SEMiX303GB12E4p

SEMiX® 3p

Trench IGBT Modules

SEMiX303GB12E4p

Target Data

Features

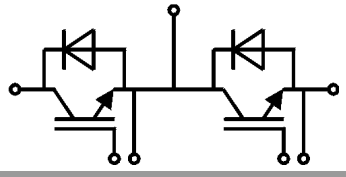
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- Press-fit pins as auxiliary contacts
- UL recognized, file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Renewable energy systems

Remarks

- Product reliability results are valid for T_j=150°C



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Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 175 °C	T_c = 25 °C	466	A
		T_c = 80 °C	359	A
I_{Cnom}			300	A
I_{CRM}	I_{CRM} = 3xI_{Cnom}		900	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V V_{GE} ≤ 20 V V_{CES} ≤ 1200 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Inverse diode				
I_F	T_j = 175 °C	T_c = 25 °C	378	A
		T_c = 80 °C	284	A
I_{Fnom}			300	A
I_{FRM}	I_{FRM} = 3xI_{Fnom}		900	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 25 °C		1485	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C		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 V_{GE} = 15 V chiplevel	T_j = 25 °C		1.80	2.05	V
		T_j = 150 °C		2.20	2.40	V
V_{CE0}	chiplevel	T_j = 25 °C		0.8	0.9	V
		T_j = 150 °C		0.7	0.8	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		3.3	3.8	mΩ
		T_j = 150 °C		5	5.3	mΩ
$V_{GE(th)}$	V_{GE}=V_{CE}, I_C = 11.4 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C			4	mA
		T_j = 150 °C				mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		18.5		nF
C_{oes}		f = 1 MHz		1.22		nF
C_{res}		f = 1 MHz		1.04		nF
Q_G	V_{GE} = - 8 V...+ 15 V			1695		nC
R_{Gint}	T_j = 25 °C			2.50		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 300 A V_{GE} = +15/-15 V $R_{G\ on}$ = 1.3 Ω $R_{G\ off}$ = 1.3 Ω di/dt$_{on}$ = 6000 A/µs di/dt$_{off}$ = 6000 A/µs du/dt = 3100 V/µs L_s = 80 nH	T_j = 150 °C		190		ns
t_r		T_j = 150 °C		50		ns
E_{on}		T_j = 150 °C		19		mJ
$t_{d(off)}$		T_j = 150 °C		600		ns
t_f		T_j = 150 °C		120		ns
E_{off}		T_j = 150 °C		40		mJ
$R_{th(j-c)}$	per IGBT				0.095	K/W

