



Höchstzulässige Werte / Maximum rated values

Elektrische Eigenschaften / Electrical properties

| | | | | |
|--|---|--------------|---------|-----------------------|
| Kollektor-Emitter-Sperrspannung collector-emitter voltage | | V_{CES} | 1200 | V |
| Kollektor-Dauergleichstrom DC-collector current | $T_C = 80\text{ °C}$ | $I_{C,nom.}$ | 75 | A |
| | $T_C = 25\text{ °C}$ | I_C | 125 | A |
| Periodischer Kollektor Spitzenstrom repetitive peak collector current | $t_p = 1\text{ ms}, T_C = 80\text{ °C}$ | I_{CRM} | 150 | A |
| Gesamt-Verlustleistung total power dissipation | $T_C=25\text{ °C}, \text{ Transistor}$ | P_{tot} | 500 | W |
| Gate-Emitter-Spitzenspannung gate-emitter peak voltage | | V_{GES} | +/- 20V | V |
| Dauergleichstrom DC forward current | | I_F | 75 | A |
| Periodischer Spitzenstrom repetitive peak forw. current | $t_p = 1\text{ ms}$ | I_{FRM} | 150 | A |
| Grenzlastintegral der Diode I^2t - value, Diode | $V_R = 0V, t_p = 10\text{ms}, T_{vj} = 125\text{ °C}$ | I^2t | 1,19 | kA^2s |
| Isolations-Prüfspannung insulation test voltage | RMS, $f = 50\text{ Hz}, t = 1\text{ min.}$ | V_{ISOL} | 2,5 | kV |

Charakteristische Werte / Characteristic values

Transistor / Transistor

min. typ. max.

| | | | | | | |
|--|---|---------------|-----|------|-----|---------------|
| Kollektor-Emitter Sättigungsspannung collector-emitter saturation voltage | $I_C = 75A, V_{GE} = 15V, T_{vj} = 25\text{ °C}$ | $V_{CE\ sat}$ | - | 2,1 | 2,6 | V |
| | $I_C = 75A, V_{GE} = 15V, T_{vj} = 125\text{ °C}$ | | - | 2,4 | 2,9 | V |
| Gate-Schwellenspannung gate threshold voltage | $I_C = 3mA, V_{CE} = V_{GE}, T_{vj} = 25\text{ °C}$ | $V_{GE(th)}$ | 4,5 | 5,5 | 6,5 | V |
| Gateladung gate charge | $V_{GE} = -15V...+15V$ | Q_G | - | 0,8 | - | μC |
| Eingangskapazität input capacitance | $f = 1\text{MHz}, T_{vj} = 25\text{ °C}, V_{CE} = 25V, V_{GE} = 0V$ | C_{ies} | - | 5,1 | - | nF |
| Rückwirkungskapazität reverse transfer capacitance | $f = 1\text{MHz}, T_{vj} = 25\text{ °C}, V_{CE} = 25V, V_{GE} = 0V$ | C_{res} | - | 0,33 | - | nF |
| Kollektor-Emitter Reststrom collector-emitter cut-off current | $V_{CE} = 1200V, V_{GE} = 0V, T_{vj} = 25\text{ °C}$ | I_{CES} | - | 3 | 92 | μA |
| | $V_{CE} = 1200V, V_{GE} = 0V, T_{vj} = 125\text{ °C}$ | | - | 300 | - | μA |
| Gate-Emitter Reststrom gate-emitter leakage current | $V_{CE} = 0V, V_{GE} = 20V, T_{vj} = 25\text{ °C}$ | I_{GES} | - | - | 400 | nA |

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|----------------------------|---------------------------------|
| prepared by: Mark Münzer | date of publication: 09.09.1999 |
| approved by: M. Hierholzer | revision: 2 |



