SEMiX® 13

Bridge Rectifier Module (halfcontrolled)

SEMiX241DH16s

Features

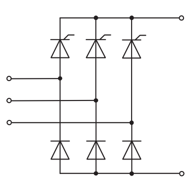
- Terminal height 17 mm
- Chips soldered directly to isolated substrate
- UL recognised file no. E63532

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"



DH

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

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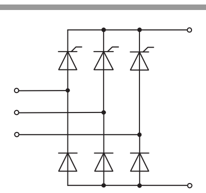


DH

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 (λ_{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 (λ_{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 (λ_{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

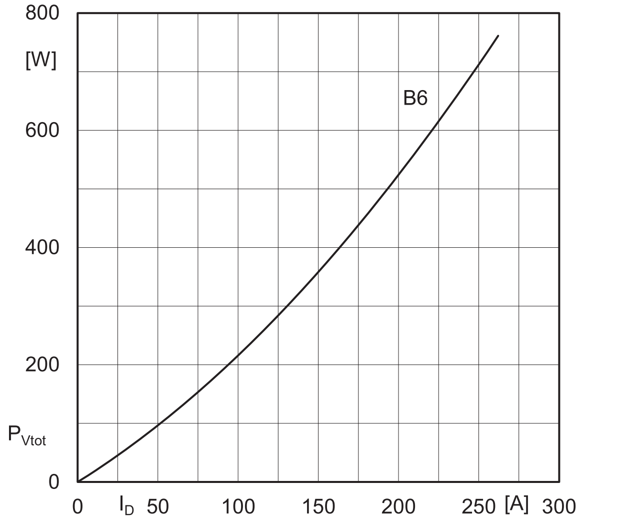


Fig. 4L: Power dissipation per module vs. direct current

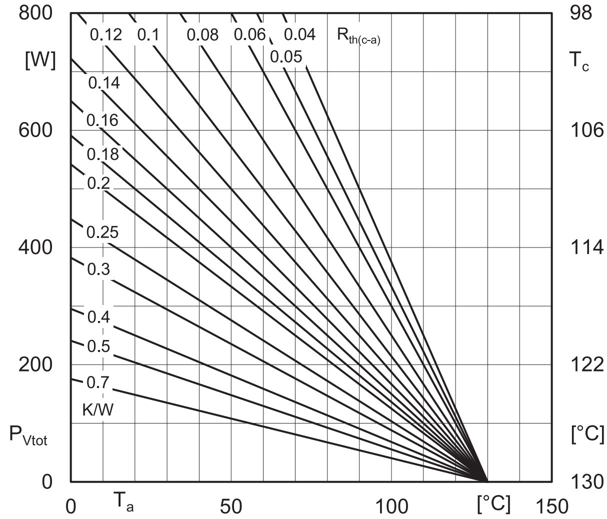


Fig. 4R: Power dissipation per module vs. ambient temperature

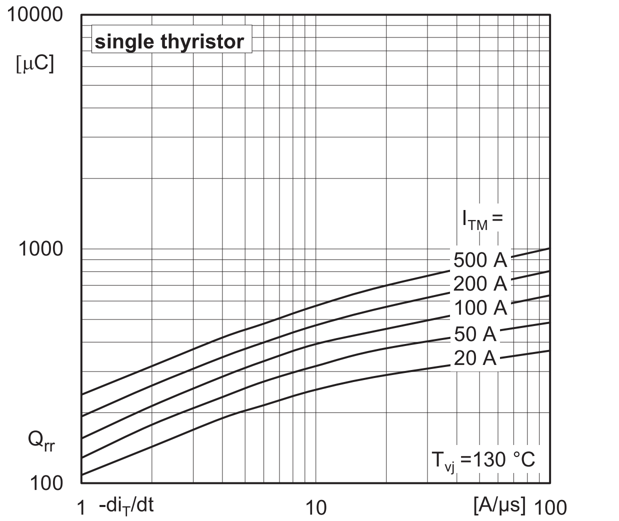


Fig. 5: Recovered charge vs. current decrease

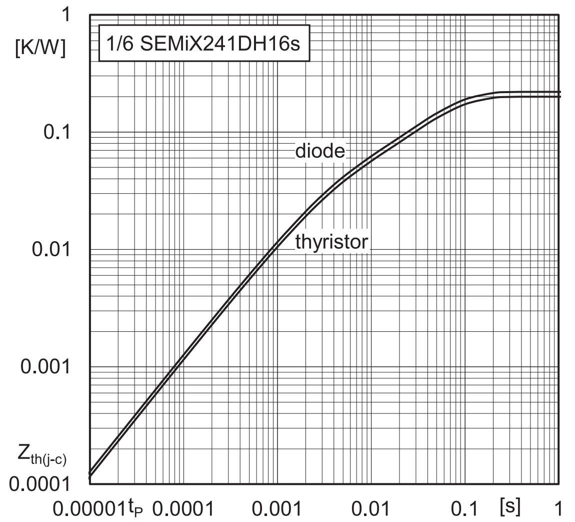


Fig. 6: Transient thermal impedance vs. time

