

**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            | $T_C = 80^{\circ}\text{C}, T_{vj\max} = 150^{\circ}\text{C}$<br>$T_C = 25^{\circ}\text{C}, T_{vj\max} = 150^{\circ}\text{C}$ | $I_{C\text{ nom}}$<br>$I_C$ | 75<br>105 | A<br>A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P = 1\text{ ms}$                                                                                                          | $I_{CRM}$                   | 150       | A      |
| Gesamt-Verlustleistung<br>Total power dissipation                        | $T_C = 25^{\circ}\text{C}, T_{vj\max} = 150$                                                                                 | $P_{\text{tot}}$            | 355       | W      |
| 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    | $I_C = 75\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 75\text{ A}, V_{GE} = 15\text{ V}$                                                                      | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $V_{CE\text{ sat}}$ | 1,70<br>2,00 | 2,20 | V<br>V                         |
| Gate-Schwellenspannung<br>Gate threshold voltage                                | $I_C = 3,00\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$                                                                                        |                                                                 | $V_{GEth}$          | 5,0          | 5,8  | 6,5 V                          |
| Gateladung<br>Gate charge                                                       | $V_{GE} = -15\text{ V} \dots +15\text{ V}$                                                                                                                  |                                                                 | $Q_G$               | 0,70         |      | $\mu\text{C}$                  |
| Interner Gatewiderstand<br>Internal gate resistor                               | $T_{vj} = 25^{\circ}\text{C}$                                                                                                                               |                                                                 | $R_{Gint}$          | 10           |      | $\Omega$                       |
| Eingangskapazität<br>Input capacitance                                          | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                  |                                                                 | $C_{ies}$           | 5,30         |      | nF                             |
| Rückwirkungskapazität<br>Reverse transfer capacitance                           | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                                                  |                                                                 | $C_{res}$           | 0,20         |      | nF                             |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current                | $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                                                  |                                                                 | $I_{CES}$           |              | 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, induktive Last<br>Turn-on delay time, inductive load | $I_C = 75\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 4,7\ \Omega$                                                         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_{don}$           | 0,26<br>0,29 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Anstiegszeit, induktive Last<br>Rise time, inductive load                       | $I_C = 75\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 4,7\ \Omega$                                                         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_r$               | 0,03<br>0,05 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load | $I_C = 75\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 4,7\ \Omega$                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_{doff}$          | 0,42<br>0,52 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Fallzeit, induktive Last<br>Fall time, inductive load                           | $I_C = 75\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 4,7\ \Omega$                                                        | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_f$               | 0,07<br>0,09 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse               | $I_C = 75\text{ A}, V_{CE} = 600\text{ V}, L_S = 45\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 4,7\ \Omega$                                     | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $E_{on}$            | 6,55<br>9,40 |      | mJ<br>mJ                       |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse               | $I_C = 75\text{ A}, V_{CE} = 600\text{ V}, L_S = 45\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 4,7\ \Omega$                                    | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $E_{off}$           | 6,80<br>9,40 |      | mJ<br>mJ                       |
| Kurzschlußverhalten<br>SC data                                                  | $V_{GE} \leq 15\text{ V}, V_{CC} = 900\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$<br>$t_P \leq 10\ \mu\text{s}, T_{vj} = 125^{\circ}\text{C}$ |                                                                 | $I_{SC}$            | 300          |      | A                              |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case       | pro IGBT / per IGBT                                                                                                                                         |                                                                 | $R_{thJC}$          |              | 0,35 | K/W                            |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions           |                                                                                                                                                             |                                                                 | $T_{vj\text{ op}}$  | -40          | 125  | $^{\circ}\text{C}$             |

prepared by: AS

date of publication: 2013-10-02

approved by: RS

revision: 3.1

**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                   |                                                                            | $I_F$     | 75   | A                    |
| Periodischer Spitzenstrom<br>Repetitive peak forward current        | $t_P = 1\text{ ms}$                                                        | $I_{FRM}$ | 150  | A                    |
| Grenzlastintegral<br>$I^2t$ - value                                 | $V_R = 0\text{ V}$ , $t_P = 10\text{ ms}$ , $T_{vj} = 125^{\circ}\text{C}$ | $I^2t$    | 1200 | $\text{A}^2\text{s}$ |

**Charakteristische Werte / Characteristic Values**

|                                                                           |                                                                                                                                                  |                                                                 | min.               | typ.         | max. |                                |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------|--------------|------|--------------------------------|
| Durchlassspannung<br>Forward voltage                                      | $I_F = 75\text{ A}$ , $V_{GE} = 0\text{ V}$<br>$I_F = 75\text{ A}$ , $V_{GE} = 0\text{ V}$                                                       | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $V_F$              | 1,65<br>1,65 | 2,20 | V<br>V                         |
| Rückstromspitze<br>Peak reverse recovery current                          | $I_F = 75\text{ A}$ , $-di_F/dt = 2000\text{ A}/\mu\text{s}$ ( $T_{vj}=125^{\circ}\text{C}$ )<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $I_{RM}$           | 80,0<br>86,0 |      | A<br>A                         |
| Sperrverzögerungsladung<br>Recovered charge                               | $I_F = 75\text{ A}$ , $-di_F/dt = 2000\text{ A}/\mu\text{s}$ ( $T_{vj}=125^{\circ}\text{C}$ )<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $Q_r$              | 9,30<br>16,5 |      | $\mu\text{C}$<br>$\mu\text{C}$ |
| Abschaltenergie pro Puls<br>Reverse recovery energy                       | $I_F = 75\text{ A}$ , $-di_F/dt = 2000\text{ A}/\mu\text{s}$ ( $T_{vj}=125^{\circ}\text{C}$ )<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $E_{rec}$          | 3,20<br>6,50 |      | mJ<br>mJ                       |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case | pro Diode / per diode                                                                                                                            |                                                                 | $R_{thJC}$         |              | 0,58 | K/W                            |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions     |                                                                                                                                                  |                                                                 | $T_{vj\text{ op}}$ | -40          | 125  | $^{\circ}\text{C}$             |