Charakteristische Werte / Characteristic values

| Transistor / Transistor | | min. | typ. | max. | | |
|---|--|-------------|------|------|------|------------|
| Einschaltverzögerungszeit (ind. Last) turn on delay time (inductive load) | $I_C = 75A, V_{CC} = 600V$ | $t_{d,on}$ | - | 0,05 | - | μs |
| | $V_{GE} = \pm 15V, R_G = 10\Omega, T_{vj} = 25^\circ C$ | | | - | 0,06 | - |
| Anstiegszeit (induktive Last) rise time (inductive load) | $I_C = 75A, V_{CC} = 600V$ | t_r | - | 0,05 | - | μs |
| | $V_{GE} = \pm 15V, R_G = 10\Omega, T_{vj} = 125^\circ C$ | | | - | 0,05 | - |
| Abschaltverzögerungszeit (ind. Last) turn off delay time (inductive load) | $I_C = 75A, V_{CC} = 600V$ | $t_{d,off}$ | - | 0,3 | - | μs |
| | $V_{GE} = \pm 15V, R_G = 10\Omega, T_{vj} = 125^\circ C$ | | | - | 0,35 | - |
| Fallzeit (induktive Last) fall time (inductive load) | $I_C = 75A, V_{CC} = 600V$ | t_f | - | 0,05 | - | μs |
| | $V_{GE} = \pm 15V, R_G = 10\Omega, T_{vj} = 125^\circ C$ | | | - | 0,07 | - |
| Einschaltverlustenergie pro Puls turn-on energy loss per pulse | $I_C = 75A, V_{CC} = 600V, V_{GE} = 15V$ $R_G = 10\Omega, T_{vj} = 125^\circ C, L_S = 60nH$ | E_{on} | - | 7,5 | - | mWs |
| Abschaltverlustenergie pro Puls turn-off energy loss per pulse | $I_C = 75A, V_{CC} = 600V, V_{GE} = 15V$ $R_G = 10\Omega, T_{vj} = 125^\circ C, L_S = 60nH$ | E_{off} | - | 9 | - | mWs |
| Kurzschlußverhalten SC Data | $t_F \leq 10\mu sec, V_{GE} \leq 15V, R_G = 10\Omega$ $T_{vj} \leq 125^\circ C, V_{CC} = 900V, V_{CEmax} = V_{CES} - L_{sCE} \cdot di/dt$ | I_{SC} | - | 540 | - | A |
| Modulinduktivität stray inductance module | | L_{sCE} | - | 25 | - | nH |
| Modul Leitungswiderstand, Anschlüsse – Chip module lead resistance, terminals – chip | $T_C = 25^\circ C$ | R_{CC+EE} | - | 1,8 | - | m Ω |

Charakteristische Werte / Characteristic values

| Diode / Diode | | min. | typ. | max. | | |
|---|---|-----------|------|------|------|----------|
| Durchlaßspannung forward voltage | $I_F = 75A, V_{GE} = 0V, T_{vj} = 25^\circ C$ | V_F | - | 1,8 | 2,3 | V |
| | $I_F = 75A, V_{GE} = 0V, T_{vj} = 125^\circ C$ | | | - | 1,7 | 2,2 |
| Rückstromspitze peak reverse recovery current | $I_F = 75A, - di_F/dt = 2000A/\mu sec$ | I_{RM} | - | 85 | - | A |
| | $V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$ $V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$ | | | - | 105 | - |
| Sperrverzögerungsladung recovered charge | $I_F = 75A, - di_F/dt = 2000A/\mu sec$ | Q_r | - | 9 | - | μAs |
| | $V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$ $V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$ | | | - | 16,5 | - |
| Abschaltenergie pro Puls reverse recovery energy | $I_F = 75A, - di_F/dt = 2000A/\mu sec$ | E_{rec} | - | 3 | - | mWs |
| | $V_R = 600V, V_{GE} = -15V, T_{vj} = 25^\circ C$ $V_R = 600V, V_{GE} = -15V, T_{vj} = 125^\circ C$ | | | - | 6,2 | - |



Thermische Eigenschaften / Thermal properties

| | | | min. | typ. | max. | |
|---|--|------------|------|-------|------|-----|
| Innerer Wärmewiderstand thermal resistance, junction to case | Transistor / transistor, DC | R_{thJC} | - | - | 0,25 | K/W |
| | Diode/Diode, DC | | - | - | 0,55 | K/W |
| Übergangs-Wärmewiderstand thermal resistance, case to heatsink | pro Modul / per module $\lambda_{Paste} = 1 \text{ W/m} \cdot \text{K}$ / $\lambda_{grease} = 1 \text{ W/m} \cdot \text{K}$ | R_{thCK} | - | 0,009 | - | K/W |
| Höchstzulässige Sperschichttemperatur maximum junction temperature | | T_{vj} | - | - | 150 | °C |
| Betriebstemperatur operation temperature | | T_{op} | -40 | - | 125 | °C |
| Lagertemperatur storage temperature | | T_{stg} | -40 | - | 150 | °C |

