

SEMiX703GAR126HDs



SEMiX® 3s

Trench IGBT Modules

SEMiX703GAR126HDs

Features

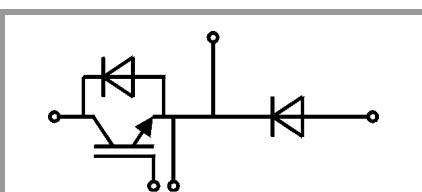
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic Welding

Remarks

- Case temperatur limited to $T_C=125^\circ\text{C}$ max.
- Not for new design



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _c = 25 °C	642	A
		T _c = 80 °C	449	A
I _{Cnom}			450	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		900	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	561	A
		T _c = 80 °C	384	A
I _{Fnom}			450	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		900	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		2900	A
T _j			-40 ... 150	°C
Freewheeling diode				
I _F	T _j = 150 °C	T _c = 25 °C	533	A
		T _c = 80 °C	367	A
I _{Fnom}			450	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		900	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		2900	A
T _j			-40 ... 150	°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 = 450 A	T _j = 25 °C		1.7	2.10	V
	V _{GE} = 15 V chiplevel	T _j = 125 °C		2.0	2.45	V
V _{CE0}	chiplevel	T _j = 25 °C		1	1.2	V
		T _j = 125 °C		0.9	1.1	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		1.6	2.0	mΩ
		T _j = 125 °C		2.4	3.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 18 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			5	mA
	V _{CE} = 1200 V	T _j = 125 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		32.3		nF
C _{oes}		f = 1 MHz		1.69		nF
C _{res}		f = 1 MHz		1.46		nF
Q _G	V _{GE} = - 8 V...+ 15 V			3600		nC
R _{Gint}	T _j = 25 °C			1.67		Ω

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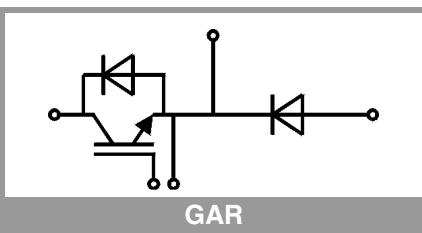
Typical Applications*

- AC inverter drives
- UPS
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Remarks

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- Not for new design

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
t _{d(on)}	V _{CC} = 600 V	T _j = 125 °C		310		ns
t _r	I _C = 450 A	T _j = 125 °C		60		ns
E _{on}	V _{GE} = ±15 V	T _j = 125 °C		32		mJ
t _{d(off)}	R _{G on} = 1.6 Ω	T _j = 125 °C		680		ns
t _f	R _{G off} = 1.6 Ω	T _j = 125 °C		135		ns
E _{off}		T _j = 125 °C		68		mJ
R _{th(j-c)}	per IGBT				0.061	K/W
Inverse diode						
V _F = V _{EC}	I _F = 450 A	T _j = 25 °C		1.6	1.80	V
	V _{GE} = 0 V chiplevel	T _j = 125 °C		1.6	1.8	V
V _{F0}	chiplevel	T _j = 25 °C	0.9	1	1.1	V
		T _j = 125 °C	0.7	0.8	0.9	V
r _F	chiplevel	T _j = 25 °C	1.1	1.3	1.6	mΩ
		T _j = 125 °C	1.6	1.8	2.0	mΩ
I _{RRM}	I _F = 450 A	T _j = 125 °C		580		A
Q _{rr}	di/dt _{off} = 8500 A/μs	T _j = 125 °C		130		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 125 °C		60		mJ
R _{th(j-c)}	per diode				0.11	K/W
Freewheeling diode						
V _F = V _{EC}	I _F = 450 A	T _j = 25 °C		1.7	1.91	V
	V _{GE} = 0 V chiplevel	T _j = 125 °C		1.7	1.9	V
V _{F0}	chiplevel	T _j = 25 °C	0.9	1	1.1	V
		T _j = 125 °C	0.7	0.8	0.9	V
r _F	chiplevel	T _j = 25 °C	1.3	1.5	1.8	mΩ
		T _j = 125 °C	1.8	2.1	2.3	mΩ
I _{RRM}	I _F = 450 A	T _j = 125 °C		580		A
Q _{rr}	di/dt _{off} = 8500 A/μs	T _j = 125 °C		130		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 125 °C		60		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
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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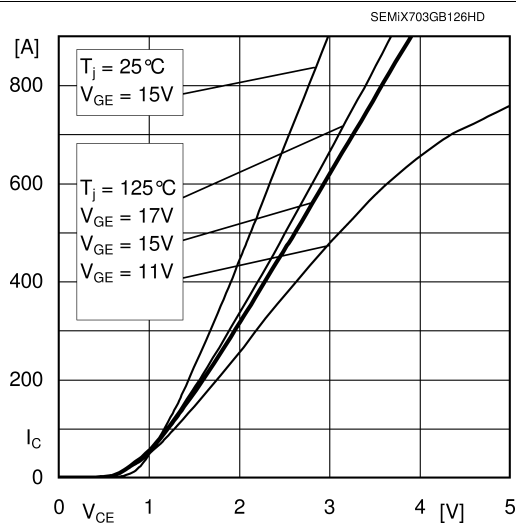


