

SEMiX353GB176HDs



SEMiX® 3s

Trench IGBT Modules

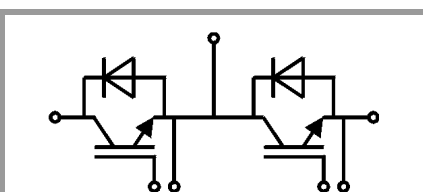
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Features

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

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders



GB

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1700	V
I _C	T _j = 150 °C	T _c = 25 °C	353	A
		T _c = 80 °C	251	A
I _{Cnom}			225	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		450	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 1000 V V _{GE} ≤ 20 V V _{CES} ≤ 1700 V	T _j = 125 °C	10	μs
T _j			-55 ... 150	°C
Inverse diode				
I _F	T _j = 150 °C	T _c = 25 °C	428	A
		T _c = 80 °C	289	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		1800	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 = 225 A	T _j = 25 °C		2	2.45	V
	V _{GE} = 15 V chiplevel	T _j = 125 °C		2.5	2.9	V
V _{CE0}		T _j = 25 °C		1	1.2	V
		T _j = 125 °C		0.9	1.1	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		4.4	5.6	mΩ
		T _j = 125 °C		6.9	8.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 9 mA		5.2	5.8	6.4	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C				mA
	V _{CE} = 1700 V	T _j = 125 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		19.9		nF
C _{oes}		f = 1 MHz		0.83		nF
C _{res}		f = 1 MHz		0.66		nF
Q _G	V _{GE} = - 8 V...+ 15 V			2100		nC
R _{Gint}	T _j = 25 °C			2.83		Ω
t _{d(on)}	V _{CC} = 1200 V	T _j = 125 °C		250		ns
t _r	I _C = 225 A	T _j = 125 °C		75		ns
E _{on}	V _{GE} = ±15 V	T _j = 125 °C		155		mJ
t _{d(off)}	R _{G on} = 5.6 Ω	T _j = 125 °C		930		ns
t _f	R _{G off} = 5.6 Ω	T _j = 125 °C		180		ns
E _{off}		T _j = 125 °C		85		mJ
R _{th(j-c)}	per IGBT				0.086	K/W

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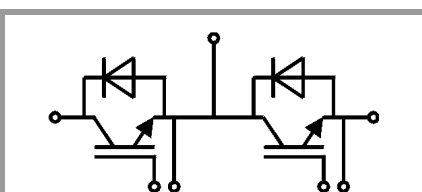
Features

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- $V_{CE(sat)}$ with positive temperature coefficient
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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 = 225 A	T _j = 25 °C		1.6	1.75	V
	V _{GE} = 0 V chip	T _j = 125 °C		1.5	1.7	V
V _{F0}		T _j = 25 °C	0.9	1.1	1.3	V
		T _j = 125 °C	0.7	0.9	1.1	V
r _F		T _j = 25 °C	2.0	2.0	2.0	mΩ
		T _j = 125 °C	2.7	2.7	2.7	mΩ
I _{RRM}	I _F = 225 A	T _j = 125 °C		280		A
Q _{rr}	di/dt _{off} = 4000 A/μs	T _j = 125 °C		83		μC
E _{rr}	V _{GE} = -15 V	T _j = 125 °C		45		mJ
	V _{CC} = 1200 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



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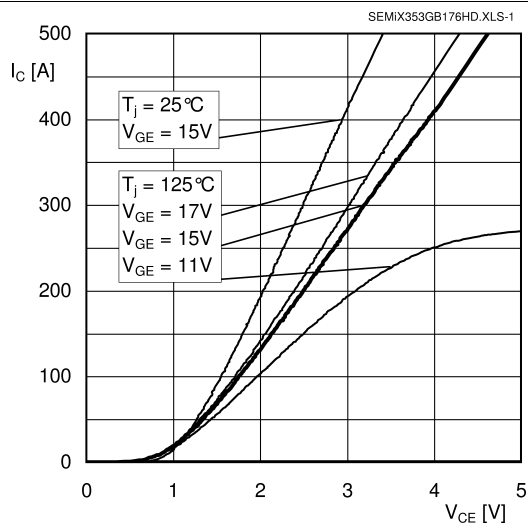