Mechanische Eigenschaften / Mechanical properties

| | | | | | | |
|--|----------|----|---|--|--------------------------------|----|
| Gehäuse, siehe Anlage case, see appendix | | | | | | |
| Innere Isolation internal insulation | | | | | AL ₂ O ₃ | |
| CTI comperative tracking index | | | | | 225 | |
| Anzugsdrehmoment f. mech. Befestigung mounting torque | screw M5 | M1 | 3 | | 6 | Nm |
| Anzugsdrehmoment f. elektr. Anschlüsse terminal connection torque | | | | | | Nm |
| Gewicht weight | | G | | | 300 | g |

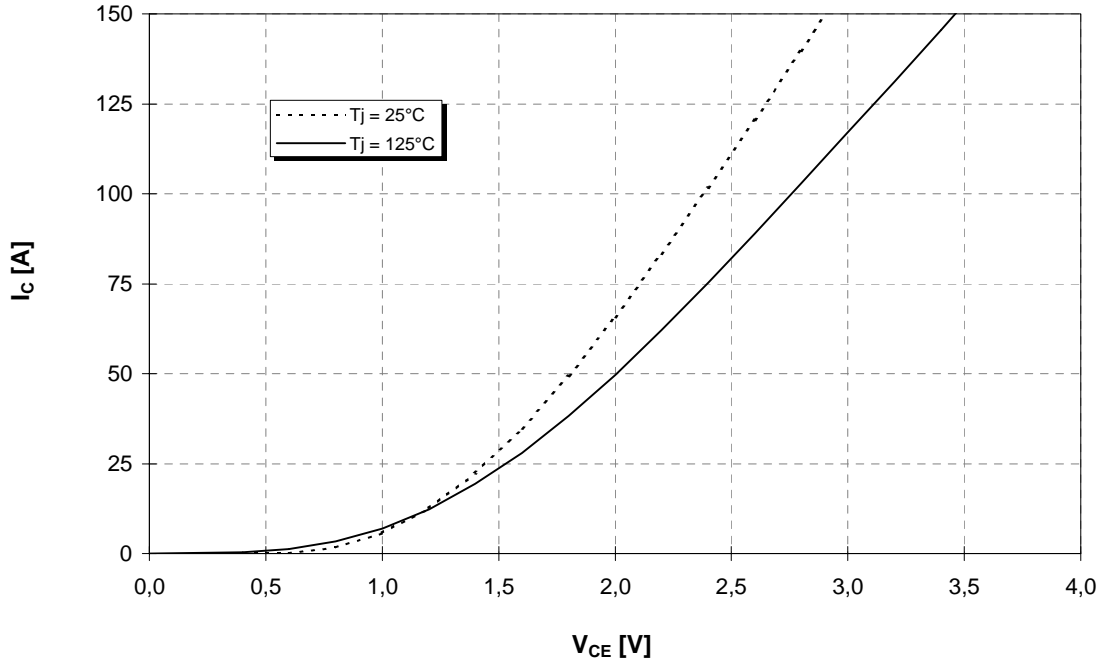
Mit dieser technischen Information werden Halbleiterbauelemente spezifiziert, jedoch keine Eigenschaften zugesichert. Sie gilt in Verbindung mit den zugehörigen Technischen Erläuterungen.