**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   | $T_C = 80^{\circ}\text{C}$                                                                                    | $I_{FRMSM}$ | 115         | A                                            |
| Gleichrichter Ausgang Grenzeffektivstrom<br>Maximum RMS current at rectifier output | $T_C = 80^{\circ}\text{C}$                                                                                    | $I_{RMSM}$  | 80          | A                                            |
| Stoßstrom Grenzwert<br>Surge forward current                                        | $t_P = 10\text{ ms}$ , $T_{vj} = 25^{\circ}\text{C}$<br>$t_P = 10\text{ ms}$ , $T_{vj} = 150^{\circ}\text{C}$ | $I_{FSM}$   | 500<br>400  | A<br>A                                       |
| Grenzlastintegral<br>$I^2t$ - value                                                 | $t_P = 10\text{ ms}$ , $T_{vj} = 25^{\circ}\text{C}$<br>$t_P = 10\text{ ms}$ , $T_{vj} = 150^{\circ}\text{C}$ | $I^2t$      | 1250<br>800 | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$ |

**Charakteristische Werte / Characteristic Values**

|                                                                           |                                                        |                    | min. | typ. | max. |                    |
|---------------------------------------------------------------------------|--------------------------------------------------------|--------------------|------|------|------|--------------------|
| Durchlassspannung<br>Forward voltage                                      | $T_{vj} = 150^{\circ}\text{C}$ , $I_F = 75\text{ A}$   | $V_F$              |      | 1,15 |      | V                  |
| Schleusenspannung<br>Threshold voltage                                    | $T_{vj} = 150^{\circ}\text{C}$                         | $V_{TO}$           |      | 0,80 |      | V                  |
| Ersatzwiderstand<br>Slope resistance                                      | $T_{vj} = 150^{\circ}\text{C}$                         | $r_T$              |      | 6,00 |      | $\text{m}\Omega$   |
| Sperrstrom<br>Reverse current                                             | $T_{vj} = 150^{\circ}\text{C}$ , $V_R = 1600\text{ V}$ | $I_R$              |      | 3,00 |      | mA                 |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case | pro Diode / per diode                                  | $R_{thJC}$         |      |      | 0,65 | K/W                |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions     |                                                        | $T_{vj\text{ op}}$ |      |      |      | $^{\circ}\text{C}$ |

prepared by: AS

date of publication: 2013-10-02

approved by: RS

revision: 3.1

**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            | $T_C = 80^{\circ}\text{C}, T_{vj\max} = 150^{\circ}\text{C}$<br>$T_C = 25^{\circ}\text{C}, T_{vj\max} = 150^{\circ}\text{C}$ | $I_{C\text{ nom}}$<br>$I_C$ | 40<br>55 | A<br>A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P = 1\text{ ms}$                                                                                                          | $I_{CRM}$                   | 80       | A      |
| Gesamt-Verlustleistung<br>Total power dissipation                        | $T_C = 25^{\circ}\text{C}, T_{vj\max} = 150$                                                                                 | $P_{\text{tot}}$            | 210      | W      |
| 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    | $I_C = 40\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 40\text{ A}, V_{GE} = 15\text{ V}$                                            | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $V_{CE\text{ sat}}$ | 1,80<br>2,15 | 2,30 | V<br>V                         |
| Gate-Schwellenspannung<br>Gate threshold voltage                                | $I_C = 1,50\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$                                                              |                                                                 | $V_{GEth}$          | 5,0          | 5,8  | 6,5 V                          |
| Gateladung<br>Gate charge                                                       | $V_{GE} = -15\text{ V} \dots +15\text{ V}$                                                                                        |                                                                 | $Q_G$               | 0,33         |      | $\mu\text{C}$                  |
| Interner Gatewiderstand<br>Internal gate resistor                               | $T_{vj} = 25^{\circ}\text{C}$                                                                                                     |                                                                 | $R_{Gint}$          | 6,0          |      | $\Omega$                       |
| Eingangskapazität<br>Input capacitance                                          | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                        |                                                                 | $C_{ies}$           | 2,50         |      | nF                             |
| Rückwirkungskapazität<br>Reverse transfer capacitance                           | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$                                        |                                                                 | $C_{res}$           | 0,09         |      | nF                             |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current                | $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$                                                        |                                                                 | $I_{CES}$           |              | 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, induktive Last<br>Turn-on delay time, inductive load | $I_C = 40\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 27\text{ }\Omega$                          | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_{don}$           | 0,09<br>0,09 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Anstiegszeit, induktive Last<br>Rise time, inductive load                       | $I_C = 40\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 27\text{ }\Omega$                          | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_r$               | 0,03<br>0,05 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load | $I_C = 40\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 27\text{ }\Omega$                         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_{doff}$          | 0,42<br>0,52 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Fallzeit, induktive Last<br>Fall time, inductive load                           | $I_C = 40\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 27\text{ }\Omega$                         | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $t_f$               | 0,07<br>0,09 |      | $\mu\text{s}$<br>$\mu\text{s}$ |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse               | $I_C = 40\text{ A}, V_{CE} = 600\text{ V}, L_S = \text{t.b.d. nH}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 27\text{ }\Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $E_{on}$            | 6,00         |      | mJ<br>mJ                       |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse               | $I_C = 40\text{ A}, V_{CE} = 600\text{ V}, L_S = \text{t.b.d. nH}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 27\text{ }\Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $E_{off}$           | 4,20         |      | mJ<br>mJ                       |
| Kurzschlußverhalten<br>SC data                                                  | $V_{GE} \leq 15\text{ V}, V_{CC} = 900\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$                                   | $t_P \leq 10\text{ }\mu\text{s}, T_{vj} = 125^{\circ}\text{C}$  | $I_{SC}$            | 160          |      | A                              |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case       | pro IGBT / per IGBT                                                                                                               |                                                                 | $R_{thJC}$          |              | 0,60 | K/W                            |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions           |                                                                                                                                   |                                                                 | $T_{vj\text{ op}}$  | -40          | 125  | $^{\circ}\text{C}$             |

