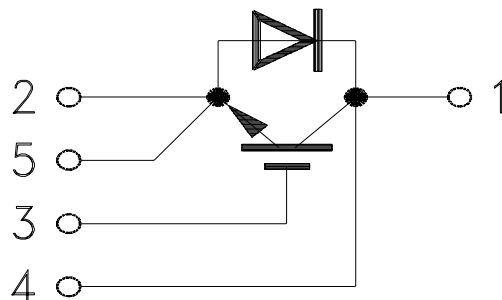
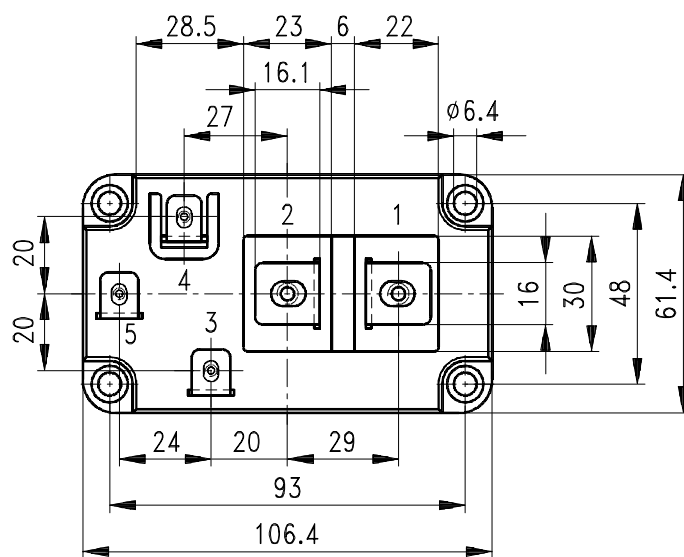
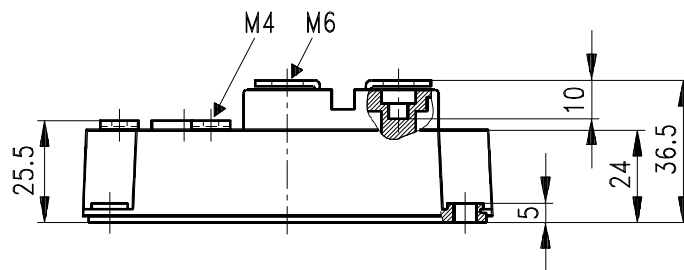




European Power-Semiconductor and Electronics Company

Marketing Information BSM 400 GA 170 DLS



BSM 400 GA 170 DLS

Höchstzulässige Werte / Maximum rated values

Elektrische Eigenschaften / Electrical properties

| | | vorläufige Daten preliminary data | |
|-------------------------------------|-----------------------------------|------------------------------------------------------------------|-------------------------------|
| Kollektor-Emitter-Sperrspannung | collector-emitter voltage | $T_C = 80^\circ\text{C}$ | V_{CES} 1700 V |
| Kollektor-Dauergleichstrom | DC-collector current | $T_C = 25^\circ\text{C}$ | $I_{C,nom.}$ 400 A |
| Periodischer Kollektor Spitzenstrom | repetitive peak collector current | $t_p = 1\text{ ms}, T_C = 80^\circ\text{C}$ | I_C 800 A |
| Gesamt-Verlustleistung | total power dissipation | $T_C = 25^\circ\text{C}, \text{ Transistor}$ | I_{CRM} 800 A |
| Gate-Emitter-Spitzenspannung | gate-emitter peak voltage | | P_{tot} 3120 W |
| Dauergleichstrom | DC forward current | | V_{GES} $\pm 20\text{ V}$ |
| Periodischer Spitzenstrom | repetitive peak forw. current | $t_p = 1\text{ ms}$ | I_F 400 A |
| Grenzlastintegral der Diode | I^2t - value, Diode | $V_R = 0\text{V}, t_p = 10\text{ms}, T_{vj} = 125^\circ\text{C}$ | I_{FRM} 800 A |
| Isolations-Prüfspannung | insulation test voltage | RMS, $f = 50\text{ Hz}, t = 1\text{ min.}$ | I^2t 72000 A ² s |
| | | | V_{ISOL} 3,4 kV |