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



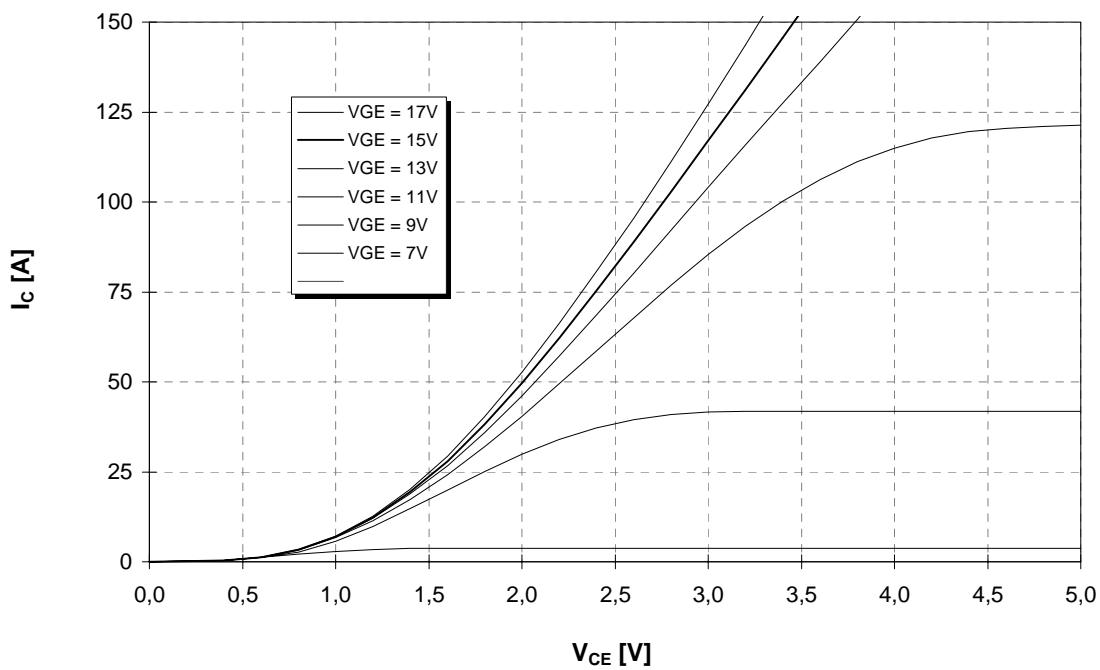
Ausgangskennlinie (typisch)
Output characteristic (typical)

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



Ausgangskennlinienfeld (typisch)
Output characteristic (typical)

