

SEMiX® 33c

SPT IGBT Modules

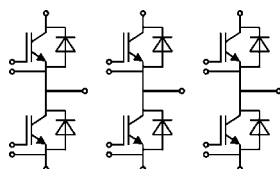
SEMiX403GD128Dc

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*

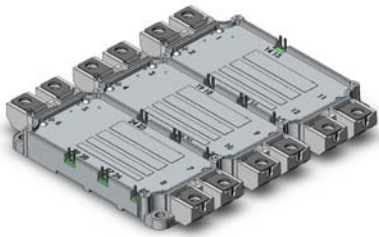
- AC inverter drives
- UPS
- Electronic welders up to 20 kHz



GD

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 chipsevel	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 R _{G off} = 4 Ω	T _J = 125 °C		20		mJ
t _{d(off)}		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



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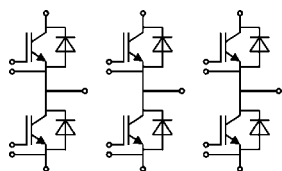
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Typical Applications*

- AC inverter drives
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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			0.014		K/W
M _s	to heat sink (M5)		3		5	Nm
M _t		to terminals (M6)	2.5		5	Nm
						Nm
w					900	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



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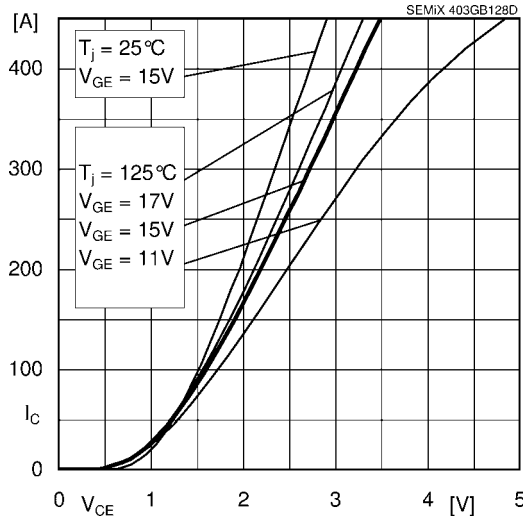


