



SEMiX® 5

Bridge Rectifier Module (halfcontrolled)

SEMiX245DH16

Features

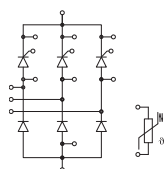
- Terminal height 17 mm
- Solderless assembling solution with PressFIT signal pins and screw power terminals
- NTC temperature sensor inside

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

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



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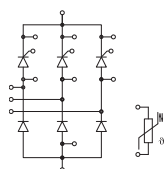
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Thyristor					
V_T	$T_j = 130^\circ\text{C}$, $I_T = 140\text{ A}$, chiplevel		1.10	1.17	V
$V_{T(TO)}$	$T_j = 130^\circ\text{C}$, chiplevel		0.84	0.91	V
r_T	$T_j = 130^\circ\text{C}$, chiplevel		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, T_s 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, T_s 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

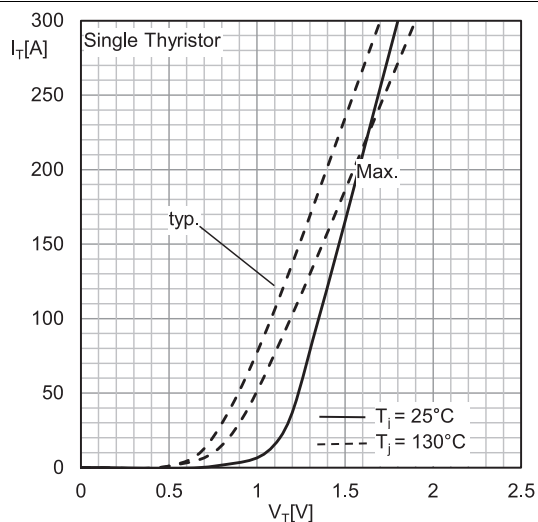


Fig. 1: Thyristor typ. on-state characteristic, incl. $R_{CC'+EE'}$

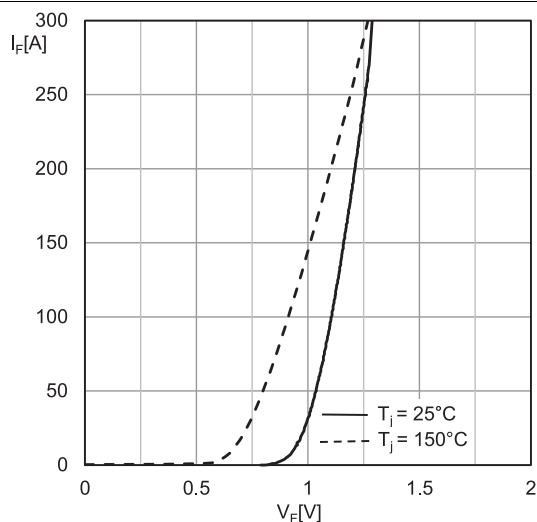


Fig. 2: Diode typ. on-state characteristic, incl. $R_{CC'+EE'}$

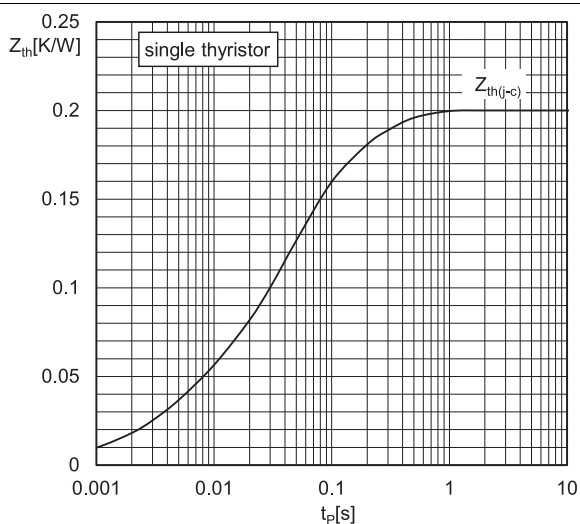


Fig. 3: Thyristor transient thermal impedance vs. time

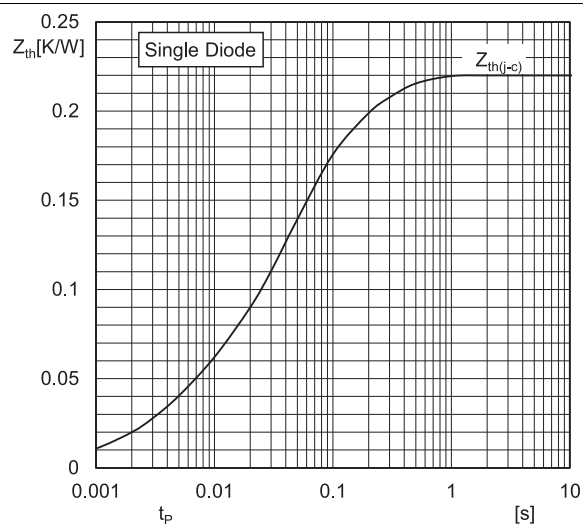


Fig. 4: Diode transient thermal impedance vs. time

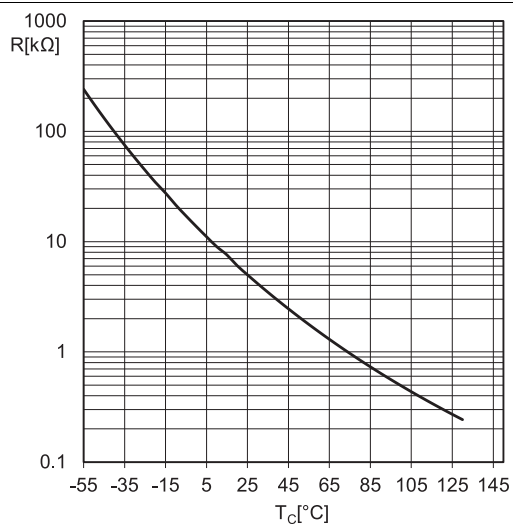
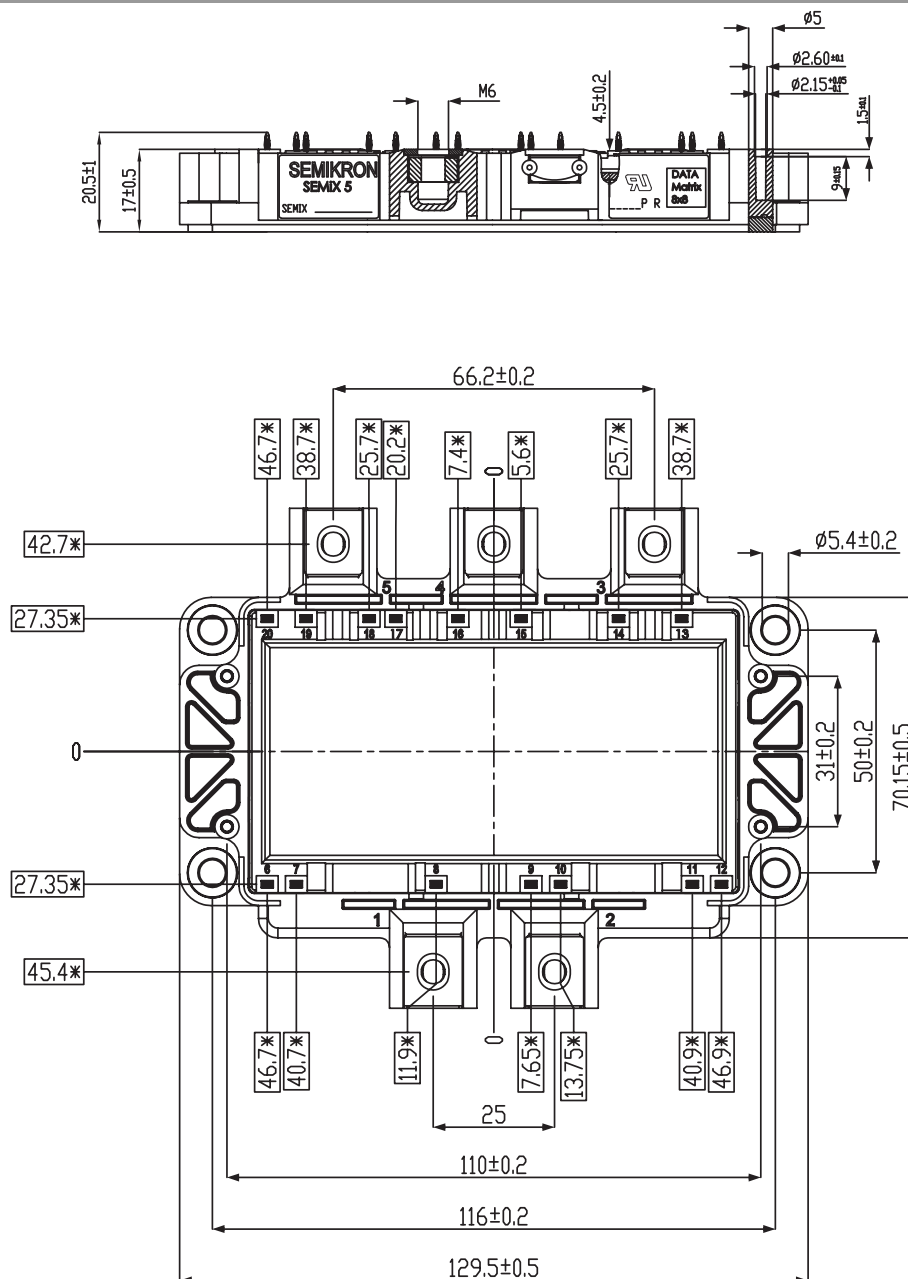


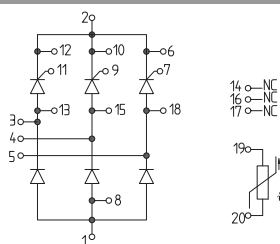
Fig. 5: Typ. NTC-temperature characteristics



* = All dimensions with tolerance of ± 0.4

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

SEMiX5p



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

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