Charakteristische Werte / Characteristic values: Transistor

| | | min. typ. max. | | |
|--------------------------------------------|--------------------------------------|---------------------------------------------------------------------------------------|---------------|------------------------|
| Kollektor-Emitter Sättigungsspannung | collector-emitter saturation voltage | $I_C = 400\text{A}, V_{GE} = 15\text{V}, T_{vj} = 25^\circ\text{C}$ | $V_{CE\ sat}$ | - 2,7 3,3 V |
| | | $I_C = 400\text{A}, V_{GE} = 15\text{V}, T_{vj} = 125^\circ\text{C}$ | | - 3,2 - V |
| Gate-Schwellenspannung | gate threshold voltage | $I_C = 18\text{mA}, V_{CE} = V_{GE}, T_{vj} = 25^\circ\text{C}$ | $V_{GE(th)}$ | 4,5 5,5 6,5 V |
| Eingangskapazität | input capacitance | $f = 1\text{MHz}, T_{vj} = 25^\circ\text{C}, V_{CE} = 25\text{V}, V_{GE} = 0\text{V}$ | C_{ies} | - 27 - nF |
| Kollektor-Emitter Reststrom | collector-emitter cut-off current | $V_{CE} = 1700\text{V}, V_{GE} = 0\text{V}, T_{vj} = 25^\circ\text{C}$ | I_{CES} | - 0,1 1 mA |
| | | $V_{CE} = 1700\text{V}, V_{GE} = 0\text{V}, T_{vj} = 125^\circ\text{C}$ | | - 12 - mA |
| Gate-Emitter Reststrom | gate-emitter leakage current | $V_{CE} = 0\text{V}, V_{GE} = 20\text{V}, T_{vj} = 25^\circ\text{C}$ | I_{GES} | - - 200 nA |
| Einschaltverzögerungszeit (induktive Last) | turn-on delay time (inductive load) | $I_C = 400\text{A}, V_{CE} = 900\text{V}$ | $t_{d,on}$ | - - - |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 25^\circ\text{C}$ | | - 0,1 - μs |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 125^\circ\text{C}$ | | - 0,1 - μs |
| Anstiegszeit (induktive Last) | rise time (inductive load) | $I_C = 400\text{A}, V_{CE} = 900\text{V}$ | t_r | - - - |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 25^\circ\text{C}$ | | - 0,1 - μs |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 125^\circ\text{C}$ | | - 0,1 - μs |
| Abschaltverzögerungszeit (ind. Last) | turn off delay time (inductive load) | $I_C = 400\text{A}, V_{CE} = 900\text{V}$ | $t_{d,off}$ | - - - |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 25^\circ\text{C}$ | | - 0,8 - μs |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 125^\circ\text{C}$ | | - 0,9 - μs |
| Fallzeit (induktive Last) | fall time (inductive load) | $I_C = 400\text{A}, V_{CE} = 900\text{V}$ | t_f | - - - |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 25^\circ\text{C}$ | | - 0,03 - μs |
| | | $V_{GE} = \pm 15\text{V}, R_G = 3,9\Omega, T_{vj} = 125^\circ\text{C}$ | | - 0,03 - μs |
| Einschaltverlustenergie pro Puls | turn-on energy loss per pulse | $I_C = 400\text{A}, V_{CE} = 900\text{V}, V_{GE} = 15\text{V}$ | E_{on} | - - - |
| | | $R_G = 3,9\Omega, T_{vj} = 125^\circ\text{C}, L_S = 60\text{nH}$ | | - 170 - mWs |
| Abschaltverlustenergie pro Puls | turn-off energy loss per pulse | $I_C = 400\text{A}, V_{CE} = 900\text{V}, V_{GE} = 15\text{V}$ | E_{off} | - - - |
| | | $R_G = 3,9\Omega, T_{vj} = 125^\circ\text{C}, L_S = 60\text{nH}$ | | - 135 - mWs |
| Kurzschlußverhalten | SC Data | $t_p \leq 10\mu\text{sec}, V_{GE} \leq 15\text{V}, R_G = 3,9\Omega$ | I_{SC} | - - - |
| | | $T_{vj} \leq 125^\circ\text{C}, V_{CC} = 1000\text{V}$ | | - 1600 - A |
| | | $V_{CEmax} = V_{CES} - L_{sCE} \times di/dt$ | | |
| Modulinduktivität | stray inductance module | | L_{sCE} | - 15 - nH |

