

SEMiX 854GB176HDs

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SEMiX® 4s

Trench IGBT Modules

SEMiX 854GB176HDs

Preliminary Data

Features

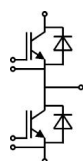
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Remarks

- short circuit capability is tested @ $V_{CC}=1000V$ (all other static parameters are tested @ $V_{CC}=1200V$)



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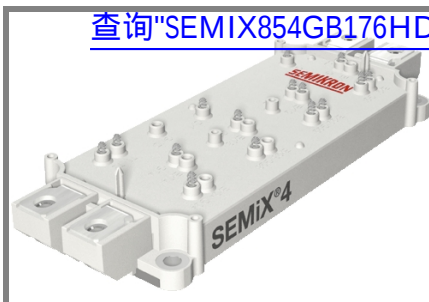
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Absolute Maximum Ratings		$T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25\text{ }^{\circ}\text{C}$	1700		V
I_C	$T_j = 150\text{ }^{\circ}\text{C}$	$T_c = 25\text{ }^{\circ}\text{C}$	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		$T_c = 25\text{ °C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 24\text{ mA}$	5,2	5,8	6,4	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$			0,45	$T_j = 25\text{ °C}$ mA
					$T_j = 125\text{ °C}$ mA
V_{CE0}			1	1,2	$T_j = 25\text{ °C}$ V
					$T_j = 125\text{ °C}$ V
r_{CE}	$V_{GE} = 0\text{ V}$		1,7	2,1	$T_j = 25\text{ °C}$ $m\Omega$
					$T_j = 125\text{ °C}$ $m\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 600\text{ A}, V_{GE} = 15\text{ V}$		2	2,45	$T_j = 25\text{ °C}_{chiplev.}$ V
					$T_j = 125\text{ °C}_{chiplev.}$ V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$		52,8		nF
C_{oes}					nF
C_{res}					nF
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		5600		nC
$t_{d(on)}$	$R_{Gon} = 2\text{ }\Omega$		340		$V_{CC} = 1200V$ ns
t_r					$I_{Cnom} = 600A$ ns
E_{on}	$R_{Goff} = 2\text{ }\Omega$		395		$T_j = 125\text{ °C}$ mJ
$t_{d(off)}$					ns
t_f					ns
E_{off}			235		mJ
$R_{th(j-c)}$	per IGBT			0,045	K/W

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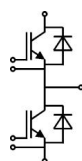
Remarks

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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 600 A$; $V_{GE} = 0 V$				
	$T_j = 25 ^\circ C_{chiplev.}$		1,7	1,9	V
	$T_j = 125 ^\circ C_{chiplev.}$		1,7	1,9	V
V_{F0}	$T_j = 25 ^\circ C$		1,1	1,3	V
	$T_j = 125 ^\circ C$		0,9	1,1	V
r_F	$T_j = 25 ^\circ C$		1		mΩ
	$T_j = 125 ^\circ C$		1,3		mΩ
I_{RRM}	$I_{Fnom} = 600 A$		730		A
Q_{rr}	$di/dt = 8000 A/\mu s$		220		μC
E_{rr}	$V_{GE} = -15 V$; $V_{CC} = 1200 V$		170		mJ
$R_{th(j-c)D}$	per diode			0,081	K/W
Module					
L_{CE}			22		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 ^\circ C$	0,7		mΩ
		$T_{case} = 125 ^\circ C$	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}	$T_c = 100 ^\circ C$ ($R_{25} = 5 k\Omega$)		0,493±5%		kΩ
$B_{100/125}$	$R(T) = R_{100} \exp[B_{100/125} (1/T - 1/T_{100})]$; $T[K]$; 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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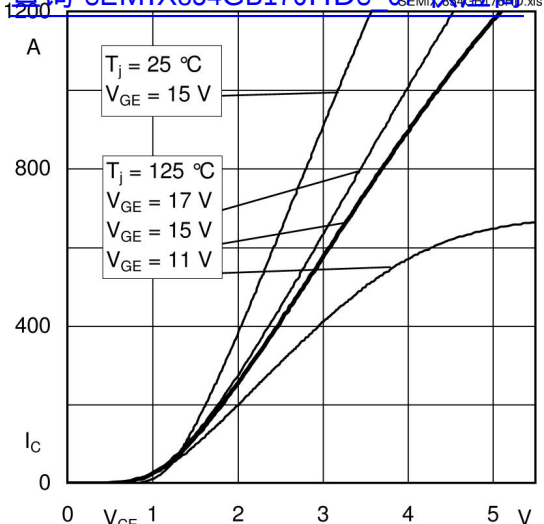


