



SEMiX[®]2s

SPT IGBT Modules

SEMiX302GB128Ds

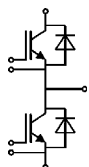
Preliminary Data

Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications

- AC inverter drives
- UPS
- Electronic welders up to 20 kHz



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}			1200	V
I _C	T _j = 150 °C	T _c = 25 °C	283	A
		T _c = 80 °C	201	A
I _{Cnom}			150	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		300	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 600 V V _{GE} ≤ 20 V T _j = 125 °C V _{CES} ≤ 1200 V		10	µs
T _j			-40 ... 150	°C
Inverse diode				
I _F	T _j = 150 °C	T _c = 25 °C	231	A
		T _c = 80 °C	159	A
I _{Fnom}			150	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		300	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		1300	A
T _j			-40 ... 150	°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 = 150 A	T _j = 25 °C		1.9	2.3	V
	V _{GE} = 15 V chipselevel	T _j = 125 °C		2.10	2.55	V
V _{CE0}		T _j = 25 °C		1	1.15	V
		T _j = 125 °C		0.9	1.05	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		6.0	7.7	mΩ
		T _j = 125 °C		8.0	10.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 6 mA		4.5	5	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C		0.1	0.3	mA
	V _{CE} = 1200 V	T _j = 125 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		13.8		nF
C _{oes}		f = 1 MHz		0.92		nF
C _{res}		f = 1 MHz		0.58		nF
Q _G	V _{GE} = - 8 V...+ 15 V			1420		nC
R _{Gint}	T _j = 25 °C			2.50		Ω
t _{d(on)}	V _{CC} = 600 V I _C = 150 A T _j = 125 °C R _{G on} = 4 Ω R _{G off} = 4 Ω			190		ns
t _r				51		ns
E _{on}				17		mJ
t _{d(off)}				466		ns
t _f				56		ns
E _{off}				16		mJ
R _{th(j-c)}		per IGBT				0.11
R _{th(i-s)}	per IGBT					K/W



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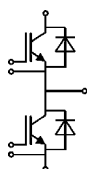
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Features

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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 150 A	T _j = 25 °C		2.0	2.5	V
	V _{GE} = 0 V chiplevel	T _j = 125 °C		1.8	2.3	V
V _{F0}		T _j = 25 °C	0.75	1.1	1.45	V
		T _j = 125 °C	0.5	0.85	1.2	V
r _F		T _j = 25 °C	5.0	6.0	7.0	mΩ
		T _j = 125 °C	5.3	6.3	7.3	mΩ
I _{RRM}	I _F = 150 A	T _j = 125 °C		180		A
Q _{rr}	di/dt _{off} = 4300 A/μs	T _j = 125 °C		22		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 125 °C		8		mJ
R _{th(j-c)}	per diode				0.19	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

