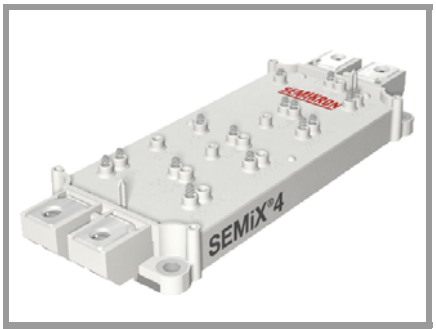
SEMiX854GB176HDs



SEMiX®4s

Trench IGBT Modules

SEMiX854GB176HDs

Preliminary Data

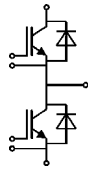
Features

- 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

Remarks



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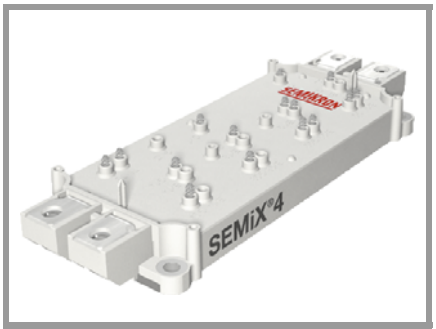
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT				
V_{CES}			1700	V
I_C	T_j = 150°C	T_c = 25°C	779	A
		T_c = 80°C	549	A
I_{CRM}	I_{CRM} = 2xI_{Cnom}		1200	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 1000V $V_{GE} \leq$ 20V T_j = 125°C $V_{CES} \leq$ 1700V		10	µs
T_j			-55 ... 150	°C
Inverse diode				
I_F	T_j = 150°C	T_c = 25°C	740	A
		T_c = 80°C	496	A
I_{FRM}	I_{FRM} = 2xI_{Fnom}		1200	A
I_{FSM}	t_p = 10ms, half sine wave, T_j = 25°C		3800	A
T_j			-40 ... 150	°C
Module				
$I_{t(RMS)}$			600	A
T_{stg}			-40 ... 125	°C
V_{isol}	AC sinus 50Hz, t = 60s		4000	V

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
$V_{CE(sat)}$	I_{Cnom} = 600A V_{GE} = 15V chiplevel	T_j = 25°C		2	2.45	V
		T_j = 125°C		2.45	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} = 15V	T_j = 25°C		1.7	2.1	mΩ
		T_j = 125°C		2.6	3.0	mΩ
$V_{GE(th)}$	V_{GE}=V_{CE}, I_C = 24mA		5.2	5.8	6.4	V
I_{CES}	V_{GE} = 0V V_{CE} = 1700V	T_j = 25°C		0.12	0.36	mA
		T_j = 125°C				mA
C_{ies}	V_{CE} = 25V V_{GE} = 0V	f = 1MHz		52.8		nF
C_{oes}		f = 1MHz		2.20		nF
C_{res}		f = 1MHz		1.75		nF
Q_G	V_{GE} = - 8 V...+ 15 V			5600		nC
R_{Gint}	T_j = 25°C			1.25		Ω
$t_{d(on)}$	V_{CC} = 1200V I_{Cnom} = 600A T_j = 125°C $R_{G\ on}$ = 2Ω $R_{G\ off}$ = 2Ω			340		ns
t_r				80		ns
E_{on}				395		mJ
$t_{d(off)}$				890		ns
t_f				155		ns
E_{off}				235		mJ
$R_{th(j-c)}$	per IGBT				0.045	K/W



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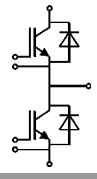

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Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	I_{Fnom} = 600A V_{GE} = 0V chiplevel	T_j = 25°C		1.7	1.9	V
		T_j = 125°C		1.7	1.9	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	1.0	1.0	1.0	mΩ
		T_j = 125°C	1.3	1.3	1.3	mΩ
I_{RRM}	I_{Fnom} = 600A di/dt_{off} = 8000A/µs V_{GE} = -15V V_{CC} = 1200V	T_j = 125°C		730		A
Q_{rr}		T_j = 125°C		220		µC
E_{rr}		T_j = 125°C		170		mJ
$R_{th(j-c)D}$	per diode				0.081	K/W
Module						
L_{CE}				22		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			0.03		K/W
M_s	to heat sink (M5)		3		5	Nm
M_t	to terminals (M6)		2.5		5	Nm
w					400	g
Temperature sensor						
R_{100}	T_c=100°C (R_{25}=5 kΩ)			0,493 ±5%		kΩ
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; T[K];			3550 ±2%		K

