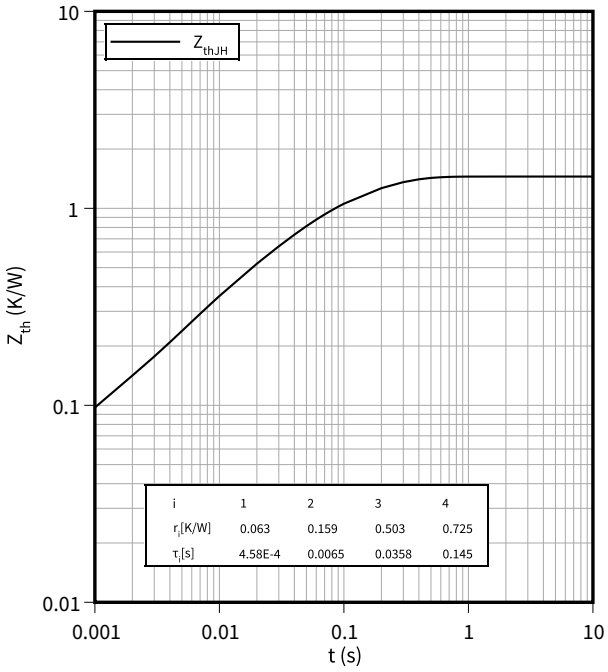
$E_{rec} = f(R_G)$

$I_F$ = 50 A, $V_{CC}$ = 300 V



### Transient thermal impedance, Diode, Inverter

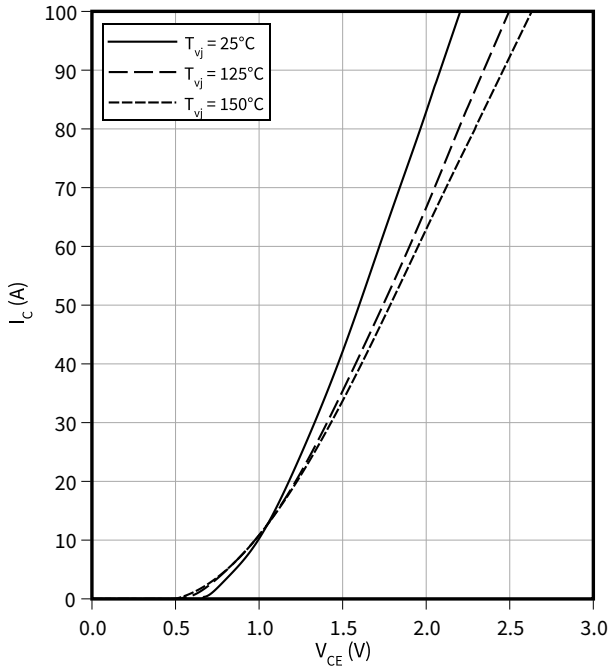
$Z_{th} = f(t)$




### Output characteristic (typical), IGBT, Boost

$I_C = f(V_{CE})$

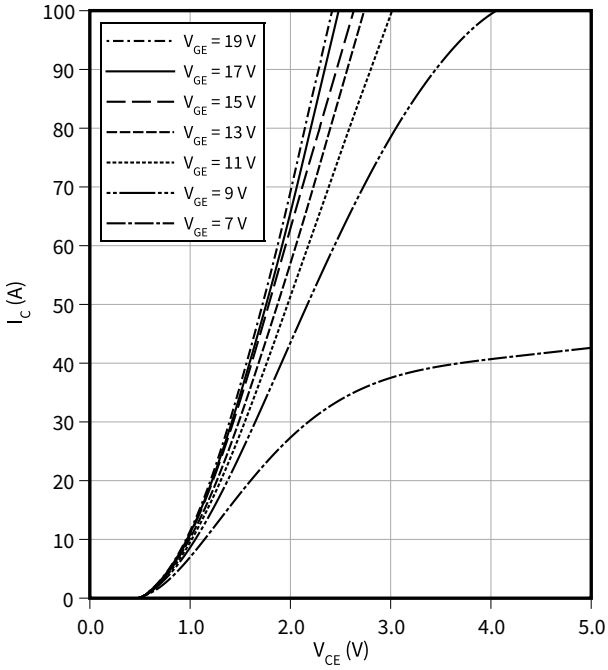
$V_{GE} = 15$ V




### Output characteristic field (typical), IGBT, Boost

$I_C = f(V_{CE})$

