

SEMiX 854GB176HD

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SEMiX® 4

Trench IGBT Modules

SEMiX 854GB176HD

Preliminary Data

Features

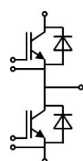
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Remarks

- short circuit capability is tested @ $V_{CC}=1000V$ (all other static parameters are tested @ $V_{CC}=1200V$)
- Not for new design



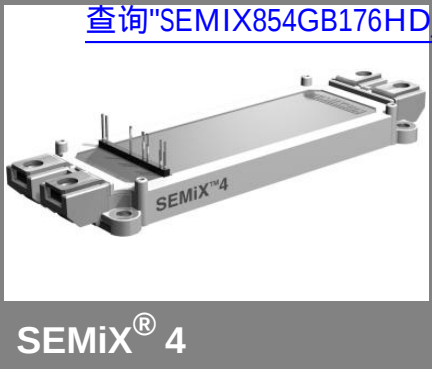
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Absolute Maximum Ratings		$T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25\text{ }^{\circ}\text{C}$	1700		V
I_C	$T_j = 150\text{ }^{\circ}\text{C}$	$T_c = 25\text{ }^{\circ}\text{C}$	775	A
		$T_c = 80\text{ }^{\circ}\text{C}$	545	A
I_{CRM}	$I_{CRM}=2 \times I_{Cnom}$	1200		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 1200\text{ V}$; $V_{GE} \leq 20\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$ $V_{CES} < 1700\text{ V}$	10		μs
Inverse Diode				
I_F	$T_j = 150\text{ }^{\circ}\text{C}$	$T_c = 25\text{ }^{\circ}\text{C}$	735	A
		$T_c = 80\text{ }^{\circ}\text{C}$	495	A
I_{FRM}	$I_{FRM}=2 \times I_{Fnom}$	1200		A
I_{FSM}	$t_p = 10\text{ ms}$; sin. $T_j = 25\text{ }^{\circ}\text{C}$	3800		A
Module				
$I_{t(RMS)}$		600		A
T_{vj}		- 40 ... + 150		$^{\circ}\text{C}$
T_{stg}		- 40 ... + 125		$^{\circ}\text{C}$
V_{isol}	AC, 1 min.	4000		V

Characteristics		$T_c = 25^\circ C$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 24 mA$	5,2	5,8	6,4	V
I_{CES}	$V_{GE} = 0 V$, $V_{CE} = V_{CES}$			0,45	mA
					mA
V_{CE0}				1	V
				0,9	V
r_{CE}	$V_{GE} = 0 V$			1,7	m Ω
				2,6	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 600 A$, $V_{GE} = 15 V$			2	V
				2,45	V
C_{ies}	$V_{CE} = 25$, $V_{GE} = 0 V$ $f = 1 MHz$			52,8	nF
C_{oes}				2,2	nF
C_{res}				1,75	nF
Q_G	$V_{GE} = -8 V \dots +15 V$		5600		nC
$t_{d(on)}$	$R_{Gon} = 2 \Omega$			340	ns
t_r				80	ns
E_{on}	$R_{Goff} = 2 \Omega$			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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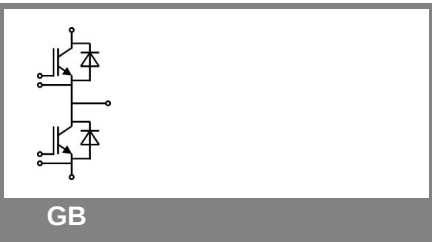
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Characteristics					
Symbol	Conditions		min.	typ.	max. Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 600\text{ A}$; $V_{GE} = 0\text{ V}$	$T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$		1,7	1,9 V
		$T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$		1,7	1,9 V
V_{F0}		$T_j = 25\text{ }^{\circ}\text{C}$		1,1	1,3 V
		$T_j = 125\text{ }^{\circ}\text{C}$		0,9	1,1 V
r_F		$T_j = 25\text{ }^{\circ}\text{C}$		1	mΩ
		$T_j = 125\text{ }^{\circ}\text{C}$		1,3	mΩ
I_{RRM}	$I_{Fnom} = 600\text{ A}$	$T_j = 125\text{ }^{\circ}\text{C}$		730	A
Q_{rr}	$di/dt = 8000\text{ A}/\mu\text{s}$			220	μC
E_{rr}	$V_{GE} = -15\text{ V}$; $V_{CC} = 1200\text{ V}$			170	mJ
$R_{th(j-c)D}$	per diode			0,081	K/W
Module					
L_{CE}				22	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25\text{ }^{\circ}\text{C}$		0,7	mΩ
		$T_{case} = 125\text{ }^{\circ}\text{C}$		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}	$T_c=100^{\circ}\text{C}$ ($R_{25}=5\text{ k}\Omega$)			0,493±5%	kΩ
$B_{100/125}$	$R(T)=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[\text{K}]; B$			3550±2%	K

