

SEMiX553GB128Ds



SPT IGBT Modules

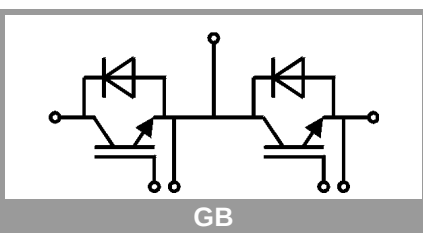
SEMiX553GB128Ds

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



Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}			1200	V
I _C	T _j = 150 °C	T _c = 25 °C	533	A
		T _c = 80 °C	379	A
I _{Cnom}			300	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		600	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 600 V V _{GE} ≤ 20 V V _{CES} ≤ 1200 V	T _j = 125 °C	10	µs
T _j			-40 ... 150	°C
Inverse diode				
I _F	T _j = 150 °C	T _c = 25 °C	421	A
		T _c = 80 °C	289	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		2300	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 = 300 A	T _j = 25 °C		1.9	2.35	V
	V _{GE} = 15 V chiplevel	T _j = 125 °C		2.1	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		3.0	4.0	mΩ
		T _j = 125 °C		4.0	5.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 12 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	f = 1 MHz		28.3		nF
C _{oes}	V _{GE} = 0 V	f = 1 MHz		1.86		nF
C _{res}		f = 1 MHz		1.17		nF
Q _G	V _{GE} = - 8 V...+ 15 V			2880		nC
R _{Gint}	T _j = 25 °C			1.33		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 125 °C		185		ns
t _r	I _C = 300 A	T _j = 125 °C		65		ns
E _{on}	R _{G on} = 3 Ω	T _j = 125 °C		27		mJ
t _{d(off)}	R _{G off} = 3 Ω	T _j = 125 °C		635		ns
t _f		T _j = 125 °C		80		ns
E _{off}		T _j = 125 °C		33		mJ
R _{th(i-c)}	per IGBT				0.061	K/W

SEMiX553GB128Ds



SEMiX® 3s

SPT IGBT Modules

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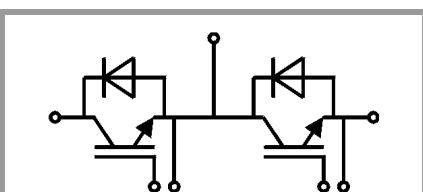
Features

- Homogeneous Si
- SPT = Soft-Punch-Through technology
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Typical Applications*

- AC inverter drives
- UPS
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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		2.0	2.50	V
	V _{GE} = 0 V chip	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	2.5	3.0	3.5	mΩ
		T _j = 125 °C	2.7	3.2	3.7	mΩ
I _{RRM}	I _F = 300 A	T _j = 125 °C		325		A
Q _{rr}	di/dt _{off} = 5400 A/μs	T _j = 125 °C		46		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 125 °C		17		mJ
R _{th(j-c)}	per diode				0.11	K/W
Module						
L _{CE}				20		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			0.04		K/W
M _s	to heat sink (M5)		3		5	Nm
M _t		to terminals (M6)	2.5		5	Nm
						Nm
w					300	g
Temperatur 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