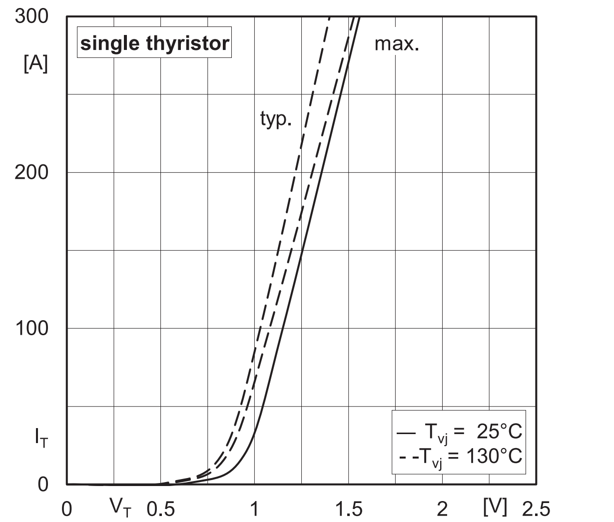


Fig. 7: On-state characteristics

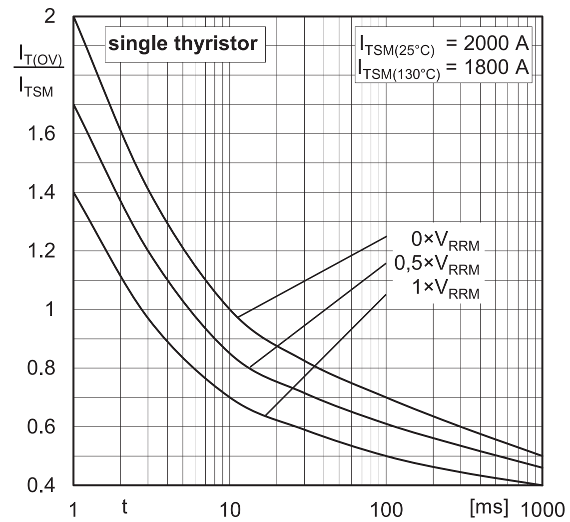


Fig. 8: Surge overload current vs. time

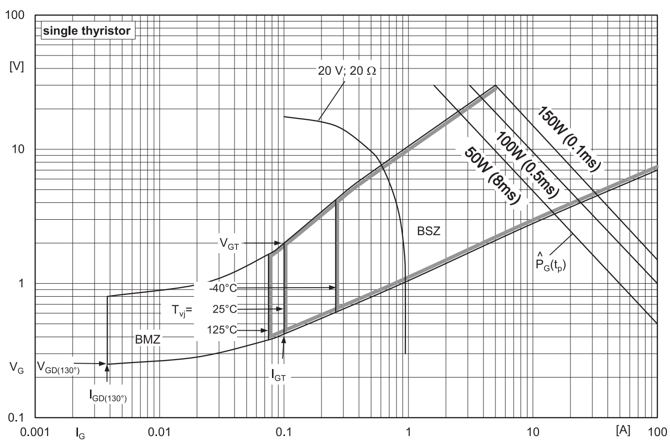
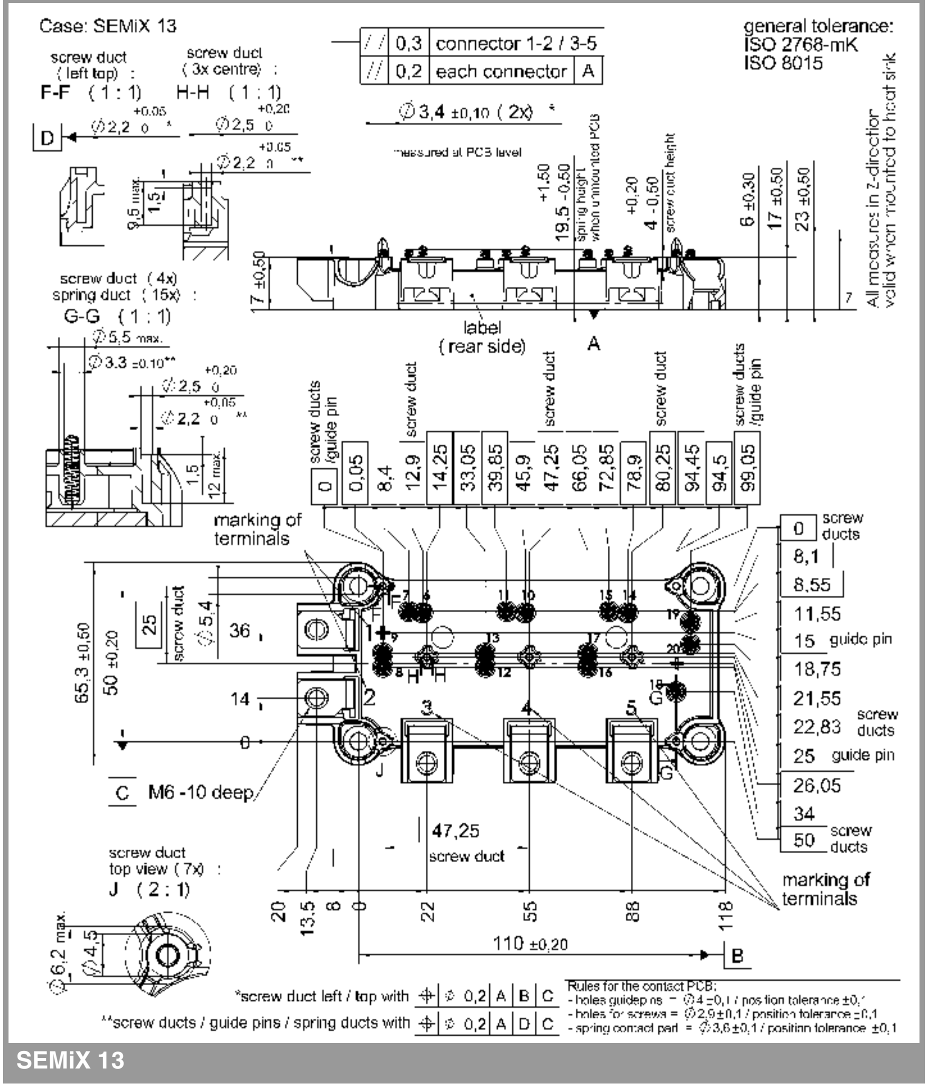


Fig. 9: Gate trigger characteristics



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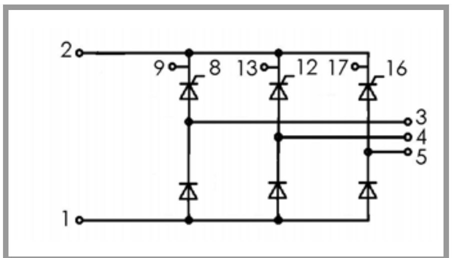

spring configuration

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

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