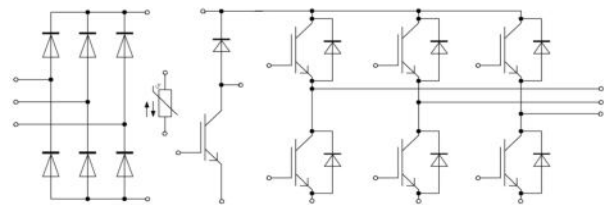
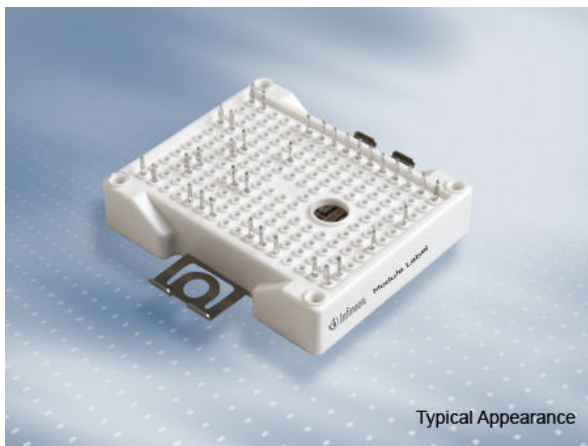


EasyPIM™ Modul mit TRENCHSTOP™ IGBT7 und Emitter Controlled 7 Diode und PressFIT / NTC  
EasyPIM™ module with TRENCHSTOP™ IGBT7 and Emitter Controlled 7 diode and PressFIT / NTC

## Vorläufige Daten / Preliminary Data



$$V_{CES} = 1200V$$

$$I_{C\text{ nom}} = 25A / I_{CRM} = 50A$$

## Potentielle Anwendungen

- Hilfsumrichter
- Klimaanlage
- Motorantriebe

## Elektrische Eigenschaften

- Niedriges  $V_{CEsat}$
- Trenchstop™ IGBT7
- Überlastbetrieb bis zu 175°C

## Mechanische Eigenschaften

- 2,5 kV AC 1min Isolationsfestigkeit
- $Al_2O_3$  Substrat mit kleinem thermischen Widerstand
- Hohe Leistungsdichte
- Kompaktes Design
- PressFIT Verbindungstechnik

## Potential Applications

- Auxiliary inverters
- Air conditioning
- Motor drives

## Electrical Features

- Low  $V_{CEsat}$
- Trenchstop™ IGBT7
- Overload operation up to 175°C

## Mechanical Features

- 2.5 kV AC 1min insulation
- $Al_2O_3$  substrate with low thermal resistance
- High power density
- Compact design
- PressFIT contact technology

## Module Label Code

Barcode Code 128



DMX - Code



## Content of the Code

| Content of the Code        | Digit   |
|----------------------------|---------|
| Module Serial Number       | 1 - 5   |
| Module Material Number     | 6 - 11  |
| Production Order Number    | 12 - 19 |
| Datecode (Production Year) | 20 - 21 |
| Datecode (Production Week) | 22 - 23 |

## Vorläufige Daten Preliminary Data

### IGBT, Wechselrichter / IGBT, Inverter

#### Höchstzulässige Werte / Maximum Rated Values

|                                                                          |                                                               |           |       |   |
|--------------------------------------------------------------------------|---------------------------------------------------------------|-----------|-------|---|
| Kollektor-Emitter-Sperrspannung<br>Collector-emitter voltage             | $T_{vj} = 25^{\circ}\text{C}$                                 | $V_{CES}$ | 1200  | V |
| Kollektor-Dauergleichstrom<br>Continuous DC collector current            | $T_H = 105^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{CDC}$ | 25    | A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P = 1\text{ ms}$                                           | $I_{CRM}$ | 50    | A |
| Gate-Emitter-Spitzenspannung<br>Gate-emitter peak voltage                |                                                               | $V_{GES}$ | +/-20 | V |

#### Charakteristische Werte / Characteristic Values

|                                                                                  |                                                                                                                                                                                                     |                                                                                                                    | min.                | typ.                    | max.   |                                                 |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|--------|-------------------------------------------------|
| Kollektor-Emitter-Sättigungsspannung<br>Collector-emitter saturation voltage     | $I_C = 25\text{ A}$<br>$V_{GE} = 15\text{ V}$                                                                                                                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                  | $V_{CE\text{ sat}}$ | 1,60<br>1,74<br>1,82    | t.b.d. | V<br>V<br>V                                     |
| Gate-Schwellenspannung<br>Gate threshold voltage                                 | $I_C = 0,525\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                               |                                                                                                                    | $V_{GEth}$          | 5,15                    | 5,80   | 6,45 V                                          |
| Gateladung<br>Gate charge                                                        | $V_{GE} = -15 / 15\text{ V}, V_{CE} = 600\text{ V}$                                                                                                                                                 |                                                                                                                    | $Q_G$               | 0,395                   |        | $\mu\text{C}$                                   |
| Interner Gatewiderstand<br>Internal gate resistor                                | $T_{vj} = 25^{\circ}\text{C}$                                                                                                                                                                       |                                                                                                                    | $R_{Gint}$          | 0,0                     |        | $\Omega$                                        |
| Eingangskapazität<br>Input capacitance                                           | $f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                        |                                                                                                                    | $C_{ies}$           | 4,77                    |        | nF                                              |
| Rückwirkungskapazität<br>Reverse transfer capacitance                            | $f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                                                        |                                                                                                                    | $C_{res}$           | 0,017                   |        | nF                                              |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current                 | $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}$                                                                                                                                                       | $T_{vj} = 25^{\circ}\text{C}$                                                                                      | $I_{CES}$           |                         | 0,0056 | mA                                              |
| Gate-Emitter-Reststrom<br>Gate-emitter leakage current                           | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                                                                                            |                                                                                                                    | $I_{GES}$           |                         | 100    | nA                                              |
| Einschaltverzögerungszeit, induktive Last<br>Turn-on delay time, inductive load  | $I_C = 25\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Gon} = 6,2\ \Omega$                                                                                               | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                  | $t_{don}$           | 0,035<br>0,036<br>0,043 |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Anstiegszeit, induktive Last<br>Rise time, inductive load                        | $I_C = 25\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Gon} = 6,2\ \Omega$                                                                                               | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                  | $t_r$               | 0,021<br>0,026<br>0,031 |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load  | $I_C = 25\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Goff} = 6,2\ \Omega$                                                                                              | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                  | $t_{d\text{ off}}$  | 0,19<br>0,26<br>0,38    |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Fallzeit, induktive Last<br>Fall time, inductive load                            | $I_C = 25\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Goff} = 6,2\ \Omega$                                                                                              | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                  | $t_f$               | 0,19<br>0,27<br>0,29    |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse                | $I_C = 25\text{ A}, V_{CE} = 600\text{ V}, L_{\sigma} = 35\text{ nH}$<br>$di/dt = 650\text{ A}/\mu\text{s} (T_{vj} = 175^{\circ}\text{C})$<br>$V_{GE} = -15 / 15\text{ V}, R_{Gon} = 6,2\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                  | $E_{on}$            | 1,78<br>2,57<br>3,18    |        | mJ<br>mJ<br>mJ                                  |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse                | $I_C = 25\text{ A}, V_{CE} = 600\text{ V}, L_{\sigma} = 35\text{ nH}$<br>$du/dt = 3000\text{ V}/\mu\text{s} (T_{vj} = 175^{\circ}\text{C})$<br>$V_{GE} = -15 / 15\text{ V}, R_{Goff} = 6,2\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                  | $E_{off}$           | 1,68<br>2,67<br>3,20    |        | mJ<br>mJ<br>mJ                                  |
| Kurzschlußverhalten<br>SC data                                                   | $V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$                                                                                                     | $t_P \leq 8\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$<br>$t_P \leq 7\ \mu\text{s}, T_{vj} = 175^{\circ}\text{C}$ | $I_{SC}$            | 80<br>75                |        | A<br>A                                          |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro IGBT / per IGBT                                                                                                                                                                                 |                                                                                                                    | $R_{thJH}$          | 1,25                    |        | K/W                                             |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |                                                                                                                                                                                                     |                                                                                                                    | $T_{vj\text{ op}}$  | -40                     | 175    | $^{\circ}\text{C}$                              |

## Vorläufige Daten Preliminary Data

### Diode, Wechselrichter / Diode, Inverter Höchstzulässige Werte / Maximum Rated Values

|                                                                     |                                                                                                                                              |           |              |                                              |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------|----------------------------------------------|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage | $T_{vj} = 25^{\circ}\text{C}$                                                                                                                | $V_{RRM}$ | 1200         | V                                            |
| Dauergleichstrom<br>Continuous DC forward current                   |                                                                                                                                              | $I_F$     | 25           | A                                            |
| Periodischer Spitzenstrom<br>Repetitive peak forward current        | $t_P = 1\text{ ms}$                                                                                                                          | $I_{FRM}$ | 50           | A                                            |
| Grenzlastintegral<br>$I^2t$ - value                                 | $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$<br>$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 175^{\circ}\text{C}$ | $I^2t$    | 72,5<br>63,0 | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$ |