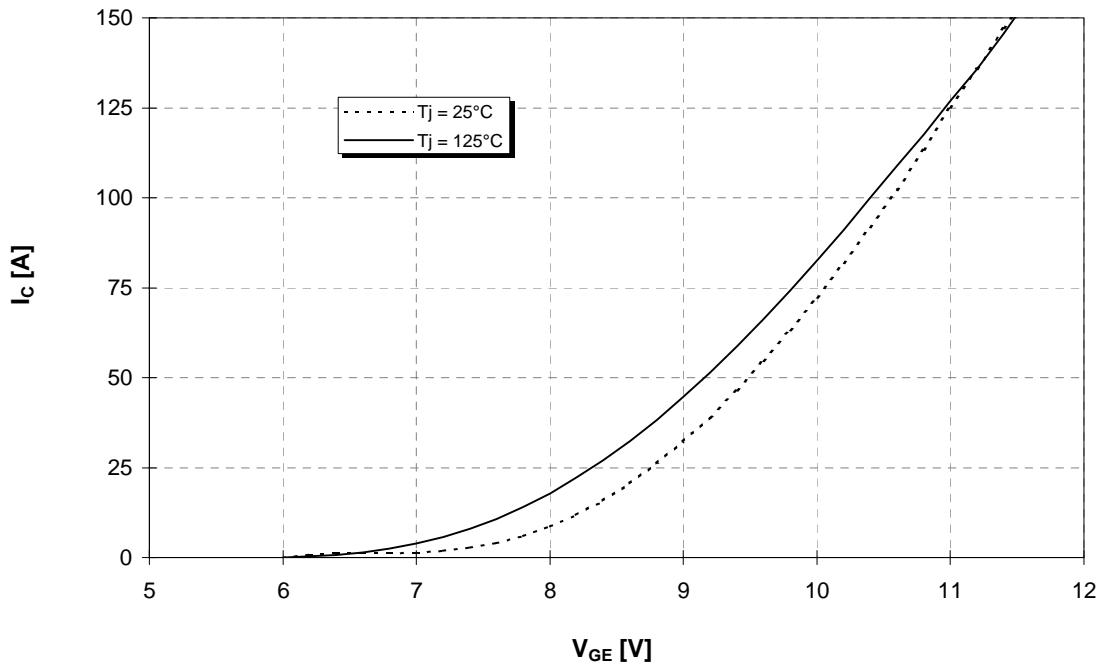
$I_C = f(V_{CE})$
 $T_{vj} = 125°C$





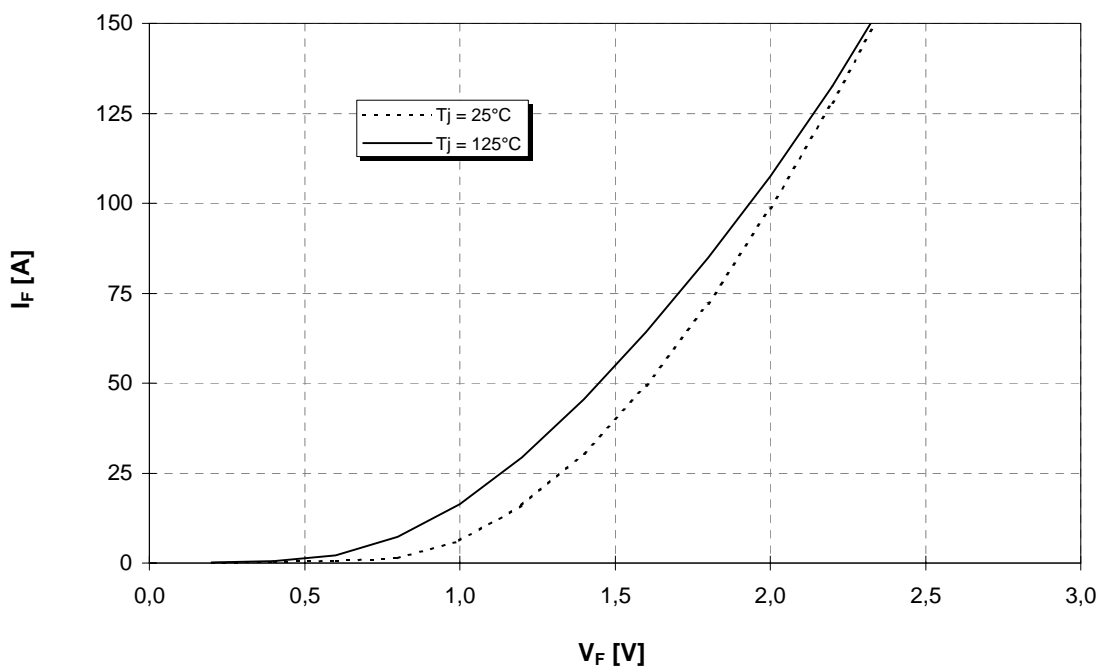
Übertragungscharakteristik (typisch)
Transfer characteristic (typical)

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



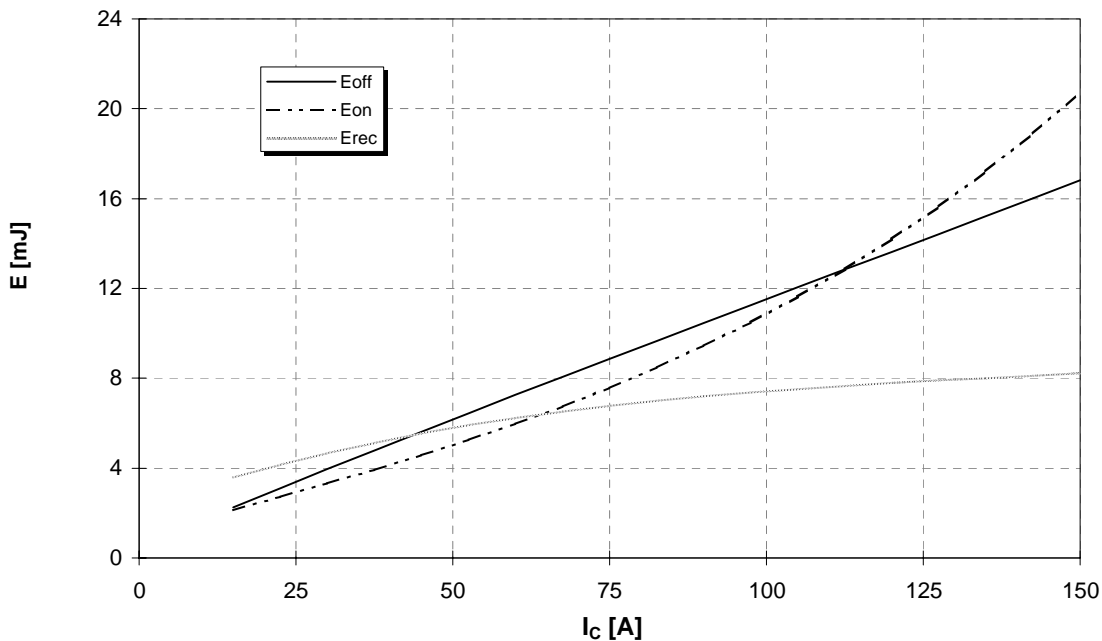
Durchlaßkennlinie der Inversdiode (typisch)
Forward characteristic of inverse diode (typical)

