# SEMiX241DH16s

**SEMiX® 13**

Bridge Rectifier Module (halfcontrolled)

**SEMiX241DH16s**

### Features

- Terminal height 17 mm
- Chips soldered directly to isolated substrate
- UL recognised file no. E63532

### Typical Applications*

- Input Bridge Rectifier for AC/DC motor control
- Power supply

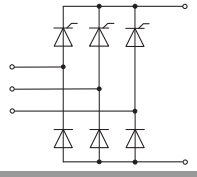
### Remarks

- For storage and case temperature with TIM see document “TP(*) SEMiX 13”

| Absolute Maximum Ratings | | | | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Unit** |
| **Module** | | | | |
| $I_D$ | $T_j$ = 130 °C rec. 120° | $T_c$ = 85 °C | 392 | A |
| | | $T_c$ = 100 °C | 298 | A |
| $T_{stg}$ | module without TIM | | -40 ... 125 | °C |
| $V_{isol}$ | AC sinus 50Hz, t = 1 min | | 4000 | V |

| Absolute Maximum Ratings | | | | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Unit** |
| **Thyristor** | | | | |
| $I_{T(AV)}$ | $T_j$ = 130 °C sinus 180° | $T_c$ = 85 °C | 138 | A |
| | | $T_c$ = 100 °C | 104 | A |
| $I_{TSM}$ | 10 ms | $T_j$ = 25 °C | 2000 | A |
| | | $T_j$ = 130 °C | 1800 | A |
| $i^2t$ | 10 ms | $T_j$ = 25 °C | 20000 | $A^2s$ |
| | | $T_j$ = 130 °C | 16200 | $A^2s$ |
| $V_{RSM}$ | | | 1700 | V |
| $V_{RRM}$ | | | 1600 | V |
| $V_{DRM}$ | | | 1600 | V |
| $(di/dt)_{cr}$ | $T_j$ = 130 °C | | 100 | A/µs |
| $(dv/dt)_{cr}$ | $T_j$ = 130 °C | | 1000 | V/µs |
| $T_j$ | | | -40 ... 130 | °C |

| Absolute Maximum Ratings | | | | |
|---|---|---|---|---|
| **Symbol** | **Conditions** | | **Values** | **Unit** |
| **Diode** | | | | |
| $I_{FAV}$ | $T_j$ = 150 °C sin. 180° | $T_c$ = 85 °C | 160 | A |
| | | $T_c$ = 100 °C | 135 | A |
| $I_{FSM}$ | 10 ms | $T_j$ = 25 °C | 2000 | A |
| | | $T_j$ = 150 °C | 1650 | A |
| $i^2t$ | 10 ms | $T_j$ = 25 °C | 20000 | $A^2s$ |
| | | $T_j$ = 150 °C | 13612 | $A^2s$ |
| $V_{RSM}$ | | | 1700 | V |
| $V_{RRM}$ | | | 1600 | V |
| $T_j$ | | | -40 ... 150 | °C |



**DH**

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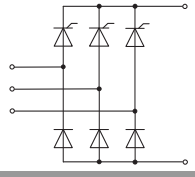


