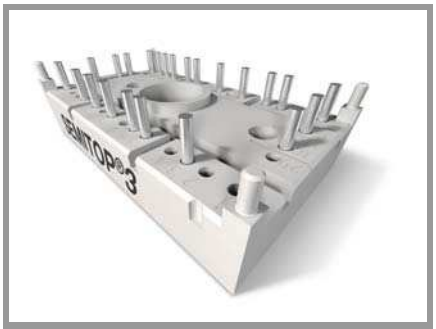
# SK 35 BGB 12T4



**SEMITOP® 3**

IGBT module with single phase bridge rectifier

**SK 35 BGB 12T4**

### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- High short circuit capability
- Trench4 IGBT technology
- CAL4F diode technology

### Typical Applications*

- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS

**Absolute Maximum Ratings**

| Symbol | Conditions | | Values | Unit |
|---|---|---|---|---|
| **IGBT 1** | | | | |
| $V_{CES}$ | $T_j$ = 25 °C | | 1200 | V |
| $I_C$ | $T_j$ = 150 °C | $T_s$ = 25 °C | 32 | A |
| | | $T_s$ = 70 °C | 25 | A |
| $I_C$ | $T_j$ = 175 °C | $T_s$ = 25 °C | 35 | A |
| | | $T_s$ = 70 °C | 29 | A |
| $I_{Cnom}$ | | | 25 | A |
| $I_{CRM}$ | $I_{CRM}$ = 3 x $I_{Cnom}$ | | 75 | A |
| $V_{GES}$ | | | -20 ... 20 | V |
| $t_{psc}$ | $V_{CC}$ = 800 V<br>$V_{GE} \leq$ 15 V<br>$V_{CES} \leq$ 1200 V | $T_j$ = 150 °C | 10 | µs |
| $T_j$ | | | -40 ... 175 | °C |

**Absolute Maximum Ratings**

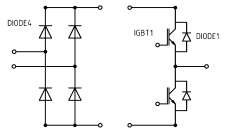
| Symbol | Conditions | | Values | Unit |
|---|---|---|---|---|
| **Diode 1** | | | | |
| $V_{RRM}$ | $T_j$ = 25 °C | | 1200 | V |
| $I_F$ | $T_j$ = 150 °C | $T_s$ = 25 °C | 25 | A |
| | | $T_s$ = 70 °C | 19 | A |
| $I_F$ | $T_j$ = 175 °C | $T_s$ = 25 °C | 28 | A |
| | | $T_s$ = 70 °C | 22 | A |
| $I_{Fnom}$ | | | 25 | A |
| $I_{FRM}$ | $I_{FRM}$ = 3 x $I_{Fnom}$ | | 75 | A |
| $I_{FSM}$ | 10 ms, sin 180°, $T_j$ = 150 °C | | 100 | A |
| $T_j$ | | | -40 ... 175 | °C |

**Absolute Maximum Ratings**

| Symbol | Conditions | | Values | Unit |
|---|---|---|---|---|
| **Diode 4** | | | | |
| $V_{RRM}$ | | | 1200 | V |
| $I_F$ | $T_j$ = 175 °C | $T_s$ = 25 °C | 28 | A |
| | | $T_s$ = 70 °C | 22 | A |
| $I_{Fnom}$ | | | 25 | A |
| $I_{FSM}$ | 10 ms, sin 180°, $T_j$ = 150 °C | | 100 | A |
| $I^2t$ | 10 ms, , $T_j$ = 150 °C | | 50 | $A^2s$ |
| $T_j$ | | | 175 | °C |

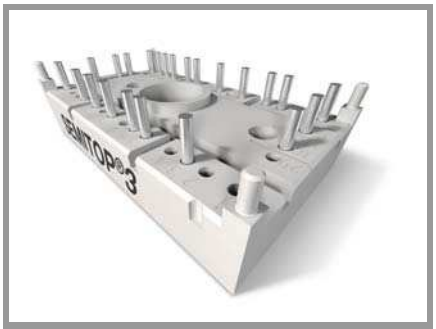
**Absolute Maximum Ratings**

| Symbol | Conditions | Values | Unit |
|---|---|---|---|
| **Module** | | | |
| $I_{t(RMS)}$ | , | | A |
| $T_{stg}$ | | -40 ... 125 | °C |
| $V_{isol}$ | AC, sinusoidal, t = 1 min | 2500 | V |