prepared by: AS

date of publication: 2013-10-02

approved by: RS

revision: 3.1

**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                   |                                                                            | $I_F$     | 25   | A                    |
| Periodischer Spitzenstrom<br>Repetitive peak forward current        | $t_P = 1\text{ ms}$                                                        | $I_{FRM}$ | 50   | A                    |
| Grenzlastintegral<br>$I^2t$ - value                                 | $V_R = 0\text{ V}$ , $t_P = 10\text{ ms}$ , $T_{vj} = 125^{\circ}\text{C}$ | $I^2t$    | 170  | $\text{A}^2\text{s}$ |

**Charakteristische Werte / Characteristic Values**

|                                                                           |                                                                                                                      |                                                                 | min.               | typ.         | max. |                                |
|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|--------------------|--------------|------|--------------------------------|
| Durchlassspannung<br>Forward voltage                                      | $I_F = 25\text{ A}$ , $V_{GE} = 0\text{ V}$<br>$I_F = 25\text{ A}$ , $V_{GE} = 0\text{ V}$                           | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $V_F$              | 1,65<br>1,65 | 2,20 | V<br>V                         |
| Rückstromspitze<br>Peak reverse recovery current                          | $I_F = 25\text{ A}$ , $-di_F/dt = 700\text{ A}/\mu\text{s}$ ( $T_{vj}=125^{\circ}\text{C}$ )<br>$V_R = 600\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $I_{RM}$           | 26,0<br>24,0 |      | A<br>A                         |
| Sperrverzögerungsladung<br>Recovered charge                               | $I_F = 25\text{ A}$ , $-di_F/dt = 700\text{ A}/\mu\text{s}$ ( $T_{vj}=125^{\circ}\text{C}$ )<br>$V_R = 600\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $Q_r$              | 2,80<br>5,00 |      | $\mu\text{C}$<br>$\mu\text{C}$ |
| Abschaltenergie pro Puls<br>Reverse recovery energy                       | $I_F = 25\text{ A}$ , $-di_F/dt = 700\text{ A}/\mu\text{s}$ ( $T_{vj}=125^{\circ}\text{C}$ )<br>$V_R = 600\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$ | $E_{rec}$          | 0,90<br>1,80 |      | mJ<br>mJ                       |
| Wärmewiderstand, Chip bis Gehäuse<br>Thermal resistance, junction to case | pro Diode / per diode                                                                                                |                                                                 | $R_{thJC}$         |              | 1,20 | K/W                            |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions     |                                                                                                                      |                                                                 | $T_{vj\text{ op}}$ | -40          | 125  | $^{\circ}\text{C}$             |

**NTC-Widerstand / NTC-Thermistor****Charakteristische Werte / Characteristic Values**

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

Angaben gemäß gültiger Application Note.

Specification according to the valid application note.

|                 |                                 |
|-----------------|---------------------------------|
| prepared by: AS | date of publication: 2013-10-02 |
| approved by: RS | revision: 3.1                   |

**Modul / Module**

|                                                                                        |                                                                                                                                                          |                                              |                                |           |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------|-----------|
| Isolations-Prüfspannung<br>Isolation test voltage                                      | RMS, f = 50 Hz, t = 1 min.                                                                                                                               | V <sub>ISOL</sub>                            | 2,5                            | kV        |
| Material Modulgrundplatte<br>Material of module baseplate                              |                                                                                                                                                          |                                              | Cu                             |           |
| 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                                                                  |                                              | 10,0                           | mm        |
| Luftstrecke<br>Clearance                                                               | Kontakt - Kühlkörper / terminal to heatsink<br>Kontakt - Kontakt / terminal to terminal                                                                  |                                              | 7,5                            | mm        |
| Vergleichszahl der Kriechwegbildung<br>Comperative tracking index                      |                                                                                                                                                          | CTI                                          | > 225                          |           |
| min. typ. max.                                                                         |                                                                                                                                                          |                                              |                                |           |
| Wärmewiderstand, Gehäuse bis Kühlkörper<br>Thermal resistance, case to heatsink        | pro Modul / per module<br>$\lambda_{\text{Paste}} = 1 \text{ W}/(\text{m}\cdot\text{K}) / \lambda_{\text{grease}} = 1 \text{ W}/(\text{m}\cdot\text{K})$ | R <sub>thCH</sub>                            | 0,009                          | K/W       |
| Modulstreuinduktivität<br>Stray inductance module                                      |                                                                                                                                                          | L <sub>sCE</sub>                             | 60                             | nH        |
| Modulleitungswiderstand, Anschlüsse - Chip<br>Module lead resistance, terminals - chip | T <sub>C</sub> = 25°C, pro Schalter / per switch                                                                                                         | R <sub>CC'+EE'</sub><br>R <sub>AA'+CC'</sub> | 7,00<br>4,00                   | mΩ        |
| Lagertemperatur<br>Storage temperature                                                 |                                                                                                                                                          | T <sub>stg</sub>                             | -40                            | 125 °C    |
| Anzugsdrehmoment f. Modulmontage<br>Mounting torque for modul mounting                 | Schraube M5 - Montage gem. gültiger Applikationsschrift<br>Screw M5 - Mounting according to valid application note                                       | M                                            | 3,00                           | - 6,00 Nm |
| Gewicht<br>Weight                                                                      |                                                                                                                                                          | G                                            | 300                            | g         |