GB

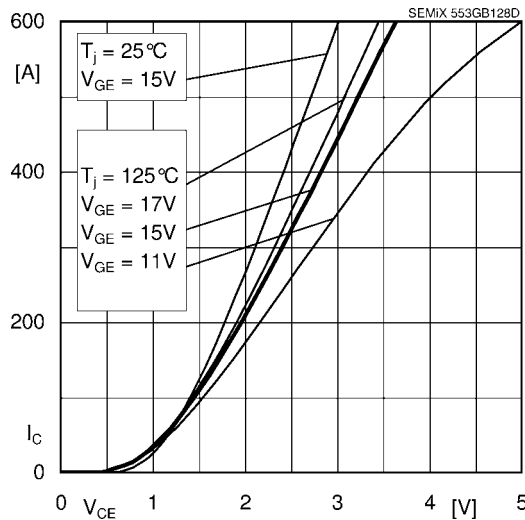


Fig. 1: Typ. output characteristic, inclusive $R_{CC'} + E_E$

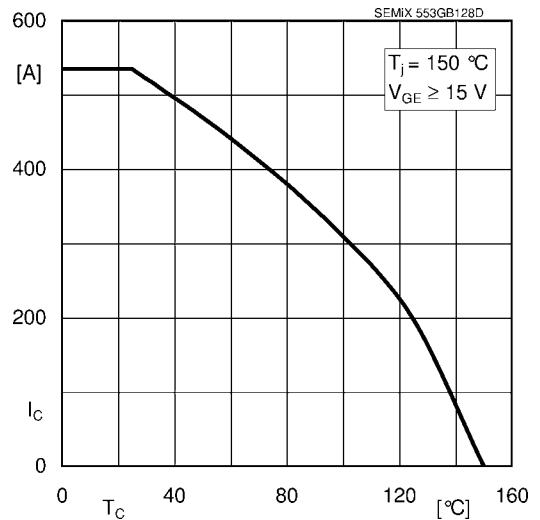


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

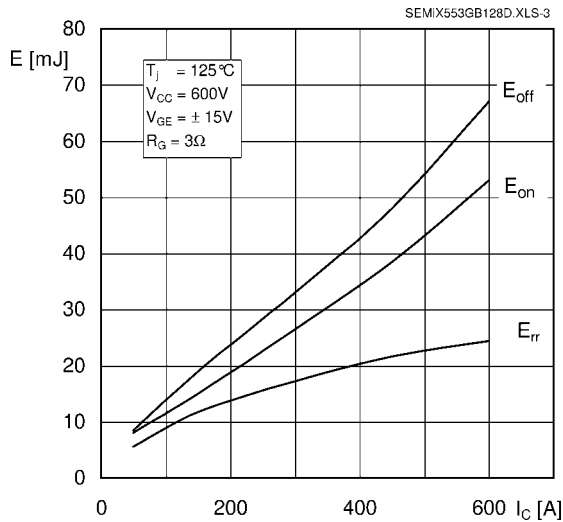


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

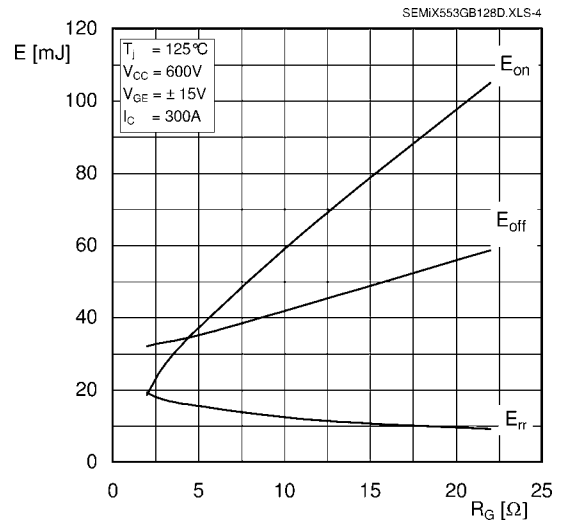


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

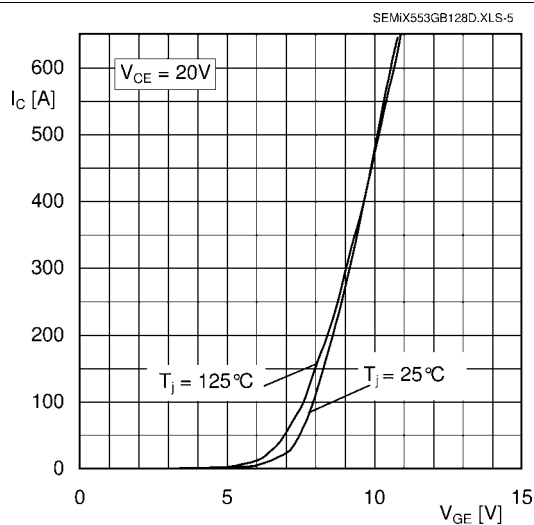


