



SEMiX[®]2s

Trench IGBT Modules

SEMiX302GB066HDs

Preliminary Data

Features

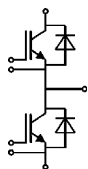
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- UL recognised file no. E63532

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j = 150^\circ\text{C}$
- For short circuit: Soft R_{Goff} recommended
- Take care of over-voltage caused by stray inductance



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}			600	V
I _C	T _j = 175 °C	T _c = 25 °C	379	A
		T _c = 80 °C	286	A
I _{Cnom}			300	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		600	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 360 V V _{GE} ≤ 15 V T _j = 150 °C V _{CES} ≤ 600 V		6	µs
T _j			-40 ... 175	°C
Inverse diode				
I _F	T _j = 175 °C	T _c = 25 °C	419	A
		T _c = 80 °C	307	A
I _{Fnom}			300	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		600	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		1400	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}			600	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 300 A	T _J = 25 °C		1.45	1.9	V
	V _{GE} = 15 V chipelevel	T _J = 150 °C		1.70	2.1	V
V _{CE0}		T _J = 25 °C		0.9	1	V
		T _J = 150 °C		0.85	0.9	V
r _{CE}	V _{GE} = 15 V	T _J = 25 °C		1.8	3.0	mΩ
		T _J = 150 °C		2.8	4.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 4.8 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _J = 25 °C		0.15	0.45	mA
	V _{CE} = 600 V	T _J = 150 °C				mA
C _{ies}	V _{CE} = 25 V	f = 1 MHz		18.5		nF
C _{oes}	V _{GE} = 0 V	f = 1 MHz		1.15		nF
C _{res}		f = 1 MHz		0.55		nF
Q _G	V _{GE} = - 8 V...+ 15 V			2400		nC
R _{Gint}	T _J = 25 °C			1.00		Ω
t _{d(on)}	V _{CC} = 300 V			110		ns
t _r	I _C = 300 A			85		ns
E _{on}	T _J = 150 °C			11.5		mJ
t _{d(off)}	R _{G on} = 5.1 Ω			820		ns
t _f	R _{G off} = 5.1 Ω			70		ns
E _{off}				15		mJ
R _{th(j-c)}	per IGBT				0.16	K/W



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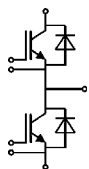
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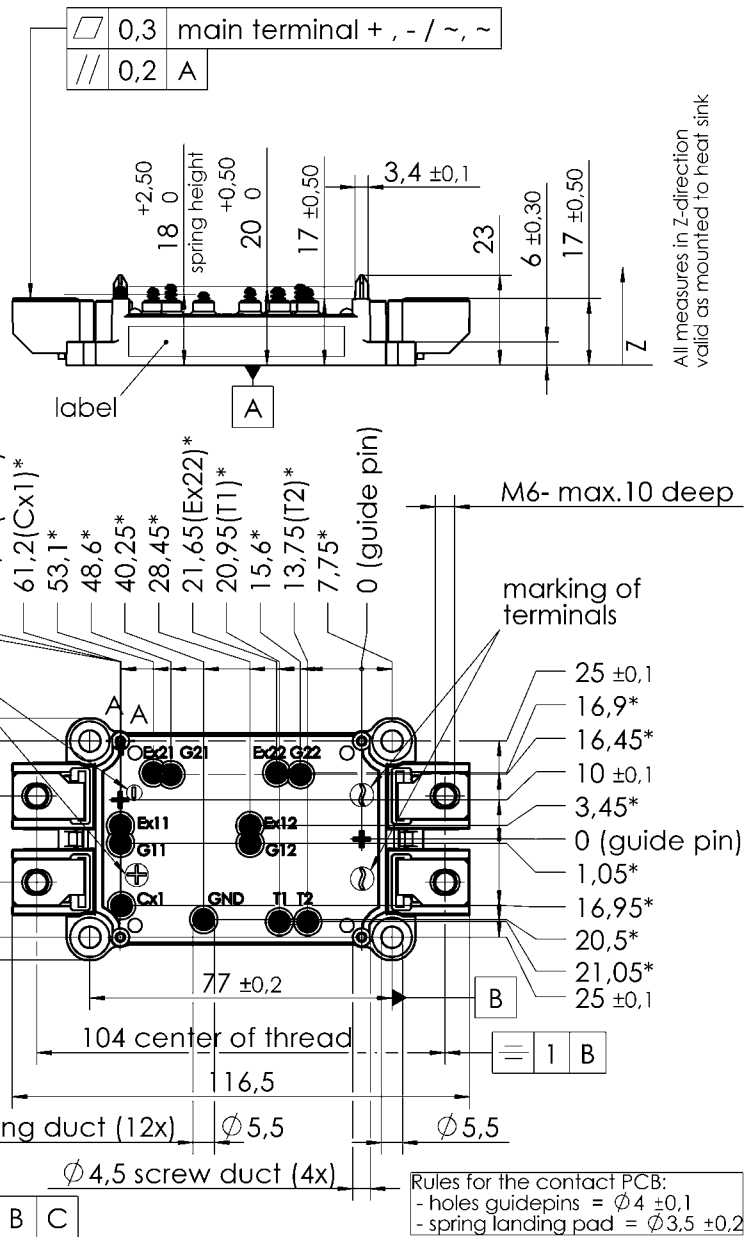
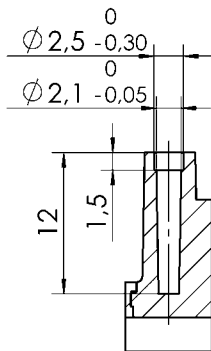
Characteristics							
Symbol	Conditions		min.	typ.	max.	Unit	
Inverse diode							
V _F = V _{EC}	I _F = 300 A	T _j = 25 °C		1.4	1.6	V	
	V _{GE} = 0 V chipllevel	T _j = 150 °C		1.4	1.6	V	
V _{F0}		T _j = 25 °C	0.9	1	1.1	V	
		T _j = 150 °C	0.75	0.85	0.95	V	
r _F		T _j = 25 °C	1.0	1.3	1.7	mΩ	
		T _j = 150 °C	1.5	1.8	2.2	mΩ	
I _{RRM}	I _F = 300 A	T _j = 150 °C	240			A	
Q _{rr}	di/dt _{off} = 3600 A/μs	T _j = 150 °C	35			μC	
E _{rr}	V _{GE} = -8 V	T _j = 150 °C	7.5			mJ	
R _{th(j-c)}	per diode		0.19			K/W	
Module							
L _{CE}			18			nH	
R _{CC'+EE'}	res., terminal-chip	T _C = 25 °C	0.7			mΩ	
		T _C = 125 °C	1			mΩ	
R _{th(c-s)}	per module		0.045			K/W	
M _s	to heat sink (M5)		3			5	Nm
M _t	to terminals (M6)		2.5			5	Nm
w			250			g	
Temperature sensor							
R ₁₀₀	T _C =100°C (R ₂₅ =5 kΩ)		0,493 ±5%			kΩ	
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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case: SEMiX 2s

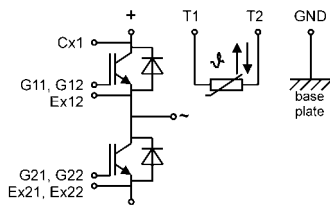
screw duct (4x):
A-A (2 : 1)



* all measures with

Rules for the contact PCB:
- holes guidepins = $\varnothing 4 \pm 0,1$
- spring landing pad = $\varnothing 3,5 \pm 0,2$

SEMIX 2s



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

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