

Vorläufig  
Preliminary

## Elektrische Eigenschaften / Electrical properties

## Höchstzulässige Werte / Maximum rated values

## Diode Gleichrichter/ Diode Rectifier

|                                                                                     |                                                                                                           |              |            |                                              |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|--------------|------------|----------------------------------------------|
| Periodische Rückw. Spitzensperrspannung<br>repetitive peak reverse voltage          | $T_{vj} = 25^{\circ}\text{C}$                                                                             | $V_{RRM}$    | 800        | V                                            |
| Durchlaßstrom Grenzeffektivwert pro Chip<br>RMS forward current per chip            | $T_C = 80^{\circ}\text{C}$                                                                                | $I_{FRMSM}$  | 29         | A                                            |
| Gleichrichter Ausgang Grenzeffektivstrom<br>maximum RMS current at Rectifier output | $T_C = 80^{\circ}\text{C}$                                                                                | $I_{RMSmax}$ | 36         | A                                            |
| Stoßstrom Grenzwert<br>surge forward current                                        | $t_p = 10 \text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10 \text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I_{FSM}$    | 262<br>215 | A<br>A                                       |
| Grenzlastintegral<br>$I^2t$ - value                                                 | $t_p = 10 \text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10 \text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I^2t$       | 344<br>231 | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$ |

## Transistor Wechselrichter/ Transistor Inverter

|                                                                          |                                                          |                       |          |        |
|--------------------------------------------------------------------------|----------------------------------------------------------|-----------------------|----------|--------|
| Kollektor-Emitter-Sperrspannung<br>collector-emitter voltage             | $T_{vj} = 25^{\circ}\text{C}$                            | $V_{CES}$             | 600      | V      |
| Kollektor-Dauergleichstrom<br>DC-collector current                       | $T_C = 65^{\circ}\text{C}$<br>$T_C = 25^{\circ}\text{C}$ | $I_{C,nom.}$<br>$I_C$ | 20<br>25 | A<br>A |
| Periodischer Kollektor Spitzenstrom<br>repetitive peak collector current | $t_p = 1 \text{ ms}, T_c = 65^{\circ}\text{C}$           | $I_{CRM}$             | 40       | A      |
| Gesamt-Verlustleistung<br>total power dissipation                        | $T_C = 25^{\circ}\text{C}$                               | $P_{tot}$             | 78       | W      |
| Gate-Emitter-Spitzenspannung<br>gate-emitter peak voltage                |                                                          | $V_{GES}$             | +/- 20V  | V      |

## Diode Wechselrichter/ Diode Inverter

|                                                            |                                                                    |           |    |                      |
|------------------------------------------------------------|--------------------------------------------------------------------|-----------|----|----------------------|
| Dauergleichstrom<br>DC forward current                     |                                                                    | $I_F$     | 20 | A                    |
| Periodischer Spitzenstrom<br>repetitive peak forw. current | $t_p = 1 \text{ ms}$                                               | $I_{FRM}$ | 40 | A                    |
| Grenzlastintegral<br>$I^2t$ - value                        | $V_R = 0\text{V}, t_p = 10\text{ms}, T_{vj} = 125^{\circ}\text{C}$ | $I^2t$    | 62 | $\text{A}^2\text{s}$ |

## Transistor Brems-Chopper/ Transistor Brake-Chopper

|                                                                          |                                                          |                       |          |        |
|--------------------------------------------------------------------------|----------------------------------------------------------|-----------------------|----------|--------|
| Kollektor-Emitter-Sperrspannung<br>collector-emitter voltage             | $T_{vj} = 25^{\circ}\text{C}$                            | $V_{CES}$             | 600      | V      |
| Kollektor-Dauergleichstrom<br>DC-collector current                       | $T_C = 65^{\circ}\text{C}$<br>$T_C = 25^{\circ}\text{C}$ | $I_{C,nom.}$<br>$I_C$ | 20<br>25 | A<br>A |
| Periodischer Kollektor Spitzenstrom<br>repetitive peak collector current | $t_p = 1 \text{ ms}, T_c = 65^{\circ}\text{C}$           | $I_{CRM}$             | 40       | A      |
| Gesamt-Verlustleistung<br>total power dissipation                        | $T_C = 25^{\circ}\text{C}$                               | $P_{tot}$             | 78       | W      |
| Gate-Emitter-Spitzenspannung<br>gate-emitter peak voltage                |                                                          | $V_{GES}$             | +/- 20V  | V      |

## Diode Brems-Chopper/ Diode Brake-Chopper

|                                                            |                      |           |    |   |
|------------------------------------------------------------|----------------------|-----------|----|---|
| Dauergleichstrom<br>DC forward current                     |                      | $I_F$     | 20 | A |
| Periodischer Spitzenstrom<br>repetitive peak forw. current | $t_p = 1 \text{ ms}$ | $I_{FRM}$ | 40 | A |

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# Technische Information / Technical Information

IGBT-Module  
IGBT-Modules

## FP20R06KL4

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### Modul Isolation/ Module Isolation

|                                                    |                                                          |            |     |    |
|----------------------------------------------------|----------------------------------------------------------|------------|-----|----|
| Isolations-Prüfspannung<br>insulation test voltage | RMS, f = 50 Hz, t = 1 min.<br>NTC connected to Baseplate | $V_{ISOL}$ | 2,5 | kV |
|----------------------------------------------------|----------------------------------------------------------|------------|-----|----|

## Elektrische Eigenschaften / Electrical properties

### Charakteristische Werte / Characteristic values

#### Diode Gleichrichter/ Diode Rectifier

min. typ. max.

|                                                                              |                                                       |                      |   |      |   |    |
|------------------------------------------------------------------------------|-------------------------------------------------------|----------------------|---|------|---|----|
| Durchlaßspannung<br>forward voltage                                          | $T_{vj} = 150^{\circ}\text{C}$ , $I_F = 20\text{ A}$  | $V_F$                | - | 0,95 | - | V  |
| Schleusenspannung<br>threshold voltage                                       | $T_{vj} = 150^{\circ}\text{C}$                        | $V_{(TO)}$           | - | 0,71 | - | V  |
| Ersatzwiderstand<br>slope resistance                                         | $T_{vj} = 150^{\circ}\text{C}$                        | $r_T$                | - | 12   | - | mΩ |
| Sperrstrom<br>reverse current                                                | $T_{vj} = 150^{\circ}\text{C}$ , $V_R = 800\text{ V}$ | $I_R$                | - | 5    | - | mA |
| Modul Leitungswiderstand, Anschlüsse-Chip<br>lead resistance, terminals-chip | $T_C = 25^{\circ}\text{C}$                            | $R_{AA^{**}CC^{**}}$ | - | 11   | - | mΩ |