Charakteristische Werte / Characteristic values: Diode

| | | | | |
|--------------------------|-------------------------------|-----------------------------------------------------------------------|-----------|------------------------|
| Durchlaßspannung | forward voltage | $I_F = 400\text{A}, V_{GE} = 0\text{V}, T_{vj} = 25^\circ\text{C}$ | V_F | - 2,2 2,6 V |
| | | $I_F = 400\text{A}, V_{GE} = 0\text{V}, T_{vj} = 125^\circ\text{C}$ | | - 2 - V |
| Rückstromspitze | peak reverse recovery current | $I_F = 400\text{A}, -di_F/dt = 6000\text{A}/\mu\text{sec}$ | I_{RM} | - - - |
| | | $V_R = 900\text{V}, V_{GE} = -10\text{V}, T_{vj} = 25^\circ\text{C}$ | | - 260 - A |
| | | $V_R = 900\text{V}, V_{GE} = -10\text{V}, T_{vj} = 125^\circ\text{C}$ | | - 400 - A |
| Sperrverzögerungsladung | recovered charge | $I_F = 400\text{A}, -di_F/dt = 6000\text{A}/\mu\text{sec}$ | Q_r | - - - |
| | | $V_R = 900\text{V}, V_{GE} = -10\text{V}, T_{vj} = 25^\circ\text{C}$ | | - 45 - μAs |
| | | $V_R = 900\text{V}, V_{GE} = -10\text{V}, T_{vj} = 125^\circ\text{C}$ | | - 100 - μAs |
| Abschaltenergie pro Puls | reverse recovery energy | $I_F = 400\text{A}, -di_F/dt = 6000\text{A}/\mu\text{sec}$ | E_{rec} | - - - |
| | | $V_R = 900\text{V}, V_{GE} = -10\text{V}, T_{vj} = 25^\circ\text{C}$ | | - 21 - mWs |
| | | $V_R = 900\text{V}, V_{GE} = -10\text{V}, T_{vj} = 125^\circ\text{C}$ | | - 43 - mWs |

Thermische Eigenschaften / Thermal properties

| | | | | |
|-----------------------------------|--------------------------------------|----------------------------------------------------------------|------------|----------------------------|
| Innerer Wärmewiderstand | thermal resistance, junction to case | Transistor / transistor, DC | R_{thJC} | - - 0,04 K/W |
| | | Diode / diode, DC | | - - 0,075 K/W |
| Übergangs-Wärmewiderstand | thermal resistance, case to heatsink | pro Module / per Module | R_{thCK} | - - - |
| | | $d_{paste} \leq 50\mu\text{m} / d_{grease} \leq 50\mu\text{m}$ | | - - 0,012 K/W |
| Höchstzul. Sperrschichttemperatur | max. junction temperature | | T_{vj} | - - 150 $^\circ\text{C}$ |
| Betriebstemperatur | operating temperature | | T_{op} | -40 - 125 $^\circ\text{C}$ |
| Lagertemperatur | storage temperature | | T_{stg} | -40 - 125 $^\circ\text{C}$ |

Mechanische Eigenschaften / Mechanical properties

| | | | | |
|----------------------------------------|----------------------------|--------------|------|-------------------------|
| Innere Isolation | internal insulation | | | Al_2O_3 |
| Kriechstrecke | creepage distance | | | 20 mm |
| Luftstrecke | clearance | | | 11 mm |
| CTI | comperative tracking index | | | |
| Anzugsdrehmoment f. mech. Befestigung | mounting torque | | max. | 5 Nm |
| Anzugsdrehmoment f. elektr. Anschlüsse | terminal connection torque | terminals M4 | max. | 2 Nm |
| | | terminals M6 | max. | 5 Nm |
| Gewicht | weight | | G | 420 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.