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

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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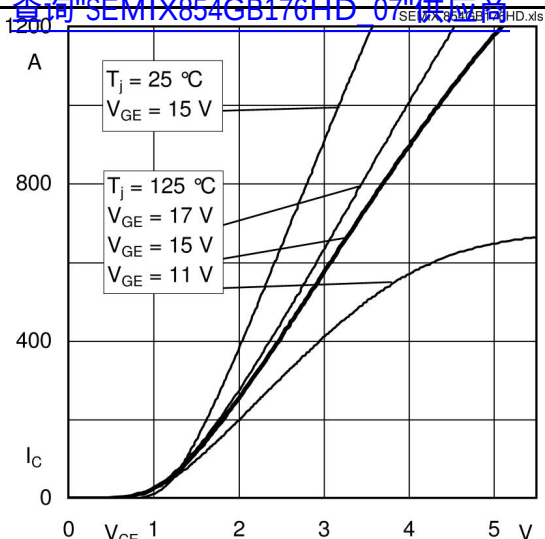


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

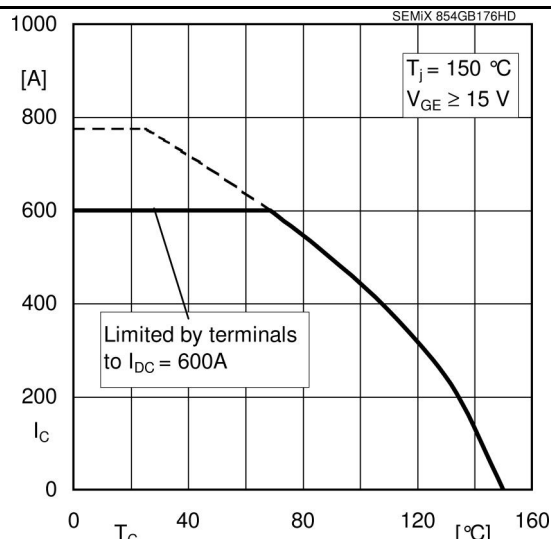