#### Transistor Wechselrichter/ Transistor Inverter

min. typ. max.

|                                                                              |                                                                                                                                                                                                                         |                     |     |      |      |     |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----|------|------|-----|
| Kollektor-Emitter Sättigungsspannung<br>collector-emitter saturation voltage | $V_{GE} = 15\text{ V}$ , $T_{vj} = 25^{\circ}\text{C}$ , $I_C = 20\text{ A}$<br>$V_{GE} = 15\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $I_C = 20\text{ A}$                                                           | $V_{CE\text{ sat}}$ | -   | 1,95 | 2,55 | V   |
| Gate-Schwellenspannung<br>gate threshold voltage                             | $V_{CE} = V_{GE}$ , $T_{vj} = 25^{\circ}\text{C}$ , $I_C = 0,5\text{ mA}$                                                                                                                                               | $V_{GE(TO)}$        | 4,5 | 5,5  | 6,5  | V   |
| Eingangskapazität<br>input capacitance                                       | f = 1MHz, $T_{vj} = 25^{\circ}\text{C}$<br>$V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$                                                                                                                               | $C_{ies}$           | -   | 1,1  | -    | nF  |
| Kollektor-Emitter Reststrom<br>collector-emitter cut-off current             | $V_{GE} = 0\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $V_{CE} = 600\text{ V}$                                                                                                                                        | $I_{CES}$           | -   | 5,0  | -    | mA  |
| Gate-Emitter Reststrom<br>gate-emitter leakage current                       | $V_{CE} = 0\text{ V}$ , $V_{GE} = 20\text{ V}$ , $T_{vj} = 25^{\circ}\text{C}$                                                                                                                                          | $I_{GES}$           | -   | -    | 400  | nA  |
| Einschaltverzögerungszeit (ind. Last)<br>turn on delay time (inductive load) | $I_C = I_{Nenn}$ , $V_{CC} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 25^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$ | $t_{d,on}$          | -   | 22   | -    | ns  |
| Anstiegszeit (induktive Last)<br>rise time (inductive load)                  | $I_C = I_{Nenn}$ , $V_{CC} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 25^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$ | $t_r$               | -   | 23   | -    | ns  |
| Abschaltverzögerungszeit (ind. Last)<br>turn off delay time (inductive load) | $I_C = I_{Nenn}$ , $V_{CC} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 25^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$ | $t_{d,off}$         | -   | 143  | -    | ns  |
| Fallzeit (induktive Last)<br>fall time (inductive load)                      | $I_C = I_{Nenn}$ , $V_{CC} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 25^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$ | $t_f$               | -   | 22   | -    | ns  |
| Einschaltverlustenergie pro Puls<br>turn-on energy loss per pulse            | $I_C = I_{Nenn}$ , $V_{CC} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$<br>$L_S = 80\text{ nH}$                                                               | $E_{on}$            | -   | 0,7  | -    | mWs |
| Abschaltverlustenergie pro Puls<br>turn-off energy loss per pulse            | $I_C = I_{Nenn}$ , $V_{CC} = 300\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$ , $T_{vj} = 125^{\circ}\text{C}$ , $R_G = 47\text{ Ohm}$<br>$L_S = 80\text{ nH}$                                                               | $E_{off}$           | -   | 0,6  | -    | mWs |
| Kurzschlußverhalten<br>SC Data                                               | $t_P \leq 10\mu\text{s}$ , $V_{GE} \leq 15\text{ V}$ , $R_G = 47\text{ Ohm}$<br>$T_{vj} \leq 125^{\circ}\text{C}$ , $V_{CC} = 360\text{ V}$                                                                             | $I_{SC}$            | -   | 90   | -    | A   |

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## Elektrische Eigenschaften / Electrical properties

## Charakteristische Werte / Characteristic values

|                                                                              |                                                                                                                                                   |                 | min. | typ.         | max.      |            |
|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|--------------|-----------|------------|
| Modulinduktivität<br>stray inductance module                                 |                                                                                                                                                   | $L_{\sigma CE}$ | -    | -            | 40        | nH         |
| Modul Leitungswiderstand, Anschlüsse-Chip<br>lead resistance, terminals-chip | $T_C = 25^\circ C$                                                                                                                                | $R_{CC'+EE'}$   | -    | 13           | -         | mΩ         |
| <b>Diode Wechselrichter/ Diode Inverter</b>                                  |                                                                                                                                                   |                 |      |              |           |            |
|                                                                              |                                                                                                                                                   |                 | min. | typ.         | max.      |            |
| Durchlaßspannung<br>forward voltage                                          | $V_{GE} = 0V, T_{vj} = 25^\circ C, I_F = 20 A$<br>$V_{GE} = 0V, T_{vj} = 125^\circ C, I_F = 20 A$                                                 | $V_F$           | -    | 1,7<br>1,7   | 2,15<br>- | V<br>V     |
| Rückstromspitze<br>peak reverse recovery current                             | $I_F = I_{Nenn}, -di_F/dt = 1000 A/us$<br>$V_{GE} = -10V, T_{vj} = 25^\circ C, V_R = 300 V$<br>$V_{GE} = -10V, T_{vj} = 125^\circ C, V_R = 300 V$ | $I_{RM}$        | -    | 20<br>23     | -<br>-    | A<br>A     |
| Sperrverzögerungsladung<br>recovered charge                                  | $I_F = I_{Nenn}, -di_F/dt = 1000 A/us$<br>$V_{GE} = -10V, T_{vj} = 25^\circ C, V_R = 300 V$<br>$V_{GE} = -10V, T_{vj} = 125^\circ C, V_R = 300 V$ | $Q_r$           | -    | 1<br>1,7     | -<br>-    | μAs<br>μAs |
| Abschaltenergie pro Puls<br>reverse recovery energy                          | $I_F = I_{Nenn}, -di_F/dt = 1000 A/us$<br>$V_{GE} = -10V, T_{vj} = 25^\circ C, V_R = 300 V$<br>$V_{GE} = -10V, T_{vj} = 125^\circ C, V_R = 300 V$ | $E_{rec}$       | -    | 0,2<br>0,35  | -<br>-    | mWs<br>mWs |
| <b>Transistor Brems-Chopper/ Transistor Brake-Chopper</b>                    |                                                                                                                                                   |                 |      |              |           |            |
|                                                                              |                                                                                                                                                   |                 | min. | typ.         | max.      |            |
| Kollektor-Emitter Sättigungsspannung<br>collector-emitter saturation voltage | $V_{GE} = 15V, T_{vj} = 25^\circ C, I_C = 20,0 A$<br>$V_{GE} = 15V, T_{vj} = 125^\circ C, I_C = 20,0 A$                                           | $V_{CE sat}$    | -    | 1,95<br>2,2  | 2,55<br>- | V<br>V     |
| Gate-Schwellenspannung<br>gate threshold voltage                             | $V_{CE} = V_{GE}, T_{vj} = 25^\circ C, I_C = 0,5mA$                                                                                               | $V_{GE(TO)}$    | 4,5  | 5,5          | 6,5       | V          |
| Eingangskapazität<br>input capacitance                                       | $f = 1MHz, T_{vj} = 25^\circ C$<br>$V_{CE} = 25 V, V_{GE} = 0 V$                                                                                  | $C_{ies}$       | -    | 1,1          | -         | nF         |
| Kollektor-Emitter Reststrom<br>collector-emitter cut-off current             | $V_{GE} = 0V, T_{vj} = 125^\circ C, V_{CE} = 600V$                                                                                                |                 | -    | 5,0          | -         | mA         |
| Gate-Emitter Reststrom<br>gate-emitter leakage current                       | $V_{CE} = 0V, V_{GE} = 20V, T_{vj} = 25^\circ C$                                                                                                  | $I_{GES}$       | -    | -            | 400       | nA         |
| <b>Diode Brems-Chopper/ Diode Brake-Chopper</b>                              |                                                                                                                                                   |                 |      |              |           |            |
|                                                                              |                                                                                                                                                   |                 | min. | typ.         | max.      |            |
| Durchlaßspannung<br>forward voltage                                          | $T_{vj} = 25^\circ C, I_F = 20A$<br>$T_{vj} = 125^\circ C, I_F = 20A$                                                                             | $V_F$           | -    | 2,45<br>2,55 | 2,9<br>-  | V<br>V     |
| <b>NTC-Widerstand/ NTC-Thermistor</b>                                        |                                                                                                                                                   |                 |      |              |           |            |
|                                                                              |                                                                                                                                                   |                 | min. | typ.         | max.      |            |
| Nennwiderstand<br>rated resistance                                           | $T_C = 25^\circ C$                                                                                                                                | $R_{25}$        | -    | 5            | -         | kΩ         |
| Abweichung von $R_{100}$<br>deviation of $R_{100}$                           | $T_C = 100^\circ C, R_{100} = 493 \Omega$                                                                                                         | $\Delta R/R$    | -5   |              | 5         | %          |
| Verlustleistung<br>power dissipation                                         | $T_C = 25^\circ C$                                                                                                                                | $P_{25}$        |      |              | 20        | mW         |
| B-Wert<br>B-value                                                            | $R_2 = R_1 \exp [B(1/T_2 - 1/T_1)]$                                                                                                               | $B_{25/50}$     |      | 3375         |           | K          |