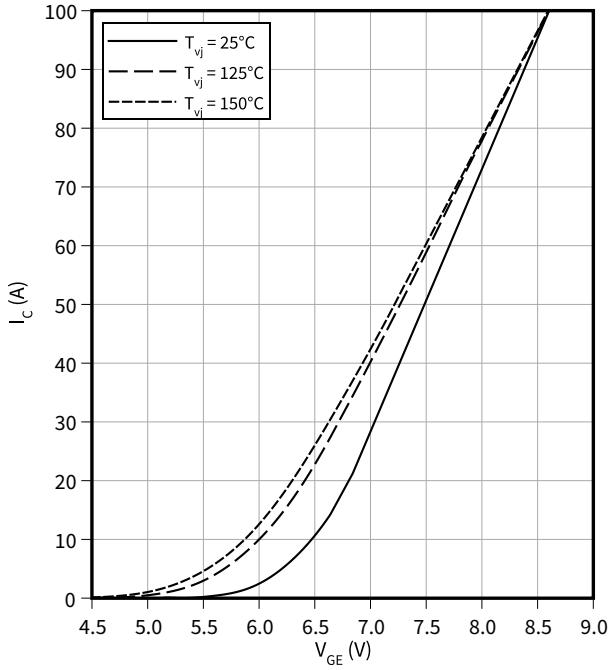
$T_{vj} = 150$ °C




### Transfer characteristic (typical), IGBT, Boost

$I_C = f(V_{GE})$

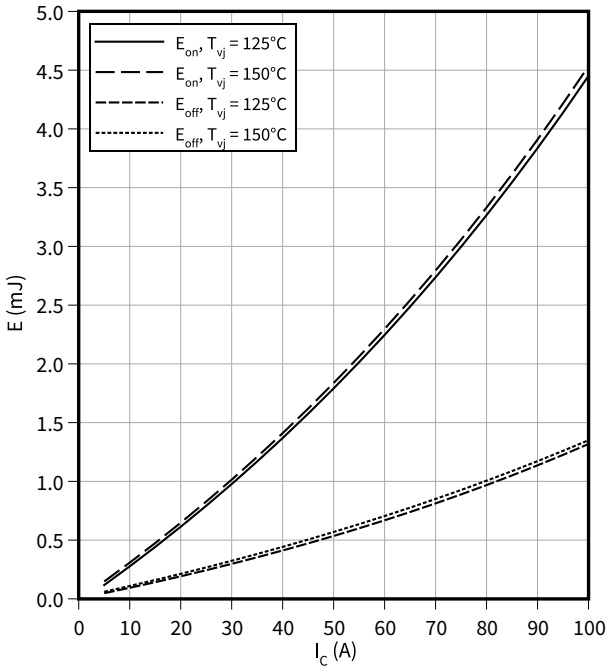
$V_{CE} = 20$ V



### Switching losses (typical), IGBT, Boost

$E = f(I_C)$

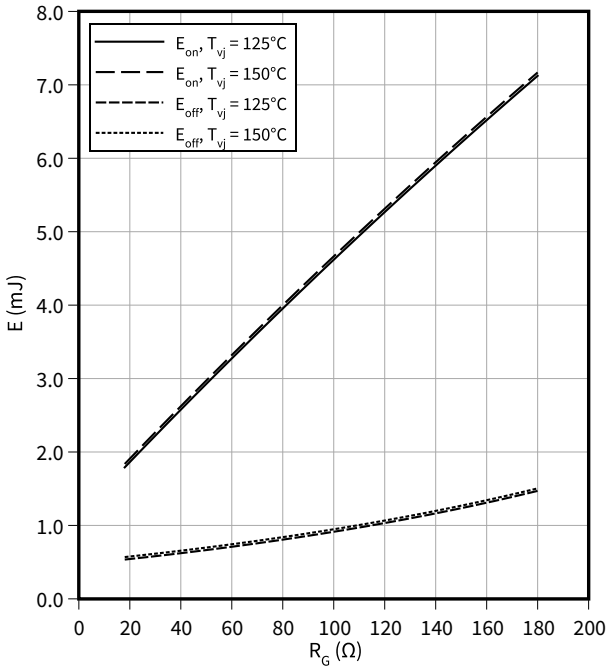
$R_{Goff} = 18\ \Omega$, $R_{Gon} = 18\ \Omega$, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V




