

## 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                   |  | $I_F$     | 35   | A                    |
| Periodischer Spitzenstrom<br>Repetitive peak forward current        | $t_p = 1\text{ ms}$  | $I_{FRM}$ | 70   | A                    |
| Grenzlastintegral<br>$I^2t$ - value                                 | $V_R = 0\text{ V}, t_p = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ | $I^2t$    | 240  | $\text{A}^2\text{s}$ |
|   | $V_R = 0\text{ V}, t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ |           | 220  | $\text{A}^2\text{s}$ |

### Charakteristische Werte / Characteristic Values

|  |   |                                | min.               | typ. | max. |                    |
|--|---|--------------------------------|--------------------|------|------|--------------------|
| Durchlassspannung<br>Forward voltage   | $I_F = 35\text{ A}, V_{GE} = 0\text{ V}$  | $T_{vj} = 25^{\circ}\text{C}$  | $V_F$              | 1,65 | 2,15 | V                  |
|  | $I_F = 35\text{ A}, V_{GE} = 0\text{ V}$  | $T_{vj} = 125^{\circ}\text{C}$ |                    | 1,65 |      | V                  |
|  | $I_F = 35\text{ A}, V_{GE} = 0\text{ V}$  | $T_{vj} = 150^{\circ}\text{C}$ |                    | 1,65 |      | V                  |
| Rückstromspitze<br>Peak reverse recovery current                                 | $I_F = 35\text{ A}, -di_F/dt = 2500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$  | $I_{RM}$           | 81,0 |      | A                  |
|  |   | $T_{vj} = 125^{\circ}\text{C}$ |                    | 85,0 |      | A                  |
|  |   | $T_{vj} = 150^{\circ}\text{C}$ |                    | 88,0 |      | A                  |
| Sperrverzögerungsladung<br>Recovered charge                                      | $I_F = 35\text{ A}, -di_F/dt = 2500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$  | $Q_r$              | 3,95 |      | $\mu\text{C}$      |
|  |   | $T_{vj} = 125^{\circ}\text{C}$ |                    | 6,80 |      | $\mu\text{C}$      |
|  |   | $T_{vj} = 150^{\circ}\text{C}$ |                    | 7,50 |      | $\mu\text{C}$      |
| Abschaltenergie pro Puls<br>Reverse recovery energy                              | $I_F = 35\text{ A}, -di_F/dt = 2500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$<br>$V_R = 600\text{ V}$<br>$V_{GE} = -15\text{ V}$ | $T_{vj} = 25^{\circ}\text{C}$  | $E_{rec}$          | 1,50 |      | mJ                 |
|  |   | $T_{vj} = 125^{\circ}\text{C}$ |                    | 2,70 |      | mJ                 |
|  |   | $T_{vj} = 150^{\circ}\text{C}$ |                    | 2,95 |      | mJ                 |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro Diode / per diode<br>valid with IFX pre-applied thermal interface material  |                                | $R_{thJH}$         |      | 1,29 | K/W                |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |   |                                | $T_{vj\text{ op}}$ | -40  | 150  | $^{\circ}\text{C}$ |

## Diode, Gleichrichter / Diode, Rectifier

### Höchstzulässige Werte / Maximum Rated Values

|   |   |             |      |                      |
|---|---|-------------|------|----------------------|
| Periodische Spitzensperrspannung<br>Repetitive peak reverse voltage                 | $T_{vj} = 25^{\circ}\text{C}$   | $V_{RRM}$   | 1600 | V                    |
| Durchlassstrom Grenzeffektivwert pro Chip<br>Maximum RMS forward current per chip   | $T_H = 60^{\circ}\text{C}$  | $I_{FRMSM}$ | 60   | A                    |
| Gleichrichter Ausgang Grenzeffektivstrom<br>Maximum RMS current at rectifier output | $T_H = 60^{\circ}\text{C}$  | $I_{RMSM}$  | 60   | A                    |
| Stoßstrom Grenzwert<br>Surge forward current  | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I_{FSM}$   | 450  | A                    |
|   |   |             | 370  | A                    |
| Grenzlastintegral<br>$I^2t$ - value   | $t_p = 10\text{ ms}, T_{vj} = 25^{\circ}\text{C}$<br>$t_p = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$ | $I^2t$      | 1000 | $\text{A}^2\text{s}$ |
|   |   |             | 685  | $\text{A}^2\text{s}$ |

### Charakteristische Werte / Characteristic Values

|  |  |       | min.               | typ. | max. |                    |
|--|--|-------|--------------------|------|------|--------------------|
| Durchlassspannung<br>Forward voltage   | $T_{vj} = 150^{\circ}\text{C}, I_F = 35\text{ A}$                              | $V_F$ |                    | 0,95 |      | V                  |
| Sperrstrom<br>Reverse current  | $T_{vj} = 150^{\circ}\text{C}, V_R = 1600\text{ V}$                            | $I_R$ |                    | 1,00 |      | mA                 |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro Diode / per diode<br>valid with IFX pre-applied thermal interface material |       | $R_{thJH}$         |      | 1,42 | K/W                |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |  |       | $T_{vj\text{ op}}$ | -40  | 150  | $^{\circ}\text{C}$ |