Fig. 5: Typ. transfer characteristic

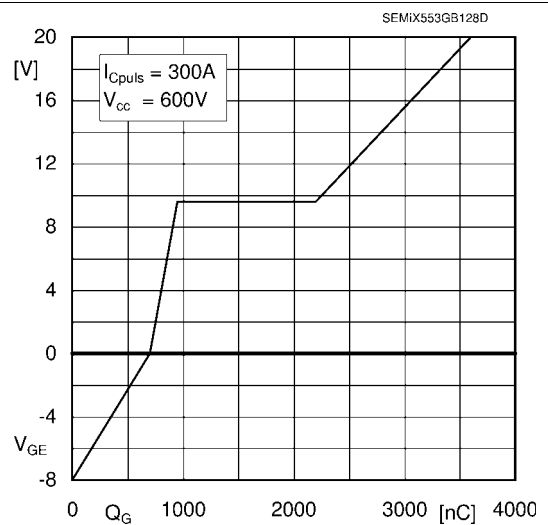


Fig. 6: Typ. gate charge characteristic

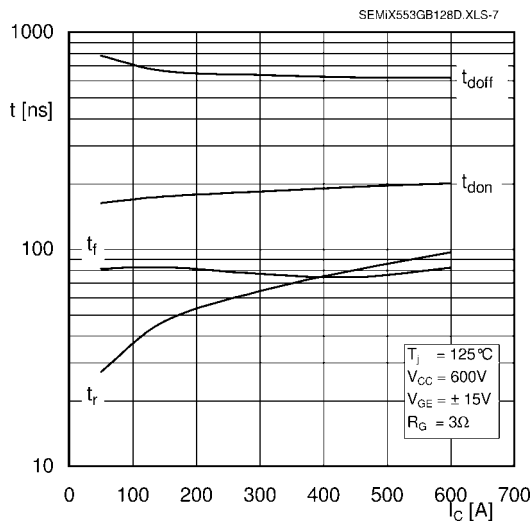


Fig. 7: Typ. switching times vs. I_C

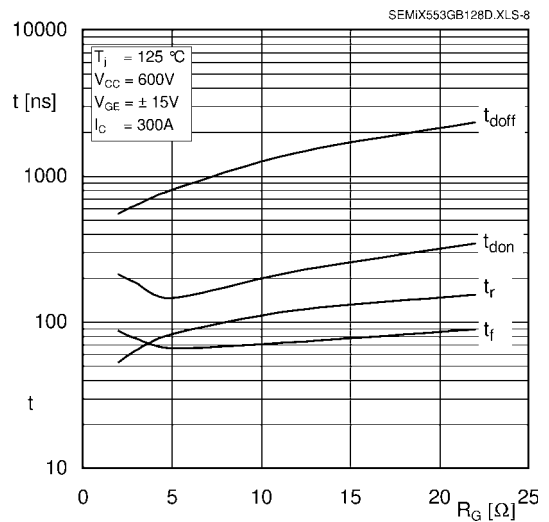


Fig. 8: Typ. switching times vs. gate resistor R_G

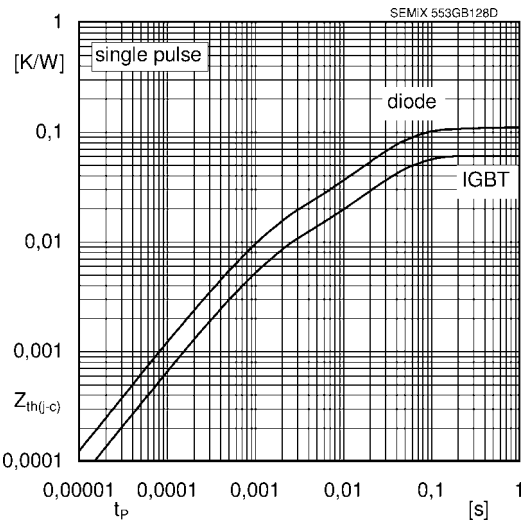


Fig. 9: Typ. transient thermal impedance

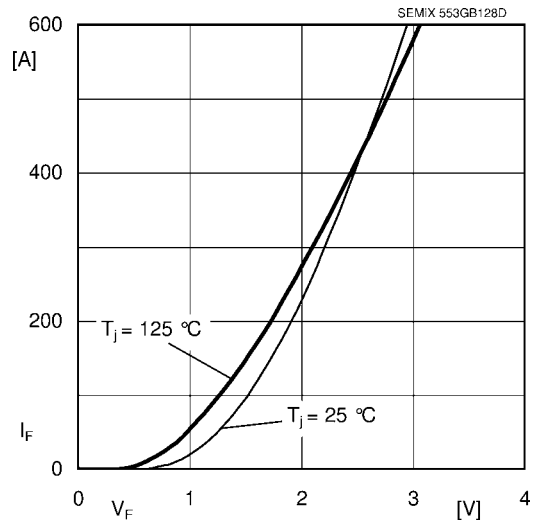


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

