

SEMiX245DH16



SEMiX® 5

Bridge Rectifier Module
(halfcontrolled)

SEMiX245DH16

Features

- Terminal height 17 mm
- Solderless assembling solution with PressFIT signal pins and screw power terminals
- NTC temperature sensor inside

Typical Applications*

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

Remarks

- Reliability tests performed at $T_j = 130^\circ\text{C}$
- For storage and case temperature with TIM see document "TP(HALA P8) SEMiX 5p"

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Module				
I _D	T _j = 130 °C	T _c = 96 °C	336	A
	rec. 120°	T _c = 80 °C	440	A
T _{stg}	module without TIM		-40 ... 125	°C
V _{isol}	AC sinus 50Hz, t = 1 min		4000	V

Absolute Maximum Ratings

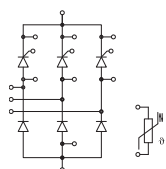
Symbol	Conditions		Values	Unit
Thyristor				
$I_{T(AV)}$	$T_j = 130\text{ }^{\circ}\text{C}$	$T_c = 80\text{ }^{\circ}\text{C}$	154	A
	sinus 180°	$T_c = 100\text{ }^{\circ}\text{C}$	107	A
I_{TSM}	10 ms	$T_j = 25\text{ }^{\circ}\text{C}$	2050	A
		$T_j = 130\text{ }^{\circ}\text{C}$	1800	A
i^2t	10 ms	$T_j = 25\text{ }^{\circ}\text{C}$	21013	A^2s
		$T_j = 130\text{ }^{\circ}\text{C}$	16200	A^2s
V_{RSM}			1700	V
V_{RRM}			1600	V
V_{DRM}			1600	V
$(di/dt)_{cr}$	$T_j = 130\text{ }^{\circ}\text{C}$		100	$\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	$T_j = 130\text{ }^{\circ}\text{C}$		1000	$\text{V}/\mu\text{s}$
T_j			-40 ... 130	$^{\circ}\text{C}$

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Diode				
I _{FAV}	T _j = 150 °C	T _c = 80 °C	167	A
	sin. 180°	T _c = 100 °C	135	A
I _{FSM}	10 ms	T _j = 25 °C	2100	A
		T _j = 130 °C	1700	A
i ² t	10 ms	T _j = 25 °C	22050	A ² s
		T _j = 130 °C	14450	A ² s
V _{RSM}			1700	V
V _{RRM}			1600	V
T _j			-40 ... 150	°C

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R_{100}	$T_c = 100^\circ\text{C}$ ($R_{25} = 5 \text{ k}\Omega$)		$493 \pm 5\%$		Ω
$B_{100/125}$	$R(T) = R_{100} \exp[B_{100/125}(1/T - 1/T_{100})]$; $T[\text{K}]$		$3550 \pm 2\%$		K



DH



SEMiX® 5

Bridge Rectifier Module (halfcontrolled)

SEMiX245DH16

Features

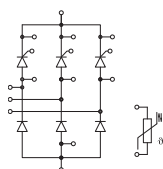
- Terminal height 17 mm
- Solderless assembling solution with PressFIT signal pins and screw power terminals
- NTC temperature sensor inside

Typical Applications*

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

Remarks

- Reliability tests performed at $T_j = 130^\circ\text{C}$
- For storage and case temperature with TIM see document "TP(HALA P8) SEMiX 5p"