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

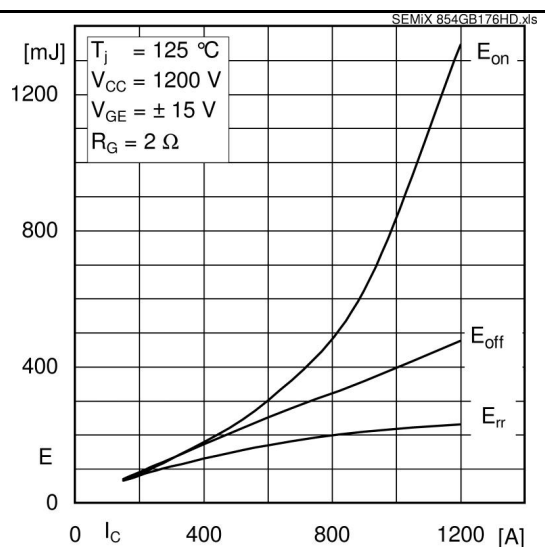


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

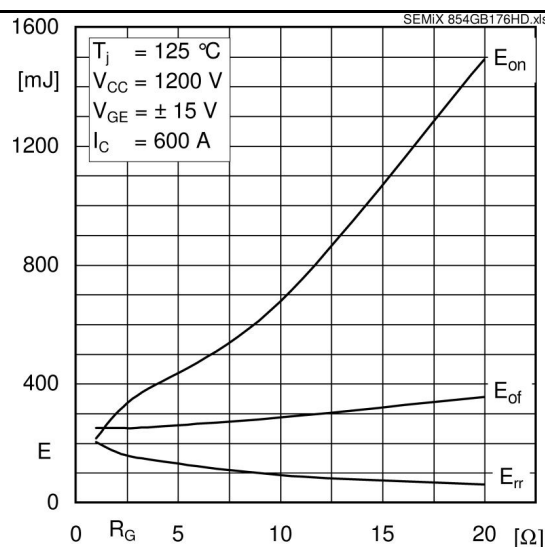


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

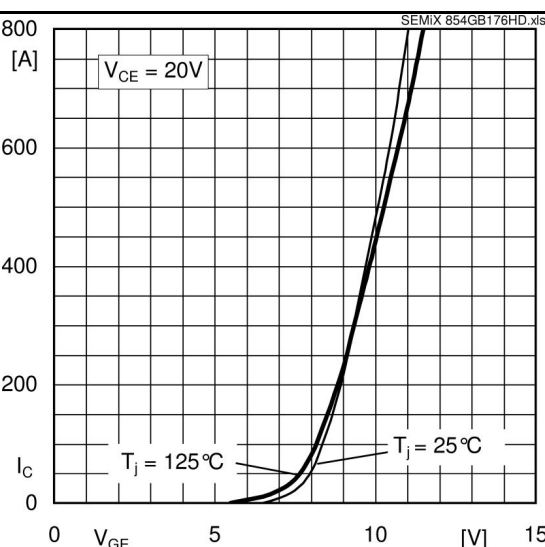