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

|  |  |                   |       |   |
|--|--|-------------------|-------|---|
| Kollektor-Emitter-Sperrspannung<br>Collector-emitter voltage             | $T_{vj} = 25^{\circ}\text{C}$                                | $V_{CES}$         | 1200  | V |
| Kollektor-Dauergleichstrom<br>Continuous DC collector current            | $T_H = 80^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$ | $I_{C\text{nom}}$ | 35    | A |
| Periodischer Kollektor-Spitzenstrom<br>Repetitive peak collector current | $t_P = 1\text{ ms}$  | $I_{CRM}$         | 70    | 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     | $I_C = 35\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 35\text{ A}, V_{GE} = 15\text{ V}$<br>$I_C = 35\text{ A}, V_{GE} = 15\text{ V}$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $V_{CE\text{sat}}$ | 1,85<br>2,15<br>2,25    | 2,25 | V<br>V<br>V |   |
| Gate-Schwellenspannung<br>Gate threshold voltage                                 | $I_C = 1,20\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$  |   | $V_{GEth}$         | 5,20                    | 5,80 | 6,40        | V   |
| Gateladung<br>Gate charge  | $V_{GE} = -15\text{ V} \dots +15\text{ V}$  |   | $Q_G$              | 0,27                    |      |             | $\mu\text{C}$                                   |
| Interner Gatewiderstand<br>Internal gate resistor                                | $T_{vj} = 25^{\circ}\text{C}$   |   | $R_{Gint}$         | 0,0                     |      |             | $\Omega$  |
| Eingangskapazität<br>Input capacitance   | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$  |   | $C_{ies}$          | 2,00                    |      |             | nF  |
| Rückwirkungskapazität<br>Reverse transfer capacitance                            | $f = 1\text{ MHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$  |   | $C_{res}$          | 0,07                    |      |             | nF  |
| Kollektor-Emitter-Reststrom<br>Collector-emitter cut-off current                 | $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_{vj} = 25^{\circ}\text{C}$  |   | $I_{CES}$          |                         |      | 1,0         | mA  |
| Gate-Emitter-Reststrom<br>Gate-emitter leakage current                           | $V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$  |   | $I_{GES}$          |                         |      | 100         | nA  |
| Einschaltverzögerungszeit, induktive Last<br>Turn-on delay time, inductive load  | $I_C = 35\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 47\ \Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{don}$          | 0,07<br>0,07<br>0,07    |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Anstiegszeit, induktive Last<br>Rise time, inductive load                        | $I_C = 35\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Gon} = 47\ \Omega$  | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_r$              | 0,045<br>0,05<br>0,057  |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Abschaltverzögerungszeit, induktive Last<br>Turn-off delay time, inductive load  | $I_C = 35\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 47\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_{doff}$         | 0,28<br>0,44<br>0,45    |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Fallzeit, induktive Last<br>Fall time, inductive load                            | $I_C = 35\text{ A}, V_{CE} = 600\text{ V}$<br>$V_{GE} = \pm 15\text{ V}$<br>$R_{Goff} = 47\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $t_f$              | 0,115<br>0,175<br>0,205 |      |             | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| Einschaltverlustenergie pro Puls<br>Turn-on energy loss per pulse                | $I_C = 35\text{ A}, V_{CE} = 600\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, di/dt = 350\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Gon} = 47\ \Omega$   | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{on}$           | 5,00<br>6,50<br>7,00    |      |             | mJ<br>mJ<br>mJ                                  |
| Abschaltverlustenergie pro Puls<br>Turn-off energy loss per pulse                | $I_C = 35\text{ A}, V_{CE} = 600\text{ V}, L_S = 35\text{ nH}$<br>$V_{GE} = \pm 15\text{ V}, du/dt = 3500\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$<br>$R_{Goff} = 47\ \Omega$ | $T_{vj} = 25^{\circ}\text{C}$<br>$T_{vj} = 125^{\circ}\text{C}$<br>$T_{vj} = 150^{\circ}\text{C}$ | $E_{off}$          | 2,10<br>3,05<br>3,35    |      |             | mJ<br>mJ<br>mJ                                  |
| Kurzschlußverhalten<br>SC data   | $V_{GE} \leq 15\text{ V}, V_{CC} = 800\text{ V}$<br>$V_{CEmax} = V_{CES} - L_{SCE} \cdot di/dt$ $t_P \leq 10\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$                                  |   | $I_{SC}$           | 130                     |      |             | A   |
| Wärmewiderstand, Chip bis Kühlkörper<br>Thermal resistance, junction to heatsink | pro IGBT / per IGBT<br>valid with IFX pre-applied thermal interface material  |   | $R_{thJH}$         |                         |      | 1,00        | K/W   |
| Temperatur im Schaltbetrieb<br>Temperature under switching conditions            |   |   | $T_{vj\text{op}}$  | -40                     |      | 150         | $^{\circ}\text{C}$                              |