**BGB**

# SK 35 BGB 12T4



**SEMITOP® 3**

IGBT module with single phase bridge rectifier

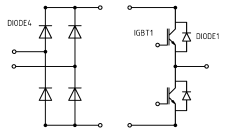
**SK 35 BGB 12T4**

### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- High short circuit capability
- Trench4 IGBT technology
- CAL4F diode technology

### Typical Applications*

- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS




**BGB**

**Characteristics**

| Symbol | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| **IGBT 1** | | | | | | |
| $V_{CE(sat)}$ | $I_C$ = 25 A<br>$V_{GE}$ = 15 V<br>chiplevel | $T_j$ = 25 °C | | 1.85 | 2.10 | V |
| | | $T_j$ = 150 °C | | 2.25 | 2.45 | V |
| $V_{CE0}$ | chiplevel | $T_j$ = 25 °C | | 0.8 | 0.9 | V |
| | | $T_j$ = 150 °C | | 0.7 | 0.8 | V |
| $r_{CE}$ | $V_{GE}$ = 15 V<br>chiplevel | $T_j$ = 25 °C | | 42.0 | 48.0 | mΩ |
| | | $T_j$ = 150 °C | | 62.0 | 66.0 | mΩ |
| $V_{GE(th)}$ | $V_{GE}$ = $V_{CE}$ V, $I_C$ = 0.85 mA | | 5 | 5.8 | 6.5 | V |
| $I_{CES}$ | $V_{GE}$ = 0 V<br>$V_{CE}$ = 1200 V | $T_j$ = 25 °C | | 0.062 | | mA |
| | | | | | | mA |
| $C_{ies}$ | $V_{CE}$ = 25 V<br>$V_{GE}$ = 0 V | f = 1 MHz | | 1.43 | | nF |
| $C_{oes}$ | | f = 1 MHz | | 0.115 | | nF |
| $C_{res}$ | | f = 1 MHz | | 0.085 | | nF |
| $Q_G$ | - 8 V...+ 15 V | | | 142 | | nC |
| $R_{Gint}$ | $T_j$ = 25 °C | | | 0.00 | | Ω |
| $t_{d(on)}$ | $V_{CC}$ = 600 V<br>$I_C$ = 25 A<br>$R_{G\ on}$ = 19 Ω<br>$R_{G\ off}$ = 19 Ω<br>$di/dt_{on}$ = 2825 A/µs<br>$di/dt_{off}$ = 2825 A/µs<br>$V_{GE\ neg}$ = -7 V<br>$V_{GE\ pos}$ = 15 V | $T_j$ = 150 °C | | 22 | | ns |
| $t_r$ | | $T_j$ = 150 °C | | 19.5 | | ns |
| $E_{on}$ | | $T_j$ = 150 °C | | 2.27 | | mJ |
| $t_{d(off)}$ | | $T_j$ = 150 °C | | 288 | | ns |
| $t_f$ | | $T_j$ = 150 °C | | 77.5 | | ns |
| $E_{off}$ | | $T_j$ = 150 °C | | 2.7 | | mJ |
| $R_{th(j-s)}$ | per IGBT | | | 1.31 | | K/W |