### Charakteristische Werte / Characteristic Values

|                                                                                  |                                                                                                                                          |                                                                                                   | min.               | typ. | max.                 |                                                 |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------|------|----------------------|-------------------------------------------------|
| Durchlassspannung<br>Forward voltage                                             | $I_F = 25\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 25\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 25\text{ A}, V_{GE} = 0\text{ V}$         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $V_F$              |      | 1,83<br>1,70<br>1,63 | t.b.d.<br>V<br>V<br>V                           |
| Rückstromspitze<br>Peak reverse recovery current                                 | $I_F = 25\text{ A}, -di_F/dt = 650\text{ A}/\mu\text{s} (T_{vj}=175^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $I_{RM}$           |      | 20,5<br>26,4<br>30,2 | A<br>A<br>A                                     |
| Sperrverzögerungsladung<br>Recovered charge                                      | $I_F = 25\text{ A}, -di_F/dt = 650\text{ A}/\mu\text{s} (T_{vj}=175^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $Q_r$              |      | 2,47<br>4,31<br>5,62 | $\mu\text{C}$<br>$\mu\text{C}$<br>$\mu\text{C}$ |
| Abschaltenergie pro Puls<br>Reverse recovery energy                              | $I_F = 25\text{ A}, -di_F/dt = 650\text{ A}/\mu\text{s} (T_{vj}=175^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $E_{rec}$          |      | 0,94<br>1,48<br>1,85 | mJ<br>mJ<br>mJ                                  |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro Diode / per diode                                                                                                                    |                                                                                                   | $R_{thJH}$         |      | 1,73                 | K/W                                             |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |                                                                                                                                          |                                                                                                   | $T_{vj\text{ op}}$ | -40  | 175                  | $^{\circ}\text{C}$                              |

### Diode, Gleichrichter / Diode, Rectifier Höchstzulässige Werte / Maximum Rated Values

|                                                                                     |                                                                                                         |             |             |                                              |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------|-------------|----------------------------------------------|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage                 | $T_{vj} = 25^{\circ}\text{C}$                                                                           | $V_{RRM}$   | 1600        | V                                            |
| Durchlassstrom Grenzeffektivwert pro Chip<br>Maximum RMS forward current per chip   | $T_H = 100^{\circ}\text{C}$                                                                             | $I_{FRMSM}$ | 45          | A                                            |
| Gleichrichter Ausgang Grenzeffektivstrom<br>Maximum RMS current at rectifier output | $T_H = 100^{\circ}\text{C}$                                                                             | $I_{RMSM}$  | 50          | A                                            |
| Stoßstrom Grenzwert<br>Surge forward current                                        | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I_{FSM}$   | 450<br>370  | A<br>A                                       |
| Grenzlastintegral<br>$I^2t$ - value                                                 | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I^2t$      | 1010<br>685 | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$ |

### Charakteristische Werte / Characteristic Values

|                                                                                  |                                                     |                    | min. | typ. | max. |                    |
|----------------------------------------------------------------------------------|-----------------------------------------------------|--------------------|------|------|------|--------------------|
| Durchlassspannung<br>Forward voltage                                             | $T_{vj} = 150^{\circ}\text{C}, I_F = 25\text{ A}$   | $V_F$              |      | 0,88 |      | V                  |
| Sperrstrom<br>Reverse current                                                    | $T_{vj} = 150^{\circ}\text{C}, V_R = 1600\text{ V}$ | $I_R$              |      | 1,00 |      | mA                 |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro Diode / per diode                               | $R_{thJH}$         |      | 1,36 |      | K/W                |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |                                                     | $T_{vj\text{ op}}$ | -40  |      | 150  | $^{\circ}\text{C}$ |

## Vorläufige Daten Preliminary Data

### IGBT, Brems-Chopper / IGBT, Brake-Chopper Höchstzulässige Werte / Maximum Rated Values

|                                                                          |                                                                  |           |       |   |
|--------------------------------------------------------------------------|------------------------------------------------------------------|-----------|-------|---|
| Kollektor-Emitter-Sperrspannung<br>Collector-emitter voltage             | $T_{vj} = 25^{\circ}\text{C}$                                    | $V_{CES}$ | 1200  | V |
| Kollektor-Dauergleichstrom<br>Continuous DC collector current            | $T_H = 105^{\circ}\text{C}$ , $T_{vj\max} = 175^{\circ}\text{C}$ | $I_{CDC}$ | 25    | A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P = 1\text{ ms}$                                              | $I_{CRM}$ | 50    | A |
| Gate-Emitter-Spitzenspannung<br>Gate-emitter peak voltage                |                                                                  | $V_{GES}$ | +/-20 | V |

### Charakteristische Werte / Characteristic Values

|                                                                                  |                                                                                                                                                                                                                  |                                                                                                                          | min.                | typ.                    | max.   |                                                 |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|--------|-------------------------------------------------|
| Kollektor-Emitter-Sättigungsspannung<br>Collector-emitter saturation voltage     | $I_C = 25\text{ A}$<br>$V_{GE} = 15\text{ V}$                                                                                                                                                                    | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                        | $V_{CE\text{ sat}}$ | 1,60<br>1,74<br>1,82    | t.b.d. | V<br>V<br>V                                     |
| Gate-Schwellenspannung<br>Gate threshold voltage                                 | $I_C = 0,525\text{ mA}$ , $V_{CE} = V_{GE}$ , $T_{vj} = 25^{\circ}\text{C}$                                                                                                                                      |                                                                                                                          | $V_{GEth}$          | 5,15                    | 5,80   | 6,45 V                                          |
| Gateladung<br>Gate charge                                                        | $V_{GE} = -15 / 15\text{ V}$ , $V_{CE} = 600\text{ V}$                                                                                                                                                           |                                                                                                                          | $Q_G$               | 0,395                   |        | $\mu\text{C}$                                   |
| Interner Gatewiderstand<br>Internal gate resistor                                | $T_{vj} = 25^{\circ}\text{C}$                                                                                                                                                                                    |                                                                                                                          | $R_{Gint}$          | 0,0                     |        | $\Omega$                                        |
| Eingangskapazität<br>Input capacitance                                           | $f = 100\text{ kHz}$ , $T_{vj} = 25^{\circ}\text{C}$ , $V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$                                                                                                            |                                                                                                                          | $C_{ies}$           | 4,77                    |        | nF                                              |
| Rückwirkungskapazität<br>Reverse transfer capacitance                            | $f = 100\text{ kHz}$ , $T_{vj} = 25^{\circ}\text{C}$ , $V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$                                                                                                            |                                                                                                                          | $C_{res}$           | 0,017                   |        | nF                                              |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current                 | $V_{CE} = 1200\text{ V}$ , $V_{GE} = 0\text{ V}$                                                                                                                                                                 | $T_{vj} = 25^{\circ}\text{C}$                                                                                            | $I_{CES}$           |                         | 0,0056 | mA                                              |
| Gate-Emitter-Reststrom<br>Gate-emitter leakage current                           | $V_{CE} = 0\text{ V}$ , $V_{GE} = 20\text{ V}$ , $T_{vj} = 25^{\circ}\text{C}$                                                                                                                                   |                                                                                                                          | $I_{GES}$           |                         | 100    | nA                                              |
| Einschaltverzögerungszeit, induktive Last<br>Turn-on delay time, inductive load  | $I_C = 25\text{ A}$ , $V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Gon} = 6,2\ \Omega$                                                                                                         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                        | $t_{don}$           | 0,034<br>0,035<br>0,041 |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Anstiegszeit, induktive Last<br>Rise time, inductive load                        | $I_C = 25\text{ A}$ , $V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Gon} = 6,2\ \Omega$                                                                                                         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                        | $t_r$               | 0,022<br>0,026<br>0,033 |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load  | $I_C = 25\text{ A}$ , $V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Goff} = 6,2\ \Omega$                                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                        | $t_{doff}$          | 0,19<br>0,25<br>0,37    |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Fallzeit, induktive Last<br>Fall time, inductive load                            | $I_C = 25\text{ A}$ , $V_{CE} = 600\text{ V}$<br>$V_{GE} = -15 / 15\text{ V}$<br>$R_{Goff} = 6,2\ \Omega$                                                                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                        | $t_f$               | 0,17<br>0,27<br>0,29    |        | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse                | $I_C = 25\text{ A}$ , $V_{CE} = 600\text{ V}$ , $L_{\sigma} = 35\text{ nH}$<br>$di/dt = 650\text{ A}/\mu\text{s}$ ( $T_{vj} = 175^{\circ}\text{C}$ )<br>$V_{GE} = -15 / 15\text{ V}$ , $R_{Gon} = 6,2\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                        | $E_{on}$            | 1,66<br>2,32<br>2,94    |        | mJ<br>mJ<br>mJ                                  |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse                | $I_C = 25\text{ A}$ , $V_{CE} = 600\text{ V}$ , $L_{\sigma} = 35\text{ nH}$<br>$du/dt = 3000\text{ V}/\mu\text{s}$ ( $T_{vj} = 175^{\circ}\text{C}$ )<br>$V_{GE} = -15 / 15\text{ V}$ , $R_{Goff} = 6,2\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$                        | $E_{off}$           | 1,73<br>2,68<br>3,32    |        | mJ<br>mJ<br>mJ                                  |
| Kurzschlußverhalten<br>SC data                                                   | $V_{GE} \leq 15\text{ V}$ , $V_{CC} = 800\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$                                                                                                               | $t_P \leq 8\ \mu\text{s}$ , $T_{vj} = 150^{\circ}\text{C}$<br>$t_P \leq 7\ \mu\text{s}$ , $T_{vj} = 175^{\circ}\text{C}$ | $I_{SC}$            | 80<br>75                |        | A<br>A                                          |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro IGBT / per IGBT                                                                                                                                                                                              |                                                                                                                          | $R_{thJH}$          | 1,25                    |        | K/W                                             |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |                                                                                                                                                                                                                  |                                                                                                                          | $T_{vj\text{ op}}$  | -40                     | 175    | $^{\circ}\text{C}$                              |