# Technische Information / Technical Information

IGBT-Module  
IGBT-Modules

## FP20R06KL4

eupec



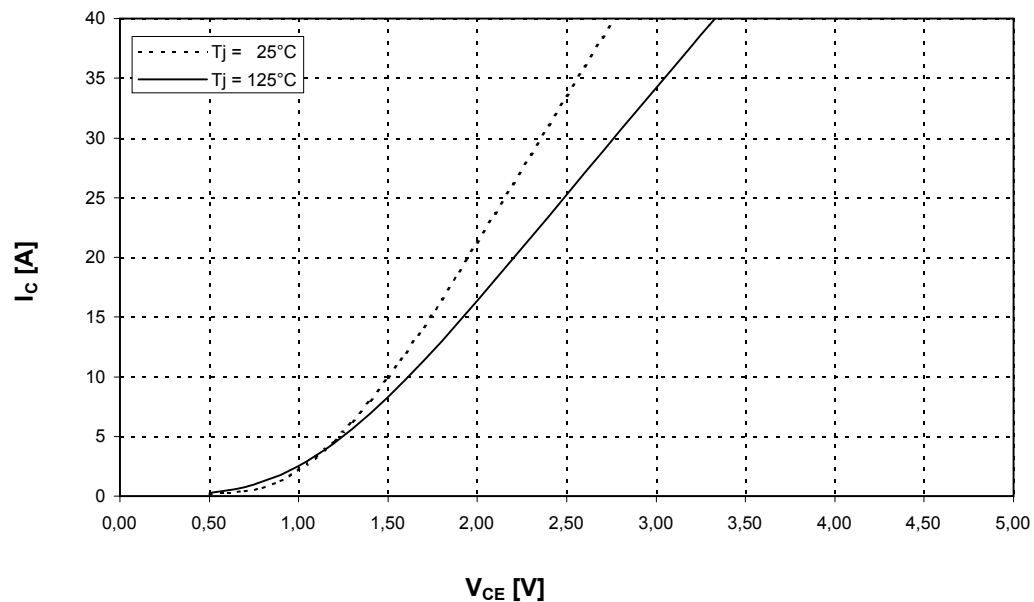
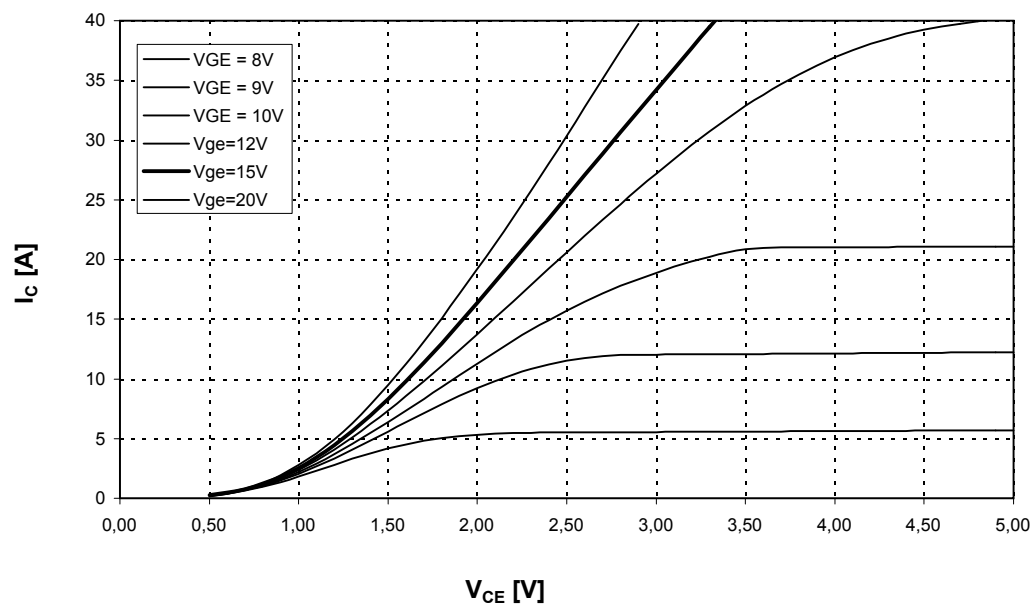
**Vorläufig**  
**Preliminary**