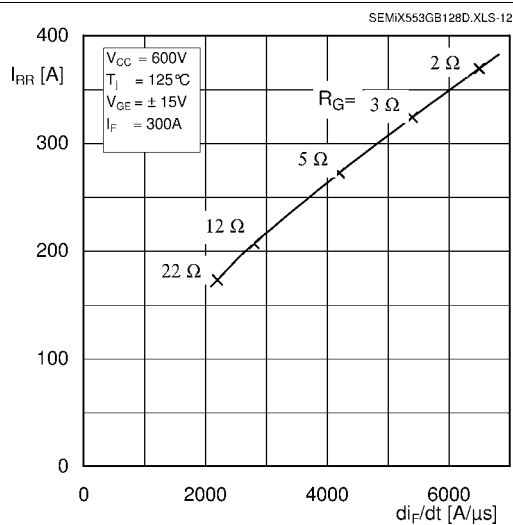


Fig. 11: Typ. CAL diode peak reverse recovery current

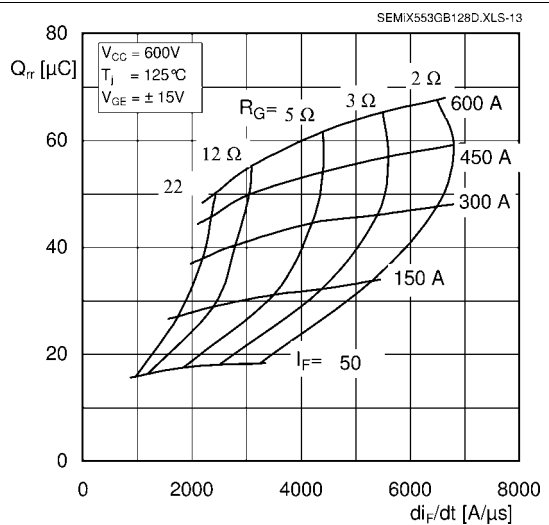
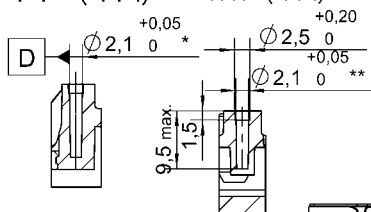


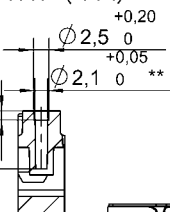
Fig. 12: Typ. CAL diode recovery charge

Case: SEMiX 3s

screw duct
(left top) :
F-F (1:1)

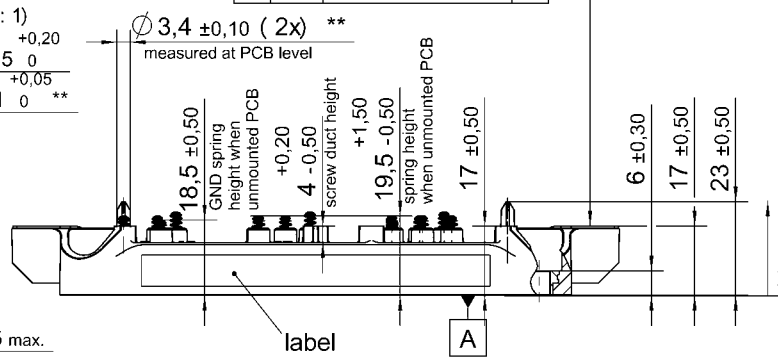
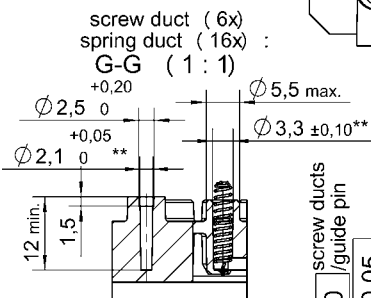


screw duct
(1x centre) :
H-H (1:1)