Fig. 5 Typ. transfer characteristic

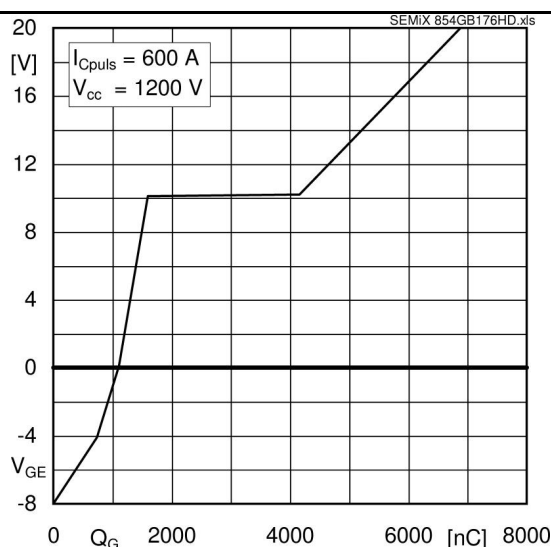
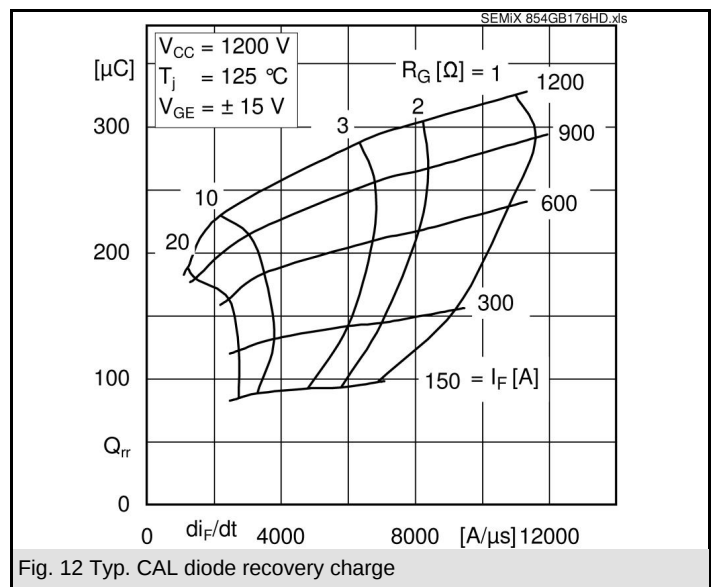
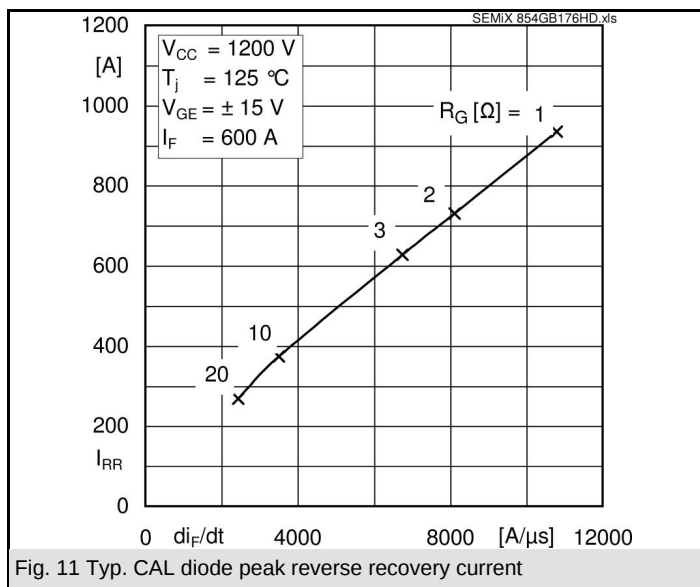
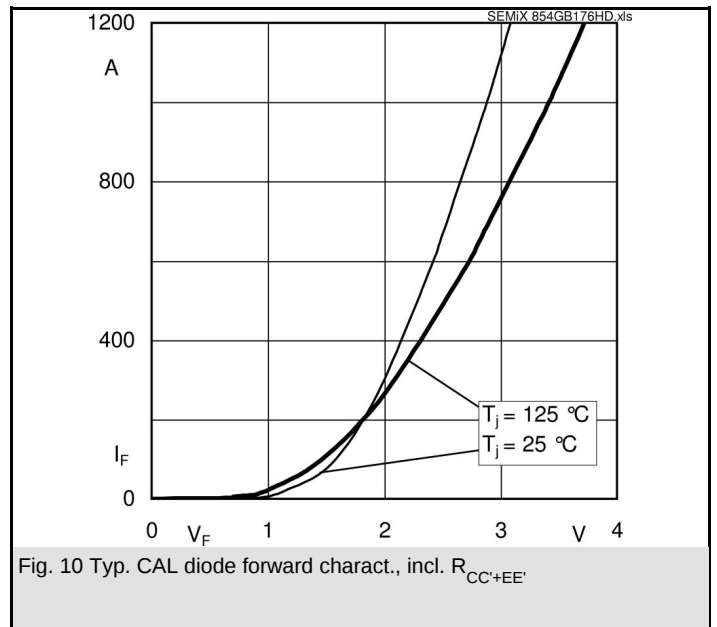
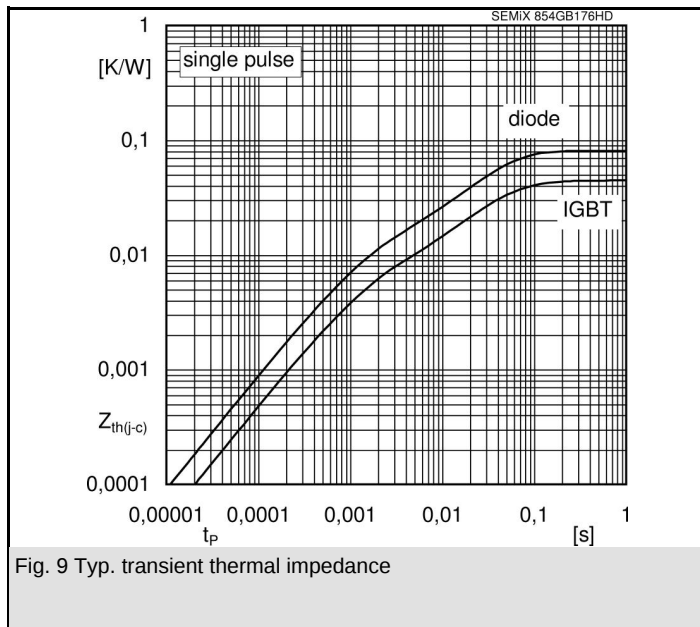
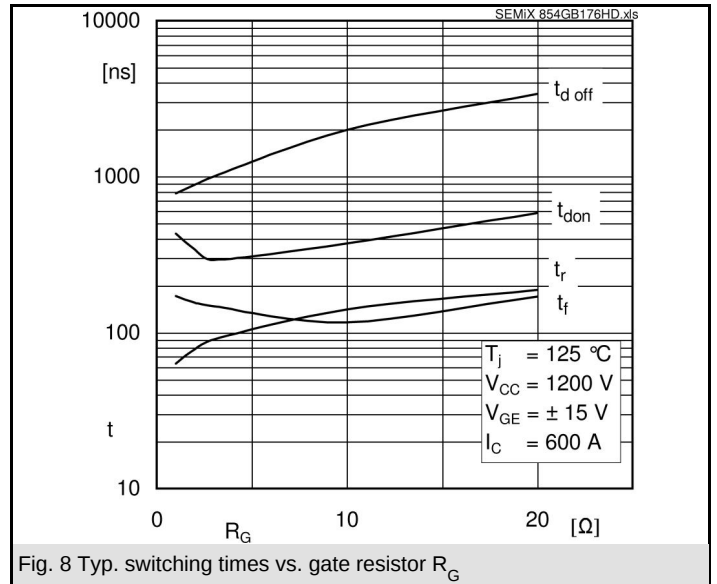
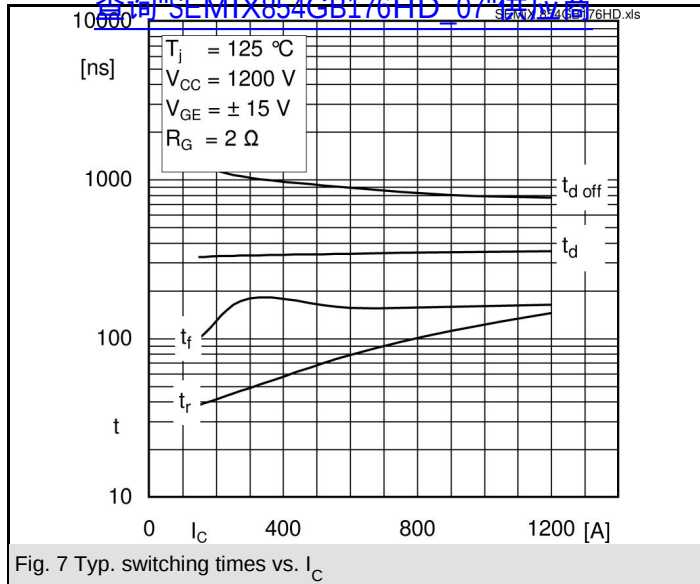