Fig. 1: Typ. output characteristic, inclusive $R_{CC'} + E_E$

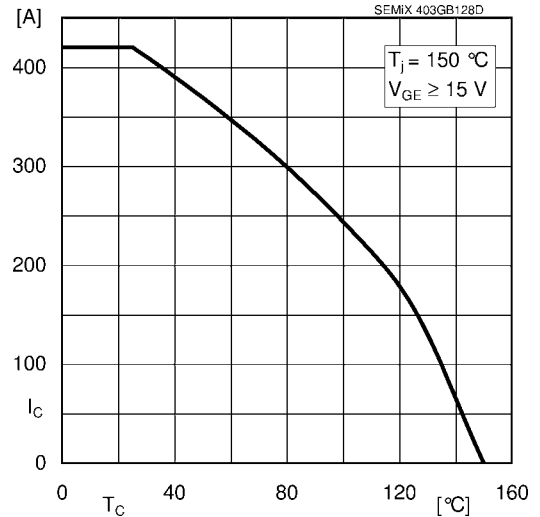


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

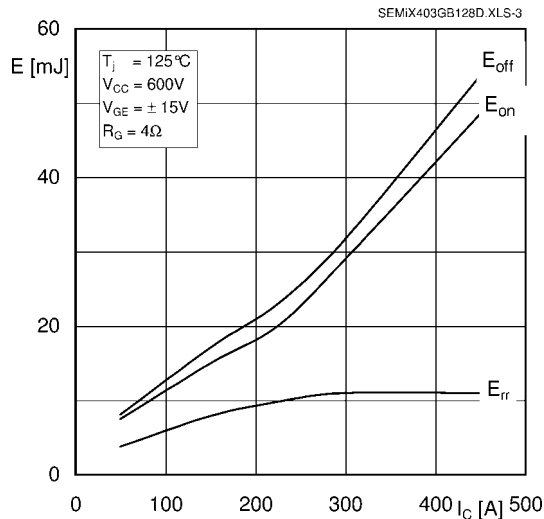


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

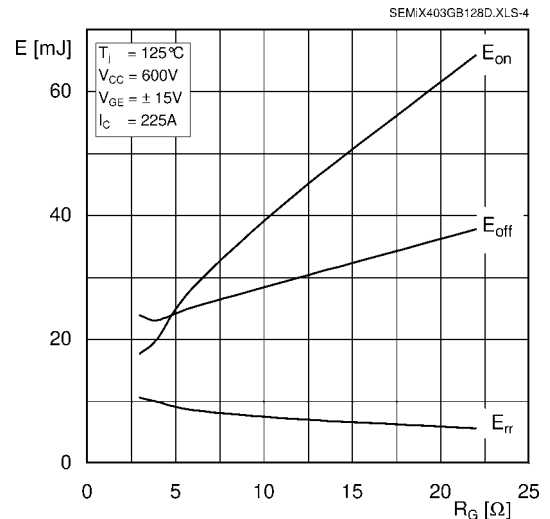


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

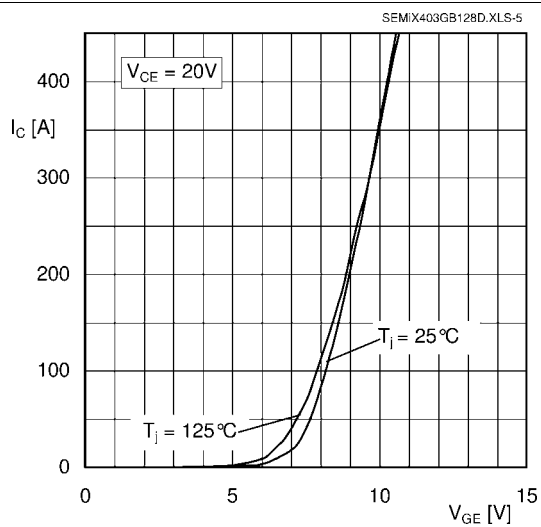