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

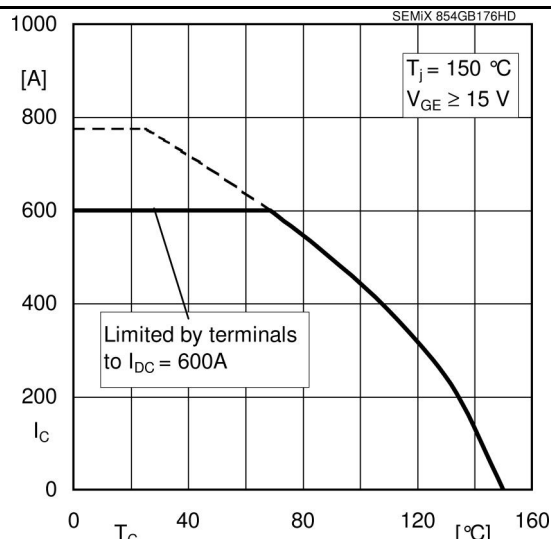


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

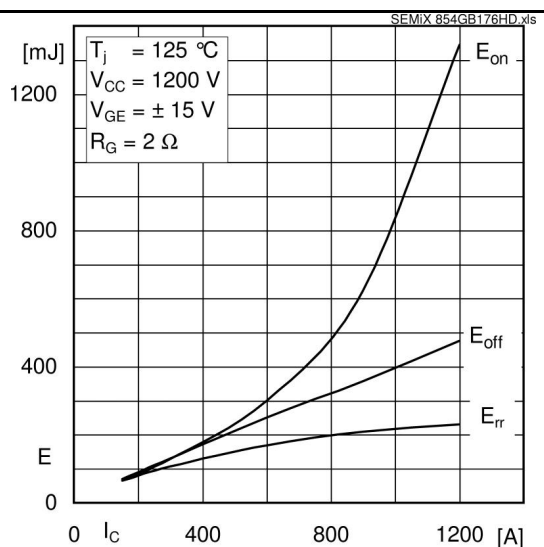


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

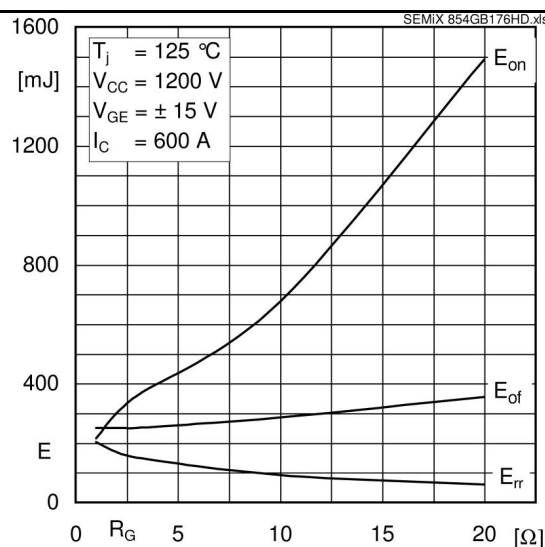


