SEMiX402GB066HDs

SEMiX®2s

Trench IGBT Modules

SEMiX402GB066HDs

Preliminary Data

Features

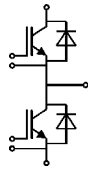
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- UL recognised file no. E63532

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to T_C=125°C max.
- Product reliability results are valid for T_j=150°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	509	A
		T_c = 80 °C	383	A
I_{Cnom}			400	A
I_{CRM}	I_{CRM} = 2xI_{Cnom}		800	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V $V_{GE} \leq$ 15 V T_j = 150 °C $V_{CES} \leq$ 600 V		6	µs
T_j			-40 ... 175	°C
Inverse diode				
I_F	T_j = 175 °C	T_c = 25 °C	543	A
		T_c = 80 °C	397	A
I_{Fnom}			400	A
I_{FRM}	I_{FRM} = 2xI_{Fnom}		800	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 25 °C		1800	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 = 400 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.9	V
		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		1.4	2.3	mΩ
		T_j = 150 °C		2.1	3.0	mΩ
$V_{GE(th)}$	V_{GE}=V_{CE}, I_C = 6.4 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 600 V	T_j = 25 °C		0.15	0.45	mA
		T_j = 150 °C				mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		24.7		nF
C_{oes}		f = 1 MHz		1.54		nF
C_{res}		f = 1 MHz		0.73		nF
Q_G	V_{GE} = - 8 V...+ 15 V			3200		nC
R_{Gint}	T_j = 25 °C			1.00		Ω
$t_{d(on)}$	V_{CC} = 300 V I_C = 400 A T_j = 150 °C $R_{G\ on}$ = 4.5 Ω $R_{G\ off}$ = 4.5 Ω			150		ns
t_r				125		ns
E_{on}				22		mJ
$t_{d(off)}$				900		ns
t_f				65		ns
E_{off}				24		mJ
$R_{th(j-c)}$	per IGBT				0.12	K/W
$R_{th(j-s)}$	per IGBT					K/W

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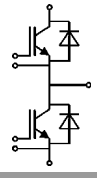
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse diode						
$V_F = V_{EC}$	I_F = 400 A V_{GE} = 0 V chiplevel	T_j = 25 °C		1.4	1.6	V
		T_j = 150 °C		1.4	1.6	V
V_{F0}		T_j = 25 °C	0.9	1	1.1	V
		T_j = 150 °C	0.75	0.85	0.95	V
r_F		T_j = 25 °C	0.8	1.0	1.3	mΩ
		T_j = 150 °C	1.1	1.4	1.6	mΩ
I_{RRM}	I_F = 400 A di/dt_{off} = 3700 A/µs V_{GE} = -8 V V_{CC} = 300 V	T_j = 150 °C		250		A
Q_{rr}		T_j = 150 °C		47		µC
E_{rr}		T_j = 150 °C		10		mJ
$R_{th(j-c)}$	per diode				0.15	K/W
$R_{th(j-s)}$	per diode					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
						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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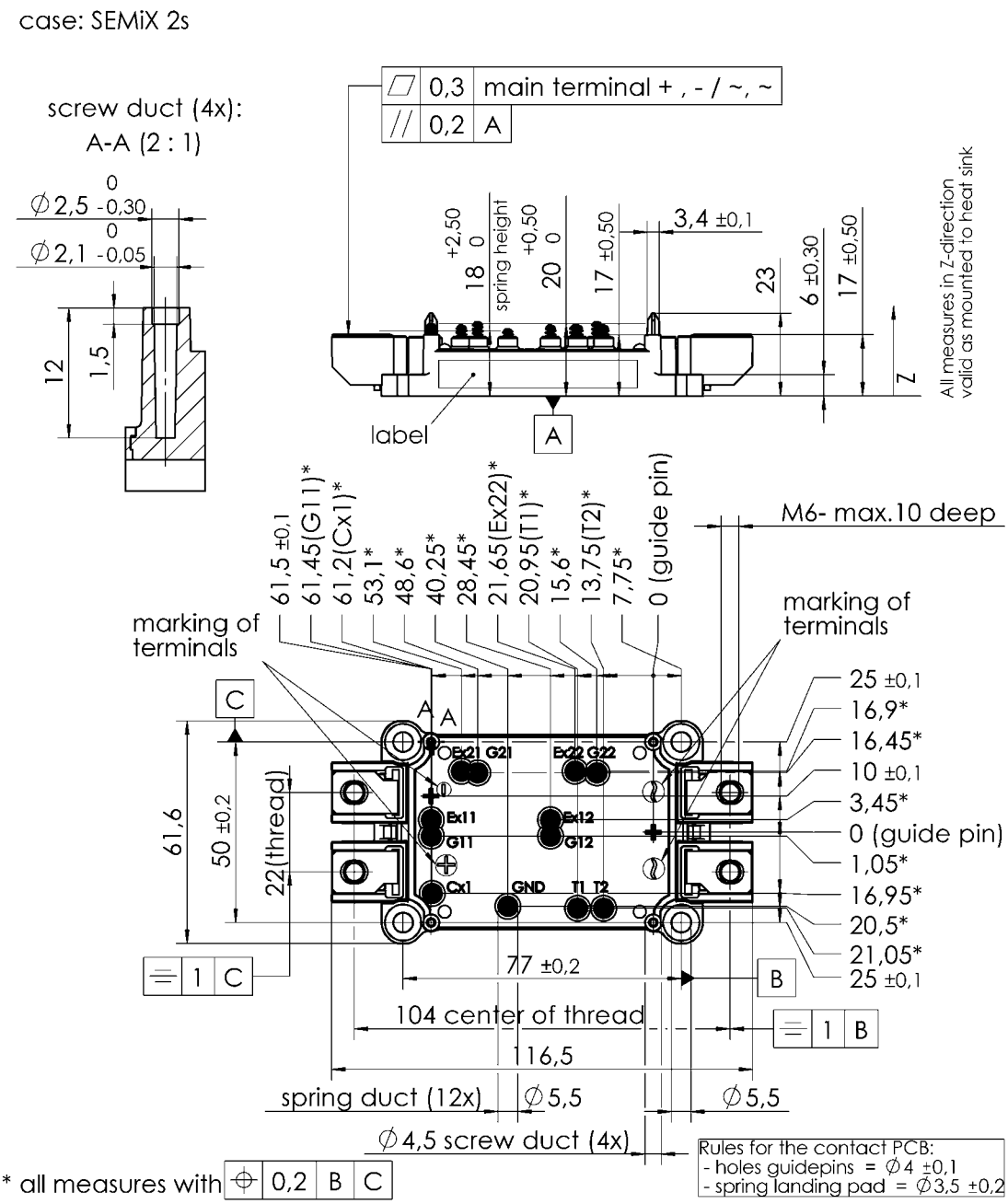

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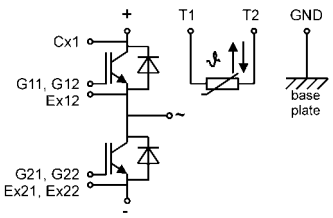

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX

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