### Thermische Eigenschaften / Thermal properties

|                                                                        |                                                                                 |                   | min. | typ. | max. |     |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------|------|------|------|-----|
| Innerer Wärmewiderstand<br>thermal resistance, junction to heatsink    | Gleichr. Diode/ Rectif. Diode $\lambda_{\text{paste}}=1\text{W/m}^2\text{K}$    | $R_{\text{thJH}}$ | -    | 2,1  | -    | K/W |
|                                                                        | Trans. Wechsr./ Trans. Inverter $\lambda_{\text{grease}}=1\text{W/m}^2\text{K}$ |                   | -    | 1,8  | -    | K/W |
|                                                                        | Diode Wechsr./ Diode Inverter                                                   |                   | -    | 3,7  | -    | K/W |
|                                                                        | Trans. Bremse/ Trans. Brake                                                     |                   | -    | 1,8  | -    | K/W |
|                                                                        | Diode Bremse/ Diode Brake                                                       |                   | -    | 4,3  | -    | K/W |
| Innerer Wärmewiderstand<br>thermal resistance, junction to case        | Gleichr. Diode/ Rectif. Diode                                                   | $R_{\text{thJC}}$ | -    | -    | 2    | K/W |
|                                                                        | Trans. Wechsr./ Trans. Inverter                                                 |                   | -    | -    | 1,6  | K/W |
|                                                                        | Diode Wechsr./ Diode Inverter                                                   |                   | -    | -    | 2,7  | K/W |
|                                                                        | Trans. Bremse/ Trans. Brake                                                     |                   | -    | -    | 1,6  | K/W |
|                                                                        | Diode Bremse/ Diode Brake                                                       |                   | -    | -    | 3,1  | K/W |
| Übergangs-Wärmewiderstand<br>thermal resistance, case to heatsink      | Gleichr. Diode/ Rectif. Diode $\lambda_{\text{paste}}=1\text{W/m}^2\text{K}$    | $R_{\text{thCH}}$ | -    | 0,3  | -    | K/W |
|                                                                        | Trans. Wechsr./ Trans. Inverter $\lambda_{\text{grease}}=1\text{W/m}^2\text{K}$ |                   | -    | 0,4  | -    | K/W |
|                                                                        | Diode Wechsr./ Diode Inverter                                                   |                   | -    | 1,3  | -    | K/W |
|                                                                        | Trans. Bremse/ Trans. Brake                                                     |                   | -    | 0,4  | -    | K/W |
|                                                                        | Diode Bremse/ Diode Brake                                                       |                   | -    | 1,5  | -    | K/W |
| Höchstzulässige Sperrschichttemperatur<br>maximum junction temperature |                                                                                 | $T_{\text{vj}}$   | -    | -    | 150  | °C  |
| Betriebstemperatur<br>operation temperature                            |                                                                                 | $T_{\text{op}}$   | -40  | -    | 125  | °C  |
| Lagertemperatur<br>storage temperature                                 |                                                                                 | $T_{\text{stg}}$  | -40  | -    | 125  | °C  |

### Mechanische Eigenschaften / Mechanical properties

|                                                    |                                    |   |                         |    |
|----------------------------------------------------|------------------------------------|---|-------------------------|----|
| Innere Isolation<br>internal insulation            |                                    |   | $\text{Al}_2\text{O}_3$ |    |
| CTI<br>comperative tracking index                  |                                    |   | 225                     |    |
| Anpreßkraft f. mech. Befestigung<br>mounting force |                                    | F | 40...80                 | N  |
| Gewicht<br>weight                                  |                                    | G | 36                      | g  |
| Kontakt - Kühlkörper<br>terminal to heatsink       | Kriechstrecke<br>creeping distance |   | 13,5                    | mm |
|                                                    | Luftstrecke<br>clearance           |   | 12                      | mm |
| Terminal - Terminal<br>terminal to terminal        | Kriechstrecke<br>creeping distance |   | 7,5                     | mm |
|                                                    | Luftstrecke<br>clearance           |   | 7,5                     | mm |

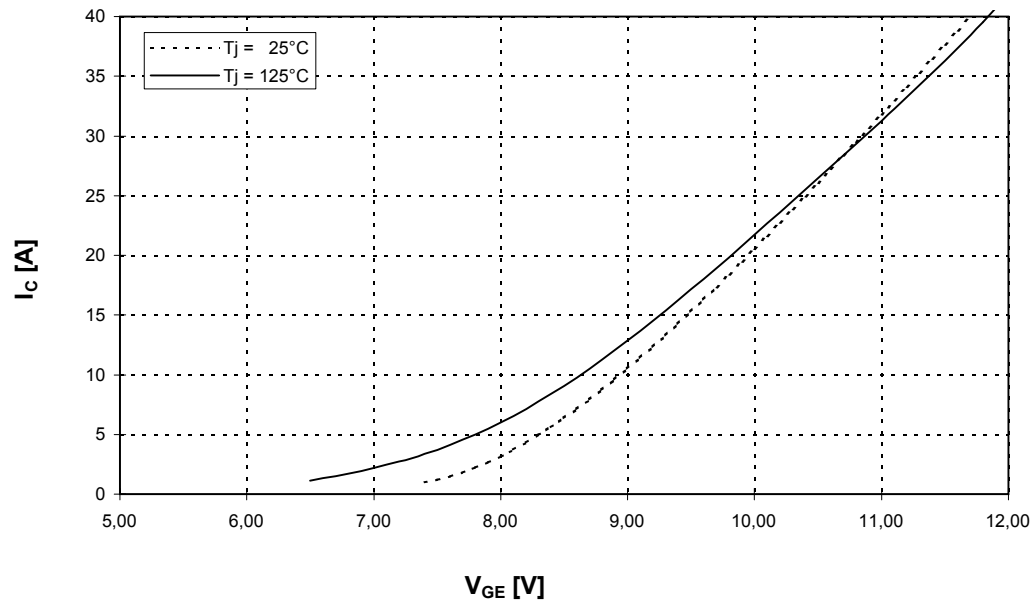
Vorläufig  
PreliminaryAusgangskennlinienfeld Wechselr. (typisch)  
Output characteristic Inverter (typical) $I_C = f(V_{CE})$   
 $V_{GE} = 15\text{ V}$ Ausgangskennlinienfeld Wechselr. (typisch)  
Output characteristic Inverter (typical) $I_C = f(V_{CE})$   
 $T_{vj} = 125^\circ\text{C}$ 