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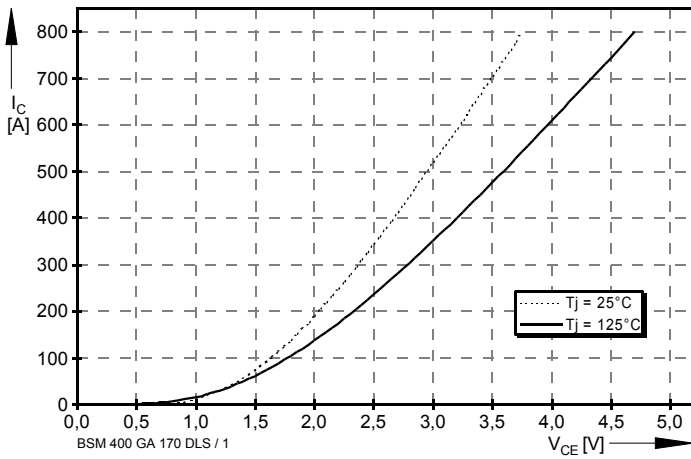


Bild / Fig. 1
Ausgangskennlinie (typisch) /
Output characteristic (typical)
 $I_C = f(V_{CE})$
 $V_{GE} = 15V$

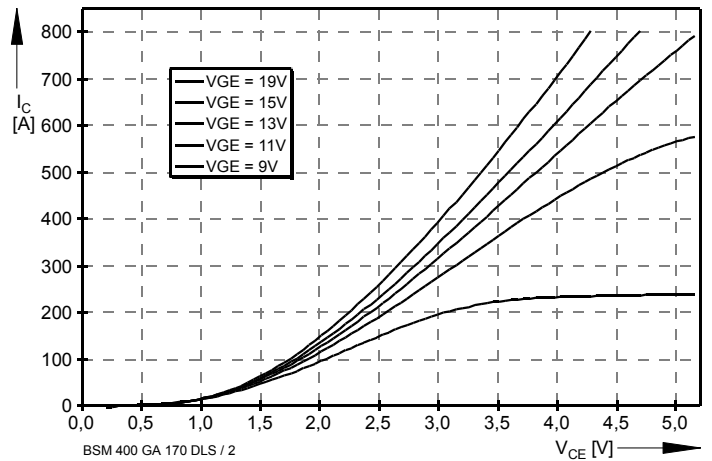


Bild / Fig. 2
Ausgangskennlinienfeld (typisch) /
Output characteristic (typical)
 $I_C = f(V_{CE})$
 $T_{vj} = 125^\circ C$

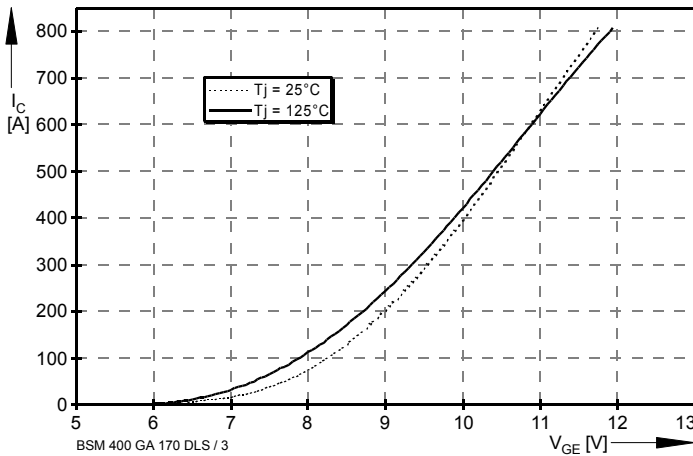


Bild / Fig. 3
Übertragungscharakteristik (typisch) /
Transfer characteristic (typical)
 $I_C = f(V_{GE})$
 $V_{CE} = 20V$

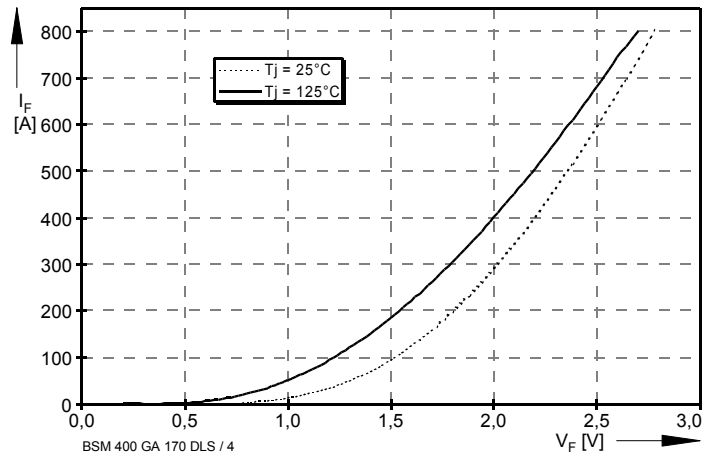


Bild / Fig. 4
Durchlaßkennlinie der Inversdiode (typisch) /
Forward characteristic of inverse diode (typical)
 $I_F = f(V_F)$