DH

**Characteristics**

| Symbol | Conditions | min. | typ. | max. | Unit |
|---|---|---|---|---|---|
| **Thyristor** | | | | | |
| $V_T$ | $T_j$ = 130 °C, $I_T$ = 300 A, chiplevel | | 1.40 | 1.53 | V |
| $V_{T(TO)}$ | $T_j$ = 130 °C, chiplevel | | 0.84 | 0.85 | V |
| $r_T$ | $T_j$ = 130 °C, chiplevel | | 1.85 | 2.3 | mΩ |
| $I_{DD}$;$I_{RD}$ | $T_j$ = 130 °C, $V_{DD}$ = $V_{DRM}$; $V_{RD}$ = $V_{RRM}$ | | | 21 | mA |
| $t_{gd}$ | $T_j$ = 25 °C, $I_G$ = 1 A, $di_G/dt$ = 1 A/µs | | 1 | | µs |
| $t_{gr}$ | $V_D$ = 0.67 * $V_{DRM}$ | | 2 | | µs |
| $t_q$ | $T_j$ = 130 °C | | 150 | | µs |
| $I_H$ | $T_j$ = 25 °C | | | 220 | mA |
| $I_L$ | $T_j$ = 25 °C, $R_G$ = 33 Ω | | | 550 | mA |
| $V_{GT}$ | $T_j$ = 25 °C, d.c. | 2 | | | V |
| $I_{GT}$ | $T_j$ = 25 °C, d.c. | 100 | | | mA |
| $V_{GD}$ | $T_j$ = 130 °C, d.c. | | | 0.25 | V |
| $I_{GD}$ | $T_j$ = 130 °C, d.c. | | | 3.8 | mA |
| $R_{th(j-c)}$ | per thyristor, sin. 180° | | | 0.2 | K/W |
| $R_{th(c-s)}$ | per thyristor ($\lambda_{grease}$=0.81 W/(m*K)) | | 0.072 | | K/W |
| $R_{th(c-s)}$ | per thyristor, pre-applied phase change material | | 0.05 | | K/W |

**Characteristics**

| Symbol | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| **Diode** | | | | | | |
| $V_F$ | $I_F$ = 300 A chiplevel | $T_j$ = 25 °C | | 1.22 | 1.63 | V |
| | | $T_j$ = 125 °C | | 1.21 | 1.59 | V |
| $V_{(TO)}$ | chiplevel | $T_j$ = 25 °C | | 0.88 | 0.98 | V |
| | | $T_j$ = 125 °C | | 0.73 | 0.83 | V |
| $r_T$ | chiplevel | $T_j$ = 25 °C | | 1.13 | 2.2 | mΩ |
| | | $T_j$ = 125 °C | | 1.60 | 2.5 | mΩ |
| $I_{RD}$ | $T_j$ = 145 °C, $V_{RD}$ = $V_{RRM}$ | | | | 1.1 | mA |
| $R_{th(j-c)}$ | per diode, sin. 180° | | | | 0.22 | K/W |
| $R_{th(c-s)}$ | per Diode ($\lambda_{grease}$=0.81 W/(m*K)) | | | 0.075 | | K/W |
| $R_{th(c-s)}$ | per Diode, pre-applied phase change material | | | 0.063 | | K/W |

**Characteristics**

| Symbol | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| **Module** | | | | | | |
| $L_{CE}$ | | | | 20 | | nH |
| $R_{CC'+EE'}$ | measured per switch | $T_C$ = 25 °C | | 0.7 | | mΩ |
| | | $T_C$ = 125 °C | | 1 | | mΩ |
| $R_{th(c-s)1}$ | calculated without thermal coupling | | | 0.012 | | K/W |
| $R_{th(c-s)2}$ | including thermal coupling, Ts underneath module ($\lambda_{grease}$=0.81 W/(m*K)) | | | 0.018 | | K/W |
| $R_{th(c-s)2}$ | including thermal coupling, Ts underneath module, pre-applied phase change material | | | 0.014 | | K/W |
| $M_s$ | to heat sink (M5) | | 3 | | 5 | Nm |
| $M_t$ | to terminals (M6) | | 2.5 | | 5 | Nm |
| w | | | | | 350 | g |