$I_F = f(V_F)$

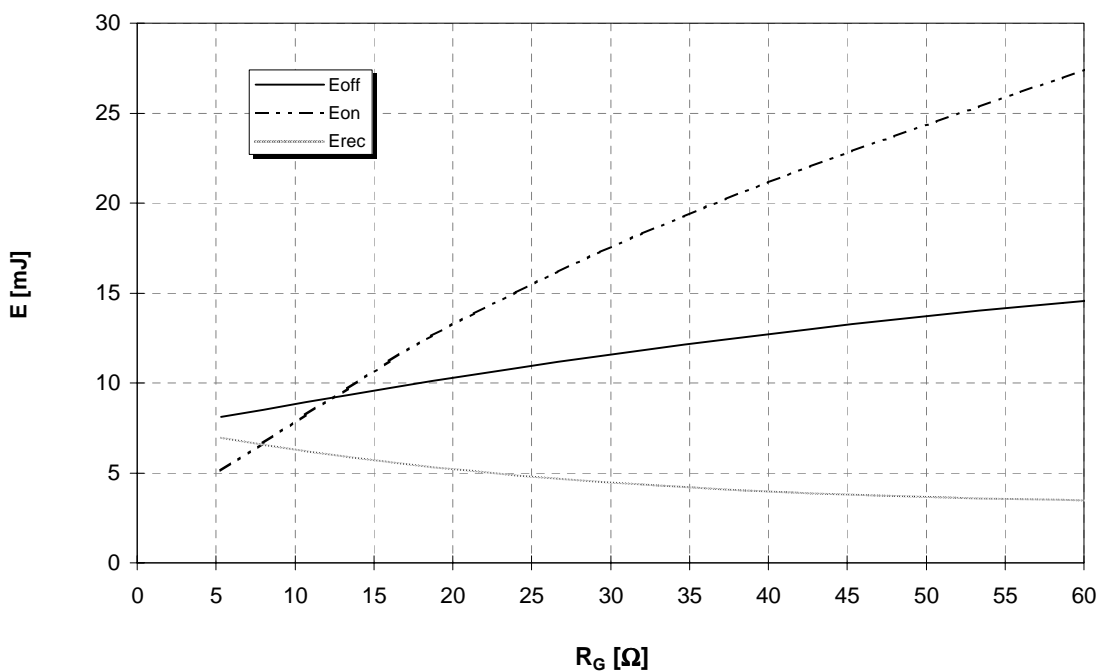




Schaltverluste (typisch) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$
Switching losses (typical) $V_{GE}=15V$, $R_{gon} = R_{goff} = 10 \Omega$, $V_{CE} = 600V$, $T_j = 125^\circ C$