### Switching losses (typical), IGBT, Boost

$E = f(R_G)$

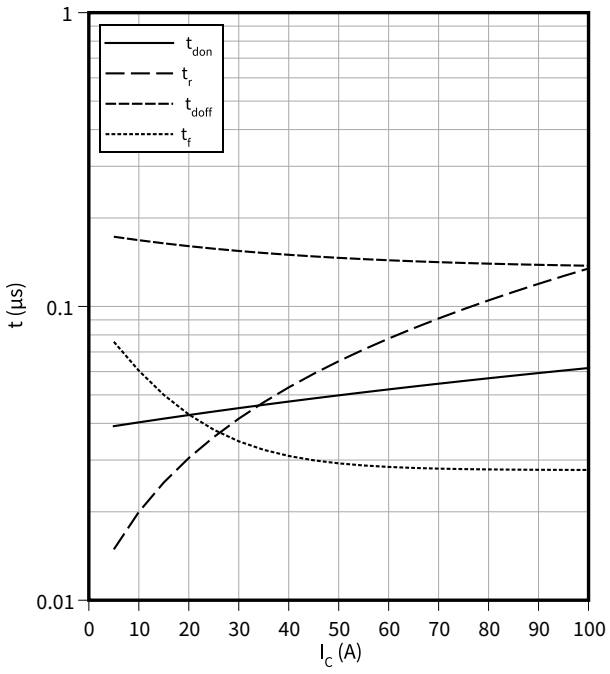
$V_{GE} = \pm 15$ V, $V_{CC} = 300$ V, $I_C = 50$ A




### Switching times (typical), IGBT, Boost

$t = f(I_C)$

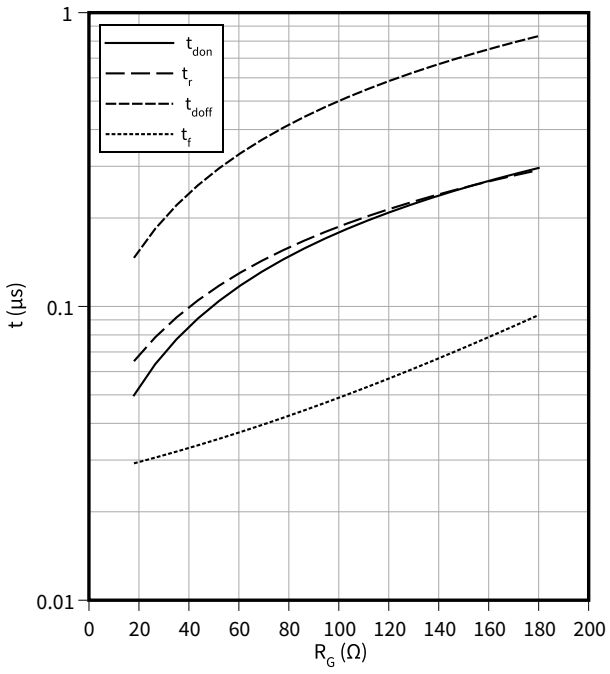
$R_{Goff} = 18\ \Omega$, $R_{Gon} = 18\ \Omega$, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C