## Vorläufige Daten Preliminary Data

### Diode, Brems-Chopper / Diode, Brake-Chopper Höchstzulässige Werte / Maximum Rated Values

|                                                                     |                                                                                                                                              |           |              |                                              |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------|----------------------------------------------|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage | $T_{vj} = 25^{\circ}\text{C}$                                                                                                                | $V_{RRM}$ | 1200         | V                                            |
| Dauergleichstrom<br>Continuous DC forward current                   |                                                                                                                                              | $I_F$     | 10           | A                                            |
| Periodischer Spitzenstrom<br>Repetitive peak forward current        | $t_P = 1\text{ ms}$                                                                                                                          | $I_{FRM}$ | 20           | A                                            |
| Grenzlastintegral<br>$I^2t$ - value                                 | $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$<br>$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 175^{\circ}\text{C}$ | $I^2t$    | 27,5<br>24,0 | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$ |

### Charakteristische Werte / Characteristic Values

|                                                                                  |                                                                                                                                          |                                                                                                   | min.               | typ. | max.                 |                                                 |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------|------|----------------------|-------------------------------------------------|
| Durchlassspannung<br>Forward voltage                                             | $I_F = 10\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 10\text{ A}, V_{GE} = 0\text{ V}$<br>$I_F = 10\text{ A}, V_{GE} = 0\text{ V}$         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $V_F$              |      | 1,72<br>1,59<br>1,52 | t.b.d.<br>V<br>V<br>V                           |
| Rückstromspitze<br>Peak reverse recovery current                                 | $I_F = 10\text{ A}, -di_F/dt = 500\text{ A}/\mu\text{s} (T_{vj}=175^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $I_{RM}$           |      | 9,81<br>14,7<br>16,1 | A<br>A<br>A                                     |
| Sperrverzögerungsladung<br>Recovered charge                                      | $I_F = 10\text{ A}, -di_F/dt = 500\text{ A}/\mu\text{s} (T_{vj}=175^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $Q_r$              |      | 0,93<br>1,66<br>2,12 | $\mu\text{C}$<br>$\mu\text{C}$<br>$\mu\text{C}$ |
| Abschaltenergie pro Puls<br>Reverse recovery energy                              | $I_F = 10\text{ A}, -di_F/dt = 500\text{ A}/\mu\text{s} (T_{vj}=175^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 175^{\circ}\text{C}$ | $E_{rec}$          |      | 0,25<br>0,51<br>0,72 | mJ<br>mJ<br>mJ                                  |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro Diode / per diode                                                                                                                    |                                                                                                   | $R_{thJH}$         |      | 2,44                 | K/W                                             |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |                                                                                                                                          |                                                                                                   | $T_{vj\text{ op}}$ | -40  | 175                  | $^{\circ}\text{C}$                              |

### NTC-Widerstand / NTC-Thermistor

#### Charakteristische Werte / Characteristic Values

|                                          |                                                               |              | min. | typ. | max. |            |
|------------------------------------------|---------------------------------------------------------------|--------------|------|------|------|------------|
| Nennwiderstand<br>Rated resistance       | $T_{NTC} = 25^{\circ}\text{C}$                                | $R_{25}$     |      | 5,00 |      | k $\Omega$ |
| Abweichung von R100<br>Deviation of R100 | $T_{NTC} = 100^{\circ}\text{C}, R_{100} = 493\text{ }\Omega$  | $\Delta R/R$ | -5   |      | 5    | %          |
| Verlustleistung<br>Power dissipation     | $T_{NTC} = 25^{\circ}\text{C}$                                | $P_{25}$     |      |      | 20,0 | mW         |
| B-Wert<br>B-value                        | $R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\text{ K}))]$  | $B_{25/50}$  |      | 3375 |      | K          |
| B-Wert<br>B-value                        | $R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15\text{ K}))]$  | $B_{25/80}$  |      | 3411 |      | K          |
| B-Wert<br>B-value                        | $R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15\text{ K}))]$ | $B_{25/100}$ |      | 3433 |      | K          |

Angaben gemäß gültiger Application Note.

Specification according to the valid application note.

## Vorläufige Daten Preliminary Data

### Modul / Module

|                                                                                           |                                                                                         |                                              |                                |              |        |
|-------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------|--------------|--------|
| Isolations-Prüfspannung<br>Isolation test voltage                                         | RMS, f = 50 Hz, t = 1 min                                                               | V <sub>ISOL</sub>                            | 2,5                            |              | kV     |
| Innere Isolation<br>Internal isolation                                                    | Basisisolation (Schutzklasse 1, EN61140)<br>basic insulation (class 1, IEC 61140)       |                                              | Al <sub>2</sub> O <sub>3</sub> |              |        |
| Kriechstrecke<br>Creepage distance                                                        | Kontakt - Kühlkörper / terminal to heatsink<br>Kontakt - Kontakt / terminal to terminal |                                              | 11,5<br>6,3                    |              | mm     |
| Luftstrecke<br>Clearance                                                                  | Kontakt - Kühlkörper / terminal to heatsink<br>Kontakt - Kontakt / terminal to terminal |                                              | 10,0<br>5,0                    |              | mm     |
| Vergleichszahl der Kriechwegbildung<br>Comperative tracking index                         |                                                                                         | CTI                                          | > 200                          |              |        |
| Relativer Temperaturindex (elektr.)<br>RTI Elec.                                          | Gehäuse<br>housing                                                                      | RTI                                          | 140                            |              | °C     |
|                                                                                           |                                                                                         |                                              |                                |              |        |
|                                                                                           |                                                                                         |                                              | min.                           | typ.         | max.   |
| Modulstreuinduktivität<br>Stray inductance module                                         |                                                                                         | L <sub>sCE</sub>                             |                                | 30           | nH     |
| Modulleitungswiderstand, Anschlüsse -<br>Chip<br>Module lead resistance, terminals - chip | T <sub>H</sub> = 25°C, pro Schalter / per switch                                        | R <sub>CC'+EE'</sub><br>R <sub>AA'+CC'</sub> |                                | 5,00<br>6,00 | mΩ     |
| Lagertemperatur<br>Storage temperature                                                    |                                                                                         | T <sub>stg</sub>                             | -40                            |              | 125 °C |
| Anpresskraft für mech. Bef. pro Feder<br>mounting force per clamp                         |                                                                                         | F                                            | 40                             | -            | 80 N   |
| Gewicht<br>Weight                                                                         |                                                                                         | G                                            |                                | 39           | g      |

Der Strom im Dauerbetrieb ist auf 25A effektiv pro Anschlusspin begrenzt.