**Characteristics**

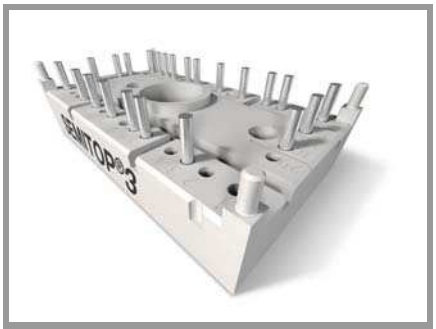
| Symbol | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| **Diode 1** | | | | | | |
| $V_F = V_{EC}$ | $I_F$ = 25 A | $T_j$ = 25 °C | | 2.41 | 2.74 | V |
| | chiplevel | $T_j$ = 150 °C | | 2.45 | 2.79 | V |
| $V_{F0}$ | | $T_j$ = 25 °C | 1.1 | 1.3 | 1.5 | V |
| | | $T_j$ = 150 °C | 0.7 | 0.9 | 1.1 | V |
| $r_F$ | chiplevel | $T_j$ = 25 °C | 36.0 | 44.4 | 49.6 | mΩ |
| | | $T_j$ = 150 °C | | 62.0 | 67.6 | mΩ |
| $I_{RRM}$ | $I_F$ = 25 A | $T_j$ = 150 °C | | 31.5 | | A |
| $Q_{rr}$ | | $T_j$ = 150 °C | | 1.15 | | µC |
| $E_{rr}$ | $V_{CC}$ = 600 V | $T_j$ = 150 °C | | 1.28 | | mJ |
| $R_{th(j-s)}$ | per diode | | | 1.91 | | K/W |

**Characteristics**

| Symbol | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| **Diode 4** | | | | | | |
| $V_F = V_{EC}$ | $I_F$ = 25 A | $T_j$ = 25 °C | | 2.41 | 2.74 | V |
| | chiplevel | $T_j$ = 150 °C | | 2.45 | 2.79 | V |
| $V_{F0}$ | chip | $T_j$ = 25 °C | 1.1 | 1.30 | 1.50 | V |
| | | $T_j$ = 150 °C | 0.7 | 0.90 | 1.10 | V |
| $r_F$ | chiplevel | $T_j$ = 25 °C | 36.0 | 62.0 | 49.6 | mΩ |
| | | $T_j$ = 150 °C | | 62.0 | 67.6 | mΩ |
| $I_{RRM}$ | | | | | | A |
| $Q_{rr}$ | | | | | | µC |
| $E_{rr}$ | | | | | | mJ |
| $R_{th(j-s)}$ | per diode | | | 1.91 | | K/W |

# SK 35 BGB 12T4



**SEMITOP® 3**

IGBT module with single phase bridge rectifier

**SK 35 BGB 12T4**

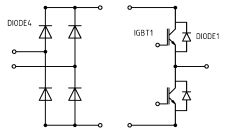
### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- High short circuit capability
- Trench4 IGBT technology
- CAL4F diode technology

### Typical Applications*

- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS

| Characteristics | | | | | |
|---|---|---|---|---|---|
| **Symbol** | **Conditions** | **min.** | **typ.** | **max.** | **Unit** |
| **Module** | | | | | |
| $M_s$ | Mounting torque | 2.3 | | 2.5 | Nm |
| w | weight | | 29 | | g |