### Switching times (typical), IGBT, Boost

$t = f(R_G)$

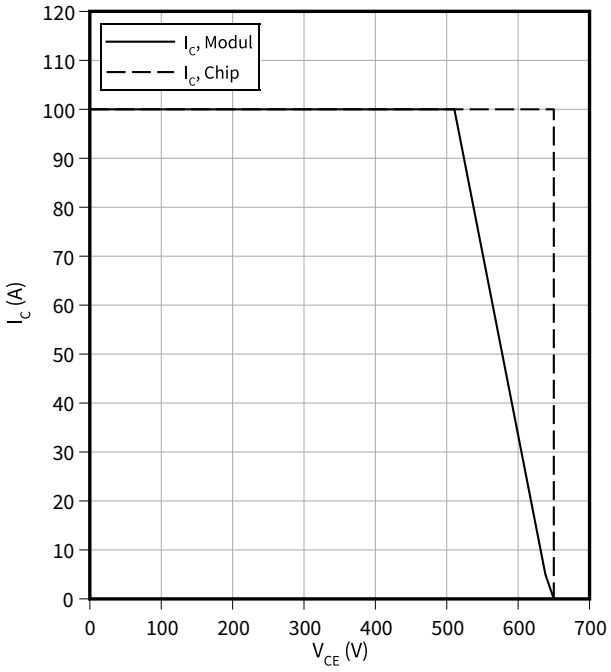
$I_C = 50$ A, $V_{CC} = 300$ V, $V_{GE} = \pm 15$ V, $T_{vj} = 150$ °C