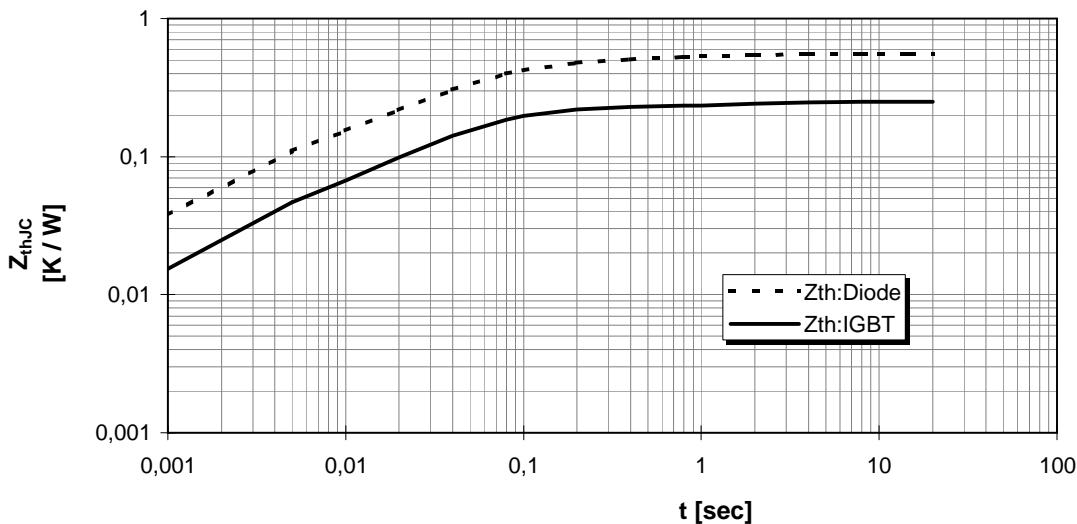
Schaltverluste (typisch) $E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$
Switching losses (typical) $V_{GE}=15V$, $I_C = 75A$, $V_{CE} = 600V$, $T_j = 125^\circ C$





Transienter Wärmewiderstand
Transient thermal impedance

$Z_{thJC} = f(t)$

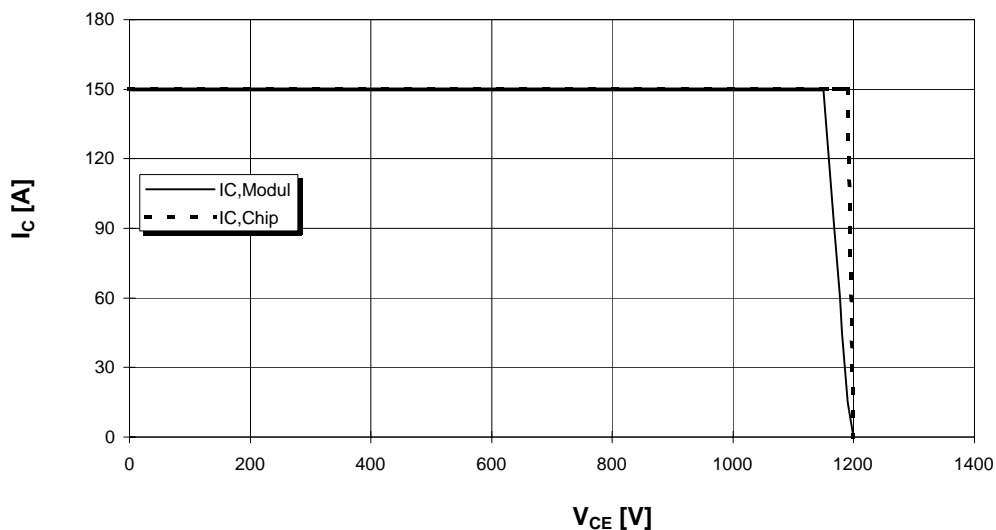


| i | 1 | 2 | 3 | 4 |
|------------------------|-------|--------|--------|-------|
| r_i [K/kW] : IGBT | 27,96 | 84,63 | 110,28 | 27,13 |
| τ_i [sec] : IGBT | 0,002 | 0,03 | 0,066 | 1,655 |
| r_i [K/kW] : Diode | 71,97 | 190,64 | 207,99 | 79,40 |
| τ_i [sec] : Diode | 0,002 | 0,03 | 0,072 | 0,682 |

Sicherer Arbeitsbereich (RBSOA)