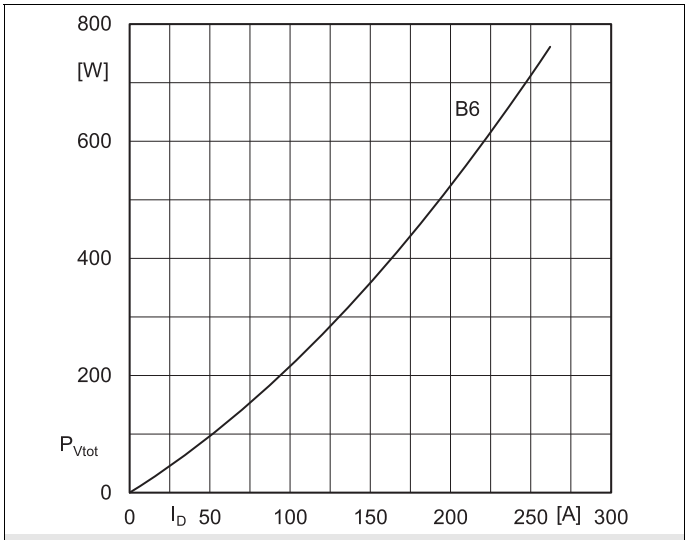



Fig. 4L: Power dissipation per module vs. direct current

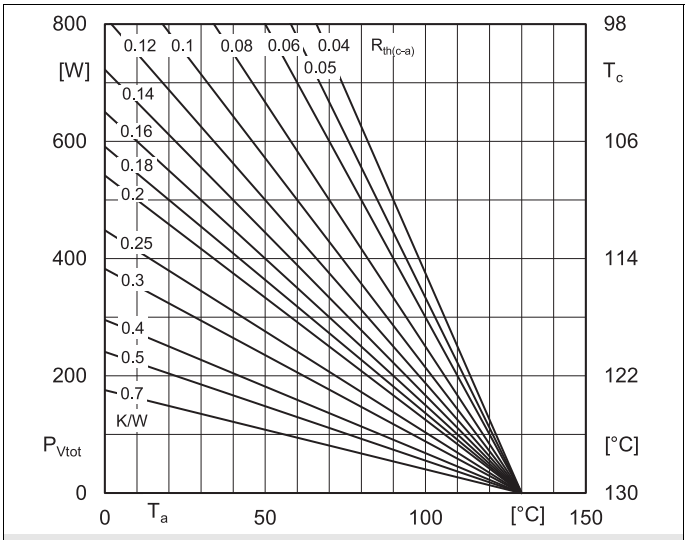



Fig. 4R: Power dissipation per module vs. ambient temperature

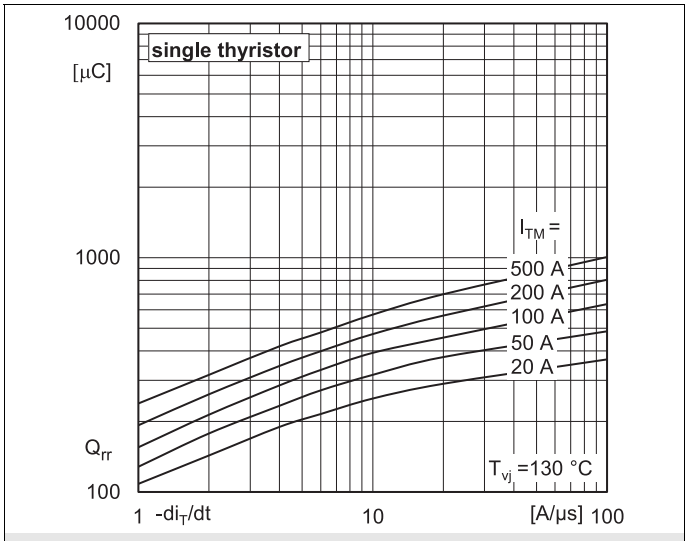



Fig. 5: Recovered charge vs. current decrease

