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

## Diode, Wechselrichter / Diode, Inverter

### Höchstzulässige Werte / Maximum Rated Values

| | | | | | |
|---|---|---|---|---|---|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage | $T_{vj}$ = 25°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 ms | $I_{FRM}$ | 20 | | A |
| Grenzlastintegral<br>I²t - value | $V_R$ = 0 V, $t_P$ = 10 ms, $T_{vj}$ = 125°C<br>$V_R$ = 0 V, $t_P$ = 10 ms, $T_{vj}$ = 175°C | I²t | 27,5<br>24,0 | | A²s<br>A²s |

### Charakteristische Werte / Characteristic Values

| | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|
| Durchlassspannung<br>Forward voltage | $I_F$ = 10 A, $V_{GE}$ = 0 V, $T_{vj}$ = 25°C<br>$I_F$ = 10 A, $V_{GE}$ = 0 V, $T_{vj}$ = 125°C<br>$I_F$ = 10 A, $V_{GE}$ = 0 V, $T_{vj}$ = 175°C | $V_F$ | | 1,72<br>1,59<br>1,52 | t.b.d. | V<br>V<br>V |
| Rückstromspitze<br>Peak reverse recovery current | $I_F$ = 10 A, - $di_F/dt$ = 700 A/µs ($T_{vj}$=175°C), $T_{vj}$ = 25°C<br>$V_R$ = 600 V, $T_{vj}$ = 125°C<br>$V_{GE}$ = -15 V, $T_{vj}$ = 175°C | $I_{RM}$ | | 15,5<br>19,2<br>22,5 | | A<br>A<br>A |
| Sperrverzögerungsladung<br>Recovered charge | $I_F$ = 10 A, - $di_F/dt$ = 700 A/µs ($T_{vj}$=175°C), $T_{vj}$ = 25°C<br>$V_R$ = 600 V, $T_{vj}$ = 125°C<br>$V_{GE}$ = -15 V, $T_{vj}$ = 175°C | $Q_r$ | | 0,82<br>1,46<br>2,05 | | µC<br>µC<br>µC |
| Abschaltenergie pro Puls<br>Reverse recovery energy | $I_F$ = 10 A, - $di_F/dt$ = 700 A/µs ($T_{vj}$=175°C), $T_{vj}$ = 25°C<br>$V_R$ = 600 V, $T_{vj}$ = 125°C<br>$V_{GE}$ = -15 V, $T_{vj}$ = 175°C | $E_{rec}$ | | 0,31<br>0,57<br>0,82 | | mJ<br>mJ<br>mJ |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro Diode / per diode | $R_{thJH}$ | | | 2,68 | K/W |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions | | $T_{vj\,op}$ | -40 | | 175 | °C |

## Diode, Gleichrichter / Diode, Rectifier

### Höchstzulässige Werte / Maximum Rated Values

| | | | | | |
|---|---|---|---|---|---|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage | $T_{vj}$ = 25°C | $V_{RRM}$ | 1600 | | V |
| Durchlassstrom Grenzeffektivwert pro Chip<br>Maximum RMS forward current per chip | $T_H$ = 100°C | $I_{FRMSM}$ | 25 | | A |
| Gleichrichter Ausgang Grenzeffektivstrom<br>Maximum RMS current at rectifier output | $T_H$ = 100°C | $I_{RMSM}$ | 25 | | A |
| Stoßstrom Grenzwert<br>Surge forward current | $t_p$ = 10 ms, $T_{vj}$ = 25°C<br>$t_p$ = 10 ms, $T_{vj}$ = 150°C | $I_{FSM}$ | 300<br>245 | | A<br>A |
| Grenzlastintegral<br>I²t - value | $t_p$ = 10 ms, $T_{vj}$ = 25°C<br>$t_p$ = 10 ms, $T_{vj}$ = 150°C | I²t | 450<br>300 | | A²s<br>A²s |