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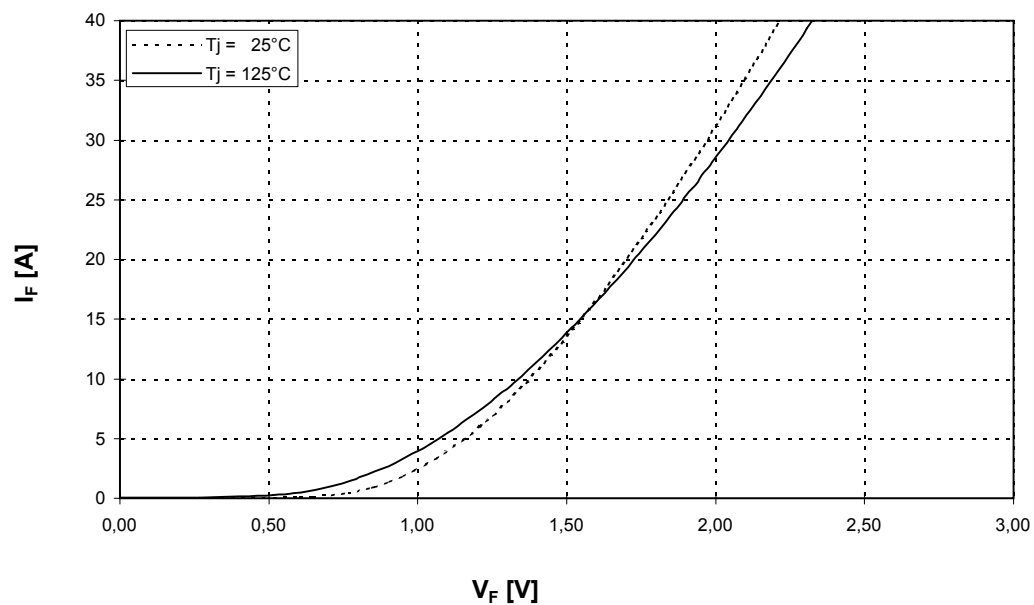
Übertragungscharakteristik Wechselr. (typisch)  
Transfer characteristic Inverter (typical)

$$I_C = f(V_{GE})$$

$$V_{CE} = 20 \text{ V}$$



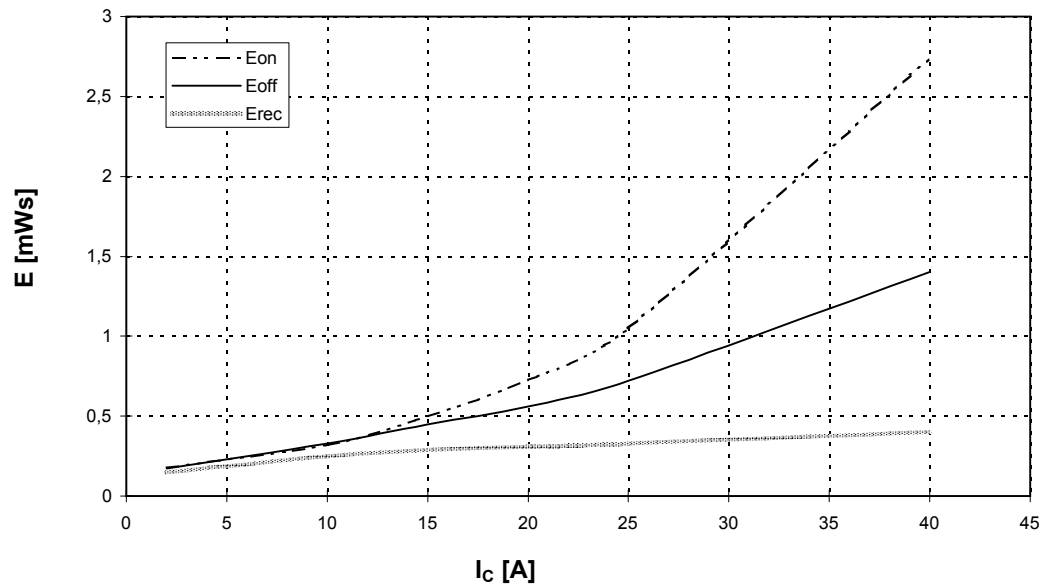
Durchlaßkennlinie der Freilaufdiode Wechselr. (typisch)  $I_F = f(V_F)$   
Forward characteristic of FWD Inverter (typical)



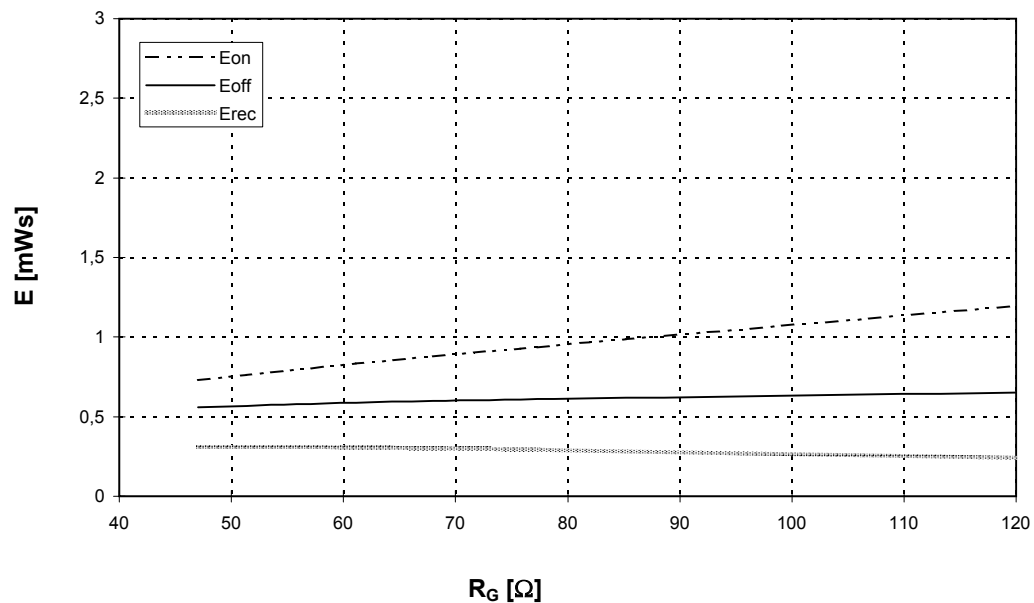


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Schaltverluste Wechselr. (typisch)  $E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$ ,  $E_{rec} = f(I_C)$   $V_{CC} = 300\text{ V}$   
 Switching losses Inverter (typical)  $T_J = 125^\circ\text{C}$ ,  $V_{GE} = \pm 15\text{ V}$ ,  $R_{Gon} = R_{Goff} = 47\text{ Ohm}$