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

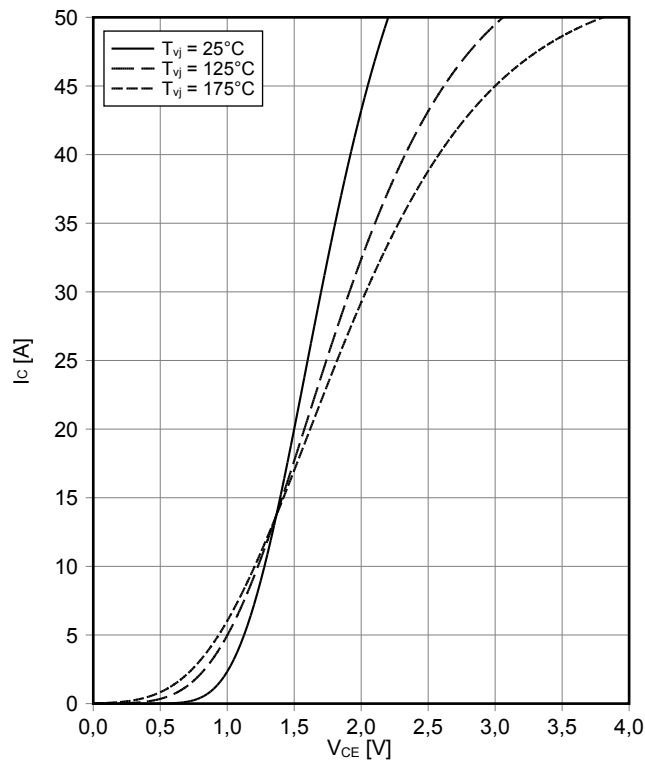
T<sub>vj op</sub> > 150°C ist im Überlastbetrieb zulässig. Detaillierte Angaben sind AN 2018-14 zu entnehmen

T<sub>vj op</sub> > 150°C is allowed for operation at overload conditions. For detailed specifications, please refer to AN 2018-14.

## Vorläufige Daten Preliminary Data

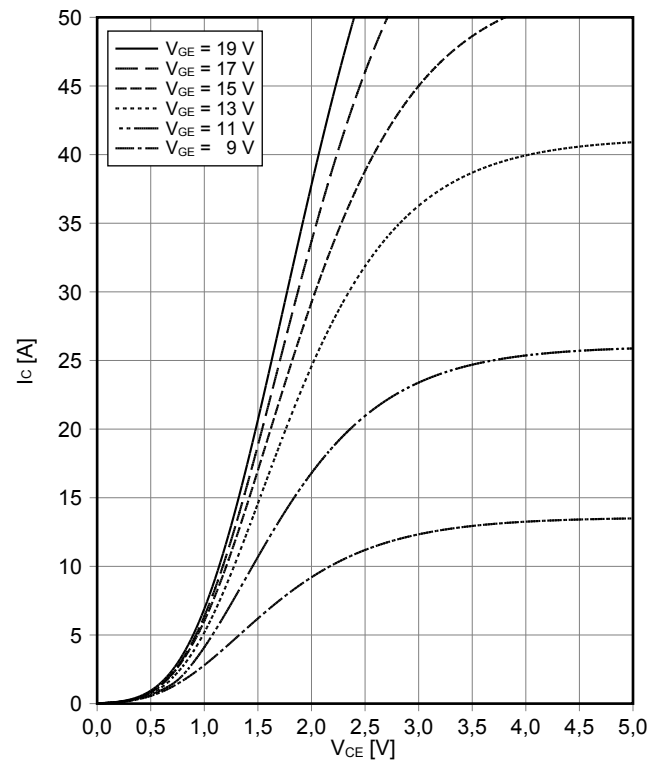
### Ausgangskennlinie IGBT, Wechselrichter (typisch) output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$   
 $V_{GE} = 15 \text{ V}$



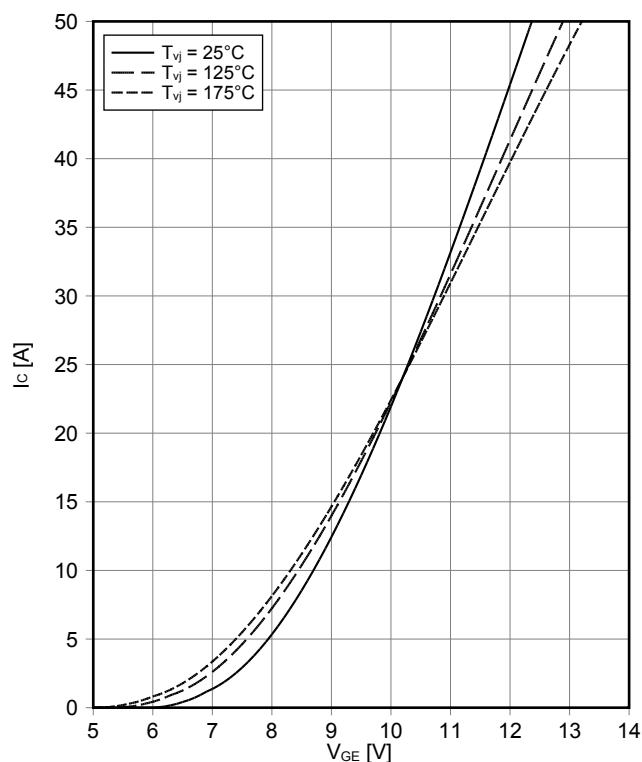
### Ausgangskennlinienfeld IGBT, Wechselrichter (typisch) output characteristic IGBT, Inverter (typical)

$I_C = f(V_{CE})$   
 $T_{vj} = 175^\circ\text{C}$



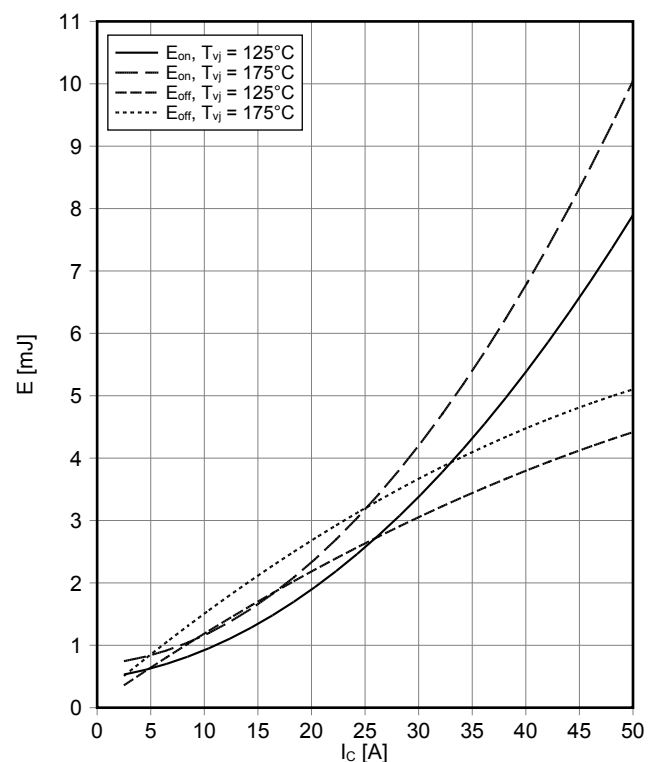
### Übertragungscharakteristik IGBT, Wechselrichter (typisch) transfer characteristic IGBT, Inverter (typical)

$I_C = f(V_{GE})$   
 $V_{CE} = 20 \text{ V}$



### Schaltverluste IGBT, Wechselrichter (typisch) switching losses IGBT, Inverter (typical)

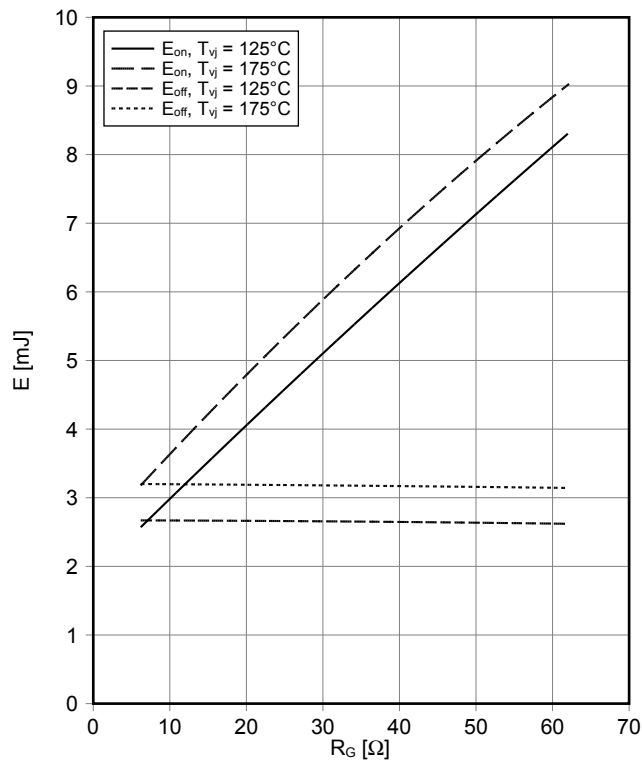
$E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $R_{Gon} = 6.2 \Omega$ ,  $R_{Goff} = 6.2 \Omega$ ,  $V_{CE} = 600 \text{ V}$