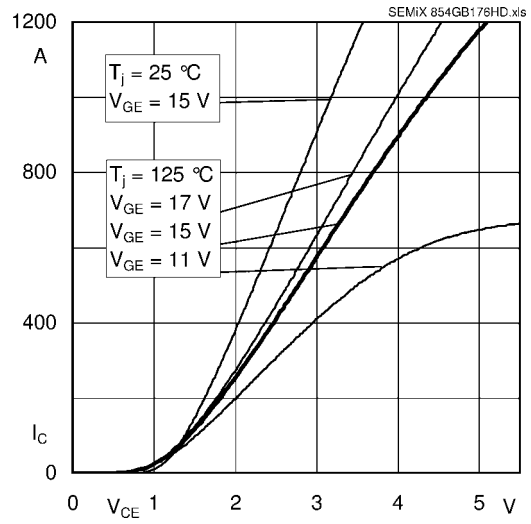


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

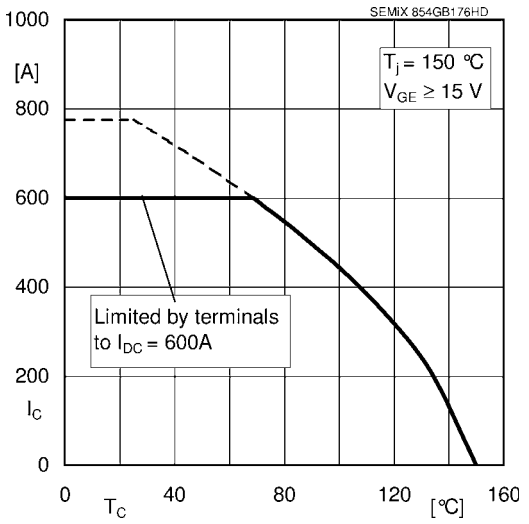


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

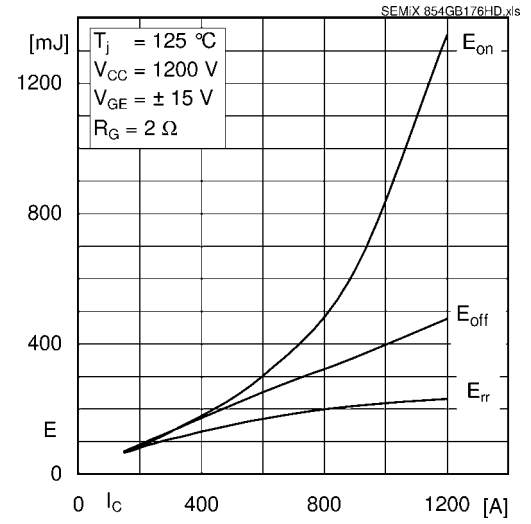


Fig. 3 Typ. turn-on /-off energy = f (I_C)

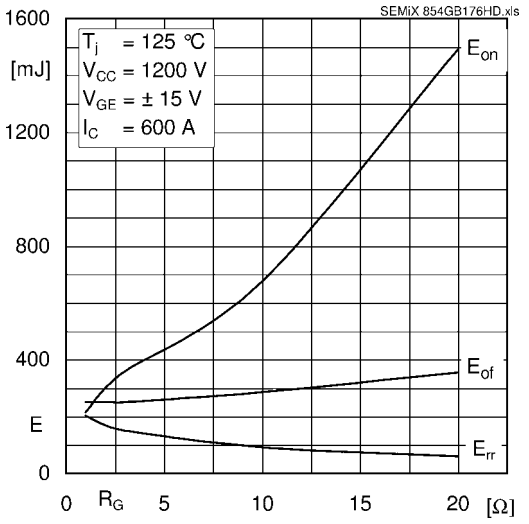


Fig. 4 Typ. turn-on /-off energy = f (R_G)