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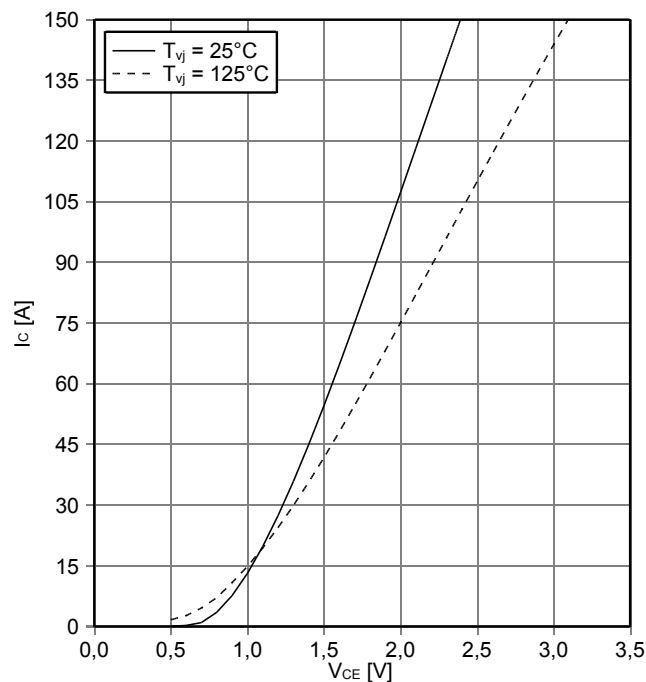
date of publication: 2013-10-02

approved by: RS

revision: 3.1

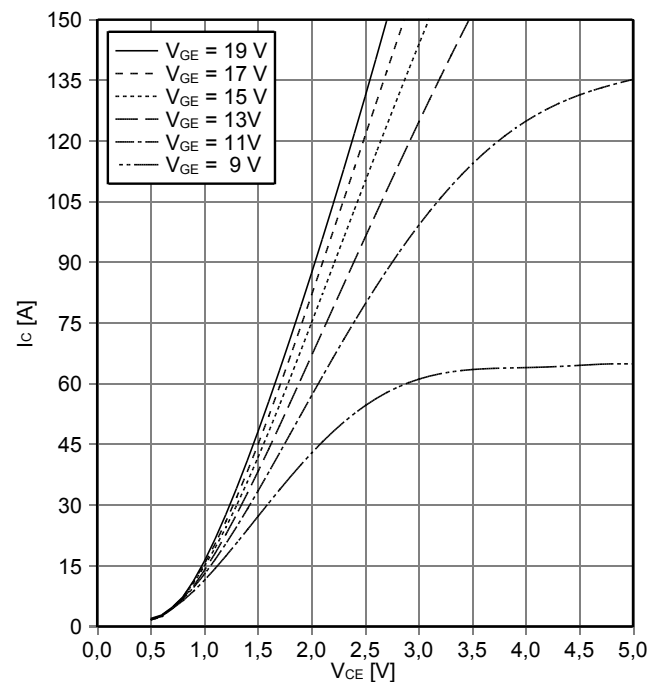
**Ausgangskennlinie IGBT, Wechselrichter (typisch)**  
**output characteristic IGBT, Inverter (typical)**

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



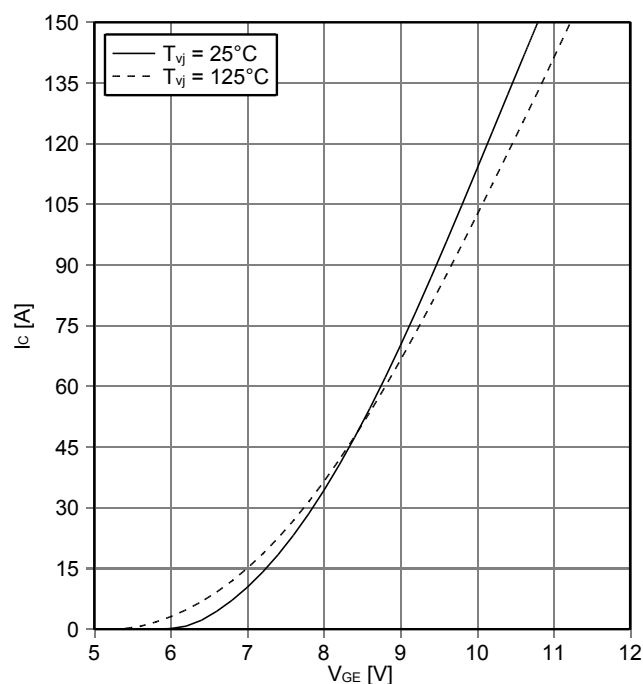
**Ausgangskennlinienfeld IGBT, Wechselrichter (typisch)**  
**output characteristic IGBT, Inverter (typical)**