## Vorläufige Daten Preliminary Data

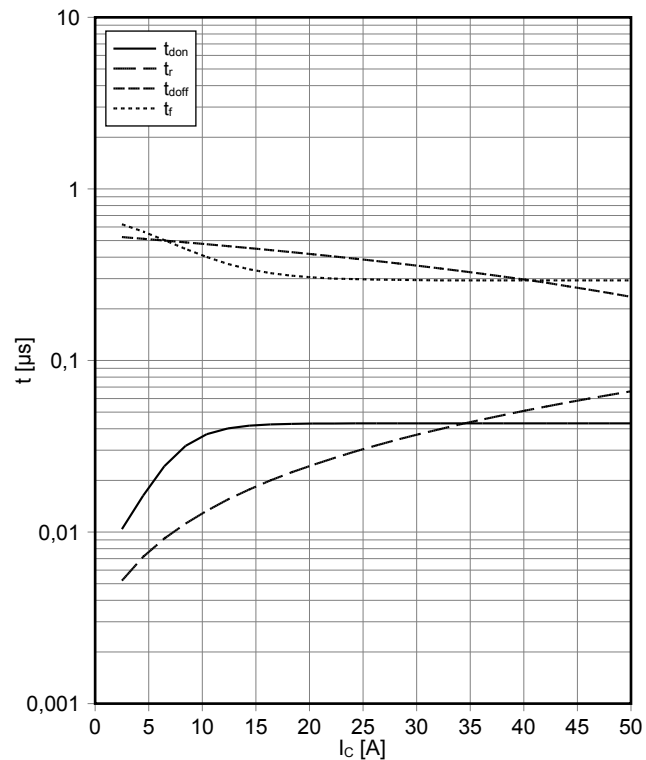
### Schaltverluste IGBT, Wechselrichter (typisch) switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$ ,  $E_{off} = f(R_G)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $I_C = 25 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$



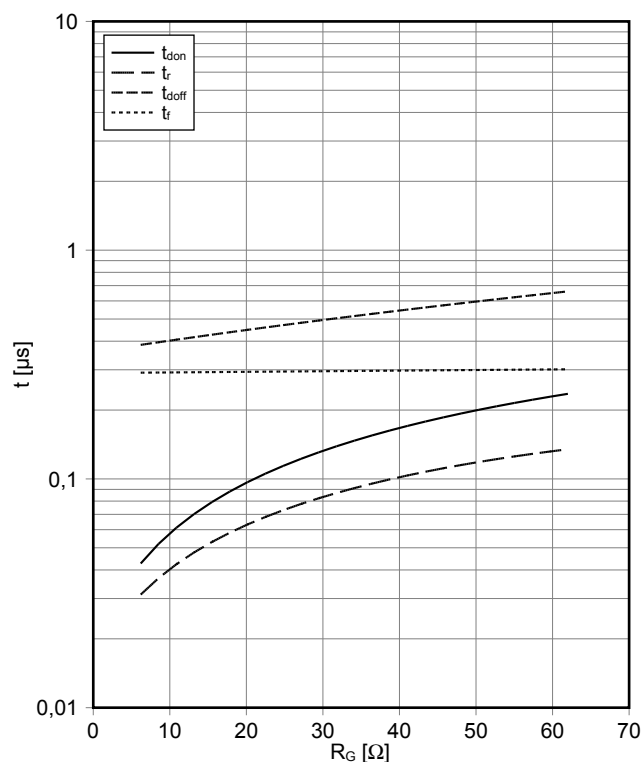
### Schaltzeiten IGBT, Wechselrichter (typisch) switching times IGBT, Inverter (typical)

$t_{don} = f(I_C)$ ,  $t_r = f(I_C)$ ,  $t_{doff} = f(I_C)$ ,  $t_f = f(I_C)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $R_{Gon} = 6.2 \Omega$ ,  $R_{Goff} = 6.2 \Omega$ ,  $V_{CE} = 600 \text{ V}$ ,  $T_{vj} = 175^\circ\text{C}$



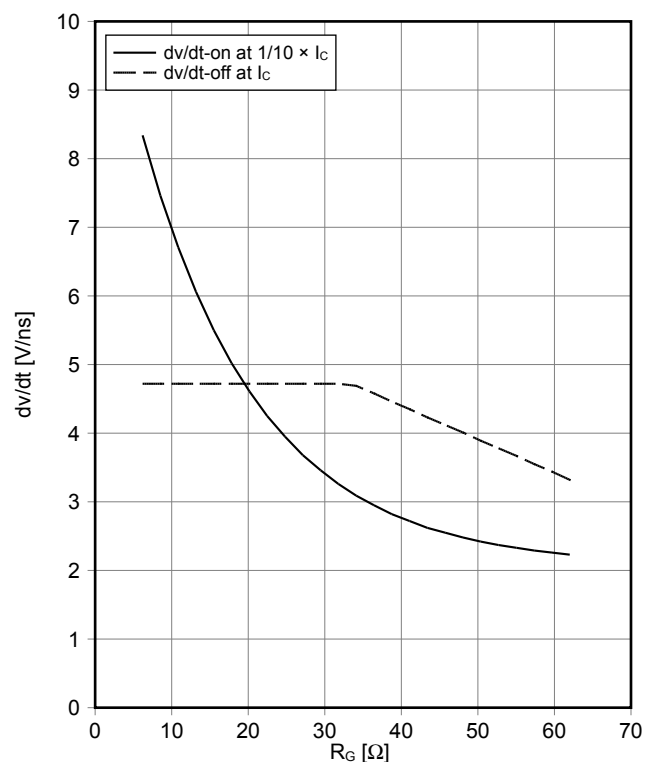
### Schaltzeiten IGBT, Wechselrichter (typisch) switching times IGBT, Inverter (typical)

$t_{don} = f(R_G)$ ,  $t_r = f(R_G)$ ,  $t_{doff} = f(R_G)$ ,  $t_f = f(R_G)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $I_C = 25 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$ ,  $T_{vj} = 175^\circ\text{C}$



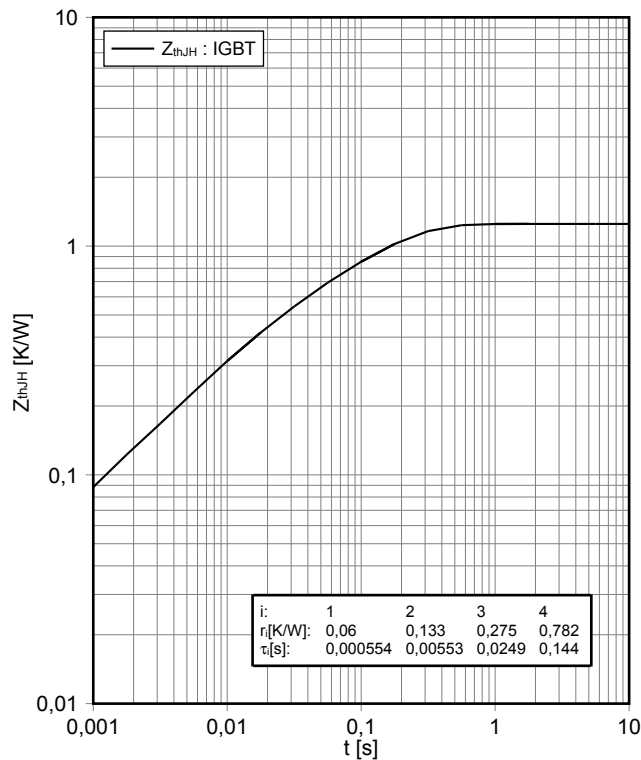
### dv/dt IGBT, Wechselrichter (typisch) dv/dt IGBT, Inverter (typical)

$dv/dt = f(R_G)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $I_C = 25 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$ ,  $T_{vj} = 25^\circ\text{C}$



## Vorläufige Daten Preliminary Data

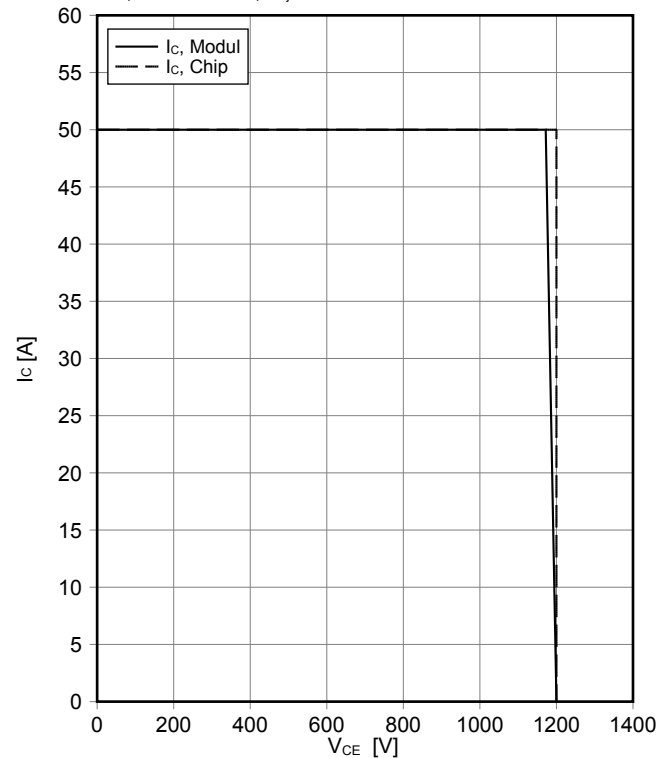
**Transienter Wärmewiderstand IGBT, Wechselrichter**  
**transient thermal impedance IGBT, Inverter**  
 $Z_{thJH} = f(t)$