**BGB**

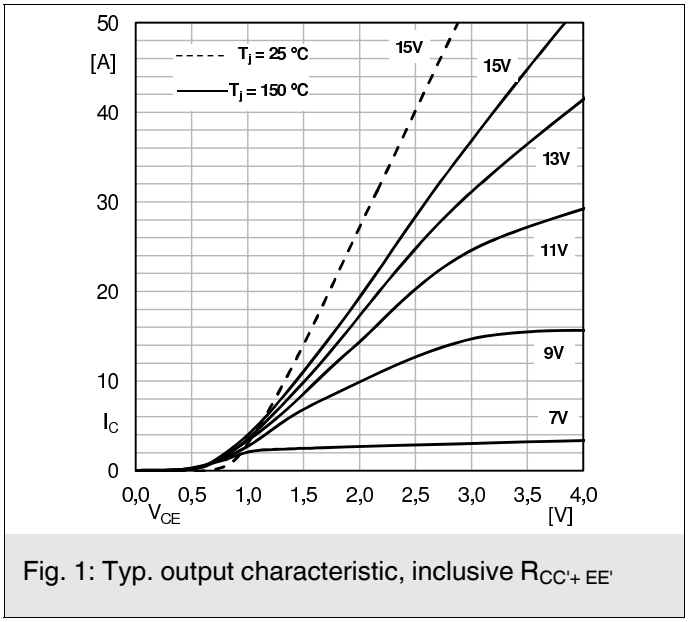



Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

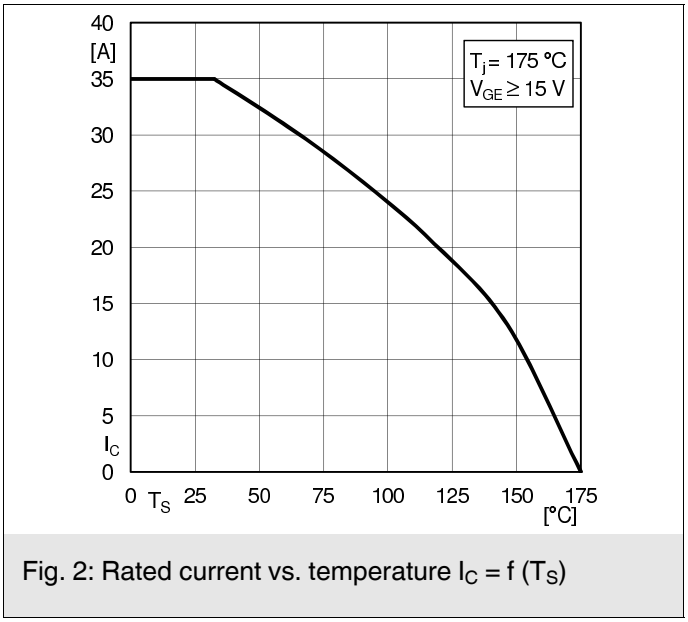



Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

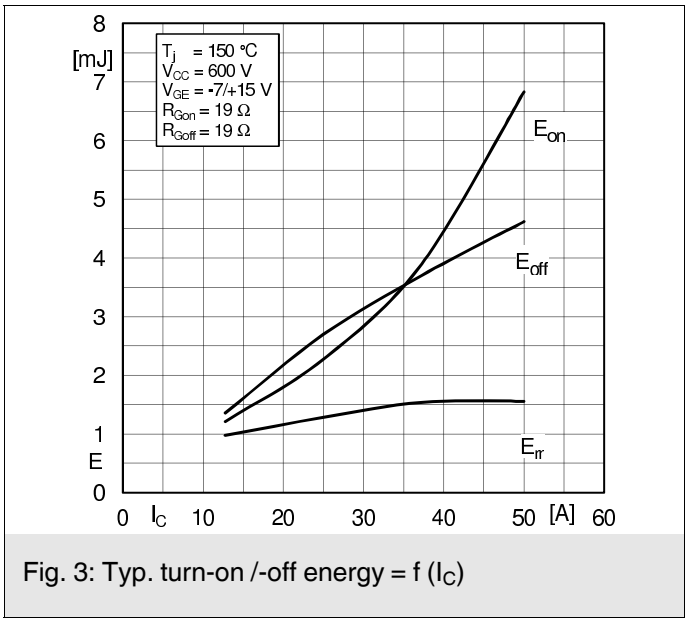



Fig. 3: Typ. turn-on /-off energy = f ($I_C$)

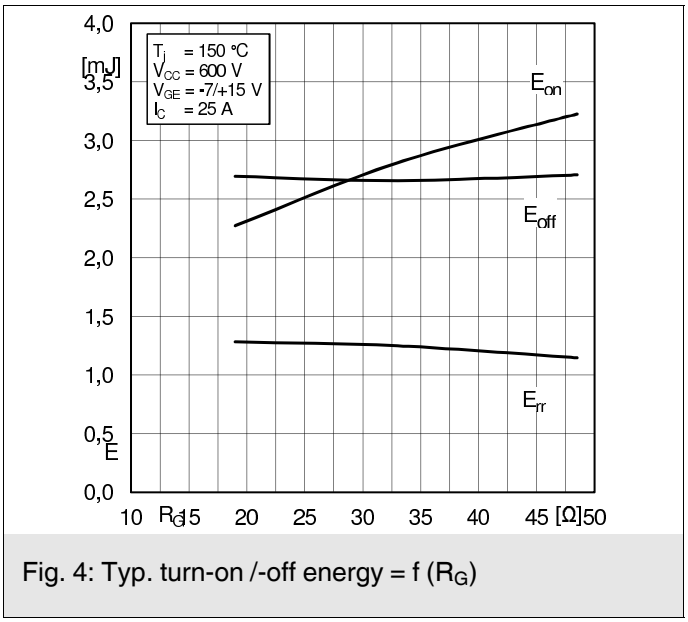



Fig. 4: Typ. turn-on /-off energy = f ($R_G$)

