SEMiX® 5

Bridge Rectifier Module (halfcontrolled)

SEMiX365DH16

Features

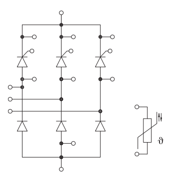
- Terminal height 17 mm
- Solderless assembling solution with PressFIT signal pins and screw power terminals
- NTC temperature sensor inside

Typical Applications*

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

Remarks

Reliability tests performed at T_j = 130°C
For storage and case temperature with TIM see document “TP(HALA P8) SEMiX 5p”



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Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Module				
I_D	T_j = 130 °C rec. 120°	T_c = 96 °C	484	A
		T_c = 80 °C	629	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 = 80 °C	221	A
		T_c = 100 °C	155	A
I_{TSM}	10 ms	T_j = 25 °C	3050	A
		T_j = 130 °C	2750	A
i^2t	10 ms	T_j = 25 °C	46513	A^2s
		T_j = 130 °C	37813	A^2s
V_{RSM}			1700	V
V_{RRM}			1600	V
V_{DRM}			1600	V
$(di/dt)_{cr}$	T_j = 130 °C		200	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 = 80 °C	249	A
		T_c = 100 °C	200	A
I_{FSM}	10 ms	T_j = 25 °C	3300	A
		T_j = 130 °C	2500	A
i^2t	10 ms	T_j = 25 °C	54450	A^2s
		T_j = 130 °C	31250	A^2s
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°C (R_{25}=5 kΩ)		493 ± 5%		Ω
$B_{100/125}$	$R_{(T)}=R_{100}exp[B_{100/125}(1/T-1/T_{100})]$; T[K];		3550 ±2%		K

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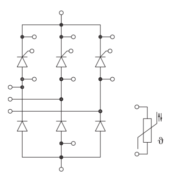

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Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Thyristor						
V_T	T_j = 130 °C, I_T = 210 A, chiplevel			1.05	1.14	V
$V_{T(TO)}$	T_j = 130 °C, chiplevel			0.80	0.85	V
r_T	T_j = 130 °C, chiplevel			1.32	1.4	mΩ
I_{DD};I_{RD}	T_j = 130 °C, V_{DD} = V_{DRM}; V_{RD} = V_{RRM}				54	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			150	220	mA
I_L	T_j = 25 °C, R_G = 33 Ω			300	550	mA
V_{GT}	T_j = 25 °C, d.c.		1.65			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.				10	mA
$R_{th(j-c)}$	per thyristor, sin. 180°				0.14	K/W
$R_{th(c-s)}$	per thyristor (λ_{grease}=0.81 W/(m*K))			0.054		K/W
$R_{th(c-s)}$	per thyristor, pre-applied phase change material			0.023		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Diode						
V_F	I_F = 210 A chiplevel	T_j = 25 °C		1.04	1.28	V
		T_j = 150 °C		0.95	1.18	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		0.75	1.44	mΩ
		T_j = 125 °C		1.06	1.69	mΩ
I_{RD}	T_j = 130 °C, V_{RD} = V_{RRM}				2	mA
$R_{th(j-c)}$	per diode, sin. 180°				0.15	K/W
$R_{th(c-s)}$	per Diode (λ_{grease}=0.81 W/(m*K))			0.059		K/W
$R_{th(c-s)}$	per Diode, pre-applied phase change material			0.033		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Module						
L_{CE}				20		nH
$R_{CC'+EE'}$	measured per switch	T_C = 25 °C		0.8		mΩ
		T_C = 125 °C		1.1		mΩ
$Rth_{(c-s)1}$	calculated without thermal coupling			0.009		K/W
$Rth_{(c-s)2}$	including thermal coupling, Ts underneath module (λ_{grease}=0.81 W/(m*K))			0.015		K/W
$Rth_{(c-s)1}$	calculated without thermal coupling; pre-applied phase change material			0.005		K/W
$Rth_{(c-s)2}$	including thermal coupling, Ts underneath module, pre-applied phase change material			0.007		K/W
M_s	to heat sink (M5)		3		6	Nm
M_t	to terminals (M6)		3		6	Nm
w				398		g