### Reverse bias safe operating area (RBSOA), IGBT, Boost

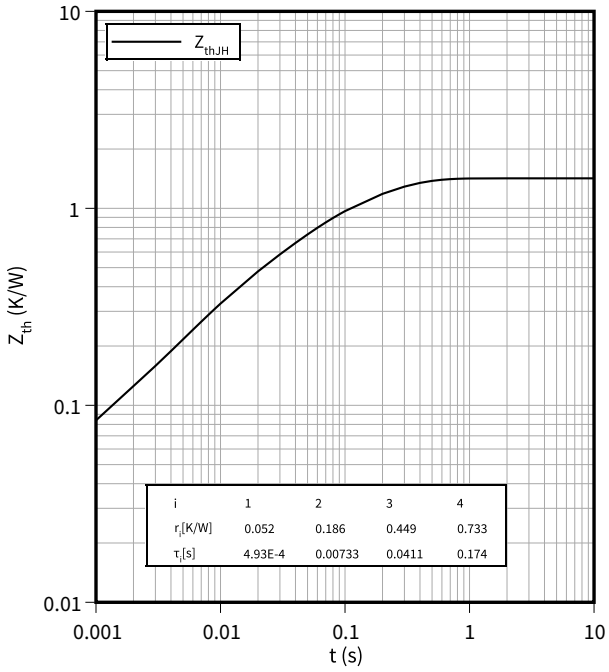
$I_C = f(V_{CE})$

$T_{vj} = 150\ °C$, $R_{Goff} = 18\ \Omega$, $V_{GE} = \pm 15\ V$



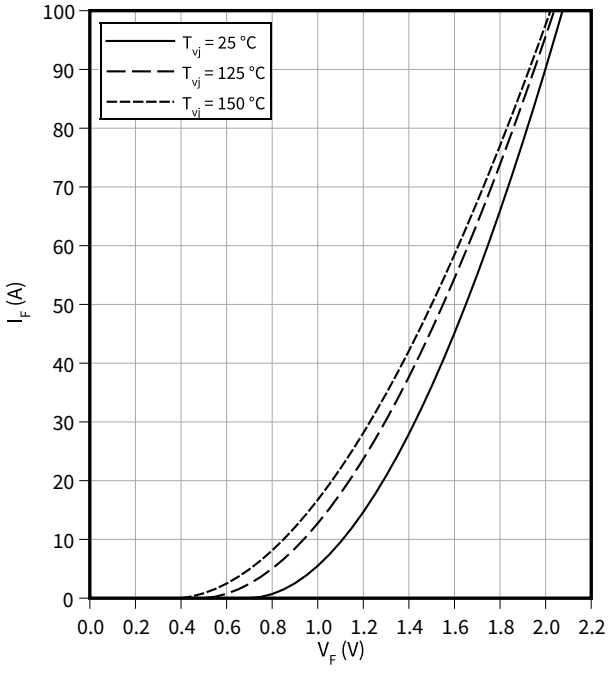

### Transient thermal impedance , IGBT, Boost

$Z_{th} = f(t)$




### Forward characteristic (typical), Diode, Boost

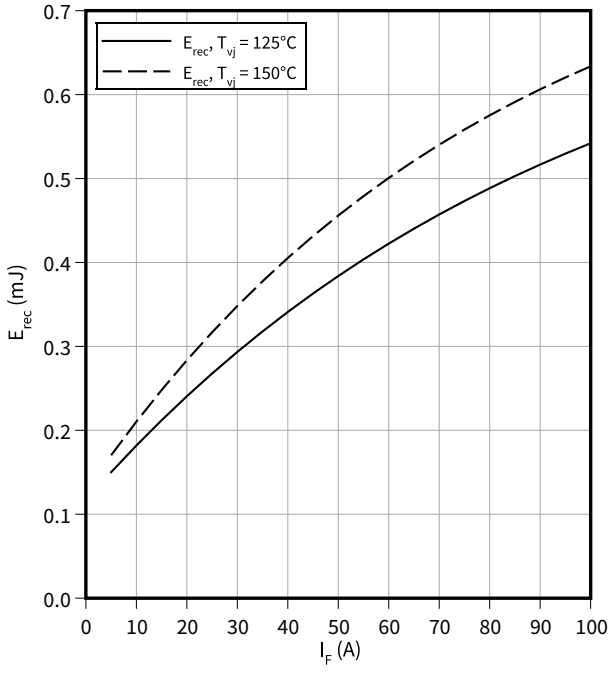
$I_F = f(V_F)$




### Switching losses (typical), Diode, Boost

$E_{rec} = f(I_F)$

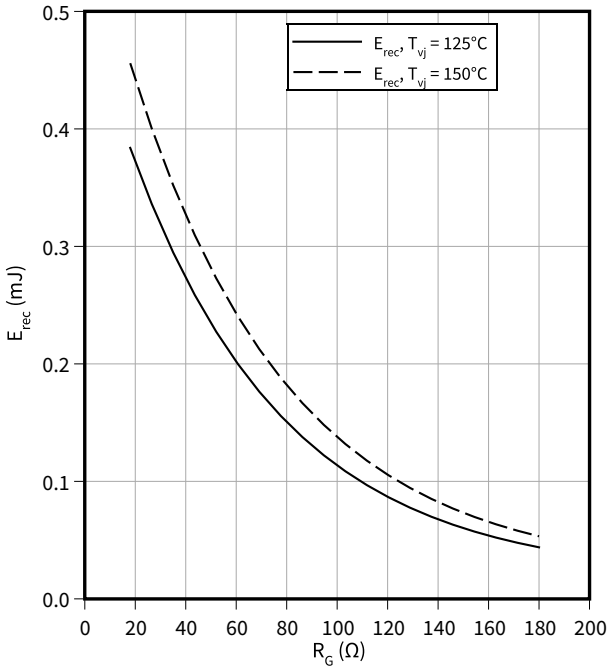
$R_{Gon} = R_{Gon}(IGBT)$ , $V_{CC} = 300\ V$