$I_C = f(V_{CE})$   
 $T_{vj} = 125^\circ\text{C}$



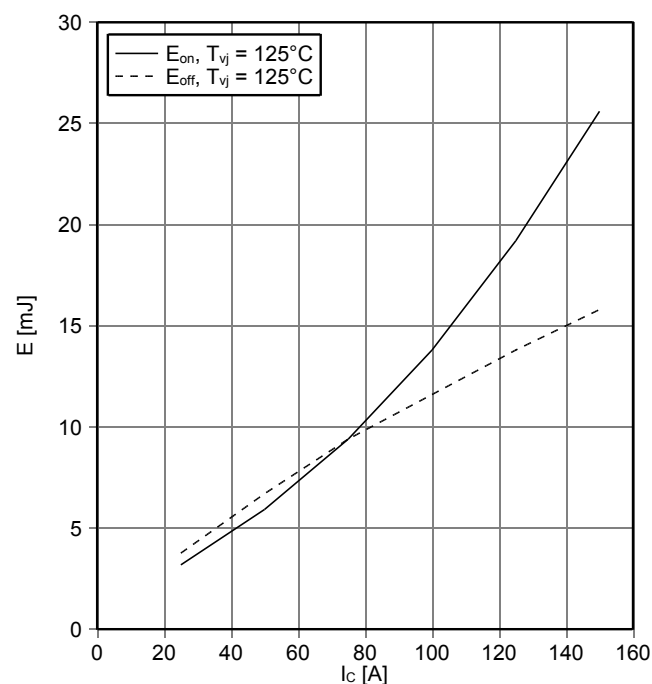
**Übertragungscharakteristik IGBT, Wechselrichter (typisch)**  
**transfer characteristic IGBT, Inverter (typical)**

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



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

$E_{on} = f(I_C)$ ,  $E_{off} = f(I_C)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $R_{Gon} = 4.7 \Omega$ ,  $R_{Goff} = 4.7 \Omega$ ,  $V_{CE} = 600 \text{ V}$



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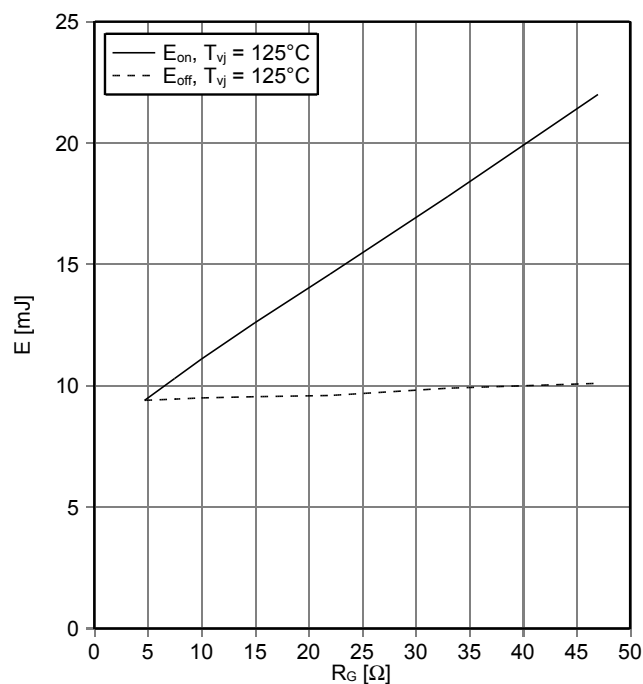
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approved by: RS

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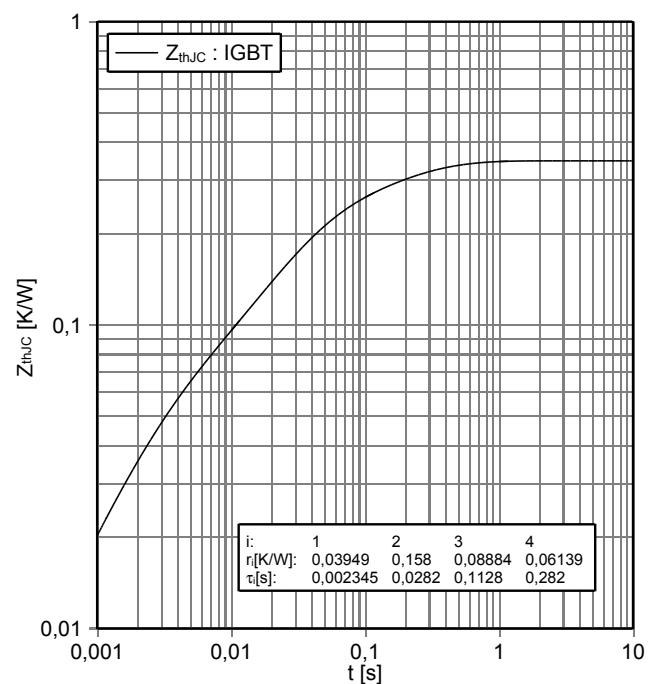
## Schaltverluste IGBT, Wechselrichter (typisch) switching losses IGBT, Inverter (typical)

$E_{on} = f(R_G)$ ,  $E_{off} = f(R_G)$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $I_C = 75 \text{ A}$ ,  $V_{CE} = 600 \text{ V}$