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

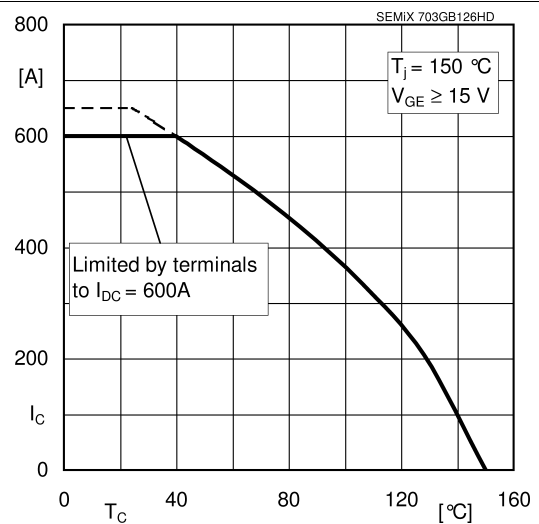


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

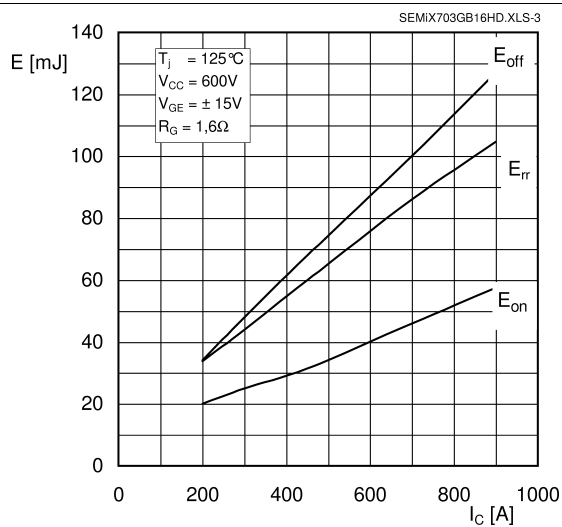


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