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

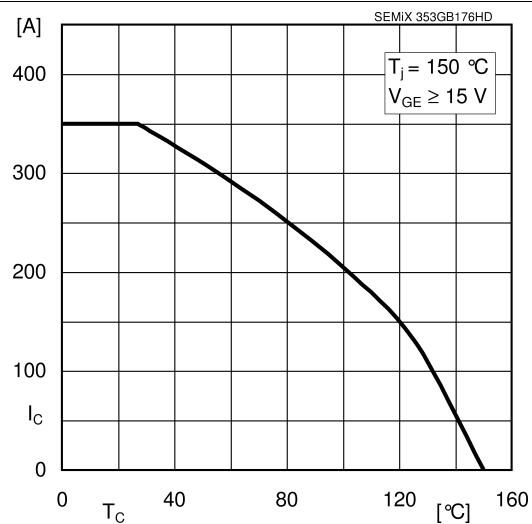


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

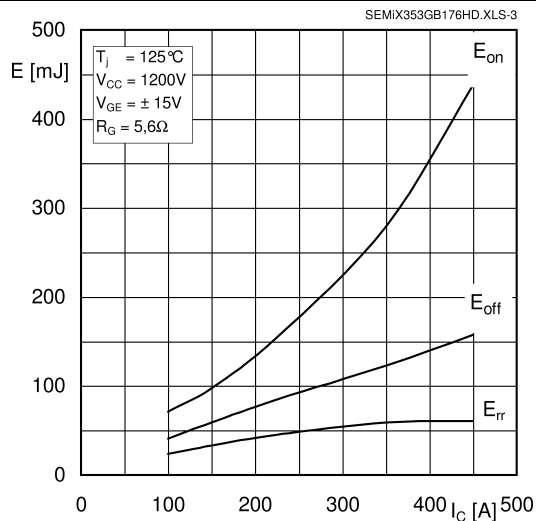


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

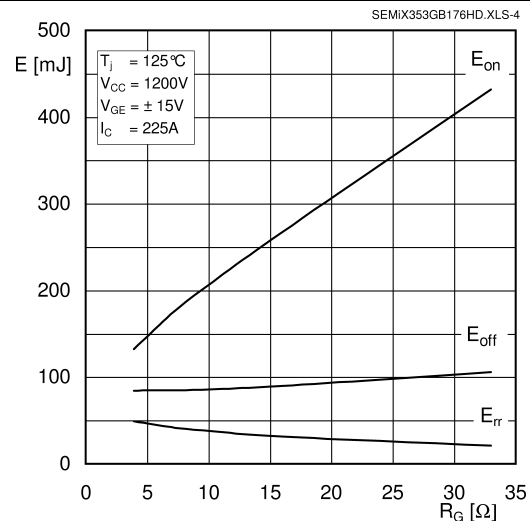