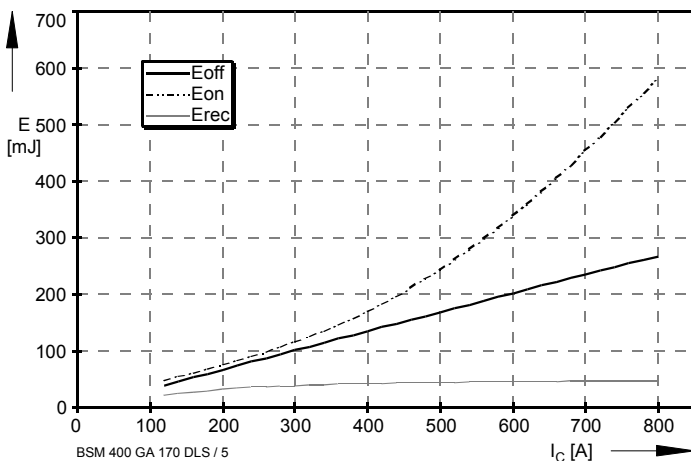


Bild / Fig. 5
Schaltverluste (typisch) /
Switching losses (typical)
 $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, $E_{rec} = f(I_C)$
 $R_{gon} = R_{goff} = 3,9\Omega$, $V_{CE} = 900V$, $T_j = 125^\circ C$

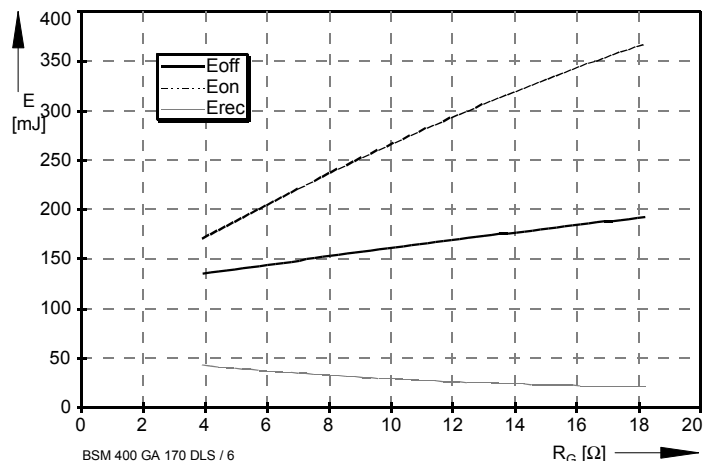


Bild / Fig. 6
Schaltverluste (typisch) /
Switching losses (typical)
 $E_{on} = f(R_G)$, $E_{off} = f(R_G)$, $E_{rec} = f(R_G)$
 $I_C = 400A$, $V_{CE} = 900V$, $T_j = 125^\circ C$

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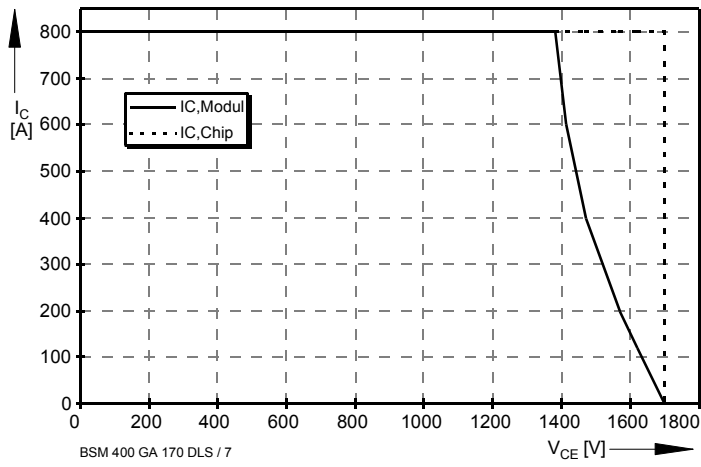


Bild / Fig. 7
Sicherer Arbeitsbereich (RBSOA) /
Reverse bias safe operation area (RBSOA)
 $R_g = 3,9\Omega$, $T_{vj} = 125^\circ\text{C}$