**Sicherer Rückwärts-Arbeitsbereich IGBT, Wechselrichter**  
**(RBSOA)**  
**reverse bias safe operating area IGBT, Inverter (RBSOA)**

$I_C = f(V_{CE})$

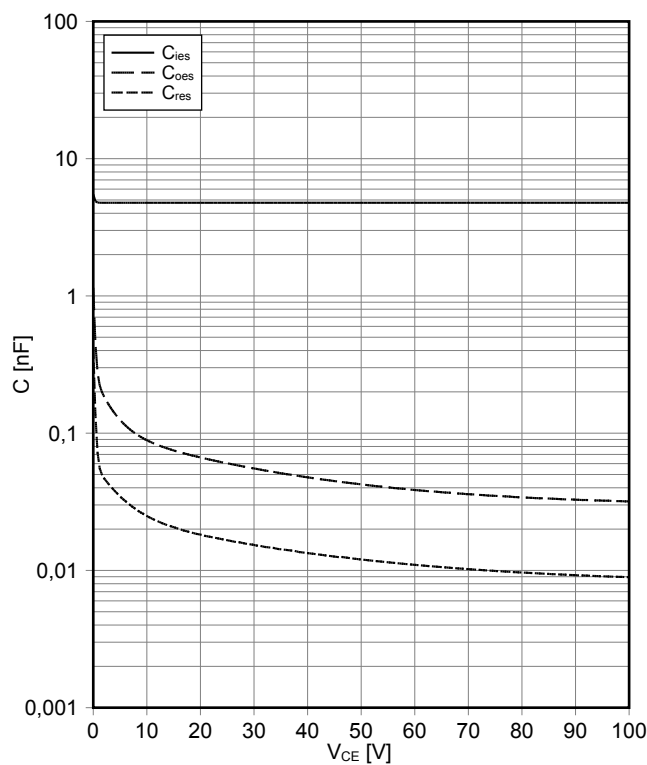
$V_{GE} = \pm 15 \text{ V}$ ,  $R_{Goff} = 6.2 \Omega$ ,  $T_{vj} = 175^\circ\text{C}$



**Kapazitäts Charakteristik IGBT, Wechselrichter (typisch)**  
**capacity characteristic IGBT, Inverter (typical)**

$C = f(V_{CE})$

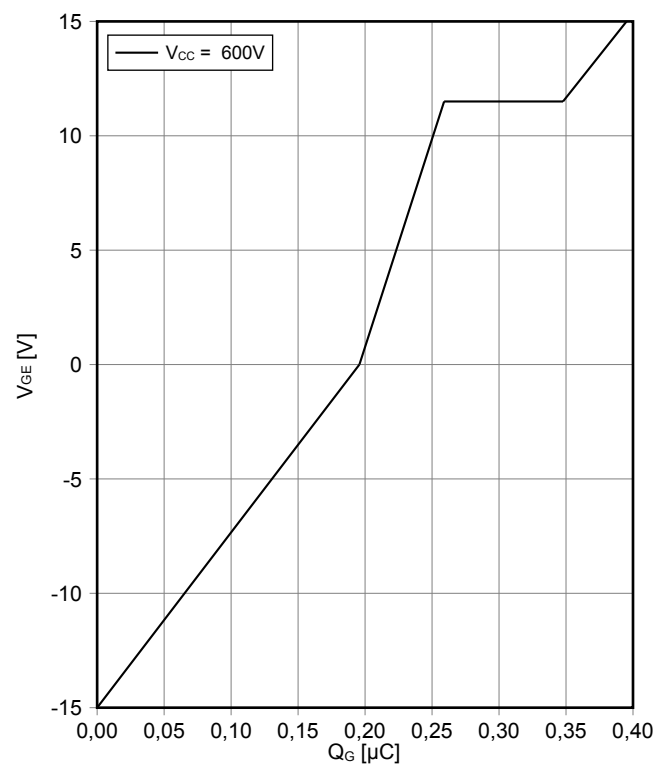
$V_{GE} = 0 \text{ V}$ ,  $T_{vj} = 25^\circ\text{C}$ ,  $f = 100\text{kHz}$



**Gateladungs Charakteristik IGBT, Wechselrichter (typisch)**  
**gate charge characteristic IGBT, Inverter (typical)**

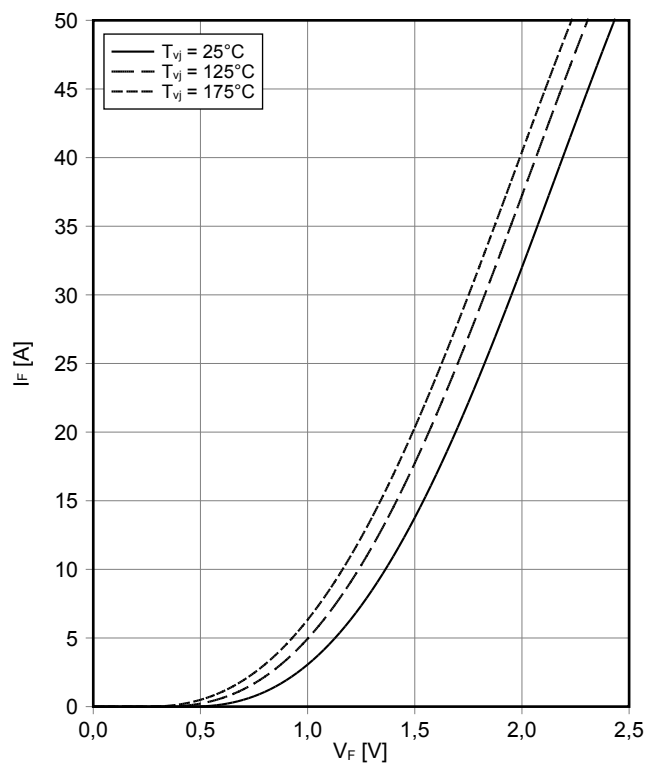
$V_{GE} = f(Q_G)$

$I_C = 25 \text{ A}$ ,  $T_{vj} = 25^\circ\text{C}$

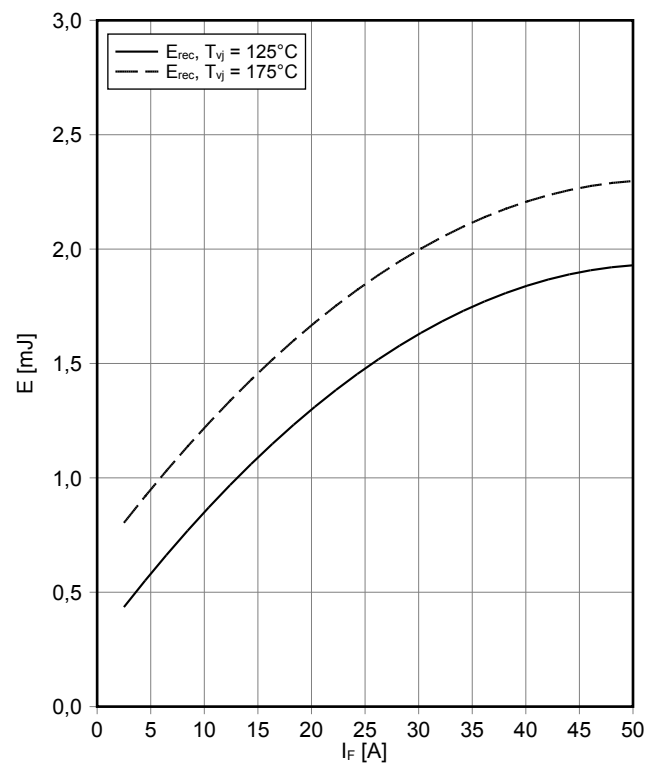


## Vorläufige Daten Preliminary Data

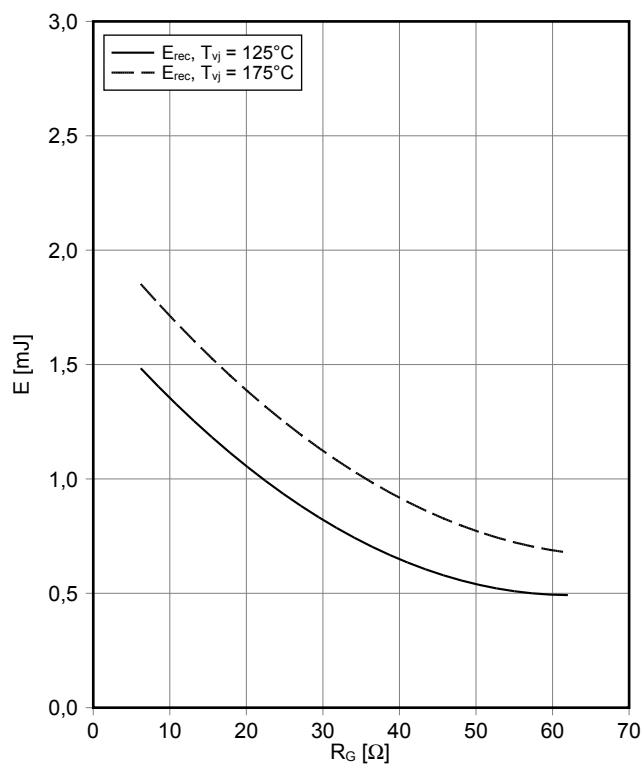
**Durchlasskennlinie der Diode, Wechselrichter (typisch)**  
forward characteristic of Diode, Inverter (typical)  
 $I_F = f(V_F)$