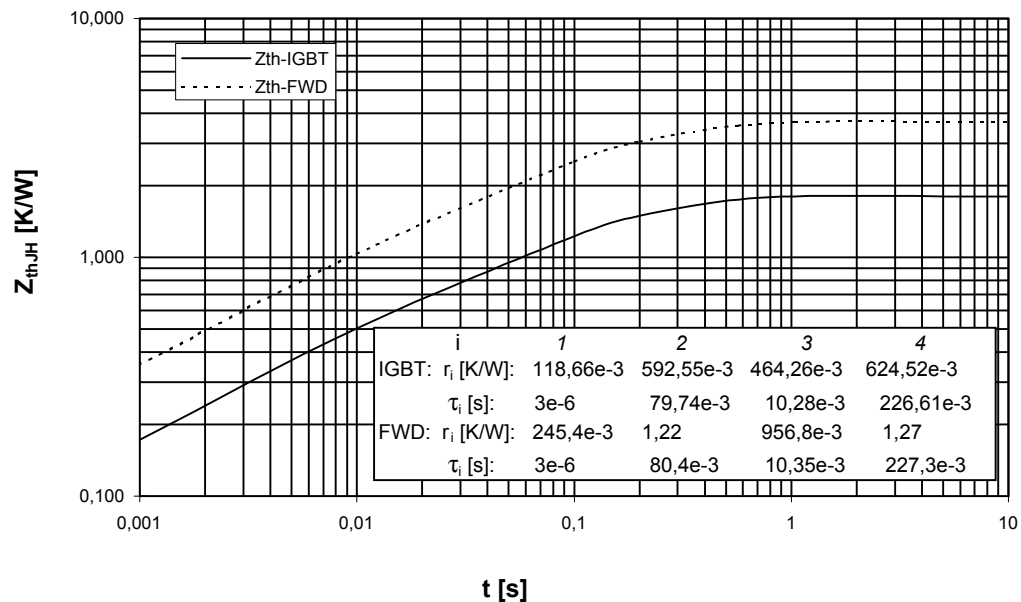


Schaltverluste Wechselr. (typisch)  $E_{on} = f(R_G)$ ,  $E_{off} = f(R_G)$ ,  $E_{rec} = f(R_G)$   
 Switching losses Inverter (typical)  $T_J = 125^\circ\text{C}$ ,  $V_{GE} = \pm 15\text{ V}$ ,  $I_C = I_{nenn}$ ,  $V_{CC} = 300\text{ V}$



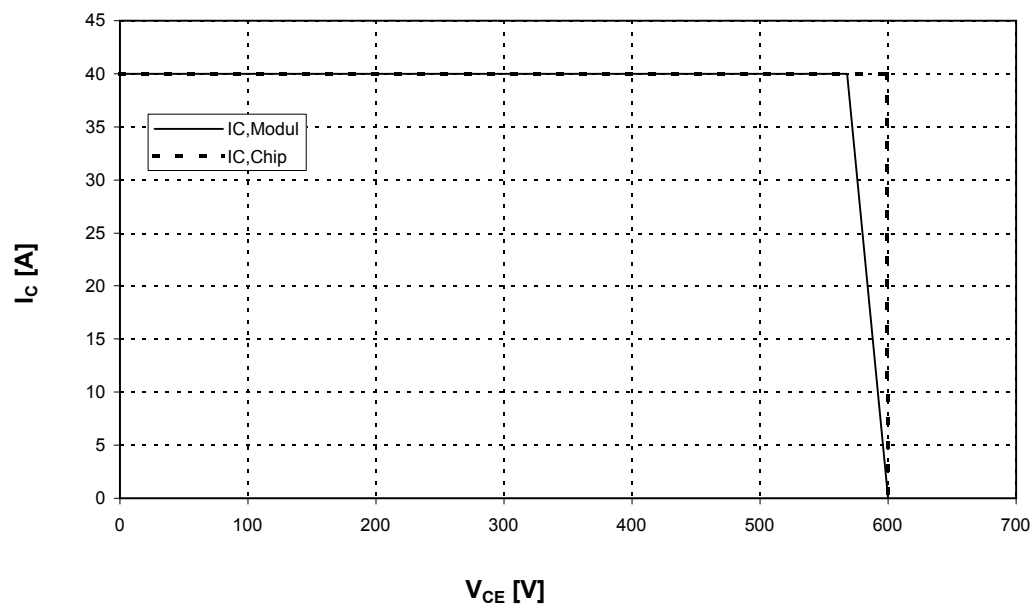
Vorläufig  
PreliminaryTransienter Wärmewiderstand Wechslr.  
Transient thermal impedance Inverter

$$Z_{thJH} = f(t)$$



Sicherer Arbeitsbereich Wechslr. (RBSOA)

$$I_c = f(V_{CE})$$

Reverse bias safe operating area Inverter (RBSOA)  $T_{vj} = 125^\circ\text{C}$ ,  $V_{GE} = \pm 15\text{V}$ ,  $R_G = 47\ \Omega$ 