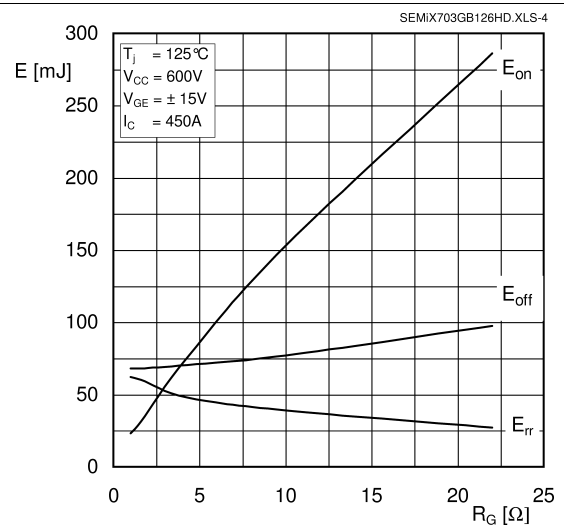


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

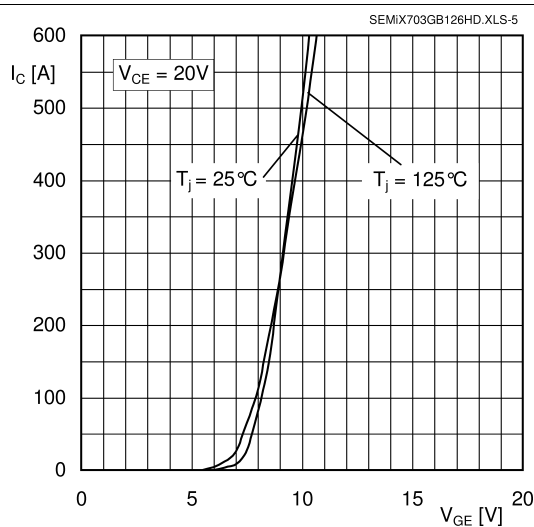


Fig. 5: Typ. transfer characteristic

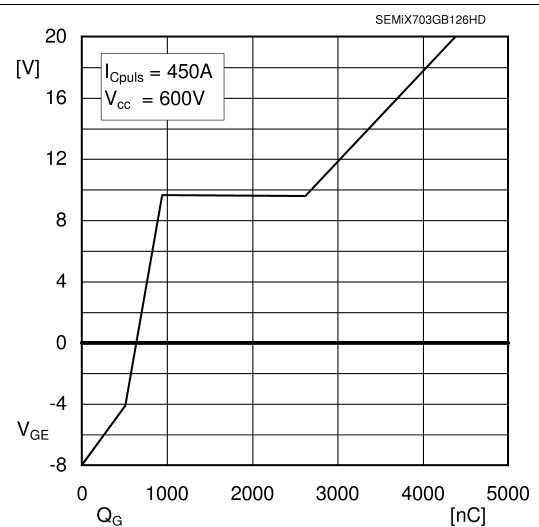