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

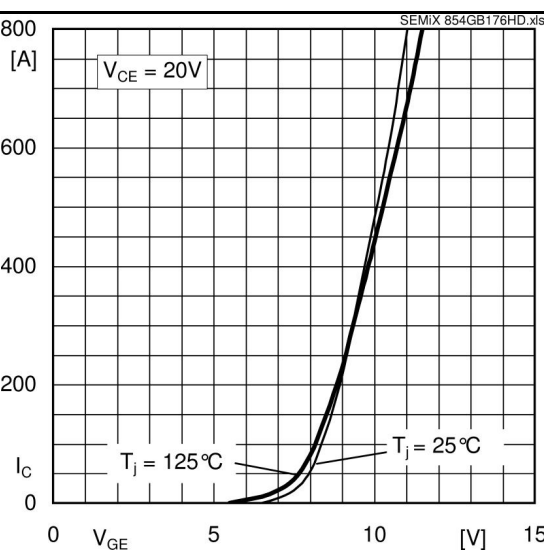


Fig. 5 Typ. transfer characteristic

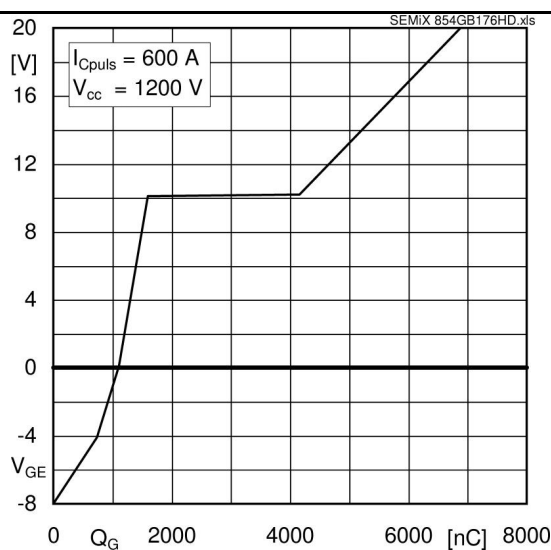
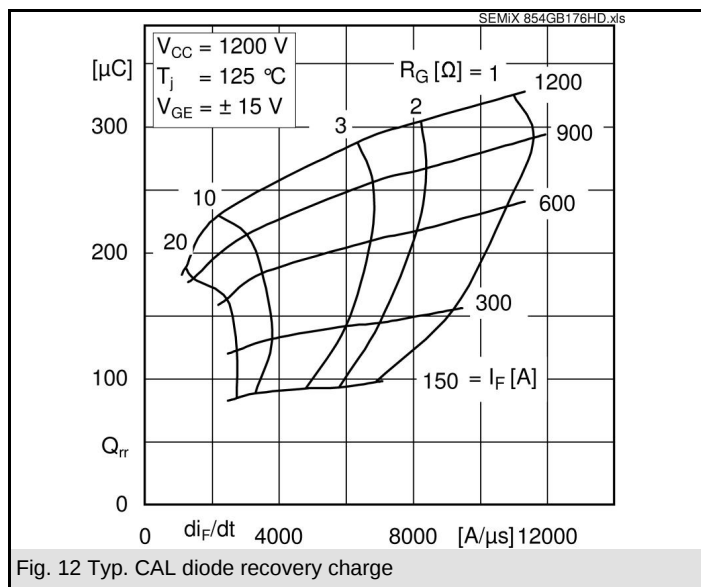
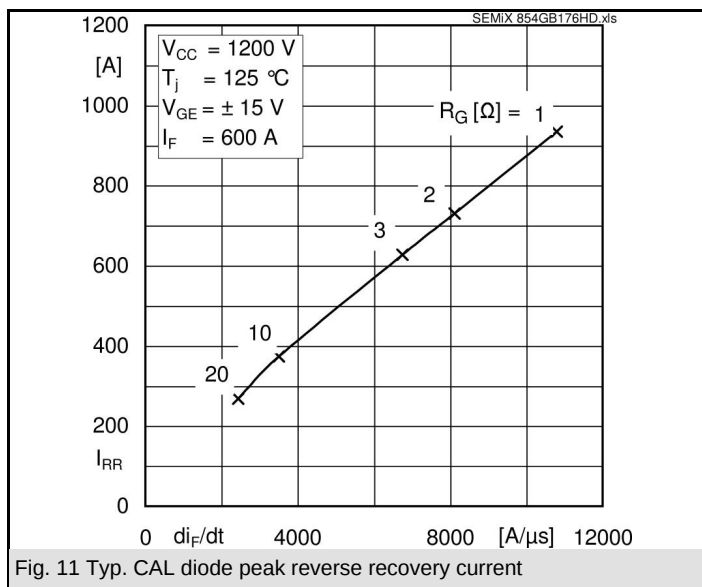