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

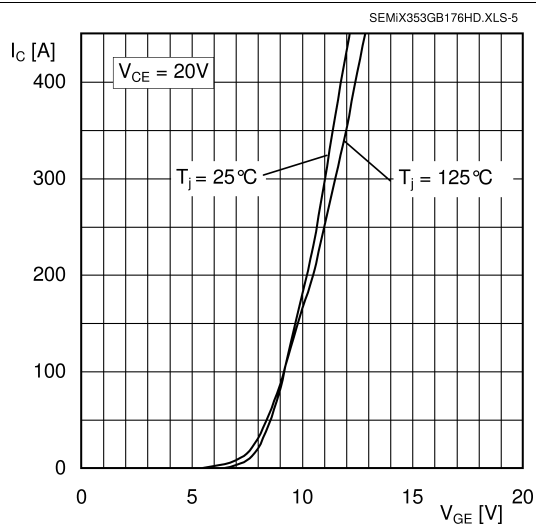


Fig. 5: Typ. transfer characteristic

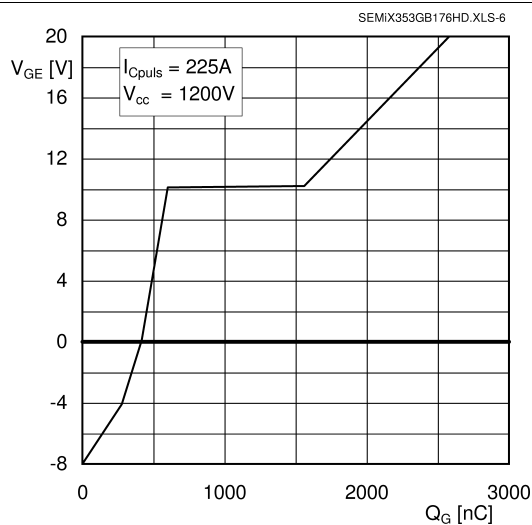
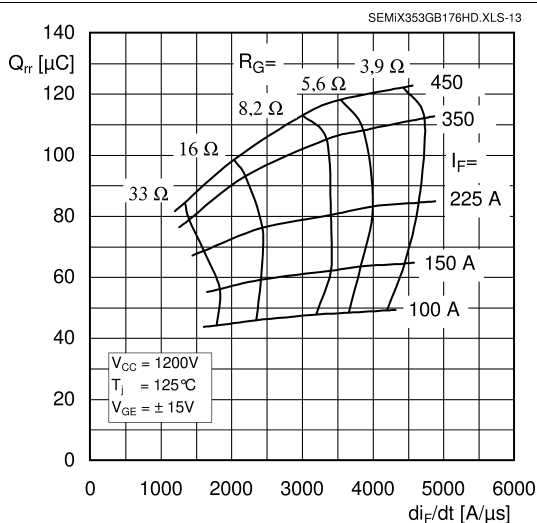
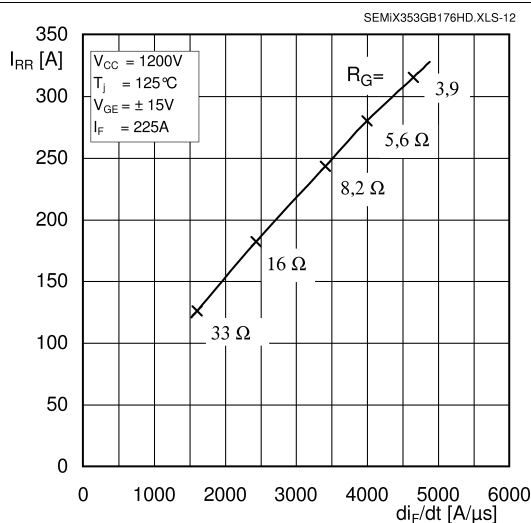
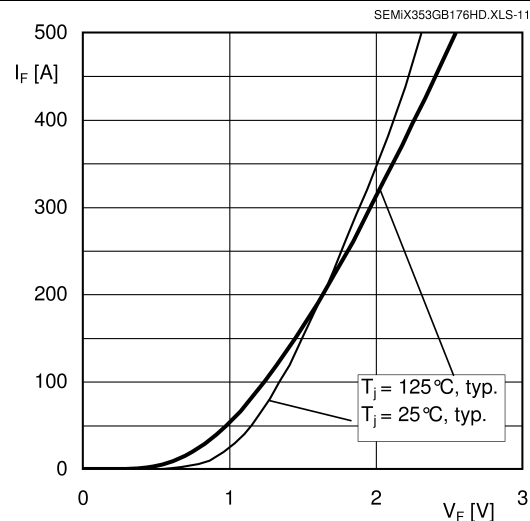
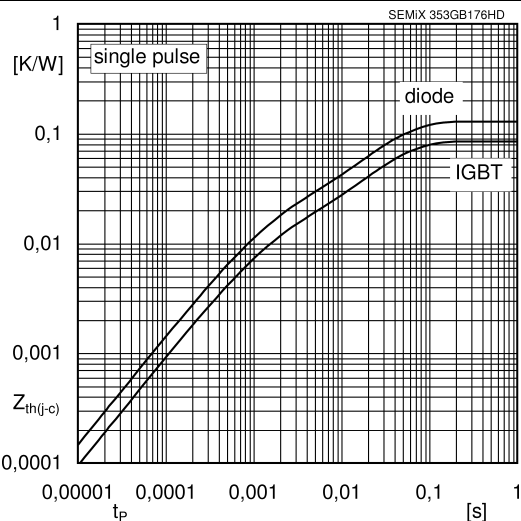