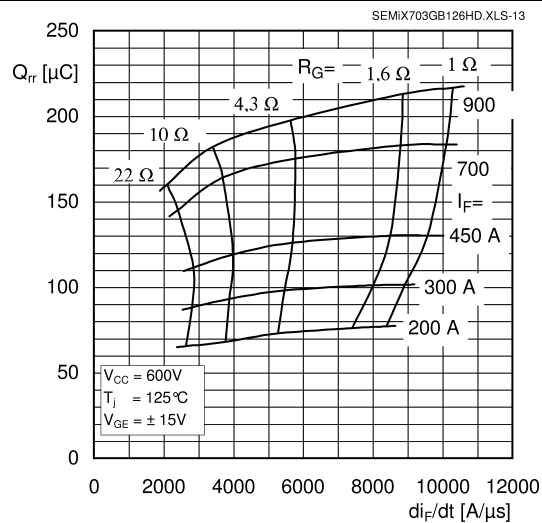
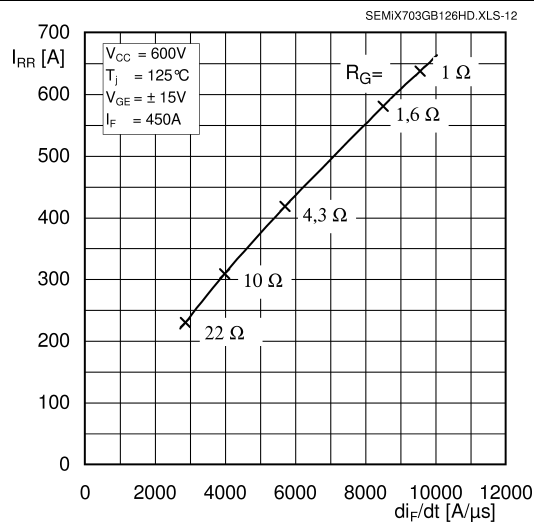
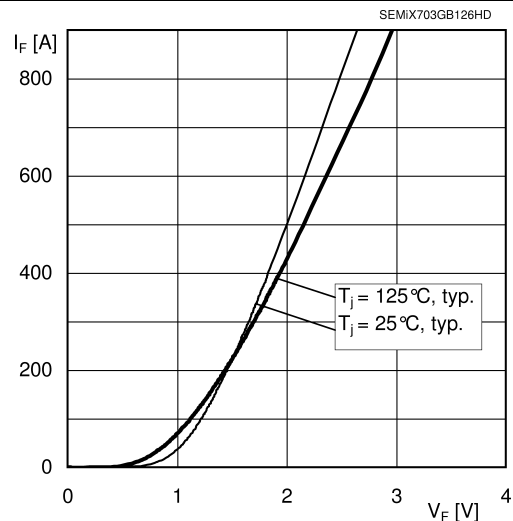
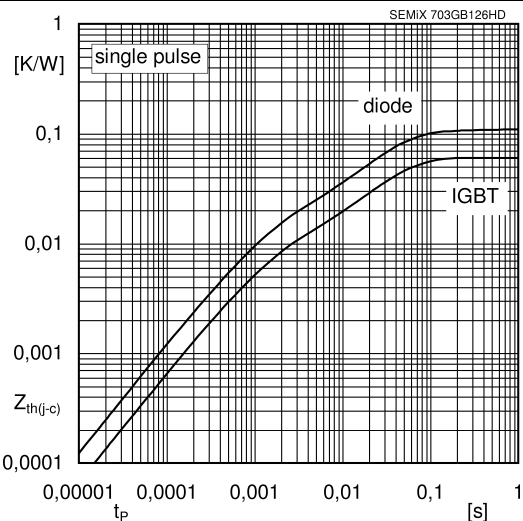
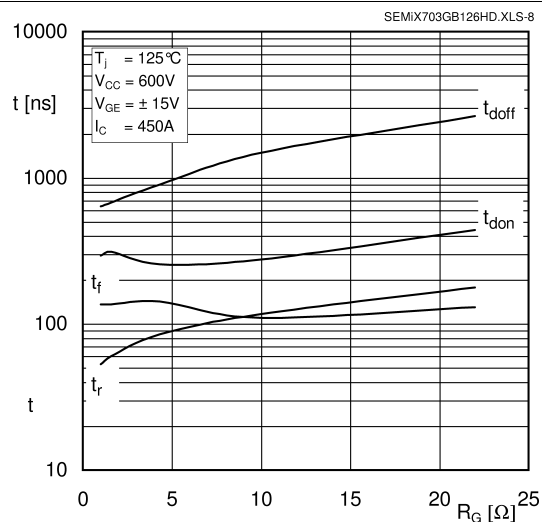
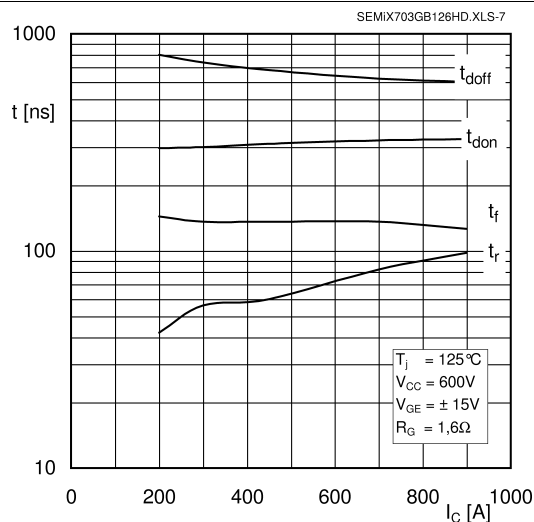