## Transienter Wärmewiderstand IGBT, Wechselrichter transient thermal impedance IGBT, Inverter

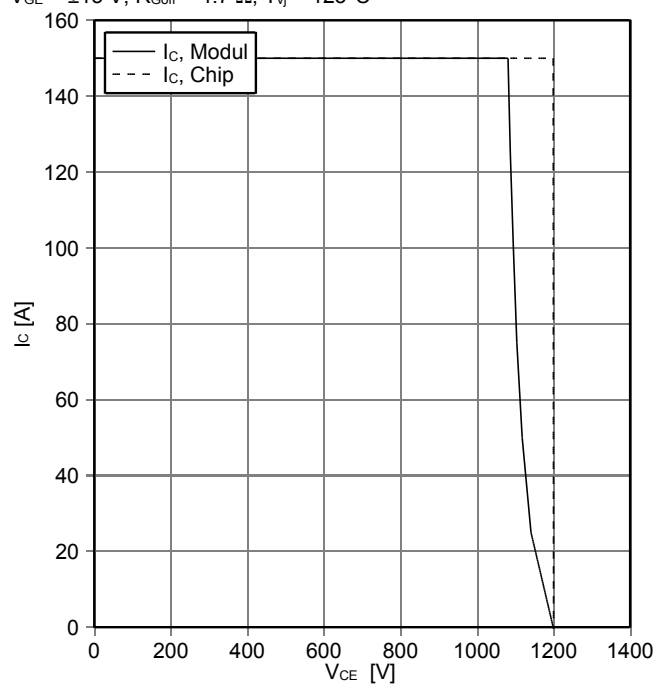
$Z_{thJC} = f(t)$



## Sicherer Rückwärts-Arbeitsbereich IGBT, Wechselrichter (RBSOA)

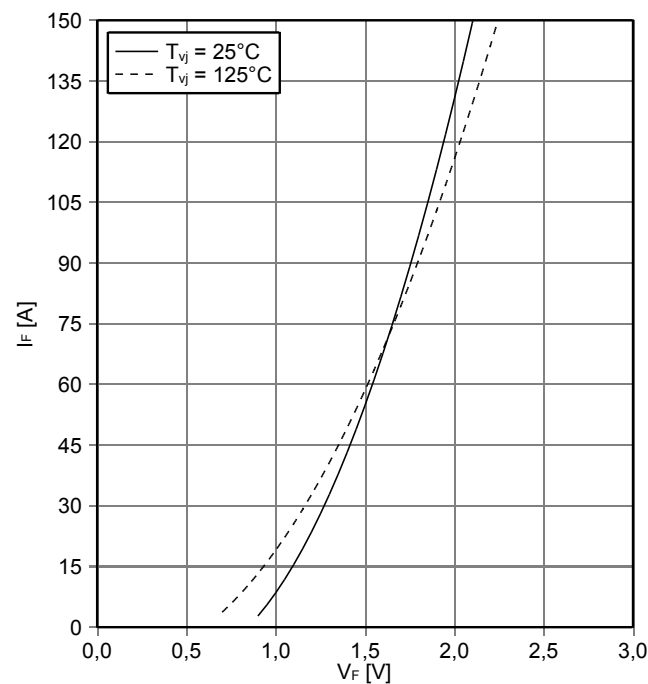
reverse bias safe operating area IGBT, Inverter (RBSOA)

$I_C = f(V_{CE})$   
 $V_{GE} = \pm 15 \text{ V}$ ,  $R_{Goff} = 4.7 \Omega$ ,  $T_{vj} = 125^\circ\text{C}$



## Durchlasskennlinie der Diode, Wechselrichter (typisch) forward characteristic of Diode, Inverter (typical)

$I_F = f(V_F)$

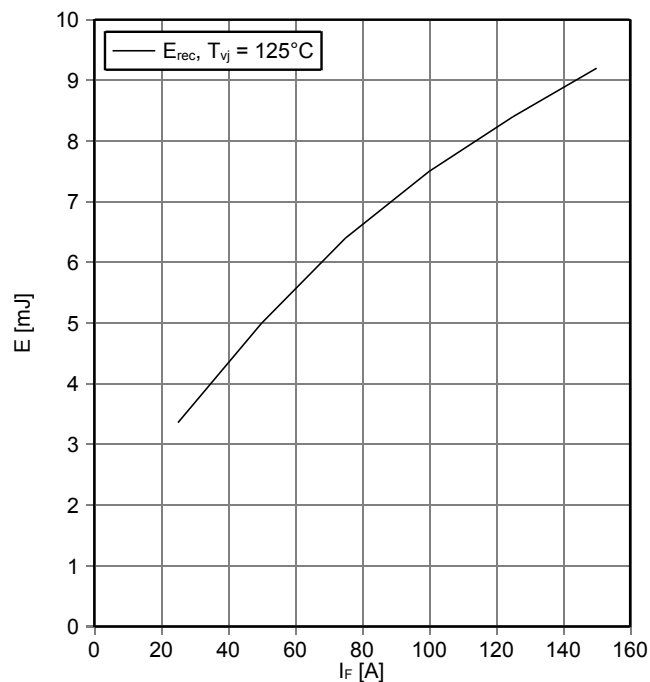
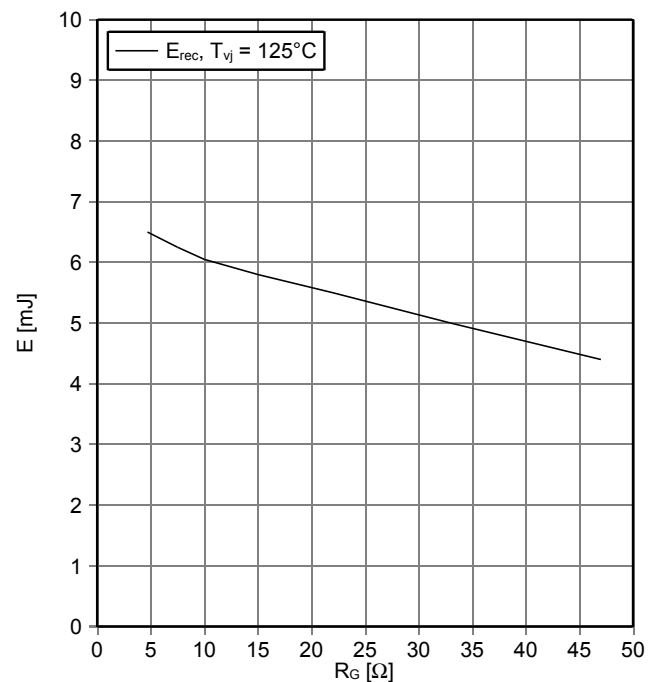
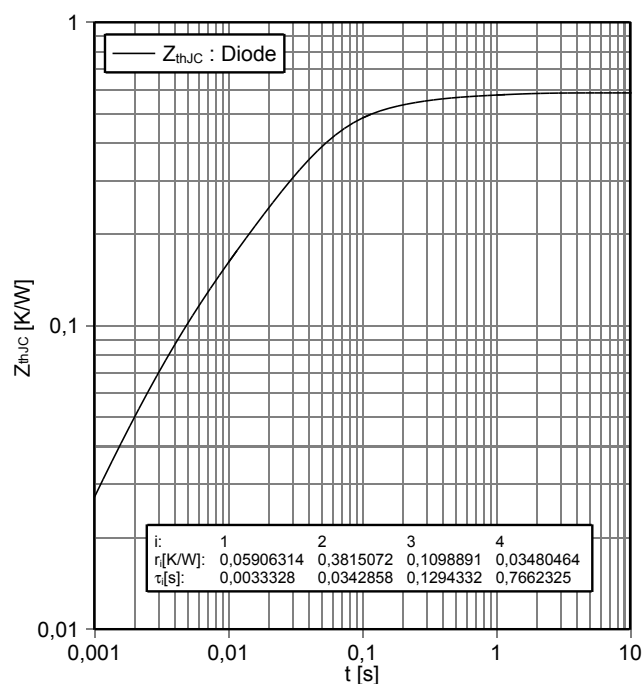
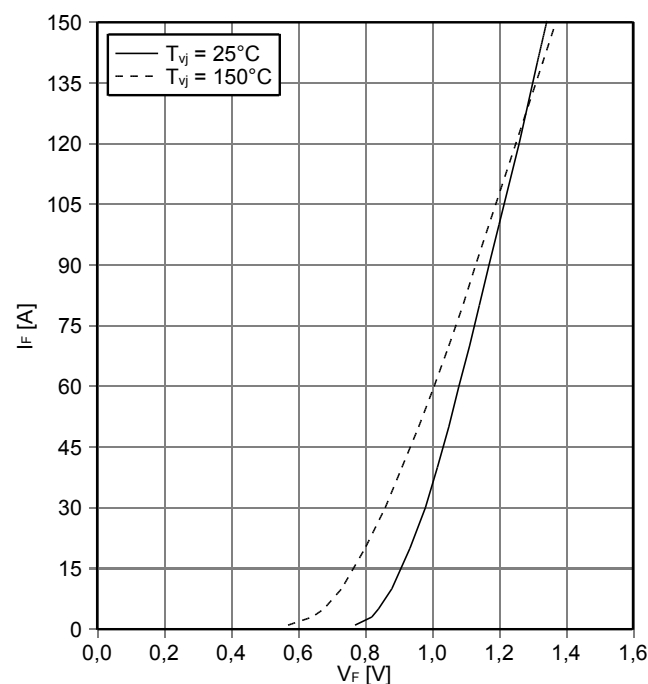