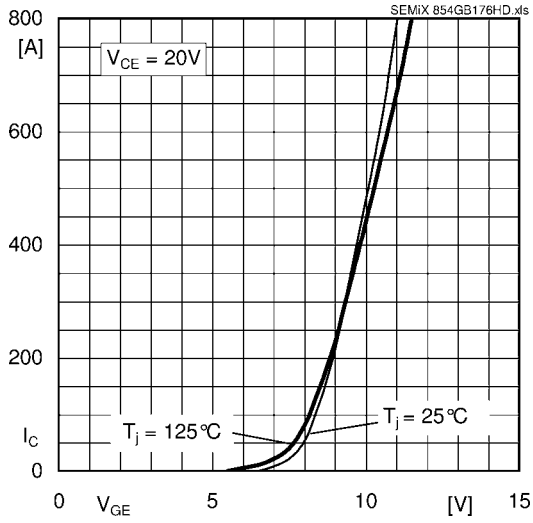


Fig. 5 Typ. transfer characteristic

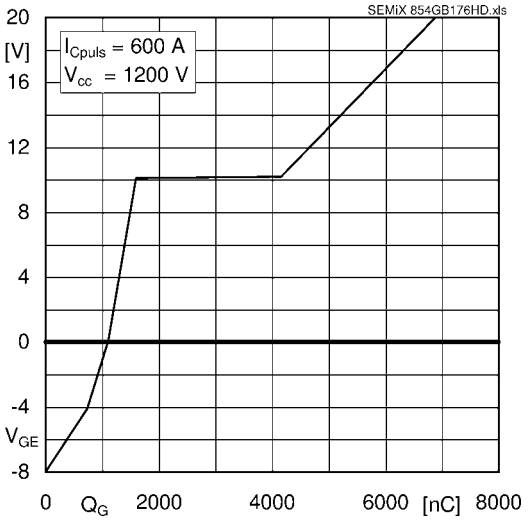


Fig. 6 Typ. gate charge characteristic

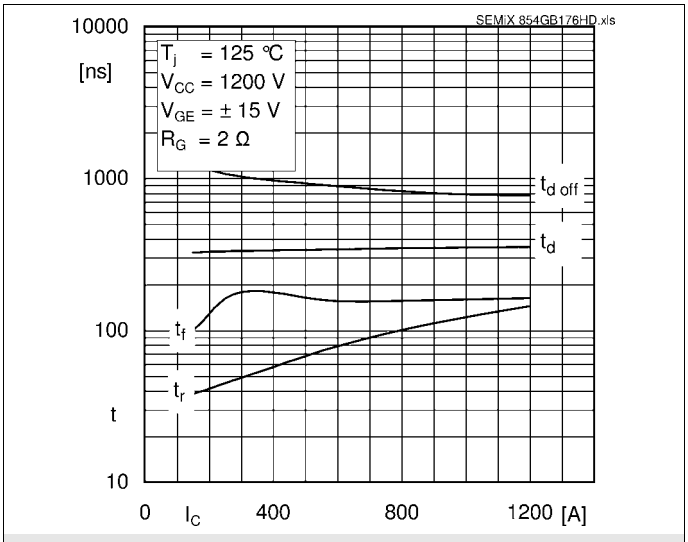


Fig. 7 Typ. switching times vs. I_C

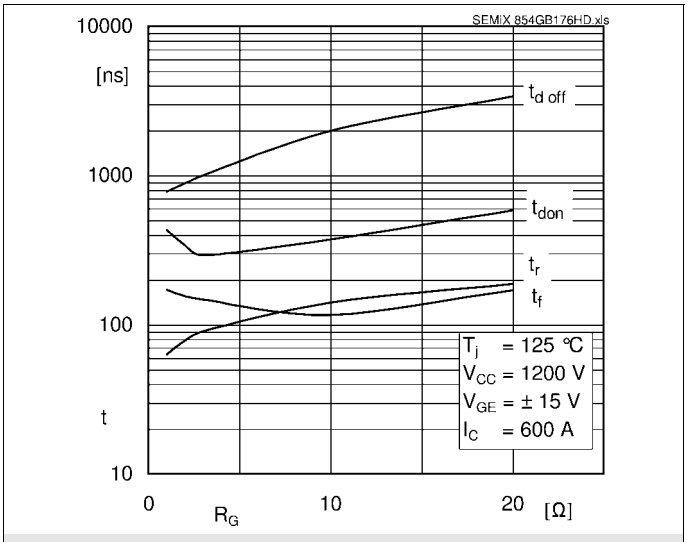


Fig. 8 Typ. switching times vs. gate resistor R_G

