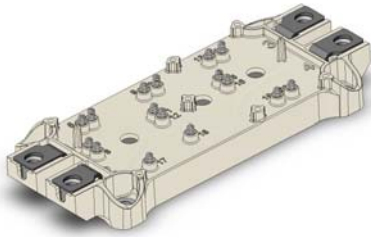


SEMiX403GB128Ds



SEMiX® 3s

SPT IGBT Modules

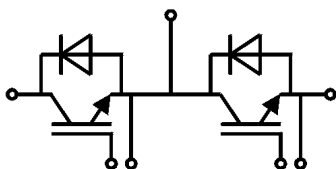
SEMiX403GB128Ds

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

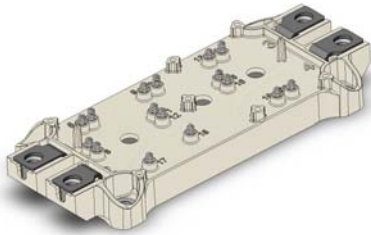


GB

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}			1200	V
I _C	T _j = 150 °C	T _c = 25 °C	418	A
		T _c = 80 °C	298	A
I _{Cnom}			225	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		450	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	342	A
		T _c = 80 °C	235	A
I _{Fnom}			225	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		450	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		2000	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 = 225 A	T _J = 25 °C		1.9	2.3	V
	V _{GE} = 15 V chipllevel	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		4.0	5.1	mΩ
		T _J = 125 °C		5.3	6.7	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 9 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		20.8		nF
C _{oes}		f = 1 MHz		1.38		nF
C _{res}		f = 1 MHz		0.87		nF
Q _G	V _{GE} = - 8 V...+ 15 V			2130		nC
R _{Gint}	T _J = 25 °C			1.67		Ω
t _{d(on)}	V _{CC} = 600 V	T _J = 125 °C		145		ns
t _r	I _C = 225 A	T _J = 125 °C		60		ns
E _{on}	R _{G on} = 4 Ω	T _J = 125 °C		20		mJ
t _{d(off)}	R _{G off} = 4 Ω	T _J = 125 °C		575		ns
t _f		T _J = 125 °C		70		ns
E _{off}		T _J = 125 °C		23		mJ
R _{th(j-c)}	per IGBT				0.075	K/W

SEMiX403GB128Ds



SEMiX® 3s

SPT IGBT Modules

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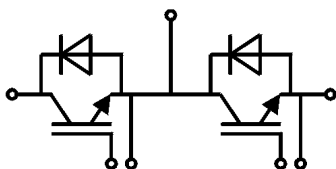
Features

- 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

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 225 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	3.3	4.0	4.7	mΩ
		T _J = 125 °C	3.6	4.2	4.9	mΩ
I _{RRM}	I _F = 225 A	T _J = 125 °C		260		A
Q _{rr}	di/dt _{off} = 4950 A/μs	T _J = 125 °C		29		μC
E _{rr}	V _{GE} = -15 V	T _J = 125 °C		10		mJ
	V _{CC} = 600 V					
R _{th(j-c)}	per diode				0.13	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