### Charakteristische Werte / Characteristic Values

| | | | min. | typ. | max. | |
|---|---|---|---|---|---|---|
| Durchlassspannung<br>Forward voltage | $T_{vj}$ = 150°C, $I_F$ = 10 A | $V_F$ | | 0,80 | | V |
| Sperrstrom<br>Reverse current | $T_{vj}$ = 150°C, $V_R$ = 1600 V | $I_R$ | | 1,00 | | mA |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro Diode / per diode | $R_{thJH}$ | | | 1,58 | K/W |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions | | $T_{vj\,op}$ | -40 | | 150 | °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°C | $V_{CES}$ | 1200 | | V |
| Kollektor-Dauergleichstrom<br>Continuous DC collector current | $T_H$ = 110°C, $T_{vj\,max}$ = 175°C | $I_{CDC}$ | 15 | | A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P$ = 1 ms | $I_{CRM}$ | 30 | | 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 | $I_C$ = 15 A, $V_{GE}$ = 15 V<br><br><br>$I_C$ = 15 A, $V_{GE}$ = 15 V<br>$I_C$ = 15 A, $V_{GE}$ = 15 V | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 175°C | $V_{CE\,sat}$ | | 1,60<br>1,74<br>1,82 | t.b.d. | V<br>V<br>V |
| Gate-Schwellenspannung<br>Gate threshold voltage | $I_C$ = 0,553 mA, $V_{CE}$ = $V_{GE}$, $T_{vj}$ = 25°C | | $V_{GEth}$ | 5,15 | 5,80 | 6,45 | V |
| Gateladung<br>Gate charge | $V_{GE}$ = -15 / 15 V, $V_{CE}$ = 600 V | | $Q_G$ | | 0,234 | | µC |
| Interner Gatewiderstand<br>Internal gate resistor | $T_{vj}$ = 25°C | | $R_{Gint}$ | | 0,0 | | Ω |
| Eingangskapazität<br>Input capacitance | f = 100 kHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{ies}$ | | 2,82 | | nF |
| Rückwirkungskapazität<br>Reverse transfer capacitance | f = 100 kHz, $T_{vj}$ = 25°C, $V_{CE}$ = 25 V, $V_{GE}$ = 0 V | | $C_{res}$ | | 0,0099 | | nF |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current | $V_{CE}$ = 1200 V, $V_{GE}$ = 0 V, $T_{vj}$ = 25°C | | $I_{CES}$ | | | 0,003 | mA |
| Gate-Emitter-Reststrom<br>Gate-emitter leakage current | $V_{CE}$ = 0 V, $V_{GE}$ = 20 V, $T_{vj}$ = 25°C | | $I_{GES}$ | | | 100 | nA |
| Einschaltverzögerungszeit, induktive Last<br>Turn-on delay time, inductive load | $I_C$ = 15 A, $V_{CE}$ = 600 V<br>$V_{GE}$ = -15 / 15 V<br>$R_{Gon}$ = 7,5 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 175°C | $t_{d\,on}$ | | 0,023<br>0,025<br>0,026 | | µs<br>µs<br>µs |
| Anstiegszeit, induktive Last<br>Rise time, inductive load | $I_C$ = 15 A, $V_{CE}$ = 600 V<br>$V_{GE}$ = -15 / 15 V<br>$R_{Gon}$ = 7,5 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 175°C | $t_r$ | | 0,012<br>0,015<br>0,026 | | µs<br>µs<br>µs |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load | $I_C$ = 15 A, $V_{CE}$ = 600 V<br>$V_{GE}$ = -15 / 15 V<br>$R_{Goff}$ = 7,5 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 175°C | $t_{d\,off}$ | | 0,18<br>0,275<br>0,31 | | µs<br>µs<br>µs |
| Fallzeit, induktive Last<br>Fall time, inductive load | $I_C$ = 15 A, $V_{CE}$ = 600 V<br>$V_{GE}$ = -15 / 15 V<br>$R_{Goff}$ = 7,5 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 175°C | $t_f$ | | 0,23<br>0,36<br>0,42 | | µs<br>µs<br>µs |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse | $I_C$ = 15 A, $V_{CE}$ = 600 V, Lσ = 35 nH<br>di/dt = 750 A/µs ($T_{vj}$ = 175°C)<br>$V_{GE}$ = -15 / 15 V, $R_{Gon}$ = 7,5 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 175°C | $E_{on}$ | | 0,87<br>1,21<br>1,45 | | mJ<br>mJ<br>mJ |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse | $I_C$ = 15 A, $V_{CE}$ = 600 V, Lσ = 35 nH<br>du/dt = 2400 V/µs ($T_{vj}$ = 175°C)<br>$V_{GE}$ = -15 / 15 V, $R_{Goff}$ = 7,5 Ω | $T_{vj}$ = 25°C<br>$T_{vj}$ = 125°C<br>$T_{vj}$ = 175°C | $E_{off}$ | | 1,24<br>1,90<br>2,25 | | mJ<br>mJ<br>mJ |
| Kurzschlußverhalten<br>SC data | $V_{GE}$ ≤ 15 V, $V_{CC}$ = 800 V<br>$V_{CEmax}$ = $V_{CES}$ -$L_{sCE}$ ·di/dt | $t_P$ ≤ 8 µs, $T_{vj}$ = 150°C<br>$t_P$ ≤ 7 µs, $T_{vj}$ = 175°C | $I_{SC}$ | | 48<br>45 | | A<br>A |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro IGBT / per IGBT | | $R_{thJH}$ | | | 1,86 | K/W |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions | | | $T_{vj\,op}$ | -40 | | 175 | °C |