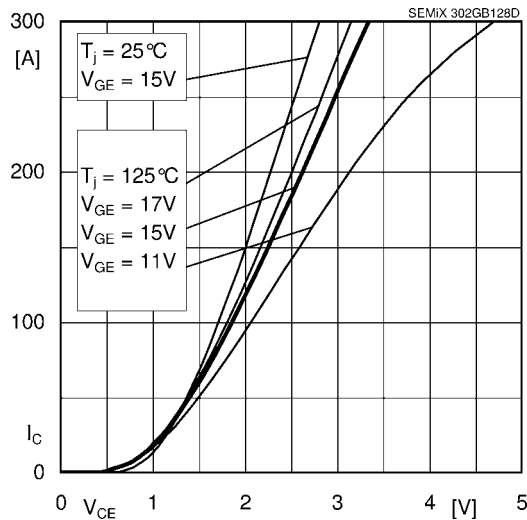


Fig. 1 Typ. output characteristic, inclusive $R_{CC'}+EE'$

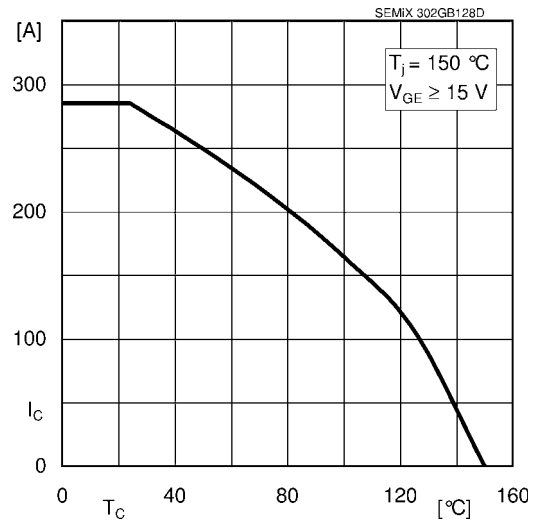


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

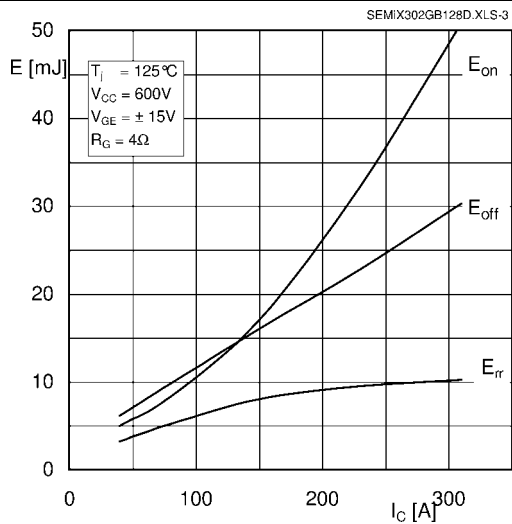


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

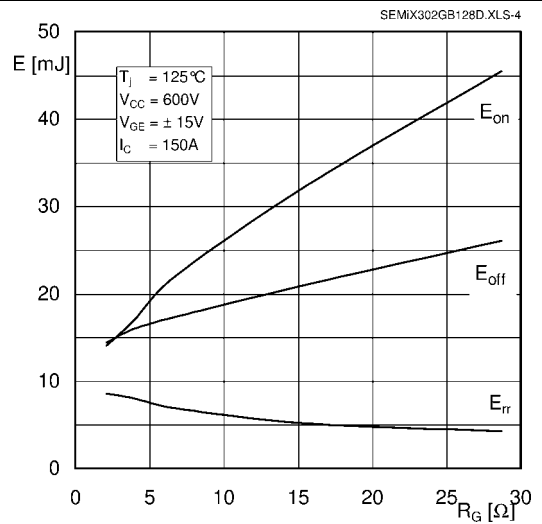


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

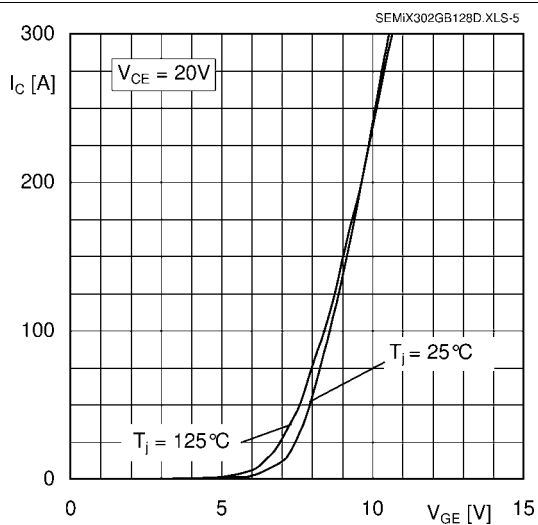


Fig. 5 Typ. transfer characteristic

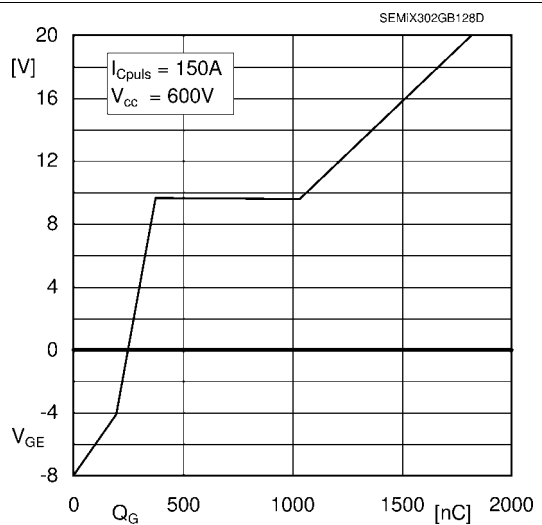


Fig. 6 Typ. gate charge characteristic