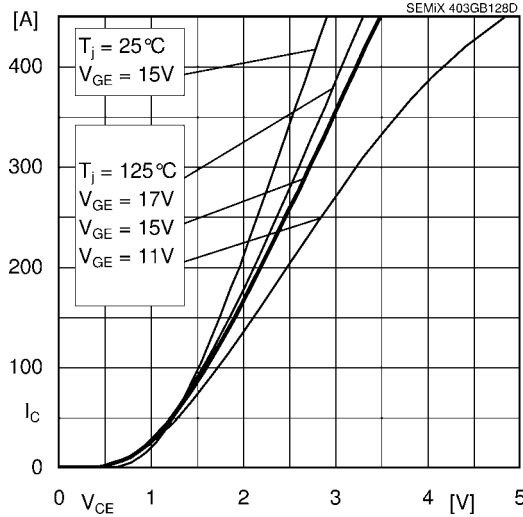


Fig. 1: Typ. output characteristic, inclusive $R_{CC'} + EE'$

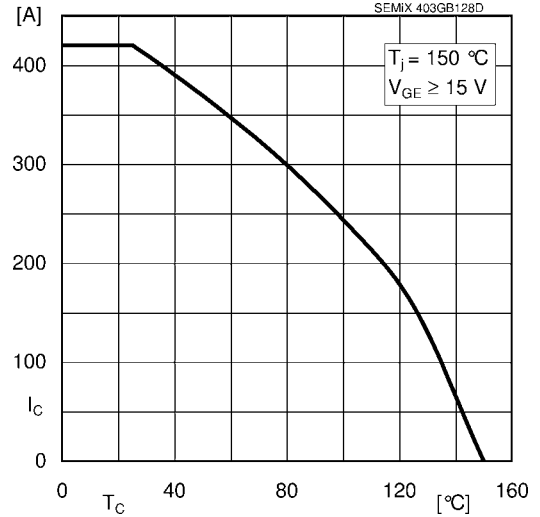


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

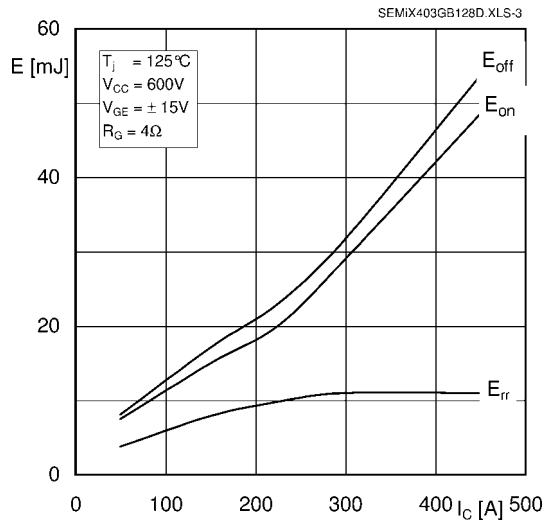


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

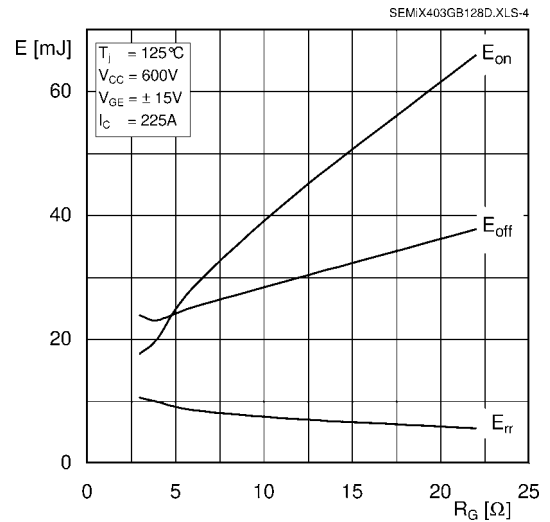


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

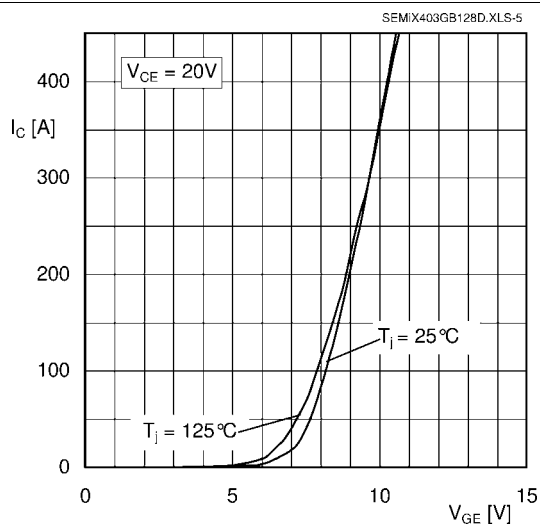


Fig. 5: Typ. transfer characteristic