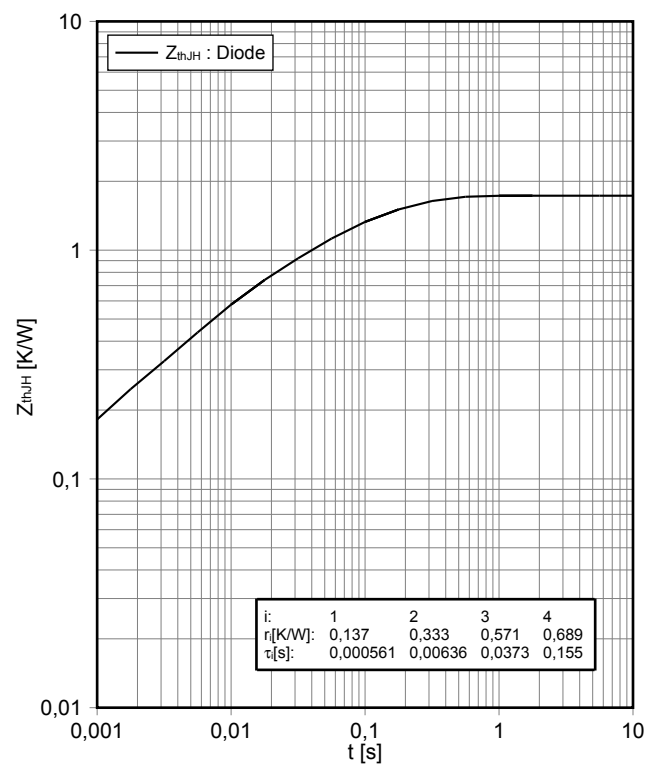
**Schaltverluste Diode, Wechselrichter (typisch)**  
switching losses Diode, Inverter (typical)  
 $E_{rec} = f(I_F)$   
 $R_{Gon} = 6.2 \Omega$ ,  $V_{CE} = 600 \text{ V}$



**Schaltverluste Diode, Wechselrichter (typisch)**  
switching losses Diode, Inverter (typical)  
 $E_{rec} = f(R_G)$   
 $I_F = 25 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$

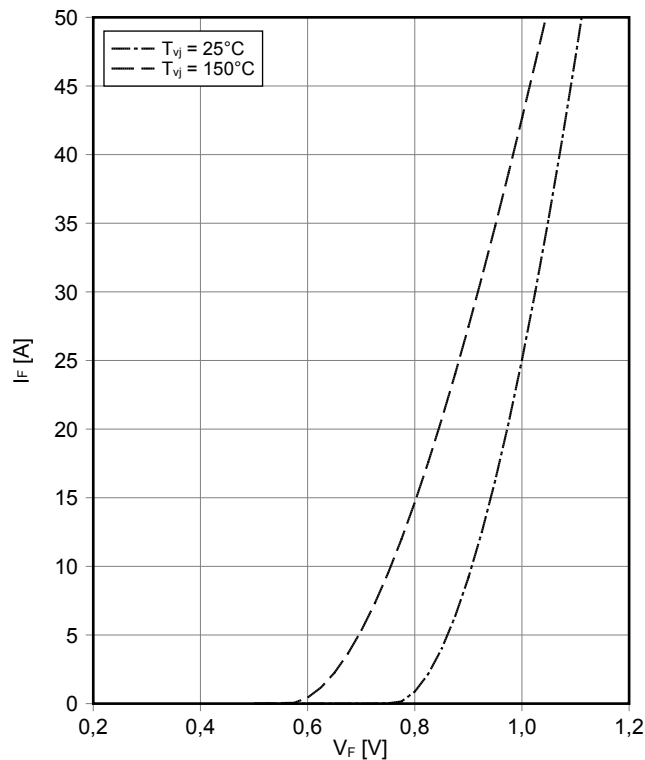


**Transienter Wärmewiderstand Diode, Wechselrichter**  
transient thermal impedance Diode, Inverter  
 $Z_{thJH} = f(t)$

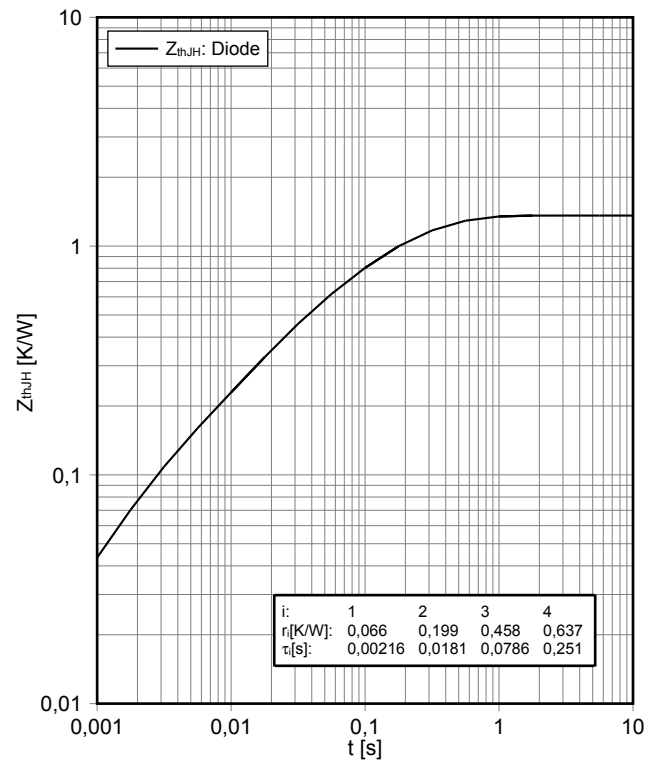


## Vorläufige Daten Preliminary Data

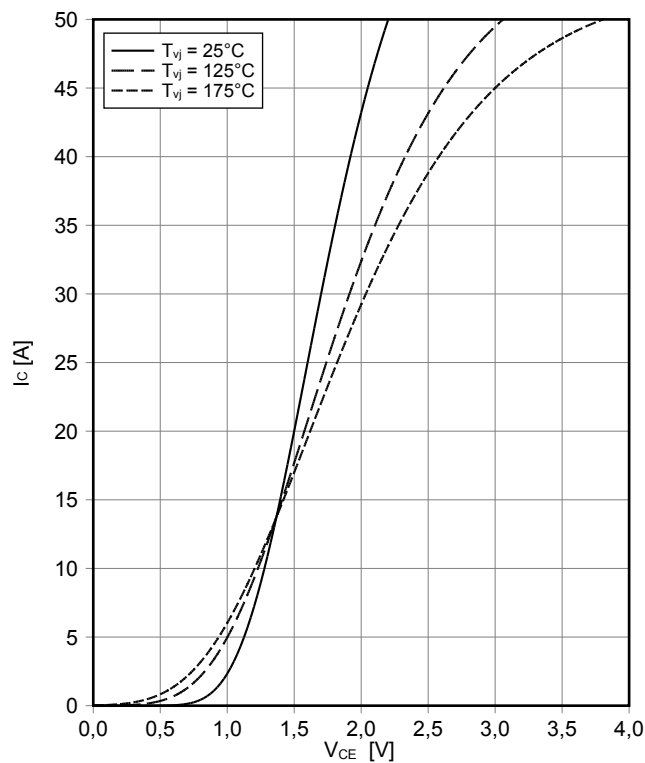
**Durchlasskennlinie der Diode, Gleichrichter (typisch)**  
forward characteristic of Diode, Rectifier (typical)  
 $I_F = f(V_F)$