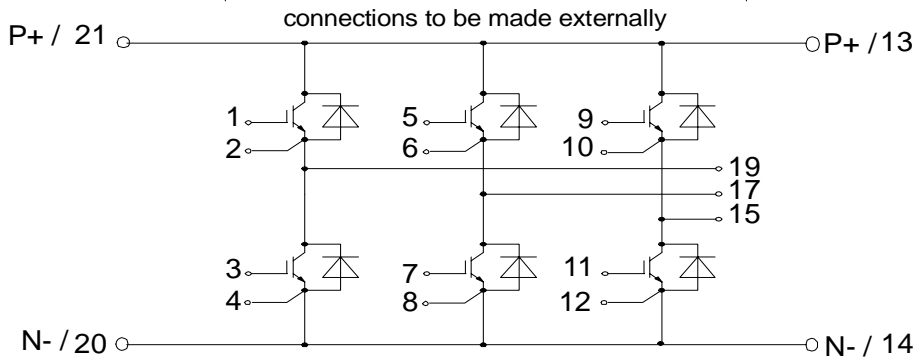
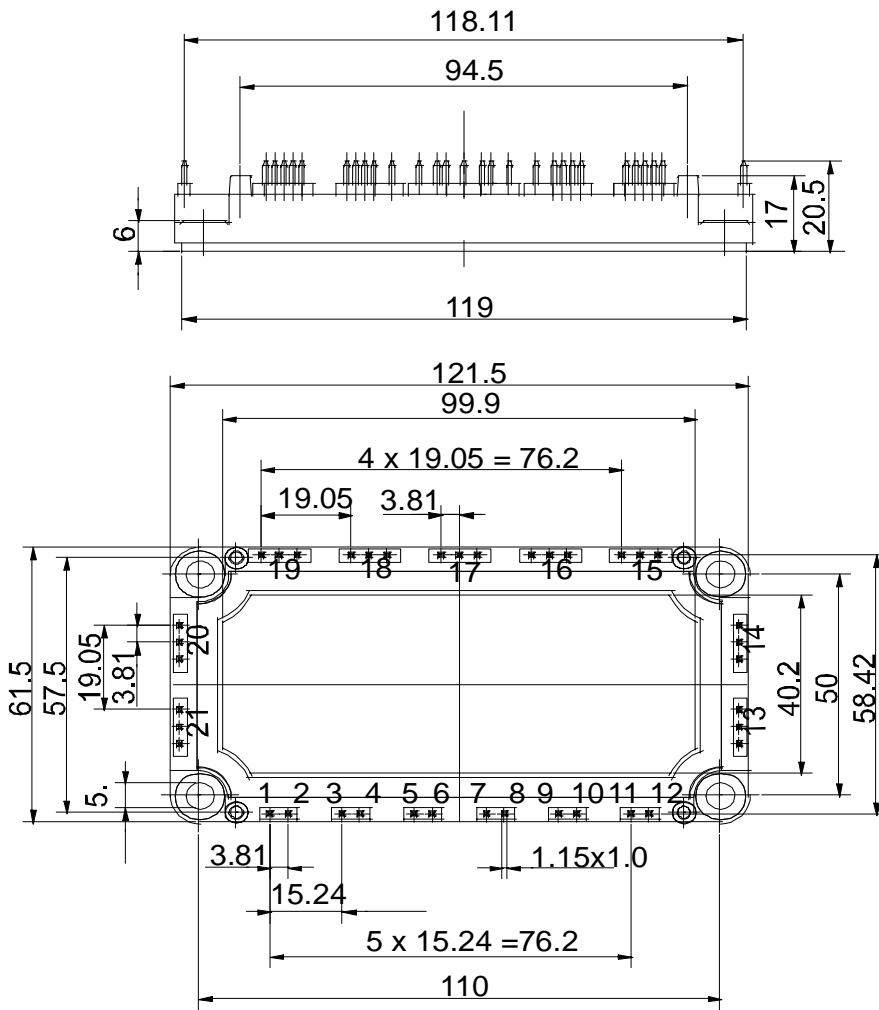
Reverse bias safe operation area (RBSOA)

$V_{GE} = 15V, R_g = 10 \text{ Ohm}, T_{vj} = 125^\circ C$





Econo 3



IS8

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