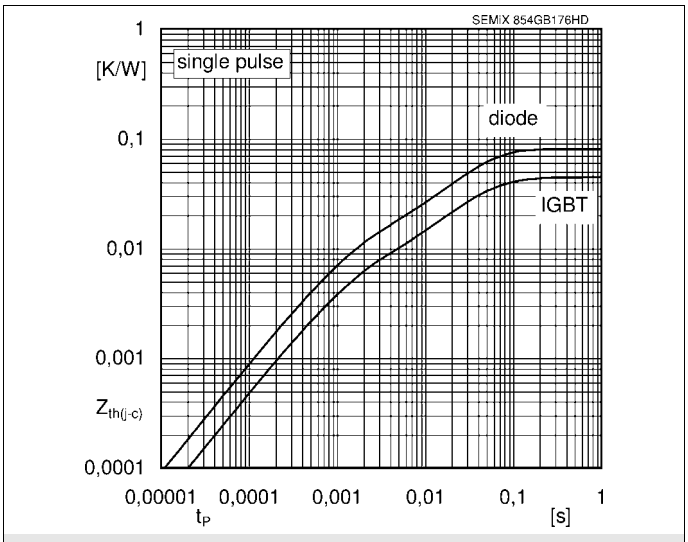


Fig. 9 Typ. transient thermal impedance

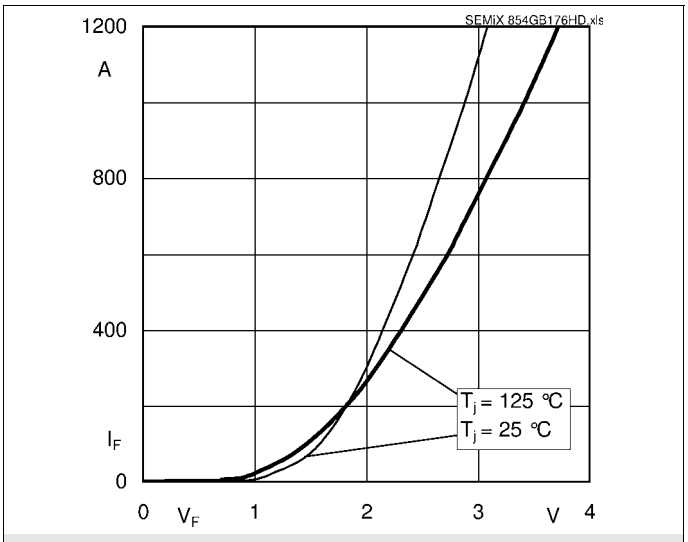


Fig. 10 Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

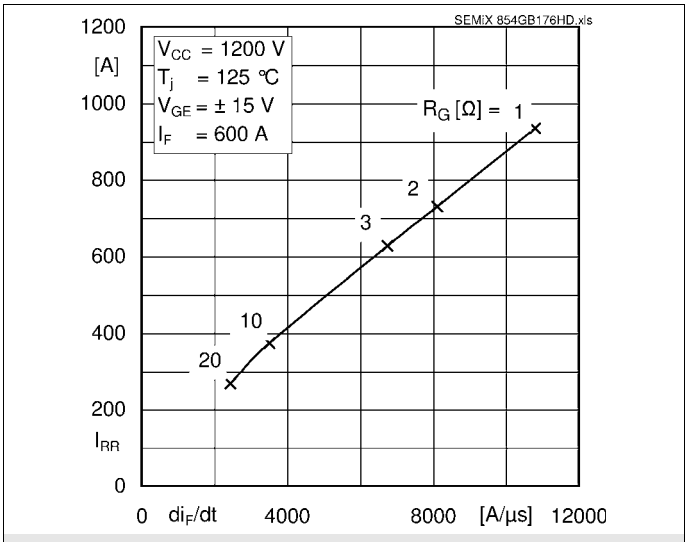


Fig. 11 Typ. CAL diode peak reverse recovery current