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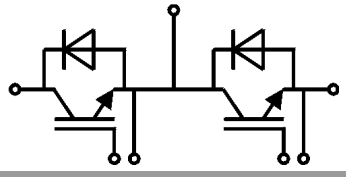
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse diode						
$V_F = V_{EC}$	I_F = 300 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.20	2.52	V
		T_j = 150 °C		2.15	2.47	V
V_{F0}	chiplevel	T_j = 25 °C	1.1	1.3	1.5	V
		T_j = 150 °C	0.7	0.9	1.1	V
r_F	chiplevel	T_j = 25 °C	2.7	3	3.4	mΩ
		T_j = 150 °C	3.5	4.2	4.6	mΩ
I_{RRM}	I_F = 300 A di/dt_{off} = 6000 A/µs V_{GE} = -15 V V_{CC} = 600 V	T_j = 150 °C		300		A
Q_{rr}		T_j = 150 °C		45		µC
E_{rr}		T_j = 150 °C		20		mJ
$R_{th(j-c)}$	per diode				0.15	K/W
Module						
L_{CE}				20		nH
$R_{CC'+EE'}$	res., terminal-chip	T_C = 25 °C		1.2		mΩ
		T_C = 125 °C		1.65		mΩ
$R_{th(c-s)}$	per module			0.04		K/W
M_s	to heat sink (M5)		3		6	Nm
M_t		to terminals (M6)	3		6	Nm
						Nm
w					340	g
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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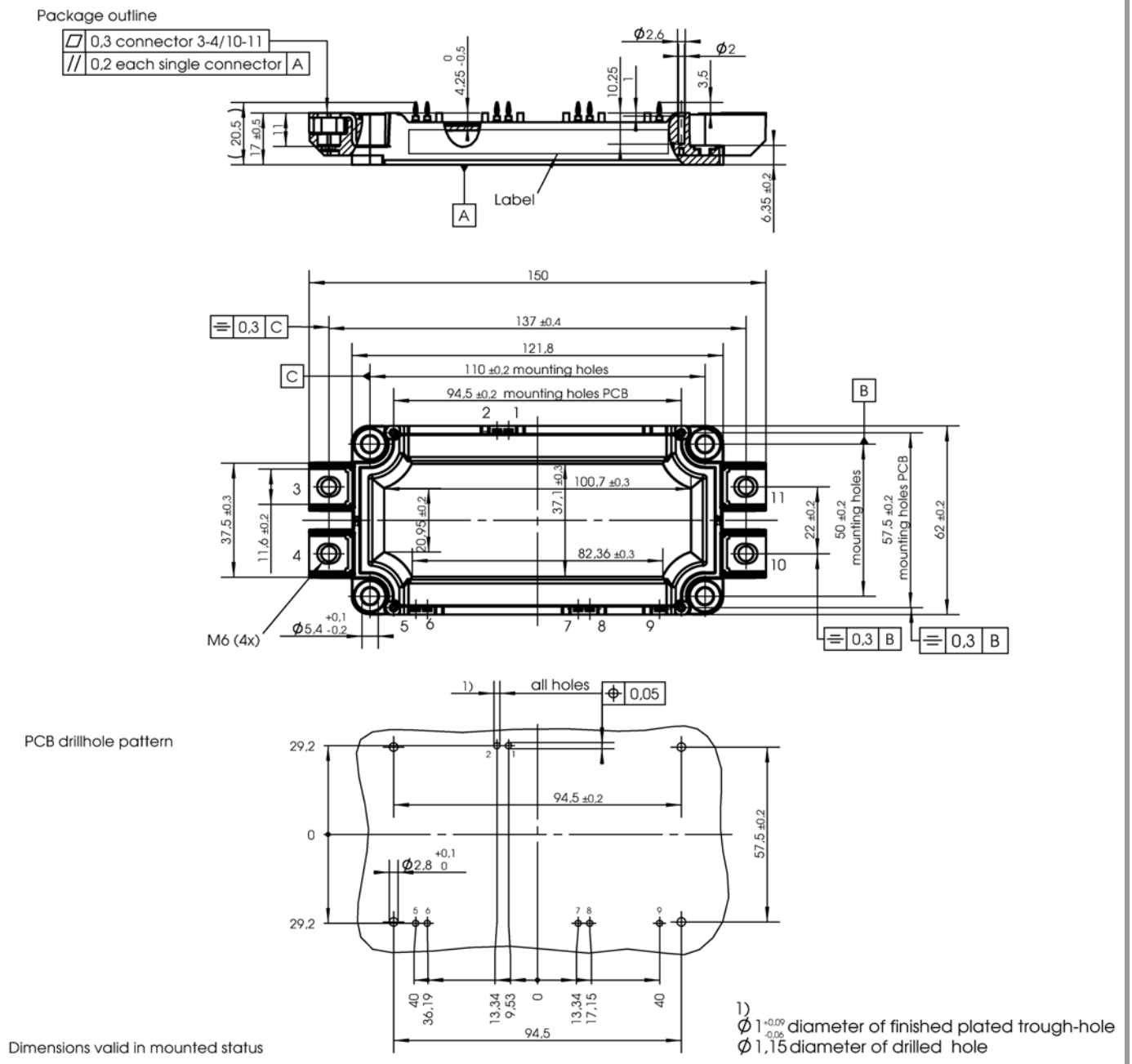

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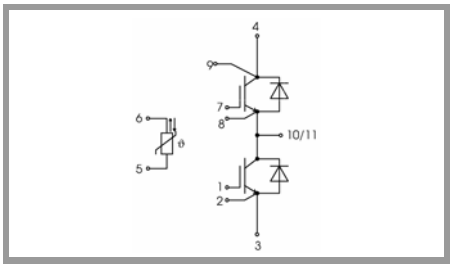

pinout

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

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.