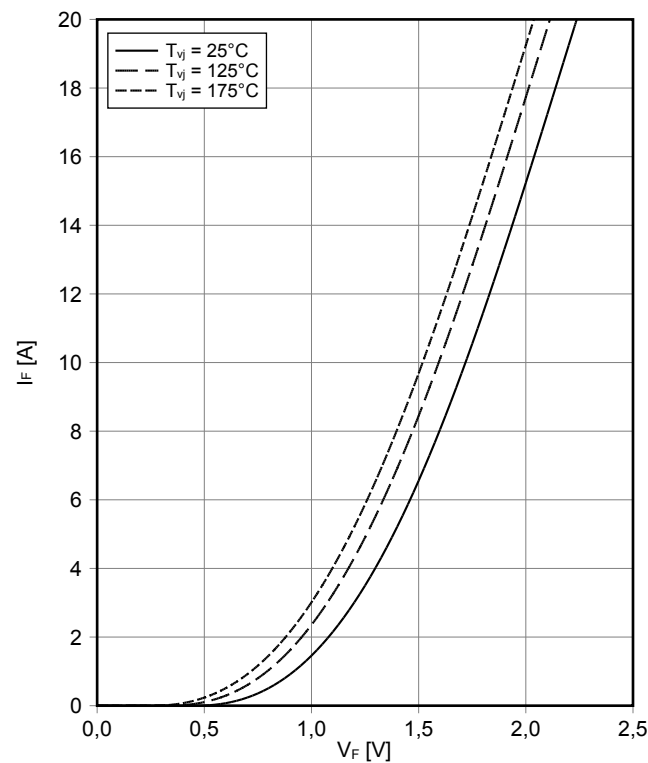
**Transienter Wärmewiderstand Diode, Gleichrichter**  
transient thermal impedance Diode, Rectifier  
 $Z_{thJH} = f(t)$



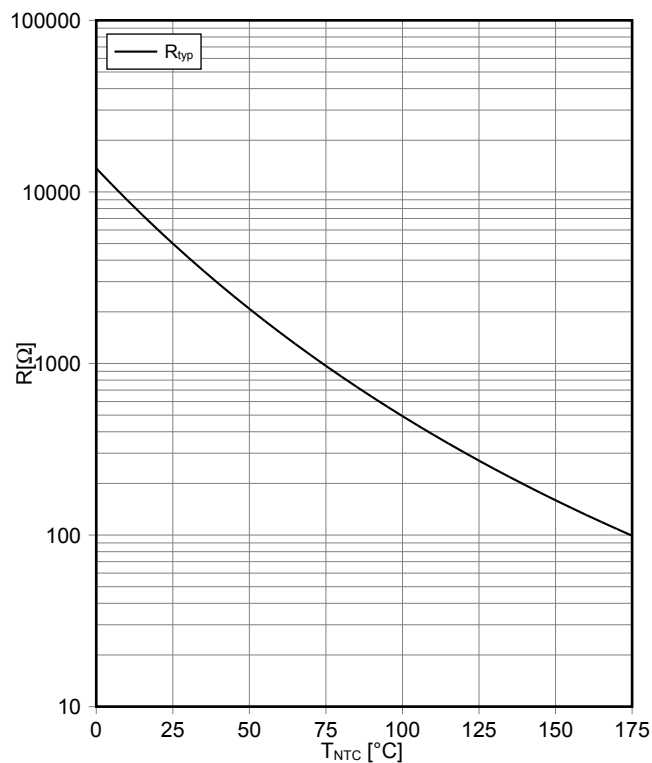
**Ausgangskennlinie IGBT, Brems-Chopper (typisch)**  
output characteristic IGBT, Brake-Chopper (typical)  
 $I_C = f(V_{CE})$   
 $V_{GE} = 15 \text{ V}$



**Durchlasskennlinie der Diode, Brems-Chopper (typisch)**  
forward characteristic of Diode, Brake-Chopper (typical)  
 $I_F = f(V_F)$

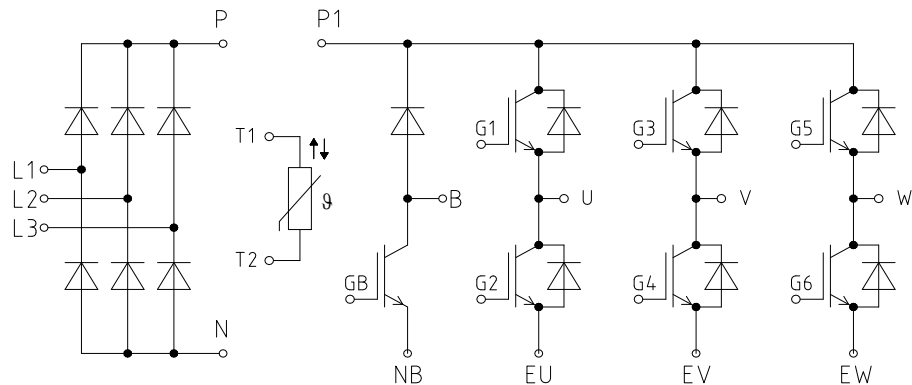


**NTC-Widerstand-Temperaturkennlinie (typisch)**  
**NTC-Thermistor-temperature characteristic (typical)**  
 $R = f(T_{NTC})$

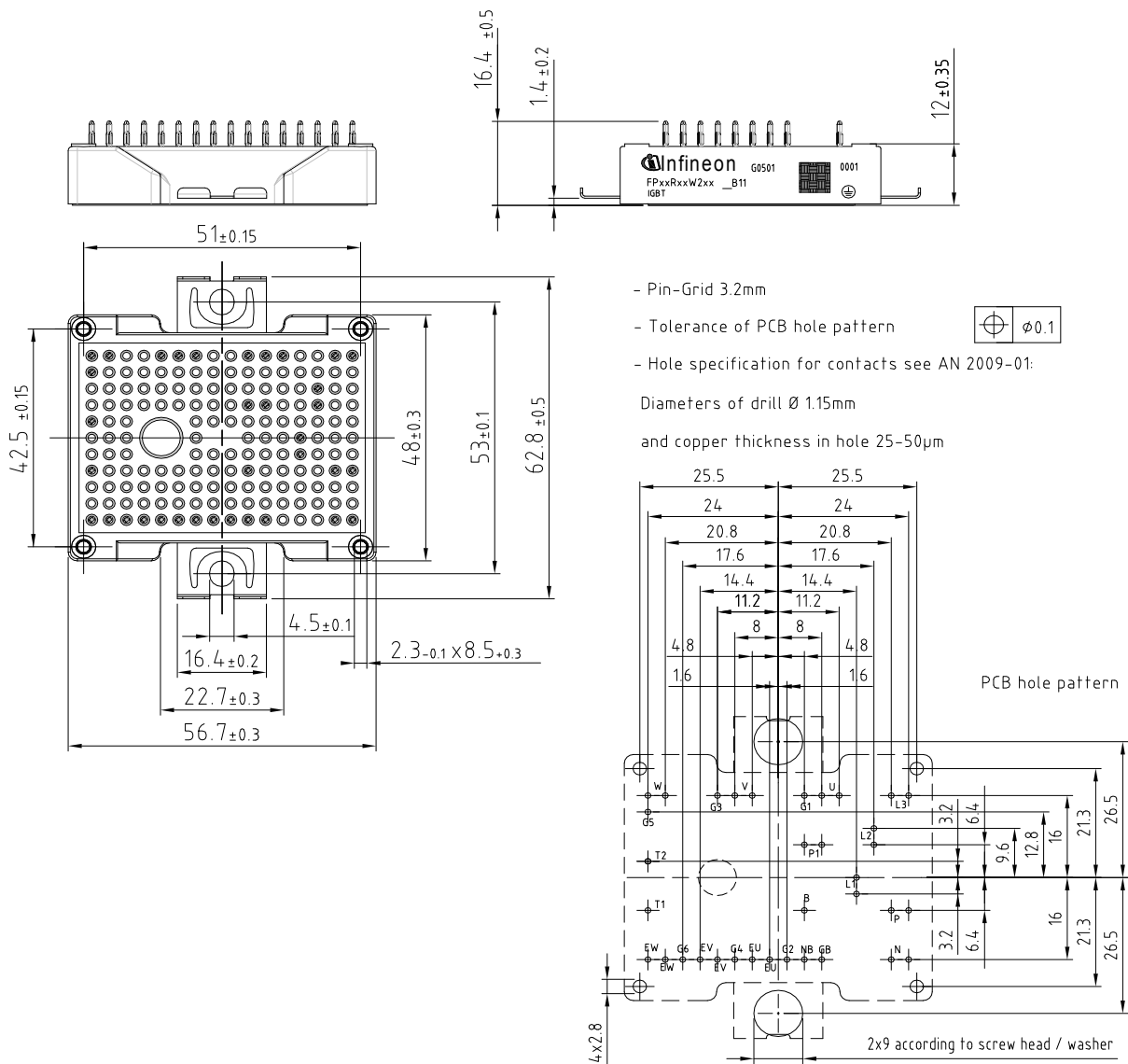


## Schaltplan / Circuit diagram

**Vorläufige Daten**  
**Preliminary Data**



## Gehäuseabmessungen / Package outlines



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