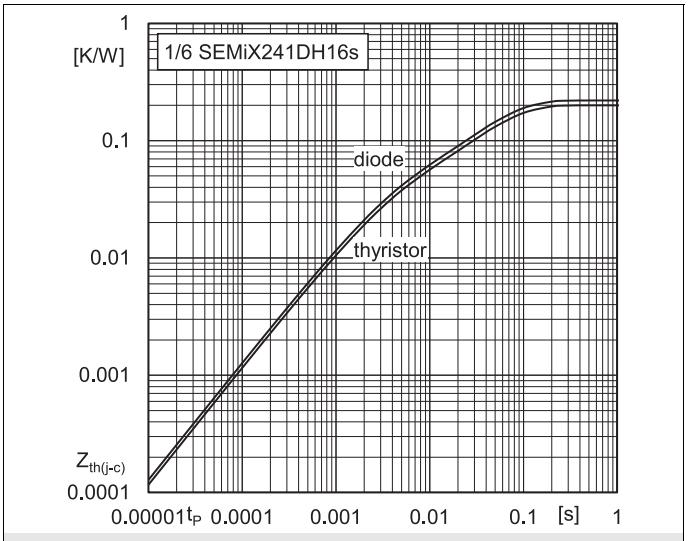



Fig. 6: Transient thermal impedance vs. time

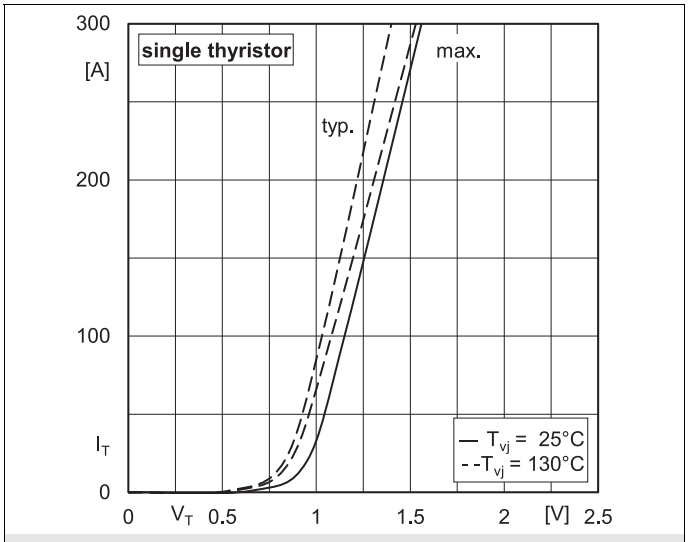



Fig. 7: On-state characteristics

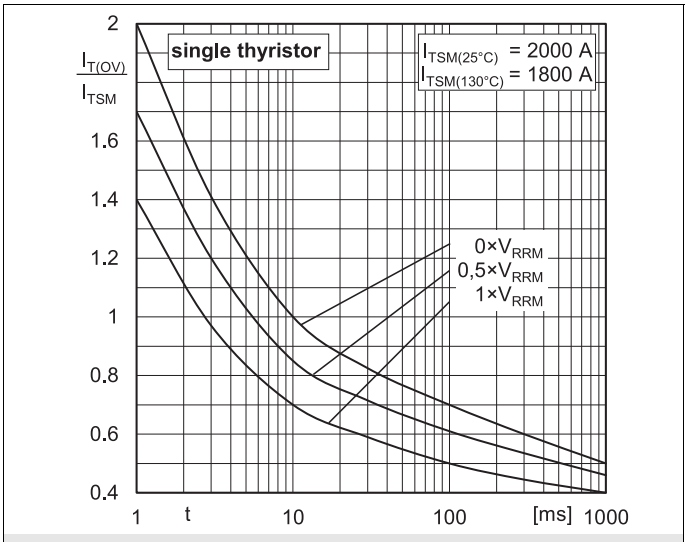



Fig. 8: Surge overload current vs. time

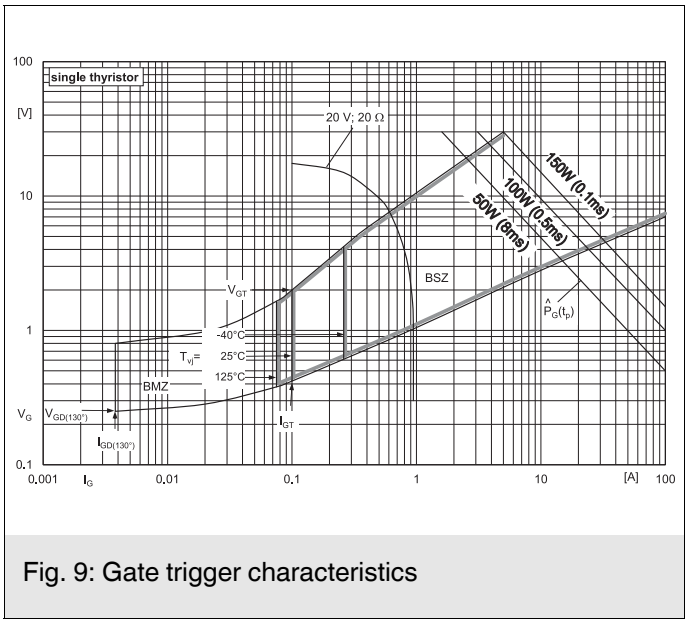