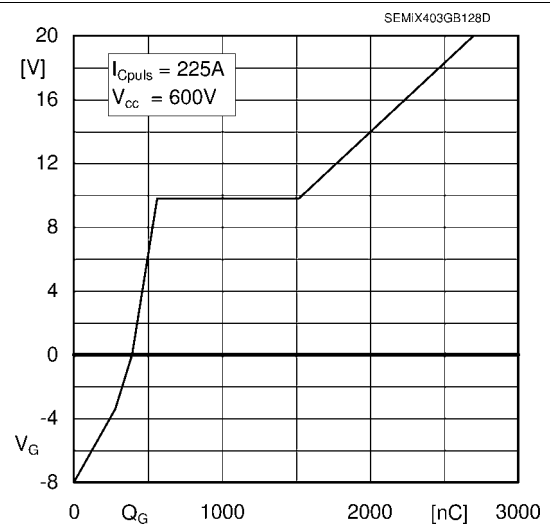


Fig. 6: Typ. gate charge characteristic

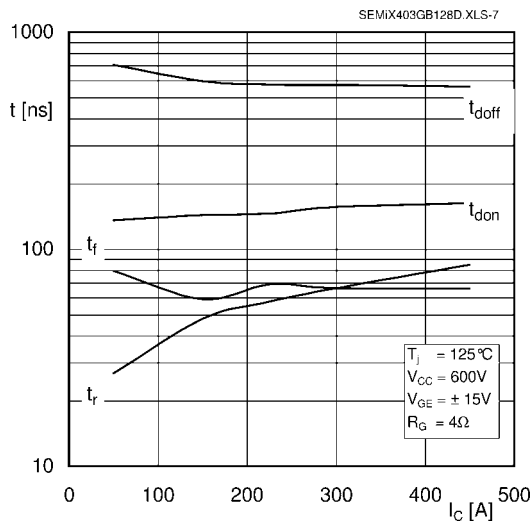


Fig. 7: Typ. switching times vs. I_C

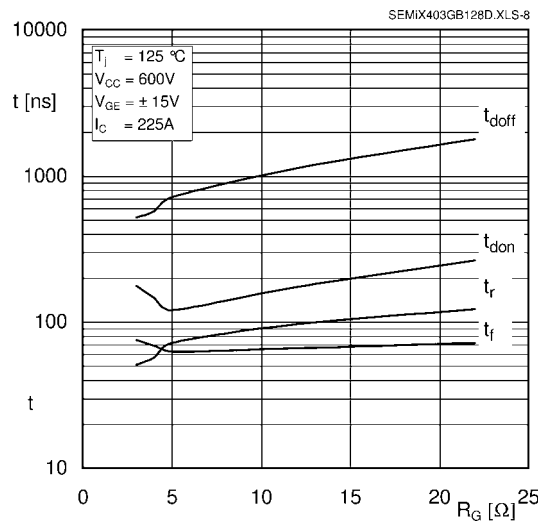


Fig. 8: Typ. switching times vs. gate resistor R_G

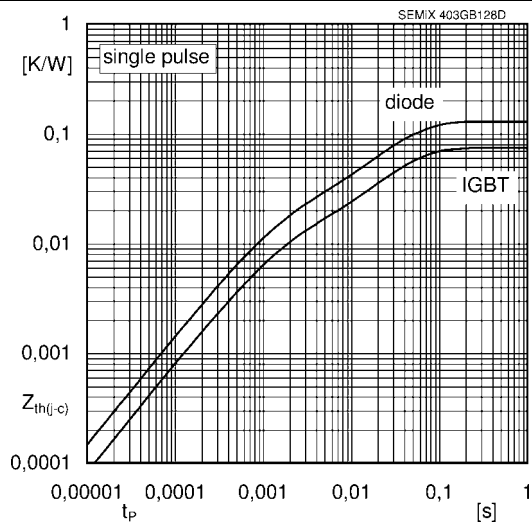


Fig. 9: Typ. transient thermal impedance

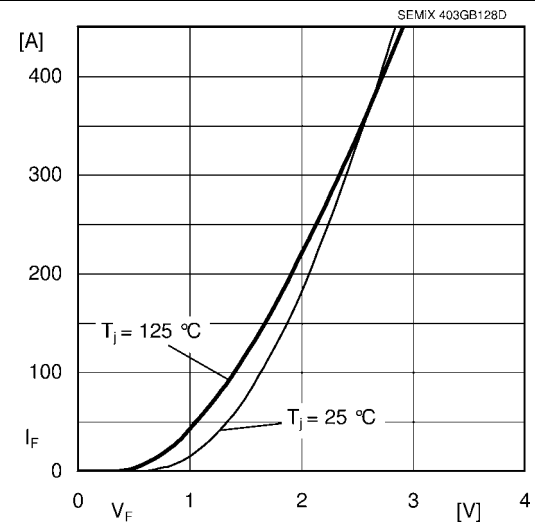


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