### Switching losses (typical), Diode, Boost

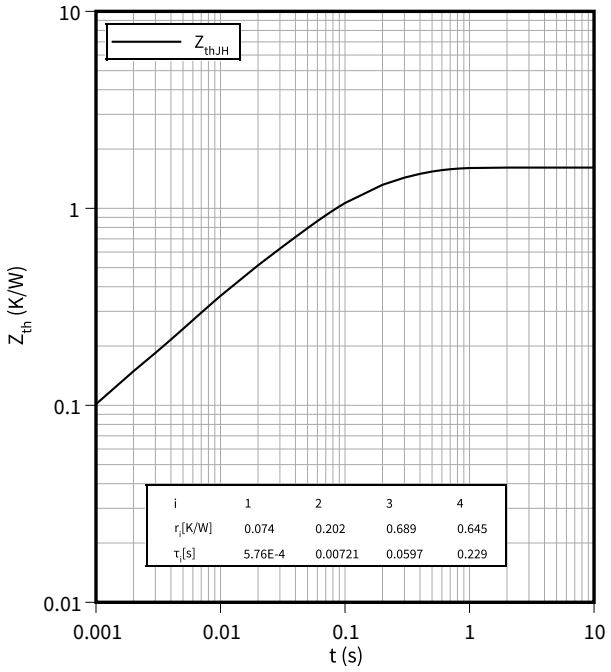
$E_{rec} = f(R_G)$

$I_F = 50\ A, V_{CC} = 300\ V$



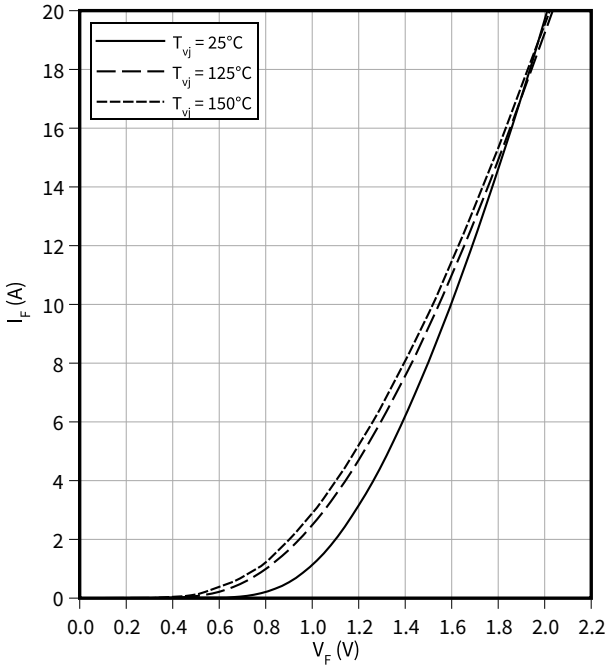

### Transient thermal impedance, Diode, Boost

$Z_{th} = f(t)$



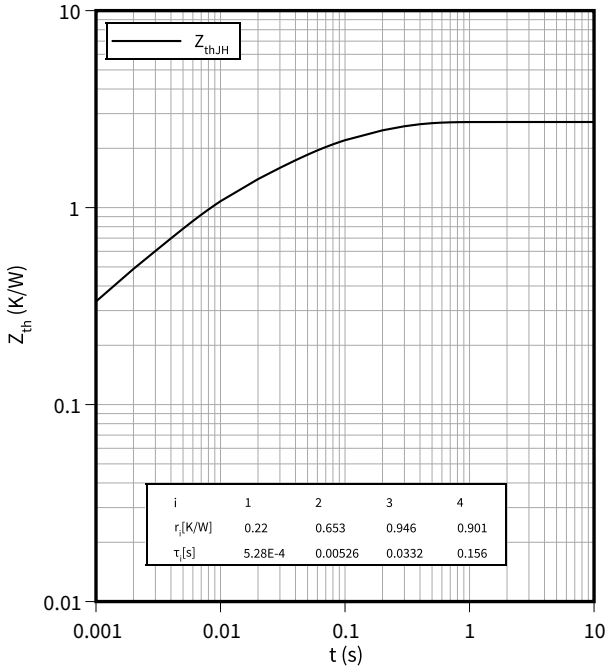

### Forward characteristic (typical), Diode, Reverse

$I_F = f(V_F)$




### Transient thermal impedance, Diode, Reverse

$Z_{th} = f(t)$



# 10 Circuit diagram

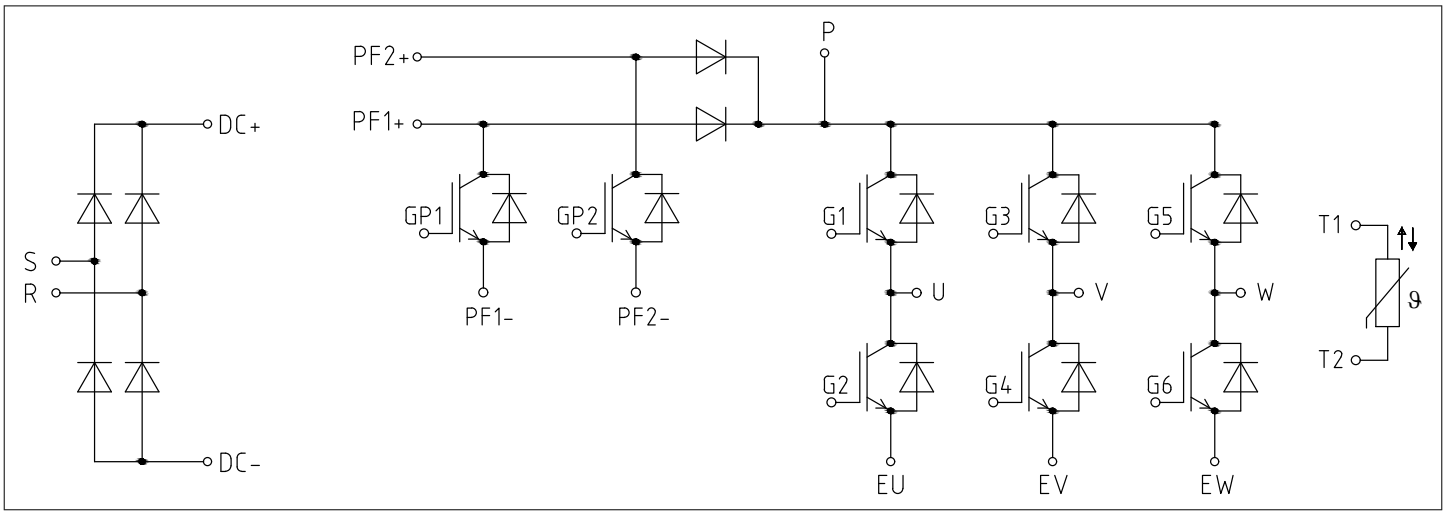



**Figure 1**

# 11 Package outlines

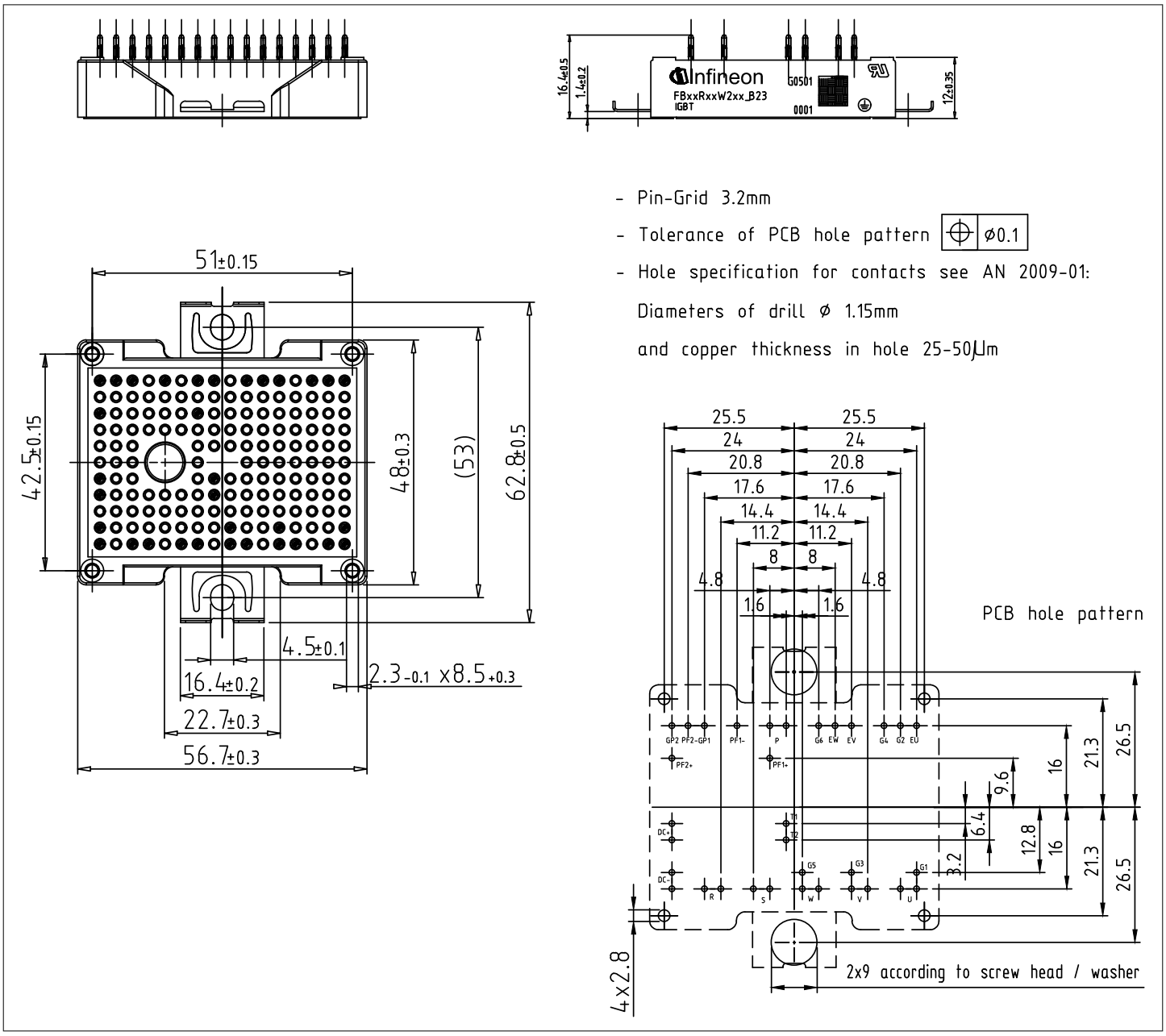