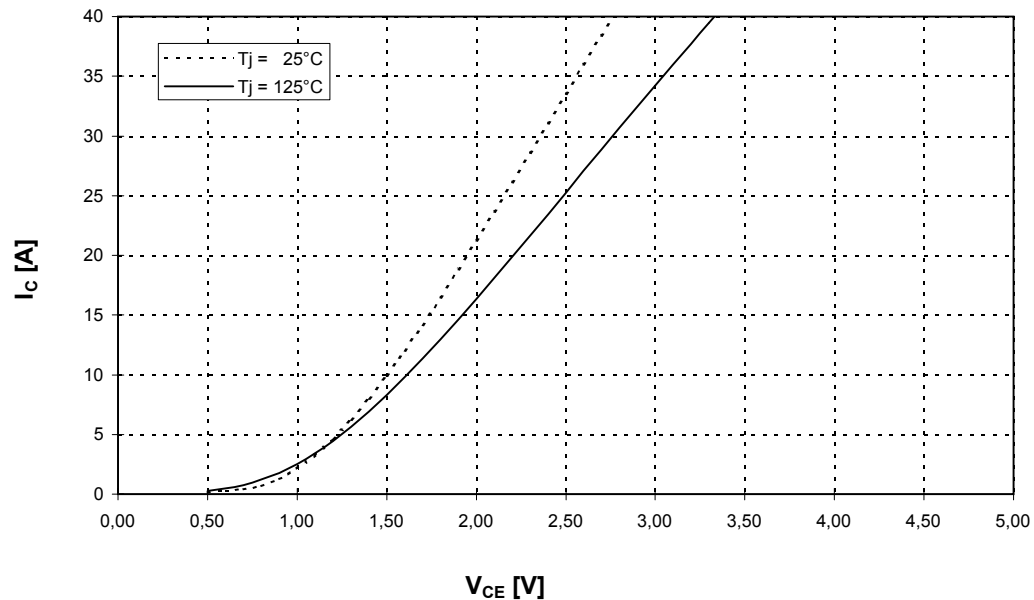


Vorläufig  
Preliminary

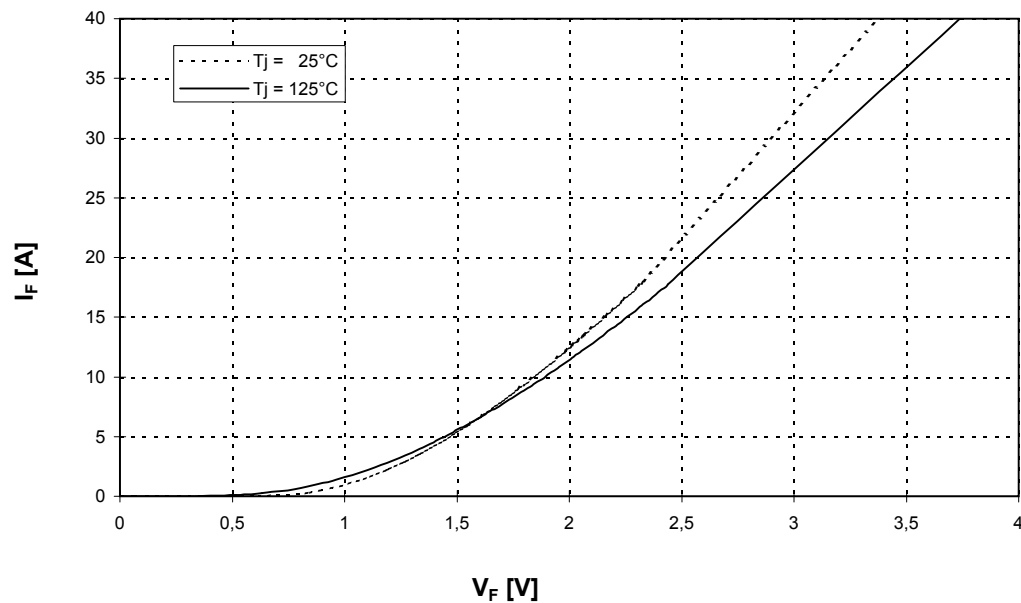
Ausgangskennlinienfeld Brems-Chopper-IGBT (typisch)

 $I_C = f(V_{CE})$ 

Output characteristic brake-chopper-IGBT (typical)

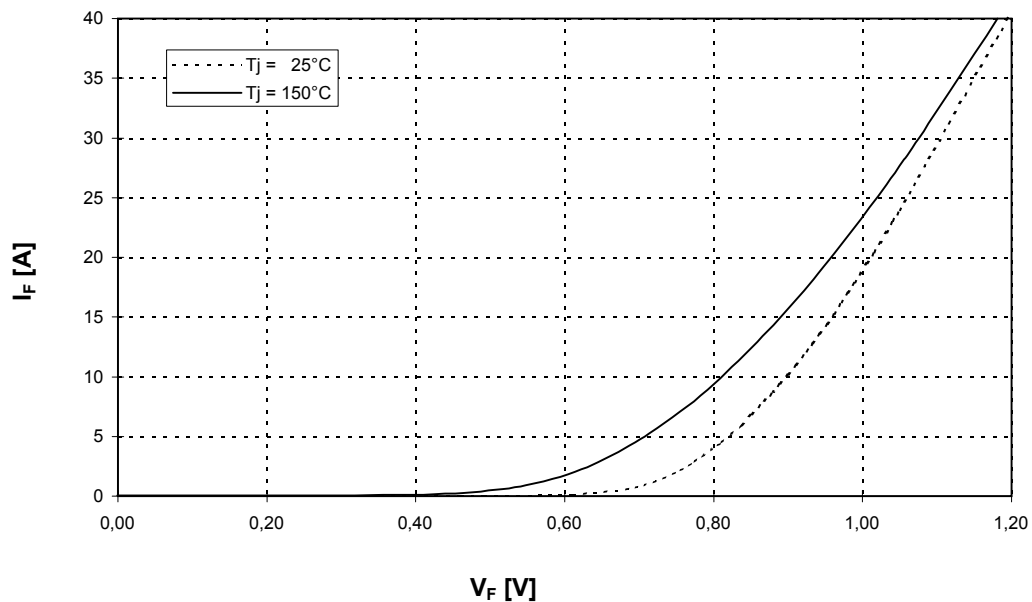
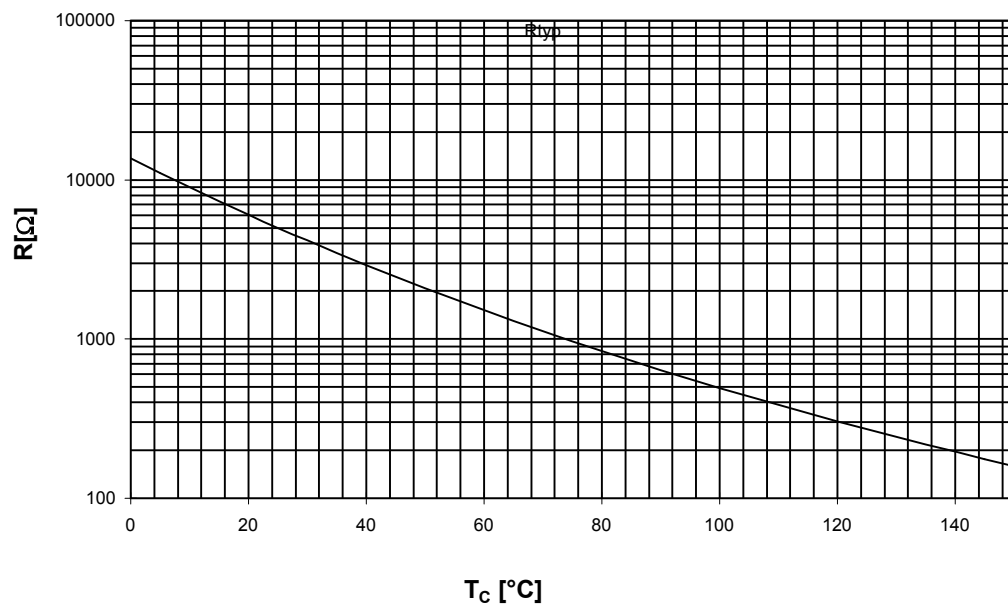
 $V_{GE} = 15\text{ V}$ Durchlaßkennlinie der Brems-Chopper-Diode (typisch)  $I_F = f(V_F)$ 