Fig. 5: Typ. transfer characteristic

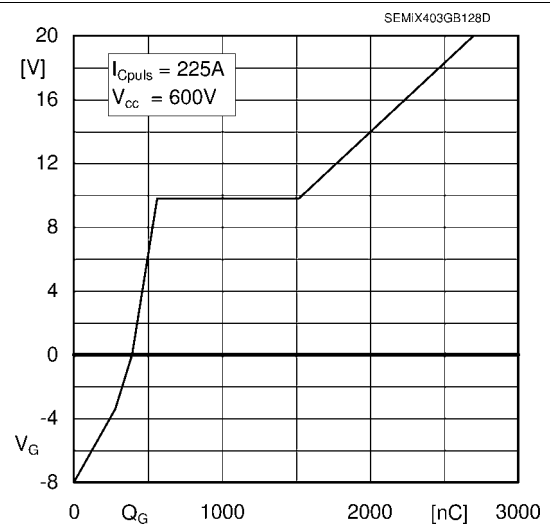
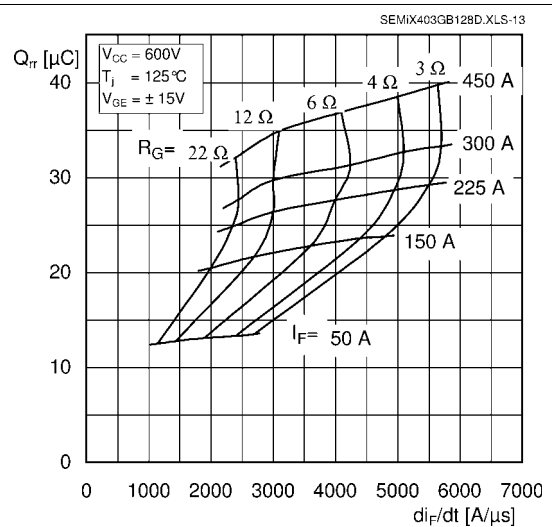
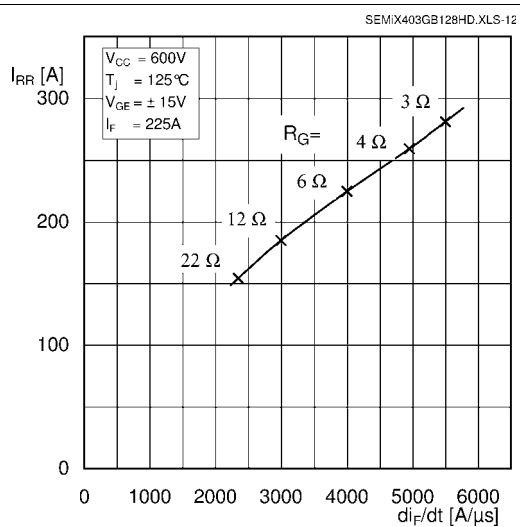
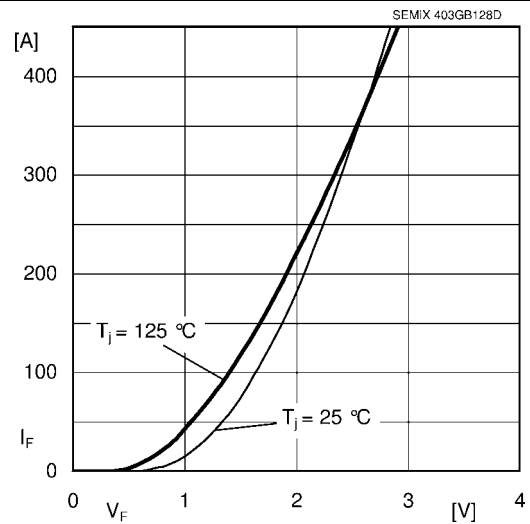
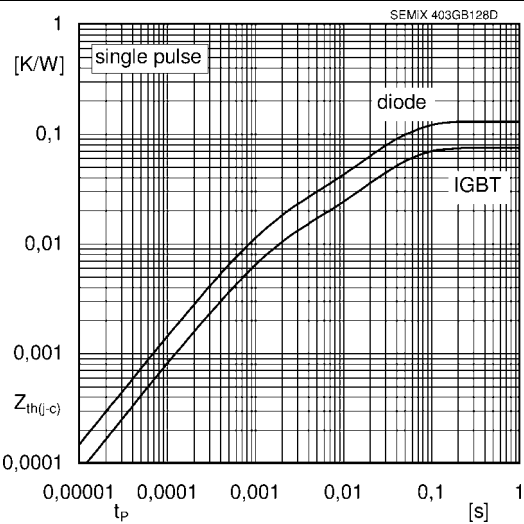
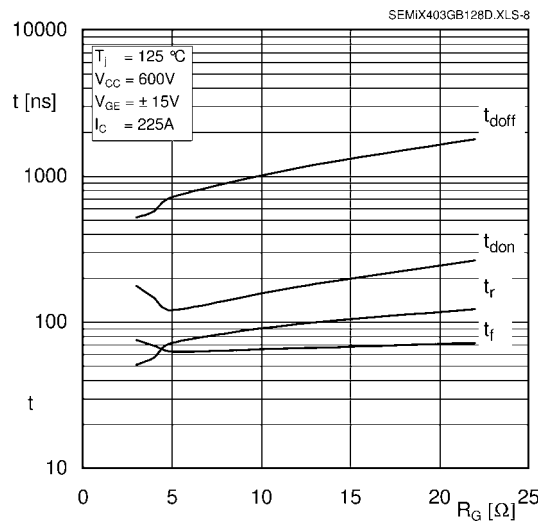
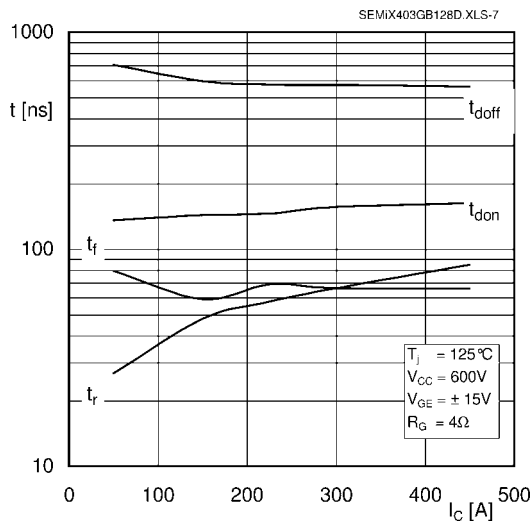
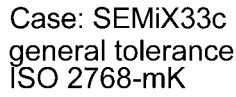