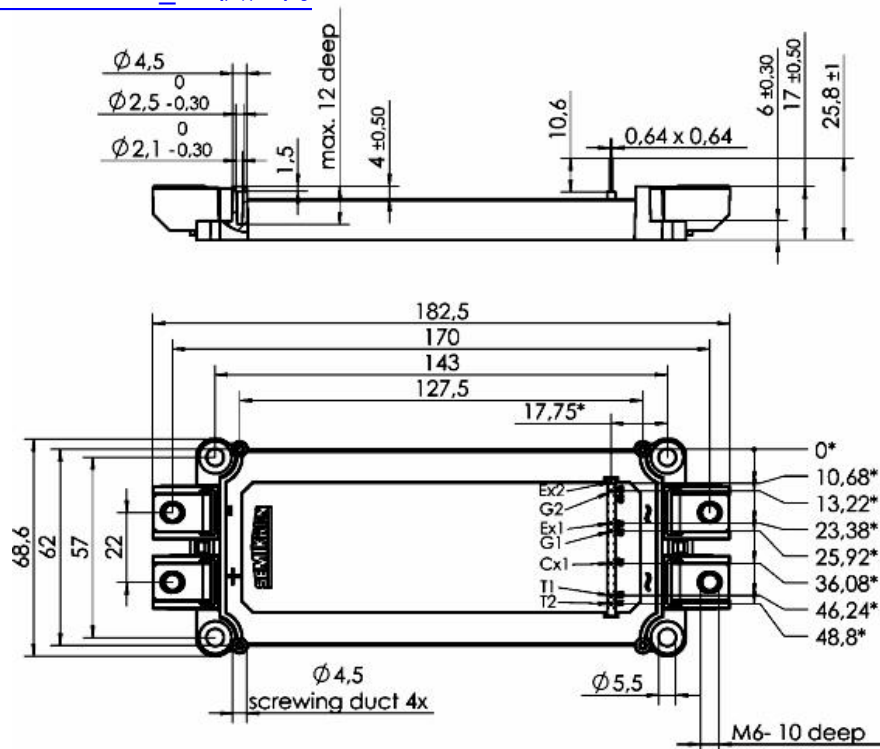


Fig. 6 Typ. gate charge characteristic

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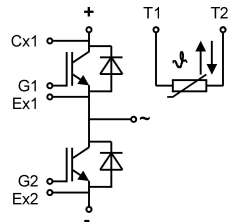


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*= all measures with $\phi 0,5$

Case SEMiX 4



Pinout

GB