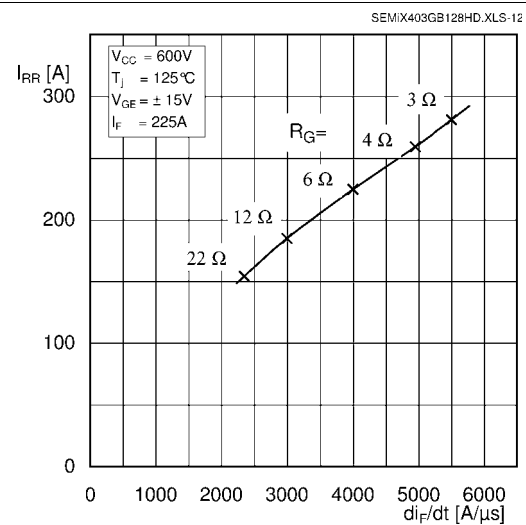


Fig. 11: Typ. CAL diode peak reverse recovery current

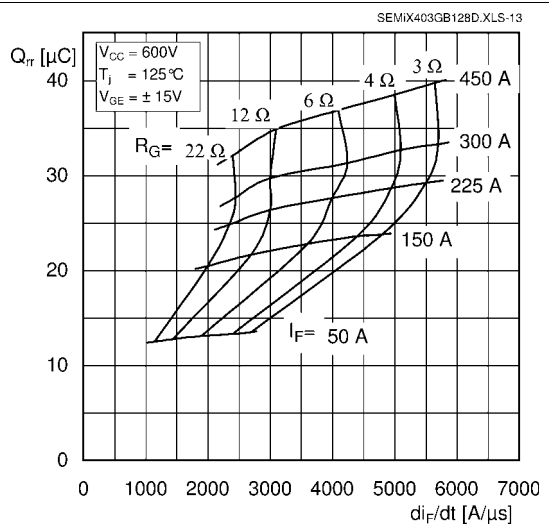
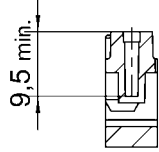


Fig. 12: Typ. CAL diode recovery charge

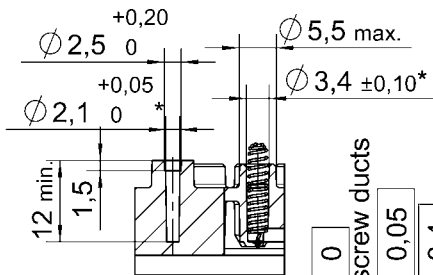
Case: SEMiX 3s

general tolerance ISO 2768-mK

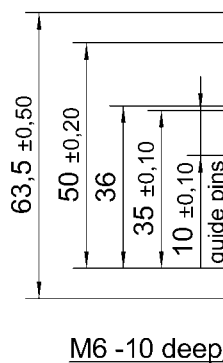
screw duct
(1x centre) :
H-H (1 : 1)



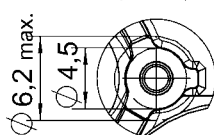
screw duct (6x)
spring duct (16x) :
A-A (1 : 1)