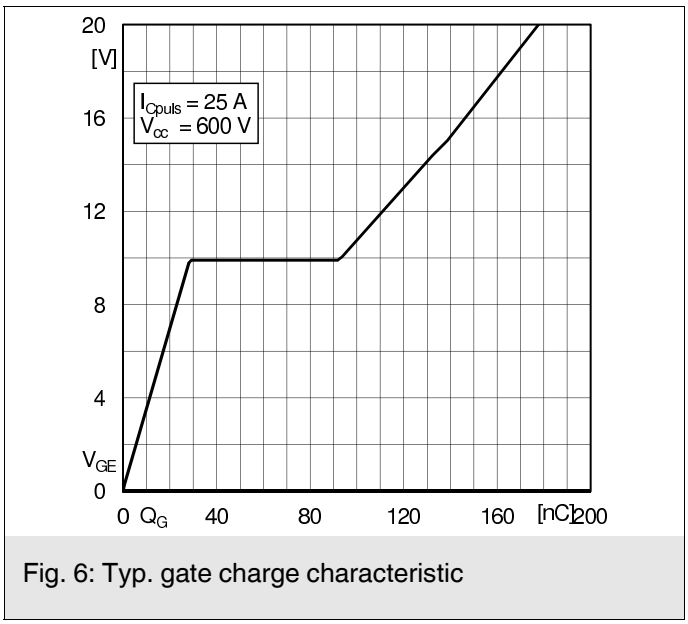



Fig. 6: Typ. gate charge characteristic

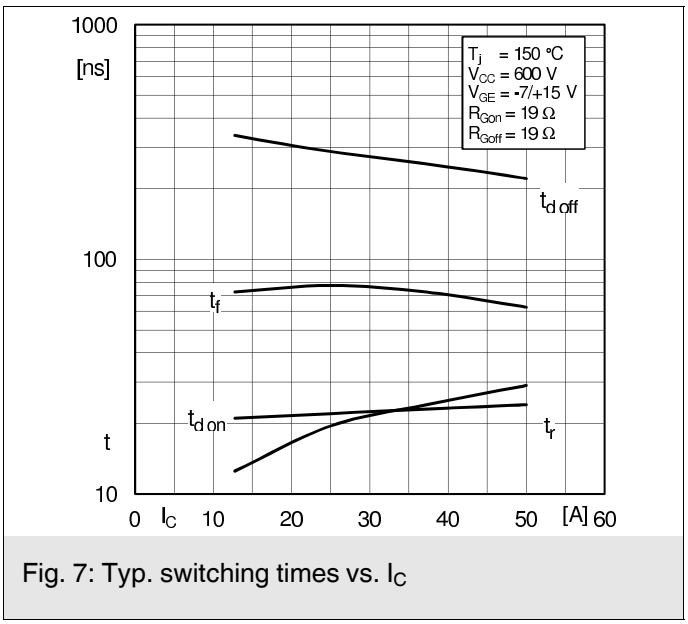



Fig. 7: Typ. switching times vs. $I_C$

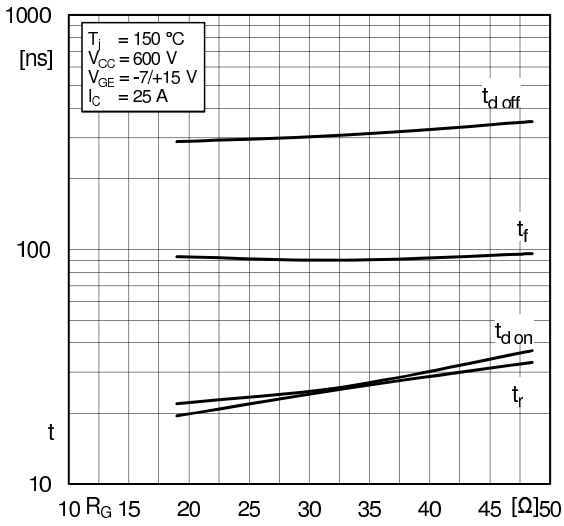



Fig. 8: Typ. switching times vs. gate resistor $R_G$

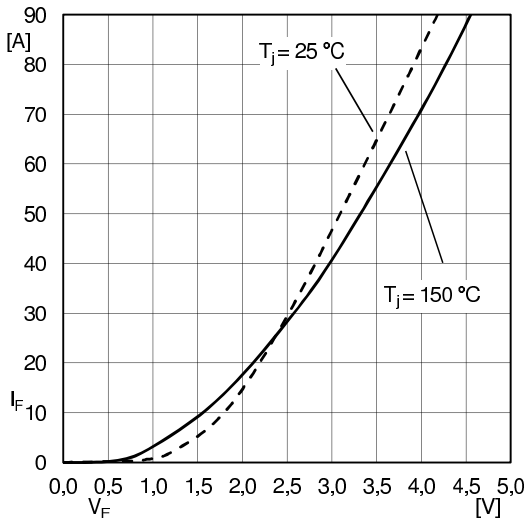



Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