DH

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Thyristor					
V_T	$T_j = 130^\circ\text{C}$, $I_T = 140\text{ A}$, chiplevel		1.10	1.17	V
$V_{T(TO)}$	$T_j = 130^\circ\text{C}$, chiplevel		0.84	0.91	V
r_T	$T_j = 130^\circ\text{C}$, chiplevel		1.85	1.87	m Ω
$I_{DD}; I_{RD}$	$T_j = 130^\circ\text{C}$, $V_{DD} = V_{DRM}$; $V_{RD} = V_{RRM}$			21	mA
t_{gd}	$T_j = 25^\circ\text{C}$, $I_G = 1\text{ A}$, $di_G/dt = 1\text{ A}/\mu\text{s}$		1		μs
t_{gr}	$V_D = 0.67 \cdot V_{DRM}$		2		μs
t_q	$T_j = 130^\circ\text{C}$		150		μs
I_H	$T_j = 25^\circ\text{C}$		150	220	mA
I_L	$T_j = 25^\circ\text{C}$, $R_G = 33\ \Omega$		300	550	mA
V_{GT}	$T_j = 25^\circ\text{C}$, d.c.	1.65			V
I_{GT}	$T_j = 25^\circ\text{C}$, d.c.	100			mA
V_{GD}	$T_j = 130^\circ\text{C}$, d.c.			0.25	V
I_{GD}	$T_j = 130^\circ\text{C}$, d.c.			3.8	mA
$R_{th(j-c)}$	per thyristor, sin. 180°			0.2	K/W
$R_{th(c-s)}$	per thyristor ($\lambda_{grease}=0.81\text{ W}/(\text{m}^2\text{K})$)		0.072		K/W
$R_{th(c-s)}$	per thyristor, pre-applied phase change material		0.053		K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Diode					
V_F	$I_F = 140\text{ A}$ chiplevel	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.04 0.95	1.28 1.19	V
$V_{(TO)}$	chiplevel	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	0.88 0.73	0.98 0.83	V
r_T	chiplevel	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$	1.13 1.60	2.2 2.5	m Ω
I_{RD}	$T_j = 130^\circ\text{C}$, $V_{RD} = V_{RRM}$			2	mA
$R_{th(j-c)}$	per diode, sin. 180°			0.22	K/W
$R_{th(c-s)}$	per Diode ($\lambda_{grease}=0.81\text{ W}/(\text{m}^2\text{K})$)		0.072		K/W
$R_{th(c-s)}$	per Diode, pre-applied phase change material		0.053		K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
L_{CE}			20		nH
$R_{CC'+EE'}$	measured per switch	$T_C = 25^\circ\text{C}$ $T_C = 125^\circ\text{C}$	0.8 1.1		m Ω
$R_{th(c-s)1}$	calculated without thermal coupling		0.012		K/W
$R_{th(c-s)2}$	including thermal coupling, Ts underneath module ($\lambda_{grease}=0.81\text{ W}/(\text{m}^2\text{K})$)		0.020		K/W
$R_{th(c-s)1}$	calculated without thermal coupling; pre-applied phase change material		0.009		K/W
$R_{th(c-s)2}$	including thermal coupling, Ts underneath module, pre-applied phase change material		0.015		K/W
M_s	to heat sink (M5)	3		6	Nm
M_t	to terminals (M6)	3		6	Nm
w			398		g

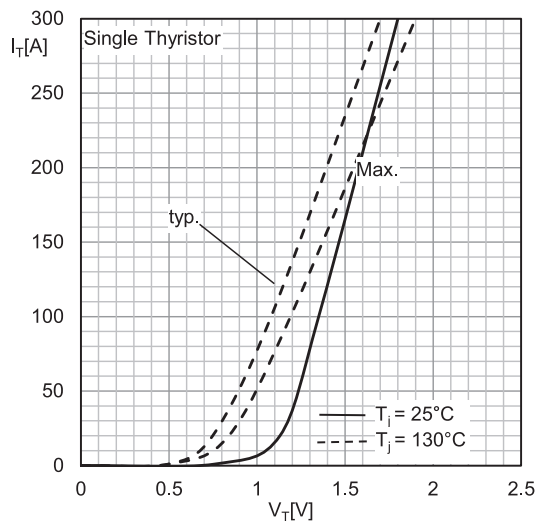
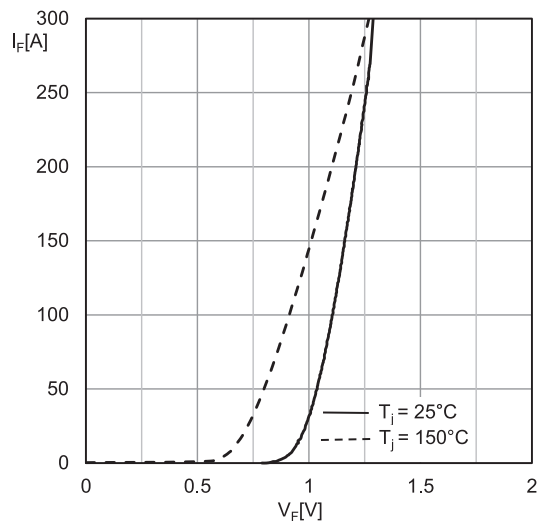
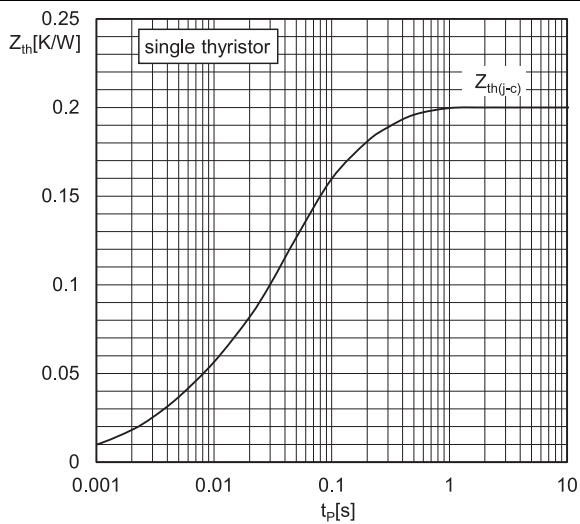
Fig. 1: Thyristor typ. on-state characteristic, incl. $R_{CC'+EE'}$ Fig. 2: Diode typ. on-state characteristic, incl. $R_{CC'+EE'}$ 