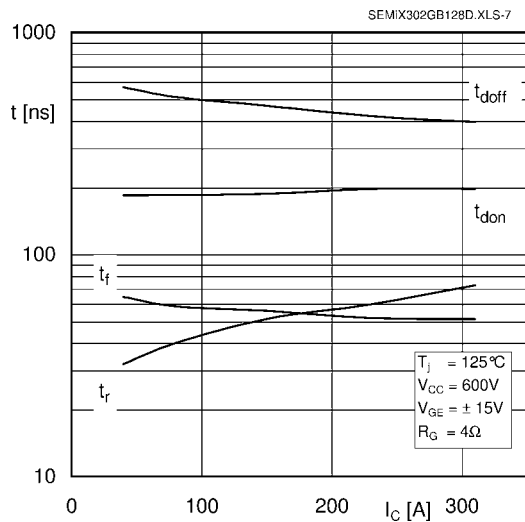


Fig. 7 Typ. switching times vs. I_C

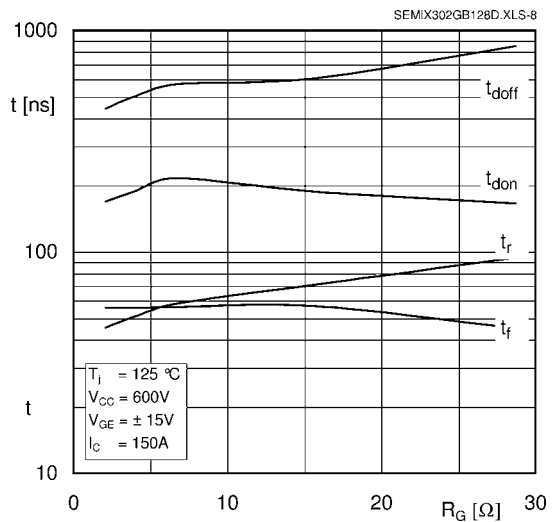


Fig. 8 Typ. switching times vs. gate resistor R_G

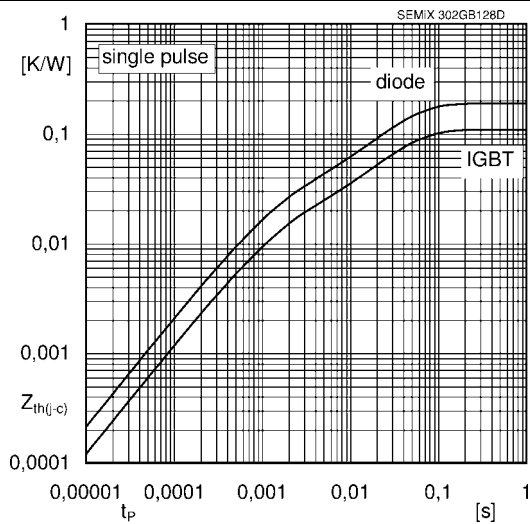


Fig. 9 Typ. transient thermal impedance

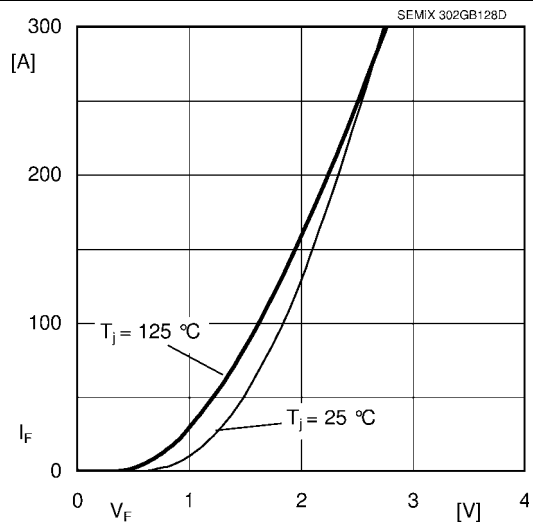


Fig. 10 Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

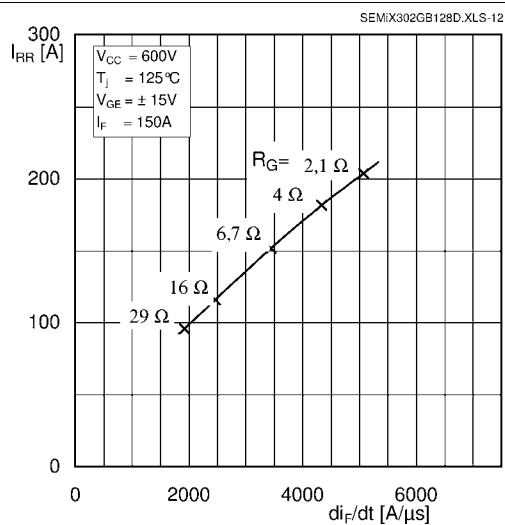


Fig. 11 Typ. CAL diode peak reverse recovery current

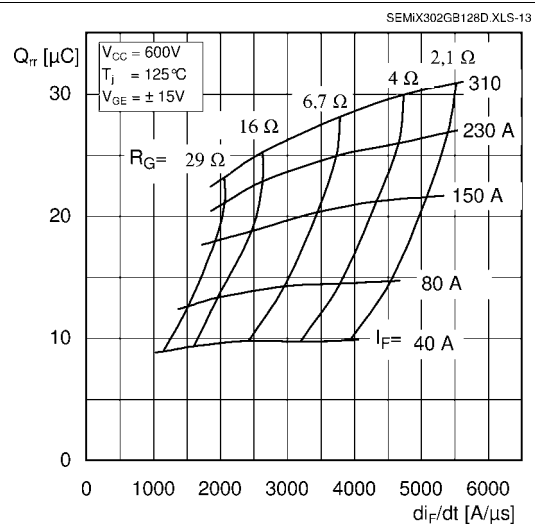