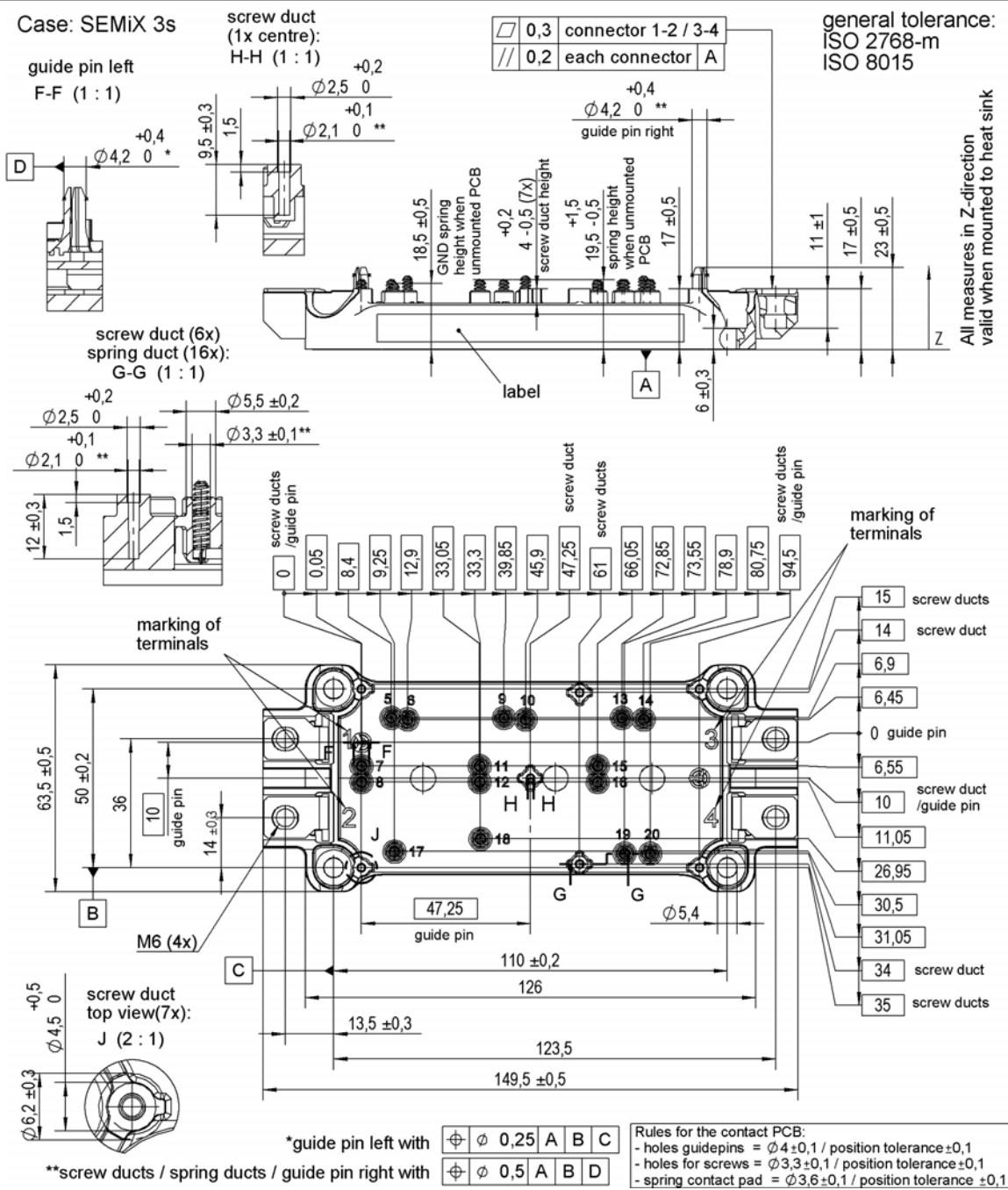


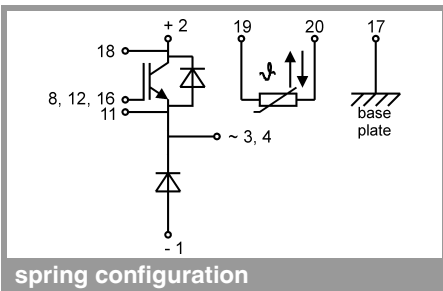
Fig. 6: Typ. gate charge characteristic



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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.