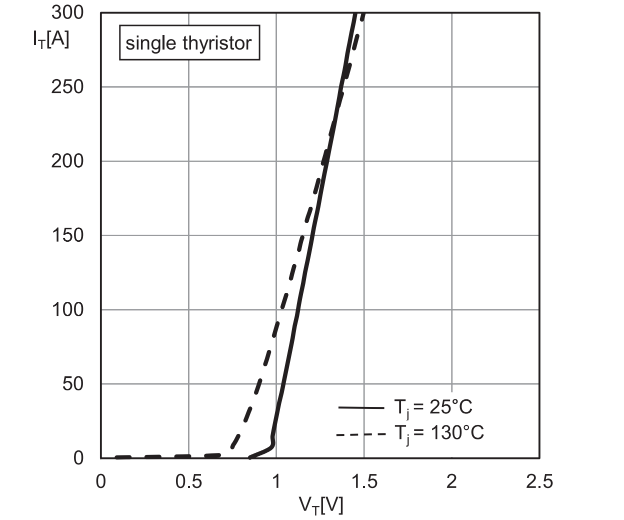


Fig. 1: Thyristor typ. on-state characteristic, incl. $R_{CC'+EE'}$

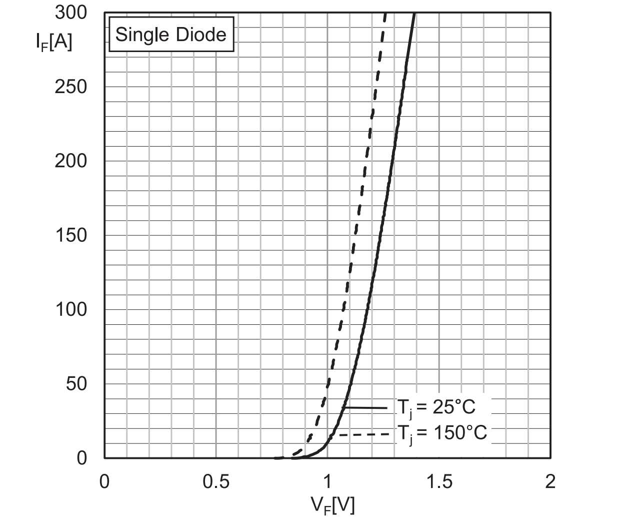


Fig. 2: Diode typ. on-state characteristic, incl. $R_{CC'+EE'}$

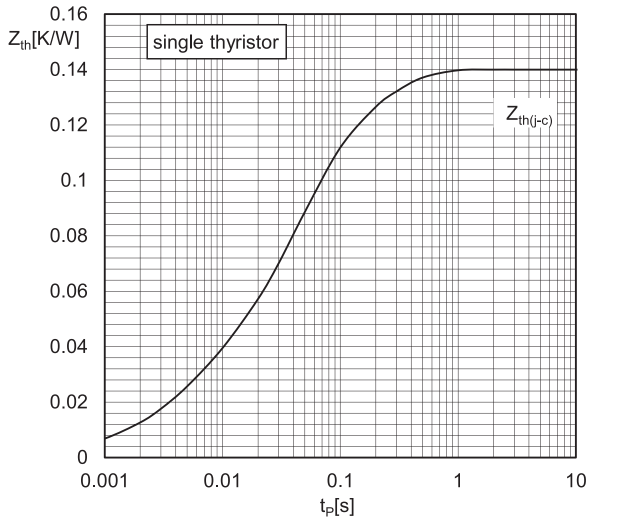


Fig. 3: Thyristor transient thermal impedance vs. time

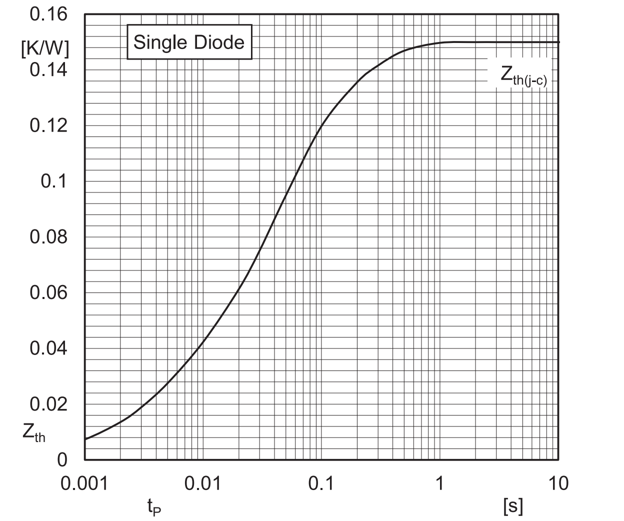