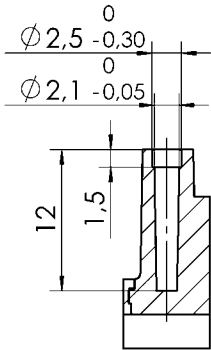


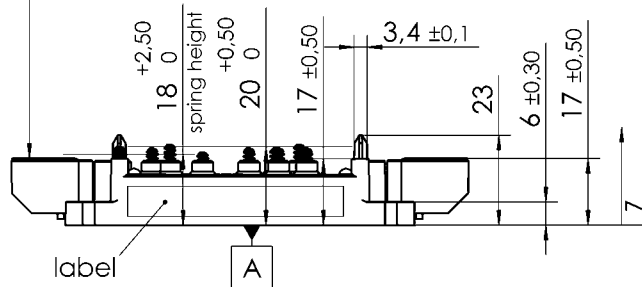
Fig. 12 Typ. CAL diode recovery charge

case: SEMiX 2s

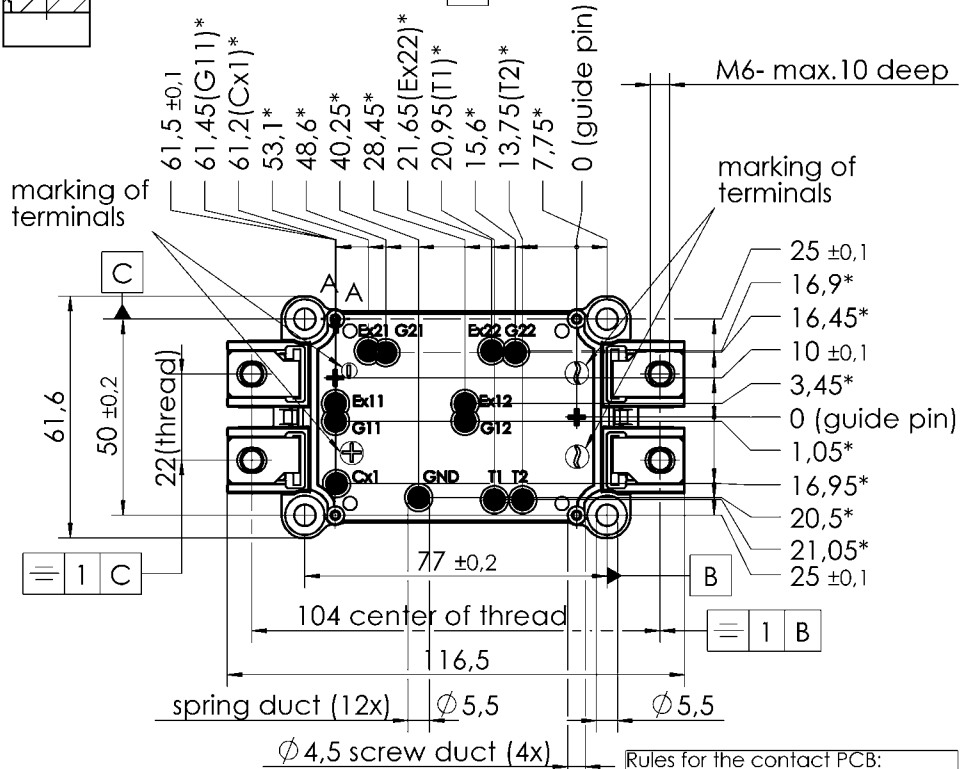
screw duct (4x):
A-A (2 : 1)



$\square$	0,3	main terminal + , - / ~, ~	
//	0,2	A	



All measures in Z-direction valid as mounted to heat sink

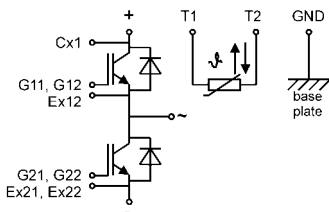


* all measures with

	0,2	B	C
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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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.