prepared by: AS

date of publication: 2013-10-02

approved by: RS

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**Schaltverluste Diode, Wechselrichter (typisch)**  
**switching losses Diode, Inverter (typical)**
 $E_{rec} = f(I_F)$   
 $R_{Gon} = 4.7 \Omega$ ,  $V_{CE} = 600 V$ 

**Schaltverluste Diode, Wechselrichter (typisch)**  
**switching losses Diode, Inverter (typical)**
 $E_{rec} = f(R_G)$   
 $I_F = 75 A$ ,  $V_{CE} = 600 V$ 

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

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


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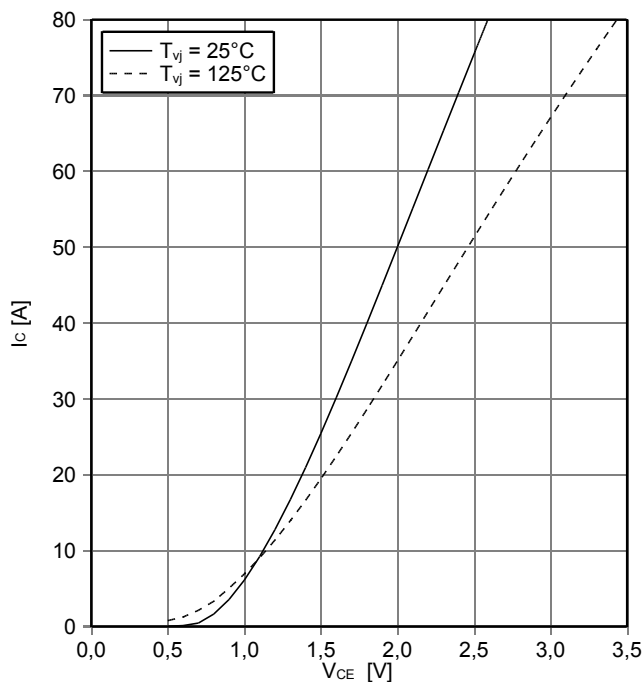
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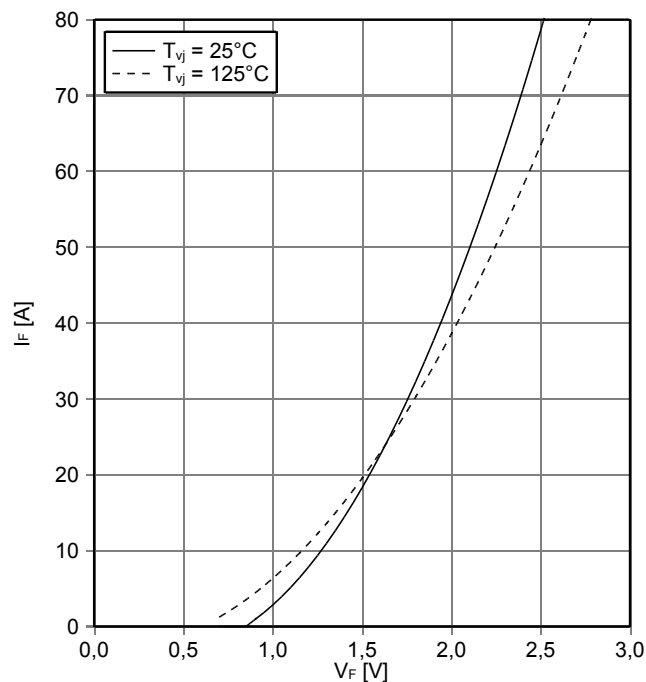
**Ausgangskennlinie IGBT, Brems-Chopper (typisch)**  
**output characteristic IGBT, Brake-Chopper (typical)**