Forward characteristic of brake-chopper-FWD (typical)



Vorläufig  
PreliminaryDurchlaßkennlinie der Gleichrichterdiode (typisch)  
Forward characteristic of Rectifier Diode (typical)

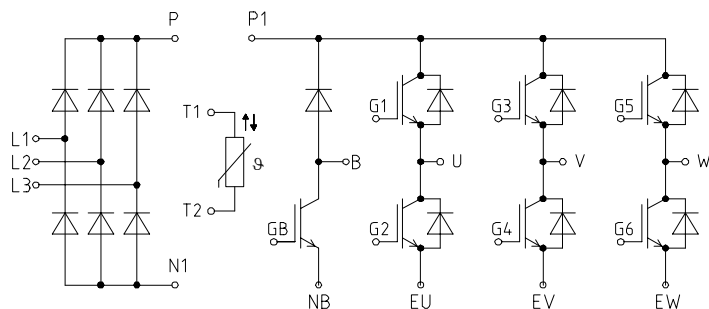
$$I_F = f(V_F)$$

NTC- Temperaturkennlinie (typisch)  $R = f(T)$   
NTC- temperature characteristic (typical)



**Vorläufig**  
**Preliminary**

### Schaltplan/ Circuit diagram

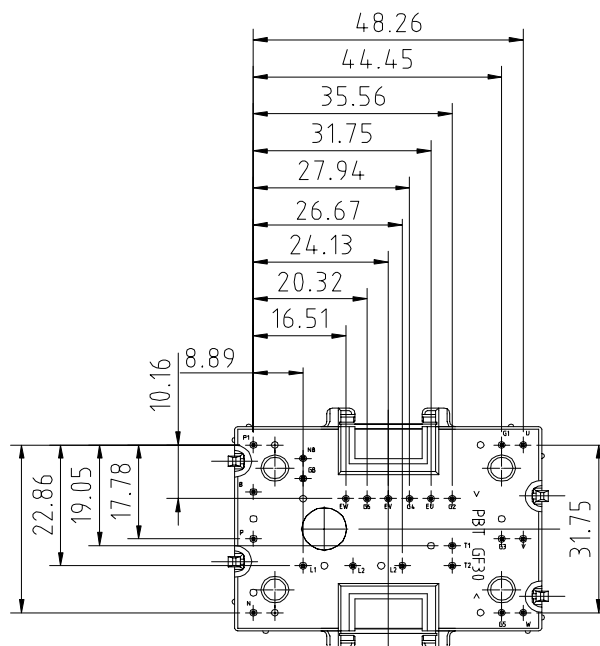
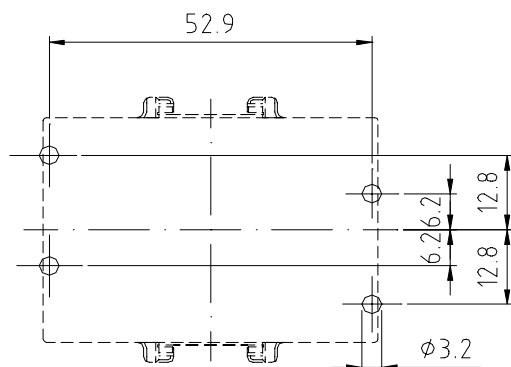


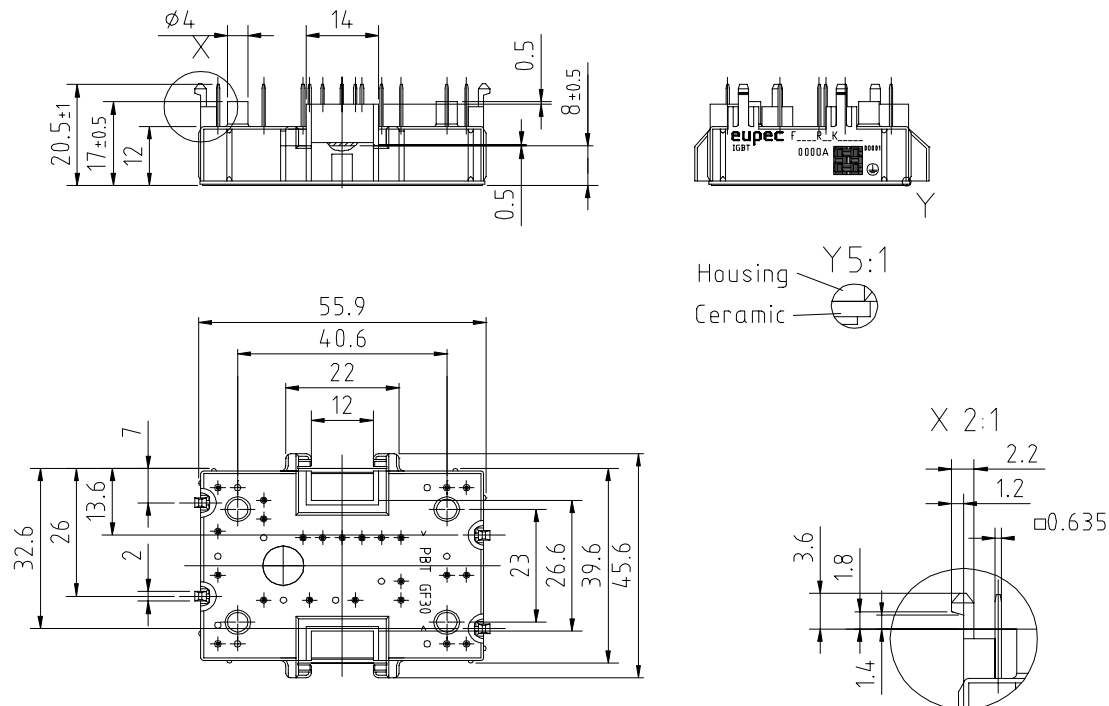
### Gehäuseabmessungen/ Package outlines

Modul only designed for mounting on PCB's with  $1.6 \pm 0.2$  mm thickness

Pinpositions with tolerance  $\pm 0.4$

Bohrplan /  
drilling layout




**Gehäuseabmessungen Forts. / Package outlines contd.**


Mit dieser technischen Information werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert. Diese gilt in Verbindung mit den zugehörigen Technischen Erläuterungen.

This technical information specifies semiconductor devices but promises no characteristics. It is valid in combination with the belonging technical notes.