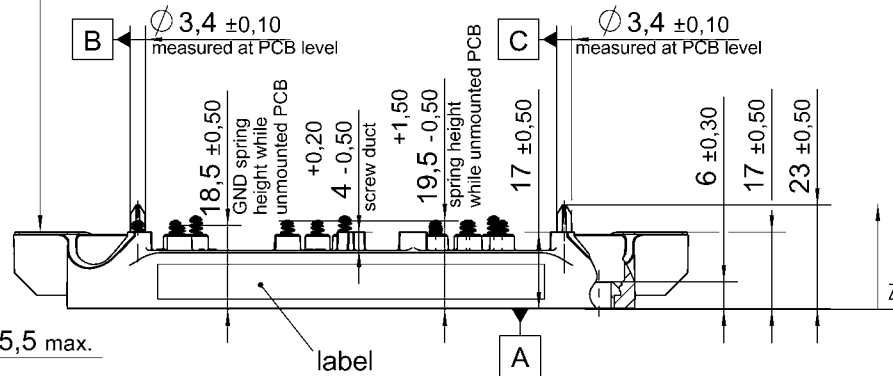
marking of terminals



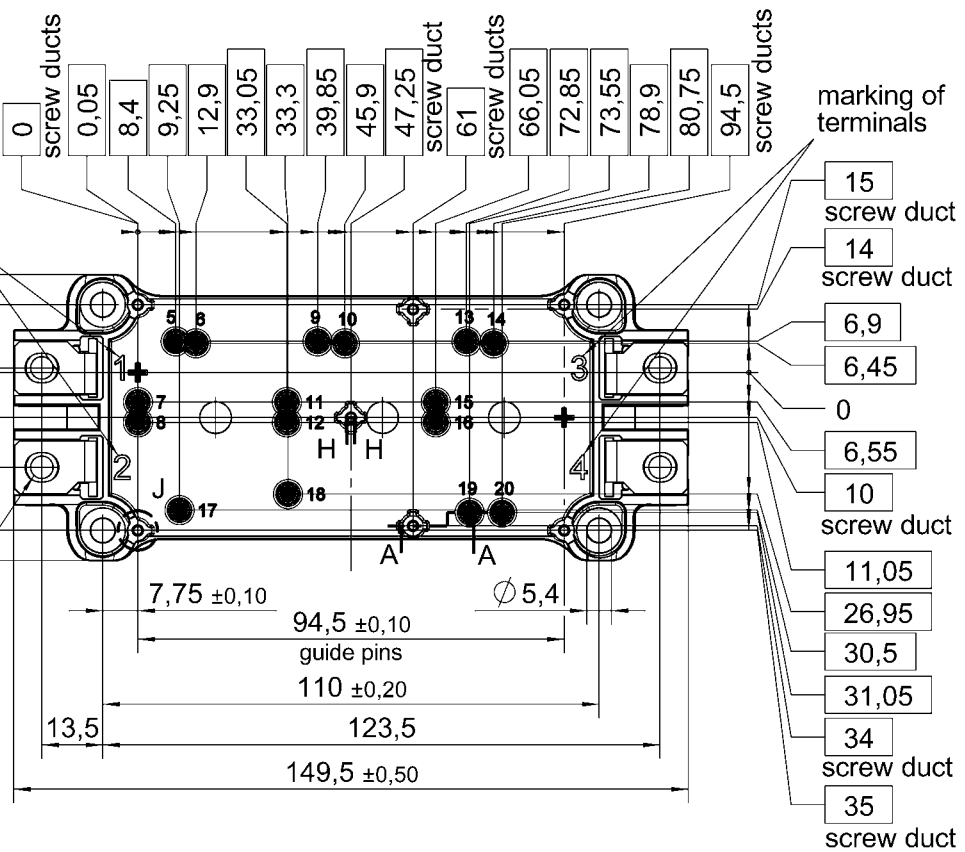
screw duct
top view (7x) :
J (2 : 1)



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



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

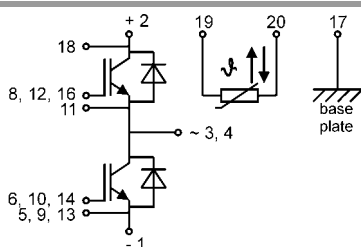


*screw ducts / spring ducts with $\phi \pm 0,2$ A B C

Rules for the contact PCB:

- holes guidepins = $\phi 4 \pm 0,1$ / position tolerance $\pm 0,1$
- spring landing pad = $\phi 3,5 \pm 0,2$ / position tolerance $\pm 0,2$

SEMiX 3s



spring configuration

SEMiX403GB128Ds

* 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.