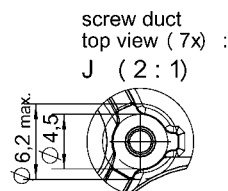
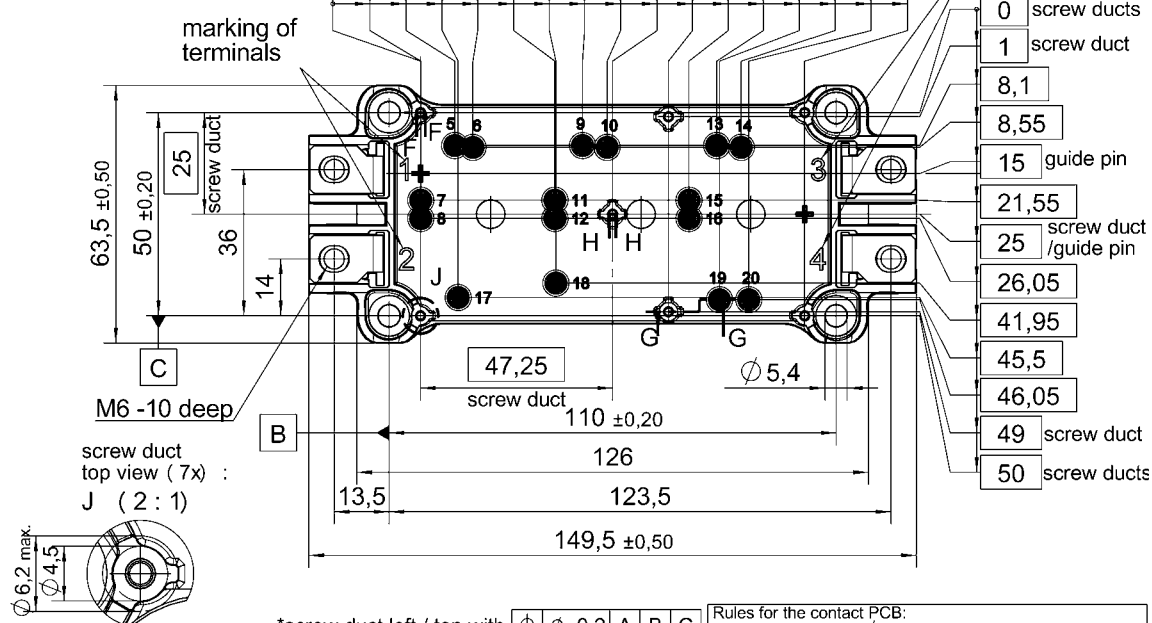


	0,3	connector 1-2 / 3-4
	0,2	each connector A

general tolerance:
ISO 2768-mK
ISO 8015



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



*screw duct left / top with

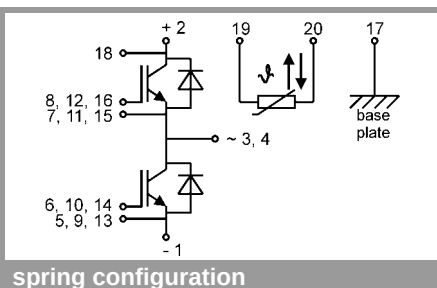
	0,2	A	B	C
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**screw ducts / guide pins / spring ducts with

	0,2	A	D	C
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Rules for the contact PCB:
- holes guidepins = $\varnothing 4 \pm 0,1$ / position tolerance $\pm 0,1$
- holes for screws = $\varnothing 2,9 \pm 0,1$ / position tolerance $\pm 0,1$
- spring contact pad = $\varnothing 3,6 \pm 0,1$ / position tolerance $\pm 0,1$

SEMiX 3s



spring configuration

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 personal.