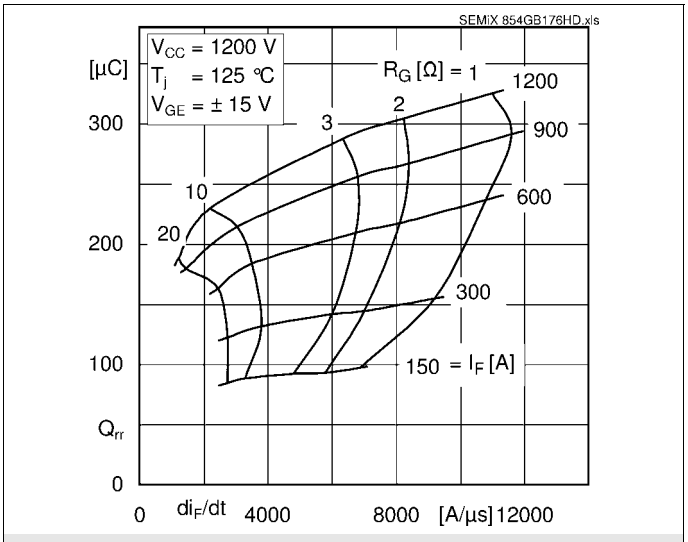
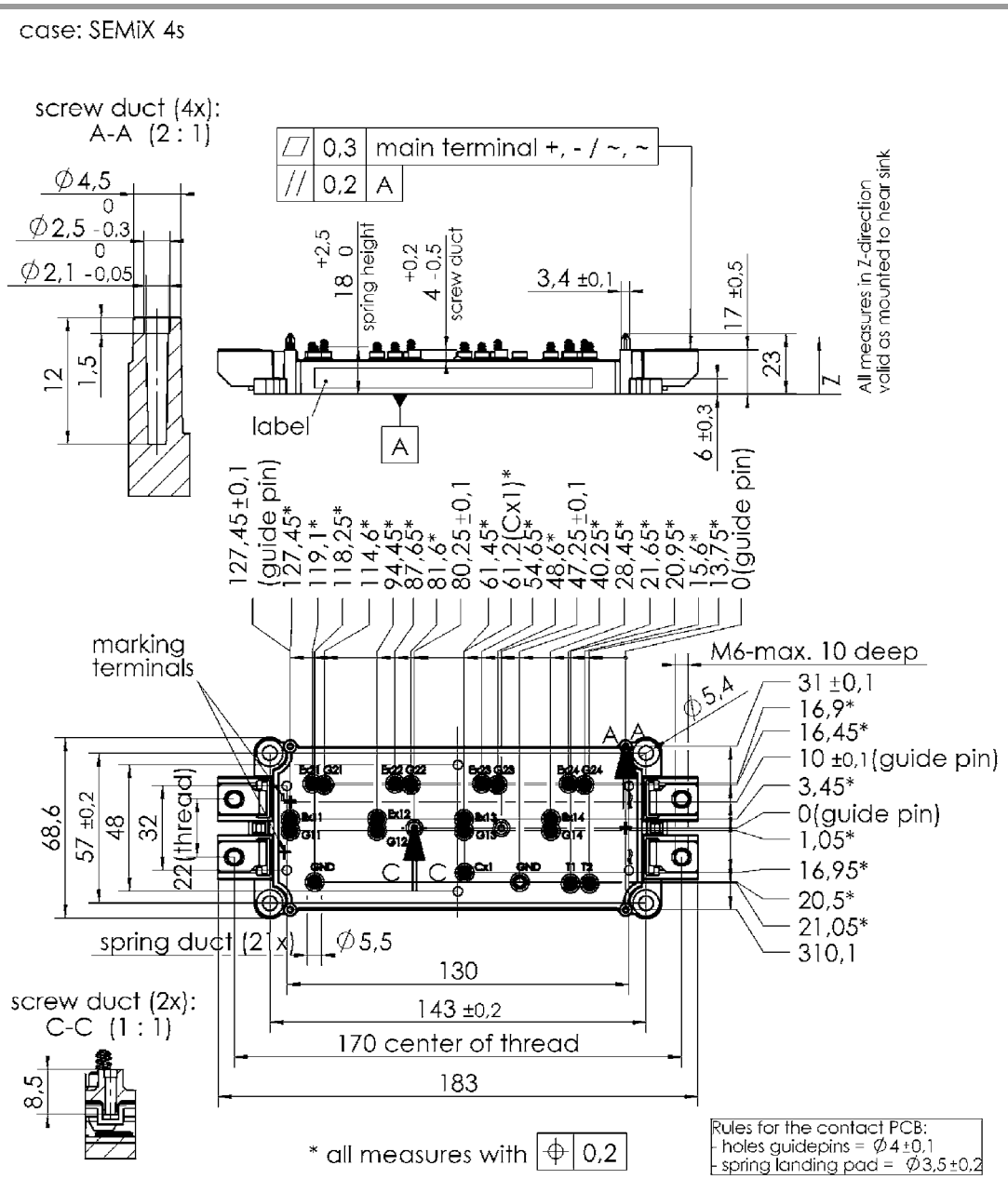


Fig. 12 Typ. CAL diode recovery charge



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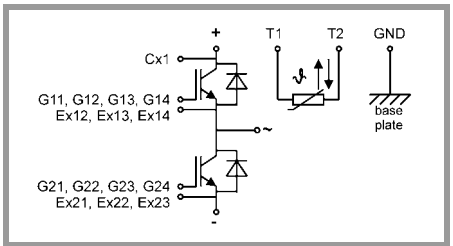

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX

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