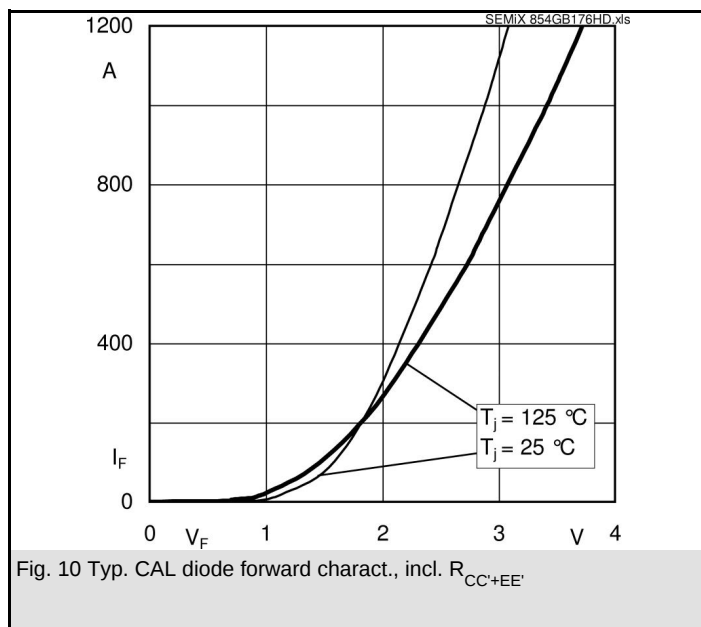
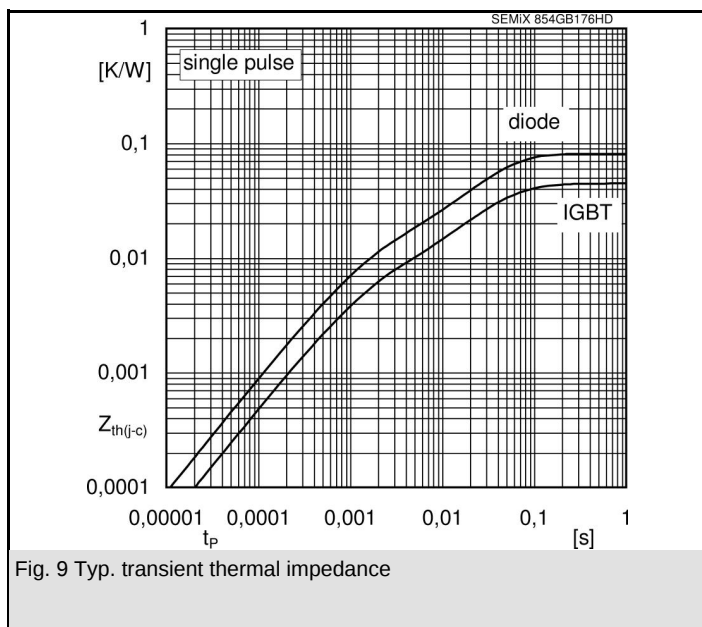
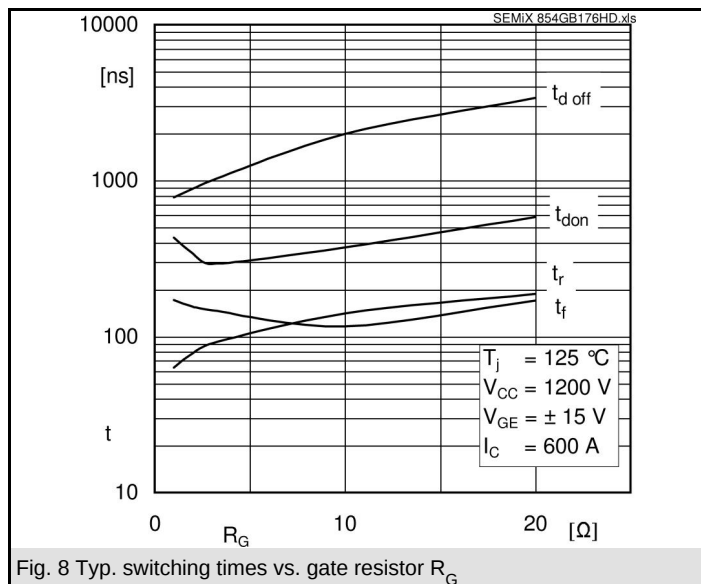
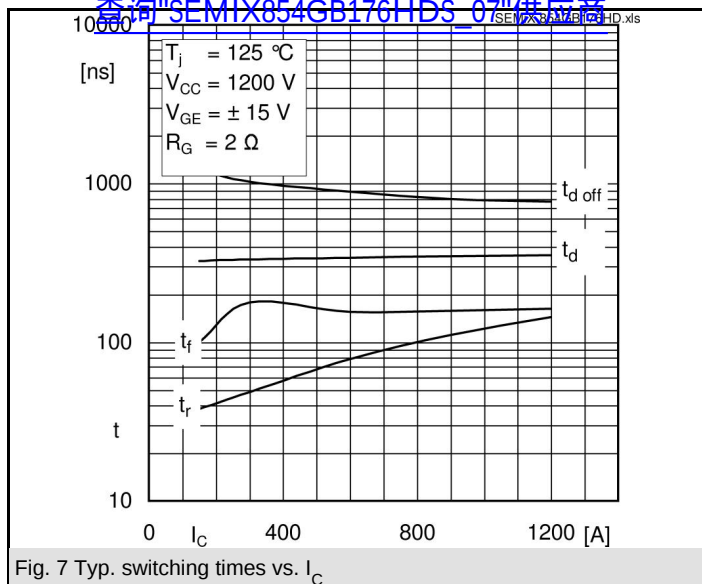
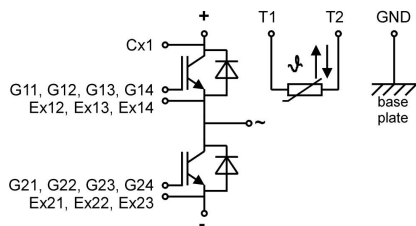


Fig. 6 Typ. gate charge characteristic

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