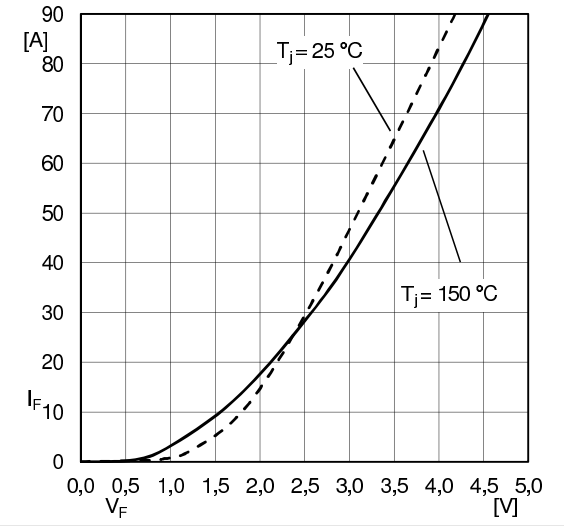
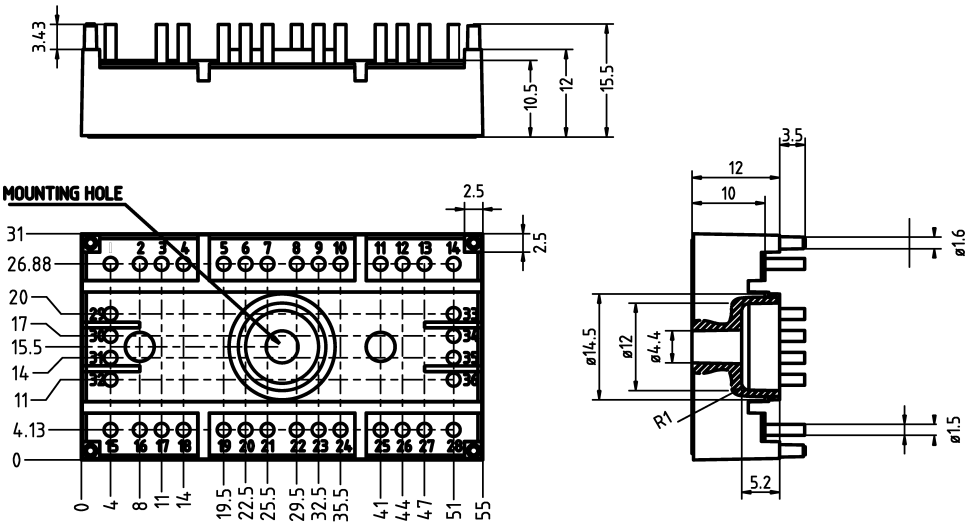


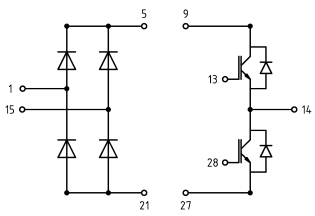

Fig.11: Typ. input diode bridge forward characteristic

dimensions in mm
tolerance system: ISO 2768-m




Suggested hole diameter, in the PCB, for solder pins and mounting plastic pins: 2mm






BGB

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.