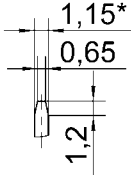
Fig. 6: Typ. gate charge characteristic



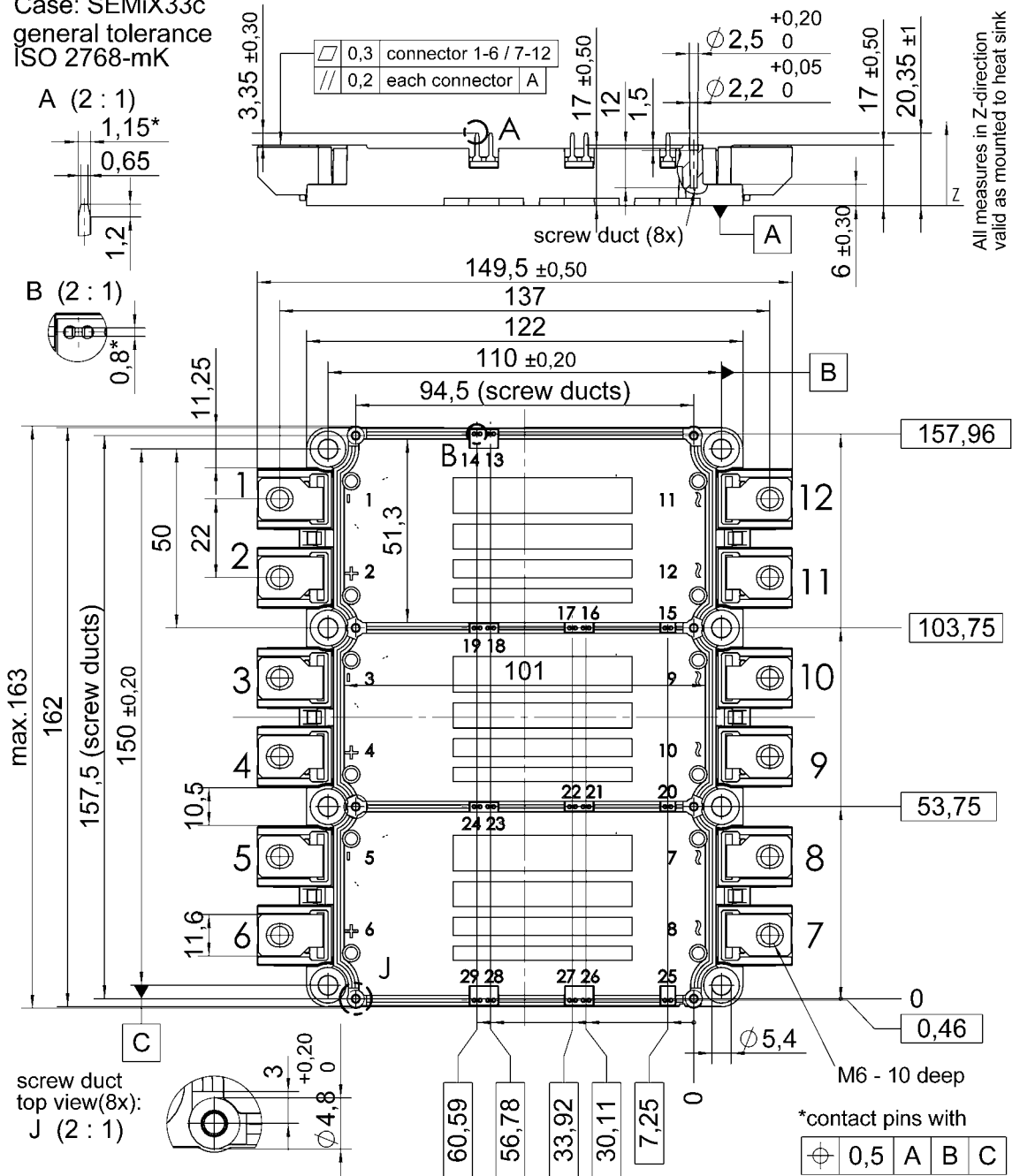
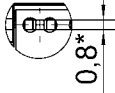
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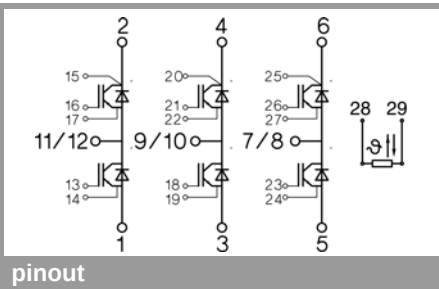
A (2 : 1)



B (2 : 1)



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* 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.