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



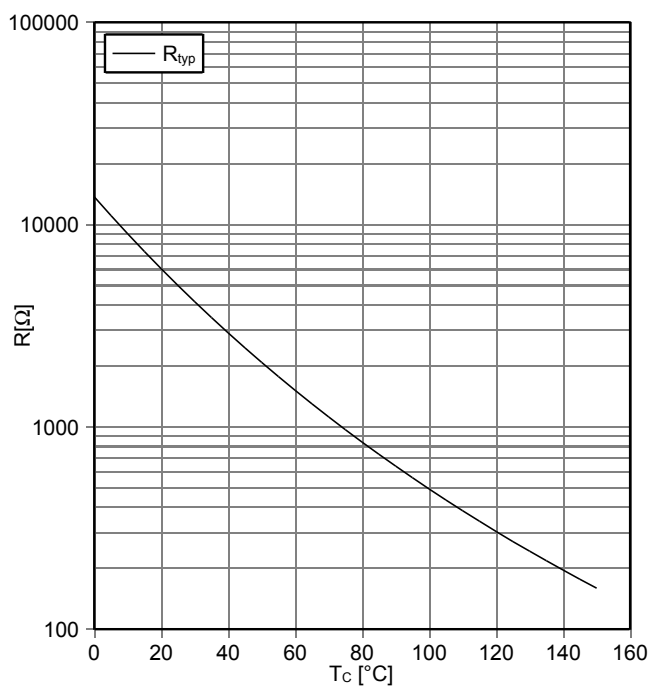
**Durchlasskennlinie der Diode, Brems-Chopper (typisch)**  
**forward characteristic of Diode, Brake-Chopper (typical)**

$I_F = f(V_F)$



**NTC-Widerstand-Temperaturkennlinie (typisch)**  
**NTC-Thermistor-temperature characteristic (typical)**

$R = f(T)$



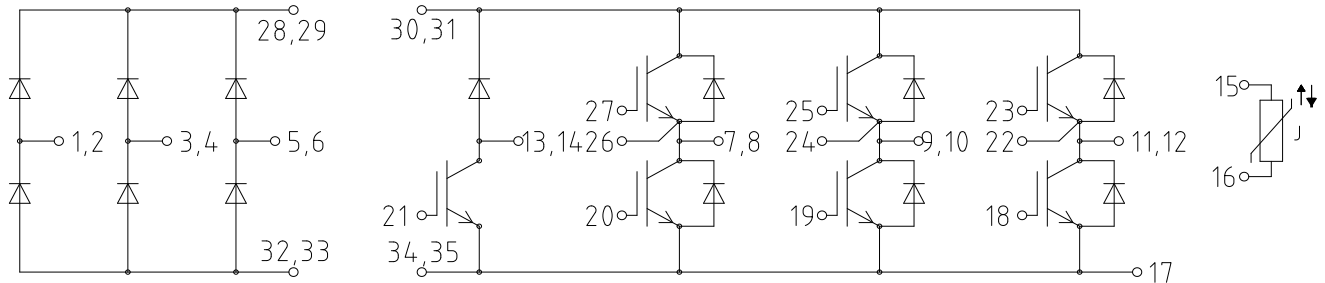
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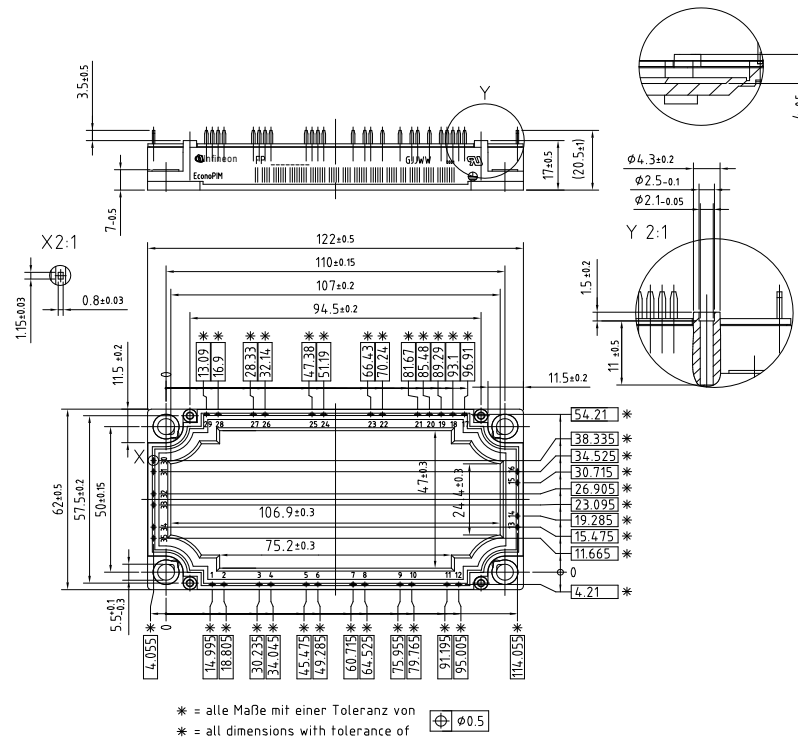
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## Schaltplan / circuit\_diagram\_headline



## Gehäuseabmessungen / package outlines



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