Fig. 3: Thyristor transient thermal impedance vs. time

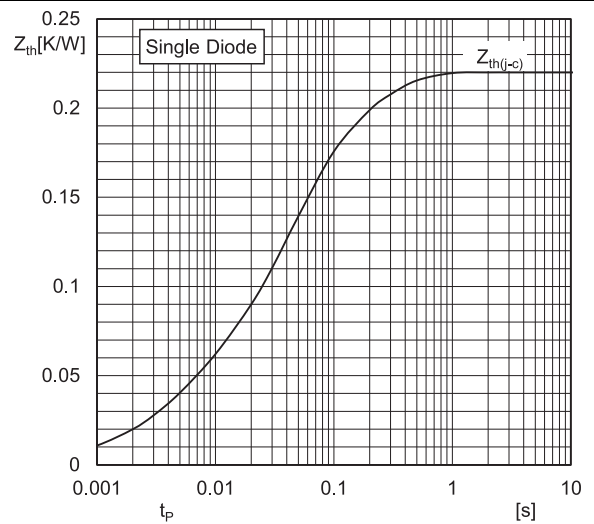


Fig. 4: Diode transient thermal impedance vs. time

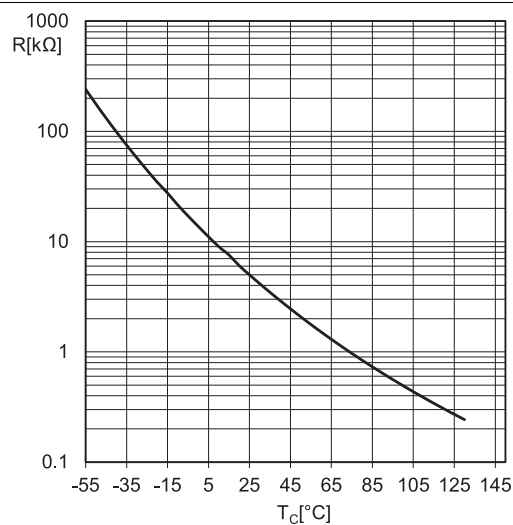
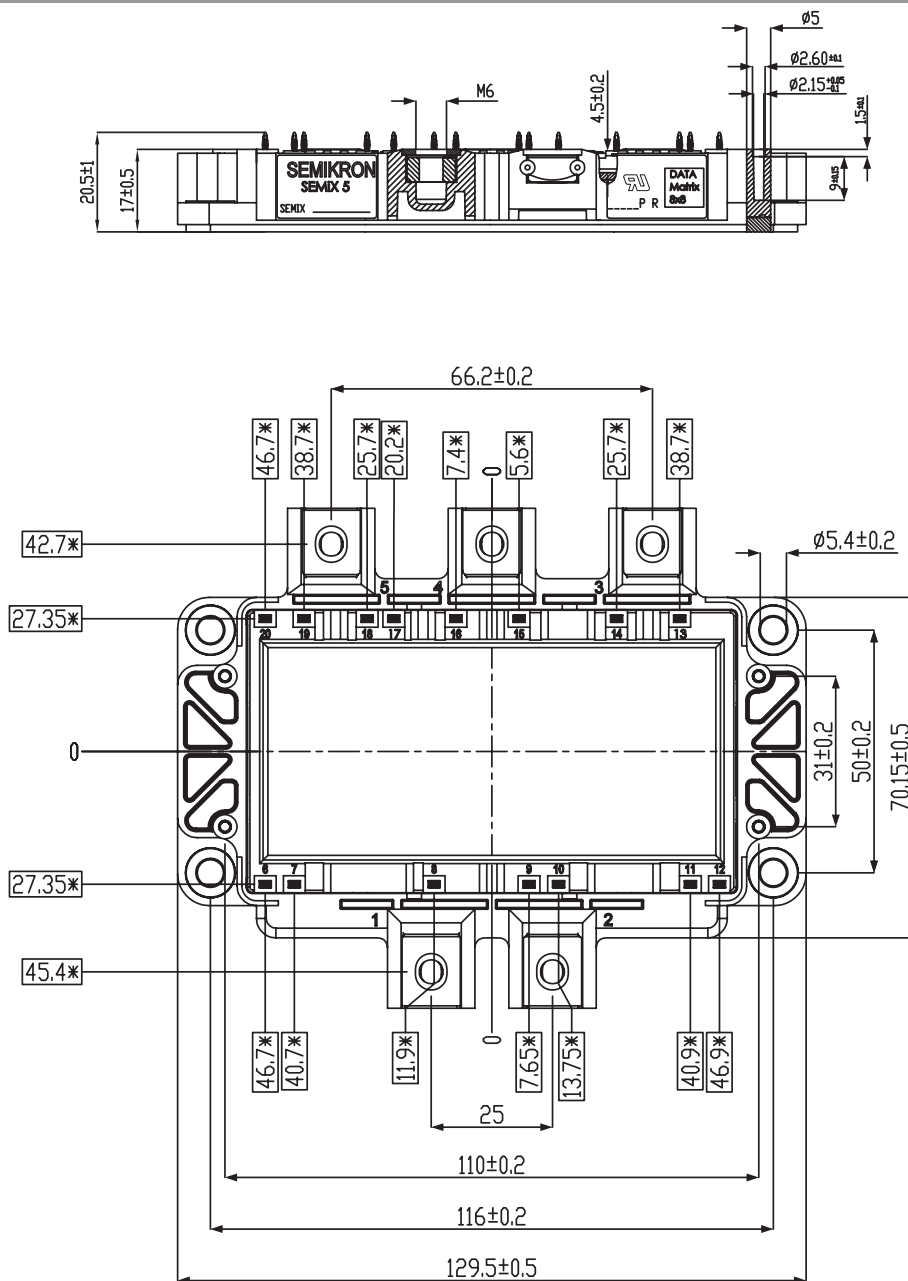


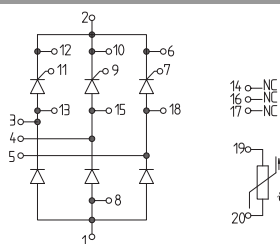
Fig. 5: Typ. NTC-temperature characteristics



* = All dimensions with tolerance of ± 0.4

For technical details please refer
to SEMiX(R)5 Mounting Instruction

SEMIX5p



DH

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

***IMPORTANT INFORMATION AND WARNINGS**

The specifications of SEMIKRON products may not be considered as guarantee or assurance of product characteristics ("Beschaffenheitsgarantie"). The specifications of SEMIKRON products describe only the usual characteristics of products to be expected in typical applications, which may still vary depending on the specific application. Therefore, products must be tested for the respective application in advance. Application adjustments may be necessary. The user of SEMIKRON products is responsible for the safety of their applications embedding SEMIKRON products and must take adequate safety measures to prevent the applications from causing a physical injury, fire or other problem if any of SEMIKRON products become faulty. The user is responsible to make sure that the application design is compliant with all applicable laws, regulations, norms and standards. Except as otherwise explicitly approved by SEMIKRON in a written document signed by authorized representatives of SEMIKRON, SEMIKRON products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury. No representation or warranty is given and no liability is assumed with respect to the accuracy, completeness and/or use of any information herein, including without limitation, warranties of non-infringement of intellectual property rights of any third party. SEMIKRON does not assume any liability arising out of the applications or use of any product; neither does it convey any license under its patent rights, copyrights, trade secrets or other intellectual property rights, nor the rights of others. SEMIKRON makes no representation or warranty of non-infringement or alleged non-infringement of intellectual property rights of any third party which may arise from applications. Due to technical requirements our products may contain dangerous substances. For information on the types in question please contact the nearest SEMIKRON sales office. This document supersedes and replaces all information previously supplied and may be superseded by updates. SEMIKRON reserves the right to make changes.