Fig. 4: Diode transient thermal impedance vs. time

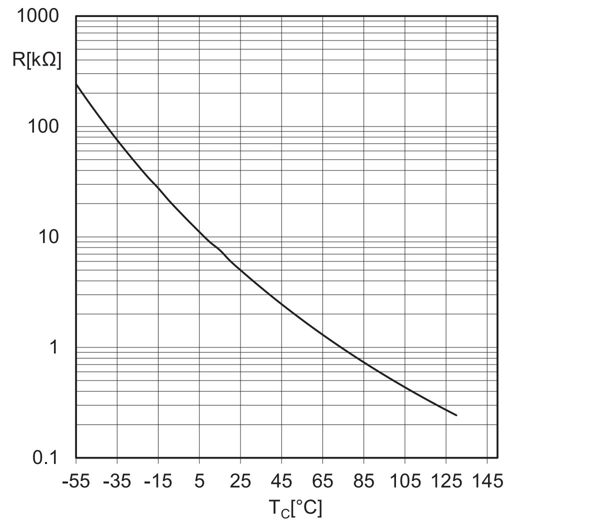
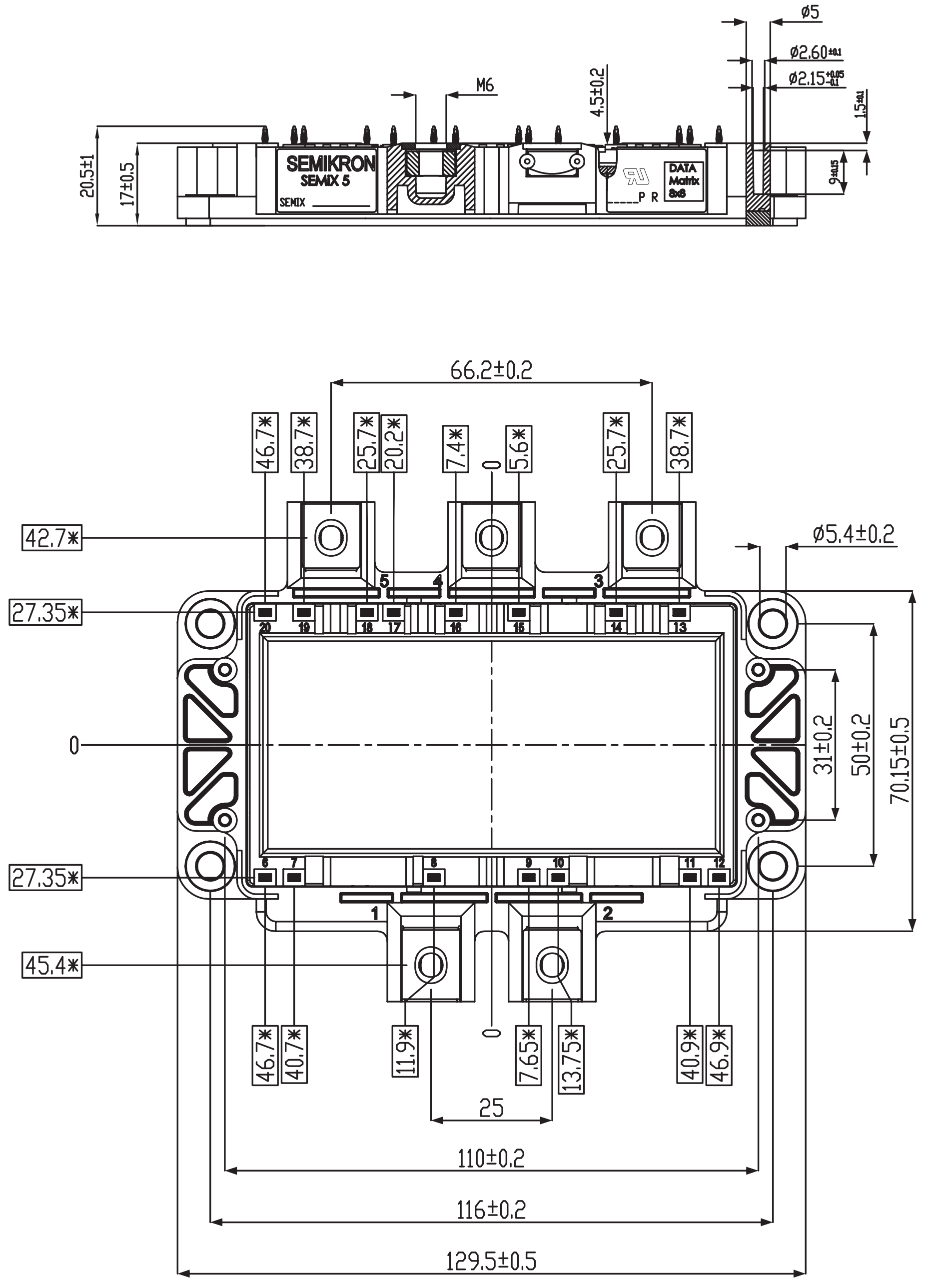


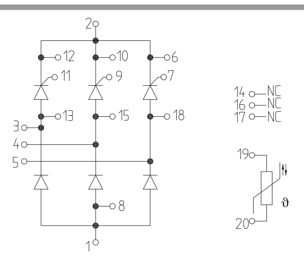
Fig. 5: Typ. NTC-temperature characteristics



* = All dimensions with tolerance of ⌖ Ø 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.