**Figure 2**

# 12 Module label code

| **Module label code** | | | |
|---|---|---|---|
| Code format | Data Matrix | | Barcode Code128 |
| Encoding | ASCII text | | Code Set A |
| Symbol size | 16x16 | | 23 digits |
| Standard | IEC24720 and IEC16022 | | IEC8859-1 |
| Code content | *Content*<br>Module serial number<br>Module material number<br>Production order number<br>Date code (production year)<br>Date code (production week) | *Digit*<br>1 – 5<br>6 - 11<br>12 - 19<br>20 – 21<br>22 – 23 | *Example*<br>71549<br>142846<br>55054991<br>15<br>30 |
| Example | 7154914284655054991530 | | 7154914284655054991530 |

**Figure 3**

## Revision history

| Document revision | Date of release | Description of changes |
|---|---|---|
| V1.0 | 2019-06-24 | Target datasheet |
| V1.1 | 2020-03-20 | Target datasheet |
| n/a | 2020-09-01 | Datasheet migrated to a new system with a new layout and new revision number schema: target or preliminary datasheet = 0.xy; final datasheet = 1.xy |
| 1.00 | 2021-03-25 | |
| 1.01 | 2022-09-16 | Correction according ERRATA 10282ERRA |

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**Email: erratum@infineon.com**

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