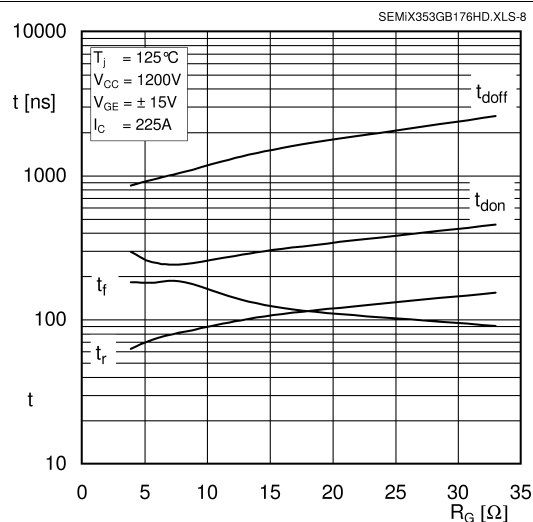
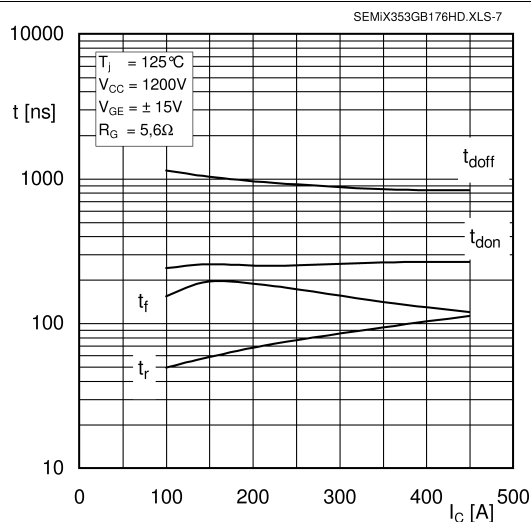
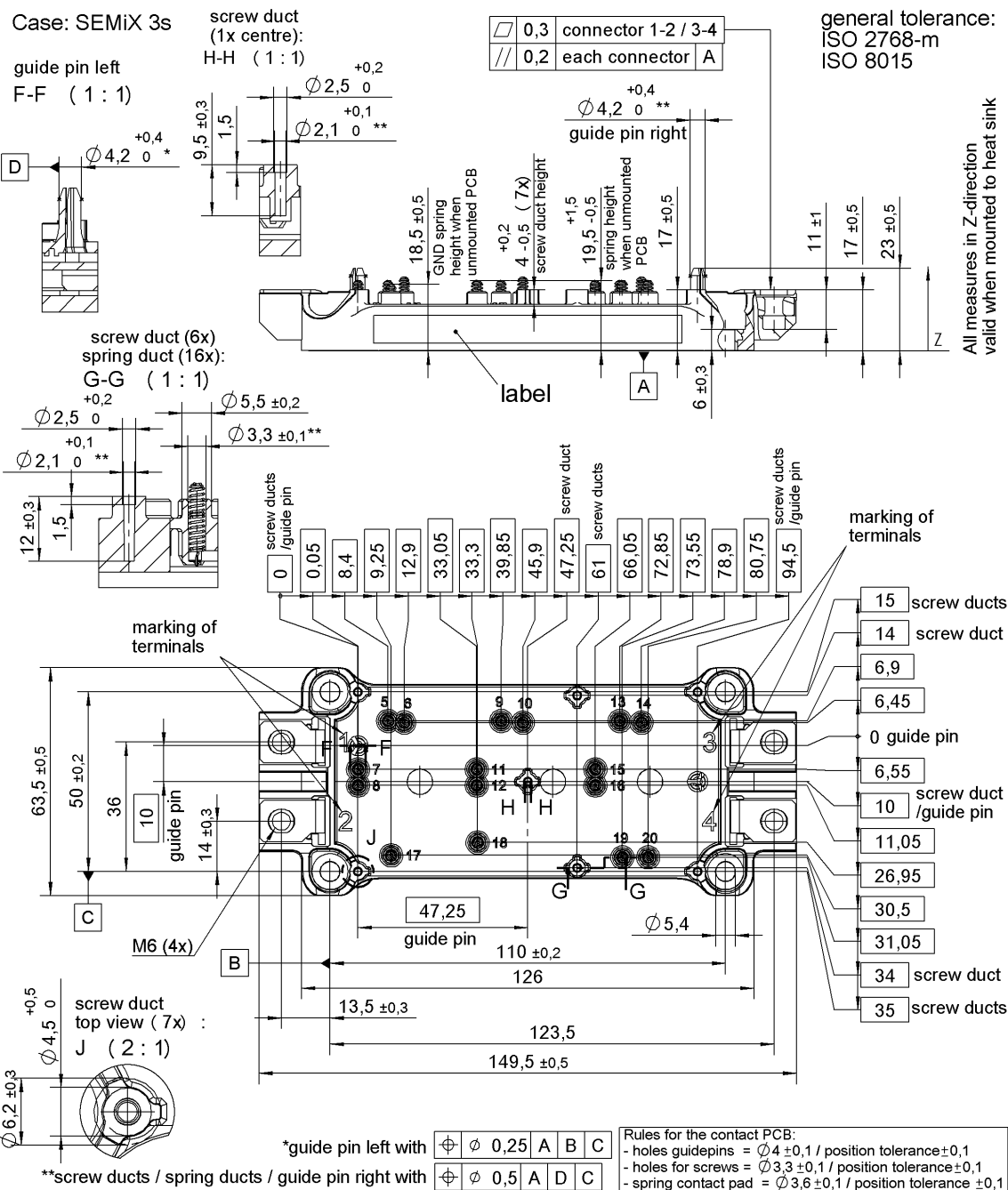


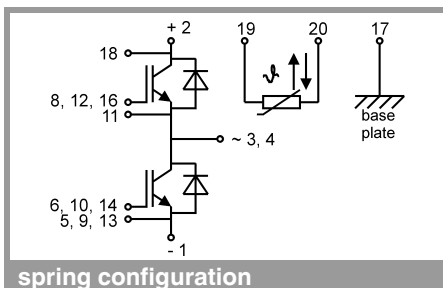
Fig. 6: Typ. gate charge characteristic



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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.