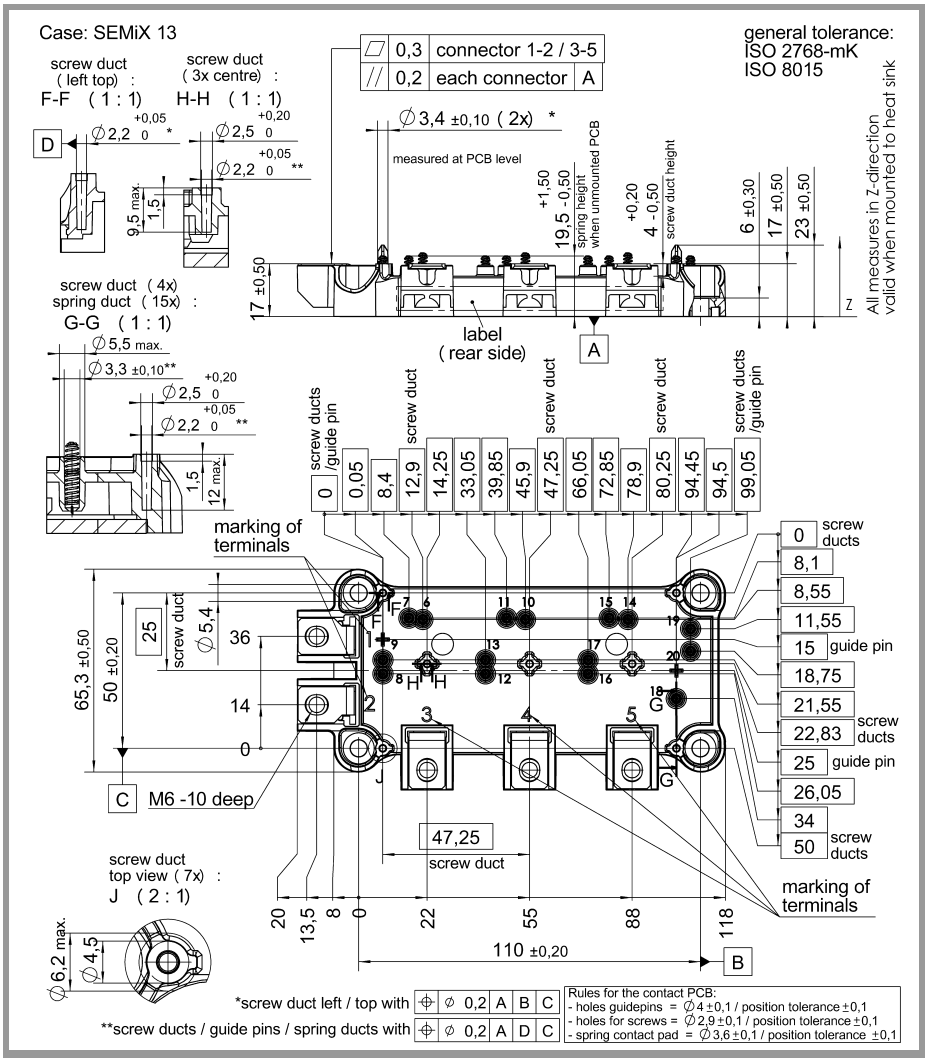
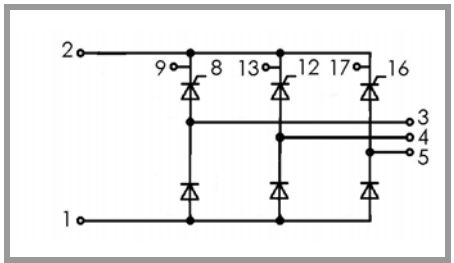



Fig. 9: Gate trigger characteristics




SEMiX 13




spring configuration

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

***IMPORTANT INFORMATION AND WARNINGS**

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