

SEMiX 904GB126HD

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SEMiX® 4

Trench IGBT Modules

SEMiX 904GB126HD

Preliminary Data

Features

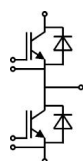
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications

- AC inverter drives
- UPS
- Electronic Welding

Remarks

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



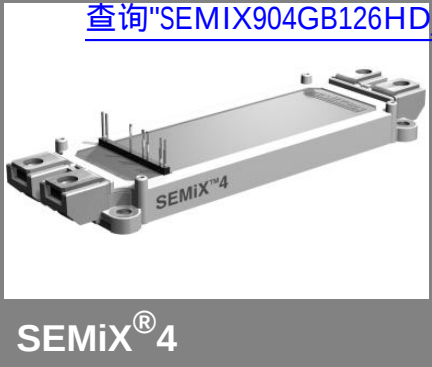
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Absolute Maximum Ratings		T _{case} = 25°C, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V _{CES}	T _j = 25 °C	1200	V
I _C	T _j = 150 °C T _c = 25 °C T _c = 80 °C	820 570	A A
I _{CRM}	I _{CRM} =2xI _{Cnom}	1200	A
V _{GES}		± 20	V
t _{psc}	V _{CC} = 600 V; V _{GE} ≤ 20 V; T _j = 125 °C V _{CES} < 1200 V	10	µs
Inverse Diode			
I _F	T _j = 150 °C T _c = 25 °C T _c = 80 °C	755 515	A A
I _{FRM}	I _{FRM} =2xI _{Fnom}	1200	A
I _{FSM}	t _p = 10 ms; sin. T _j = 25 °C	3600	A
Module			
I _{t(RMS)}		600	A
T _{vj}		- 40 ... + 150	°C
T _{stg}		- 40 ... + 125	°C
V _{isol}	AC, 1 min.	4000	V

Characteristics		T _{case} = 25°C, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 24 mA	5	5,8	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C			0,3	mA
V _{CE0}	T _j = 25 °C T _j = 125 °C		1	1,2	V
			0,9	1,1	V
r _{CE}	V _{GE} = 15 V T _j = 25°C T _j = 125°C		1,2	1,6	mΩ
			1,8	2,3	mΩ
V _{CE(sat)}	I _{Cnom} = 600 A, V _{GE} = 15 V T _j = 25°C _{chiplev.} T _j = 125°C _{chiplev.}		1,7	2,15	V
			2	2,45	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz		43,1		nF
C _{oes}			2,25		nF
C _{res}			1,95		nF
Q _G	V _{GE} = -8 ... +15V		4800		nC
t _{d(on)}	R _{Gon} = 1,6 Ω	V _{CC} = 600V I _{Cnom} = 600A T _j = 125 °C		440	ns
t _r				85	ns
E _{on}			60	mJ	
t _{d(off)}	R _{Goff} = 1,6 Ω			710	ns
t _f				130	ns
E _{off}			88	mJ	
R _{th(j-c)}	per IGBT			0,05	K/W

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Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 600\text{ A}$; $V_{GE} = 0\text{ V}$	$T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$	1,6	1,8	V
		$T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$	1,6	1,8	V
V_{F0}		$T_j = 25\text{ }^{\circ}\text{C}$	1	1,1	V
		$T_j = 125\text{ }^{\circ}\text{C}$	0,8	0,9	V
r_F		$T_j = 25\text{ }^{\circ}\text{C}$	1	1,2	mΩ
		$T_j = 125\text{ }^{\circ}\text{C}$	1,3	1,5	mΩ
I_{RRM}	$I_{Fnom} = 600\text{ A}$	$T_j = 125\text{ }^{\circ}\text{C}$	625		A
Q_{rr}	$di/dt = 8400\text{ A}/\mu\text{s}$		165		μC
E_{rr}	$V_{GE} = -15\text{ V}$; $V_{CC} = 600\text{ V}$		75		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
$B_{100/125}$	$R(T)=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[\text{K}]$		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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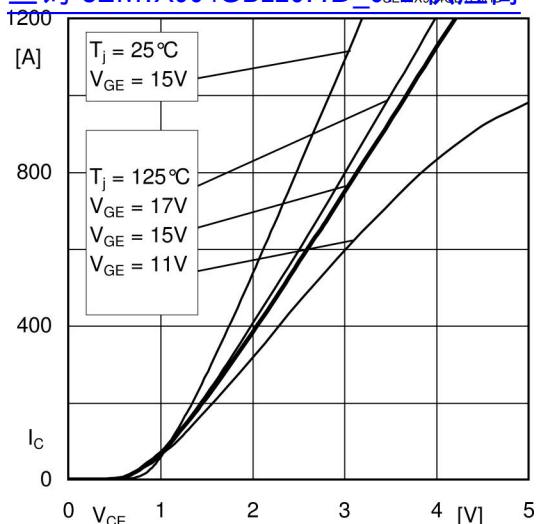


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

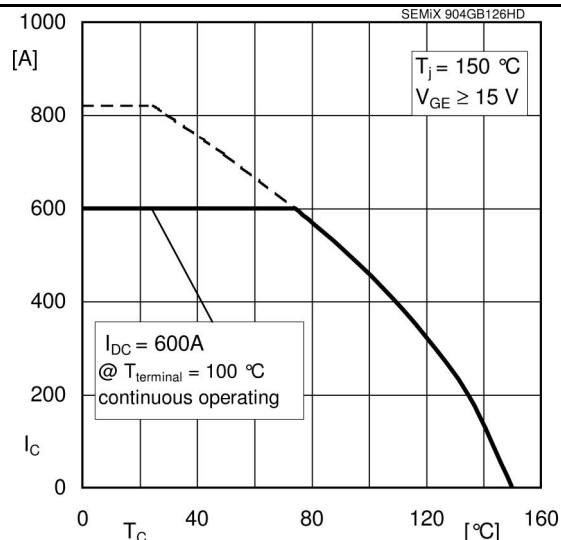


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

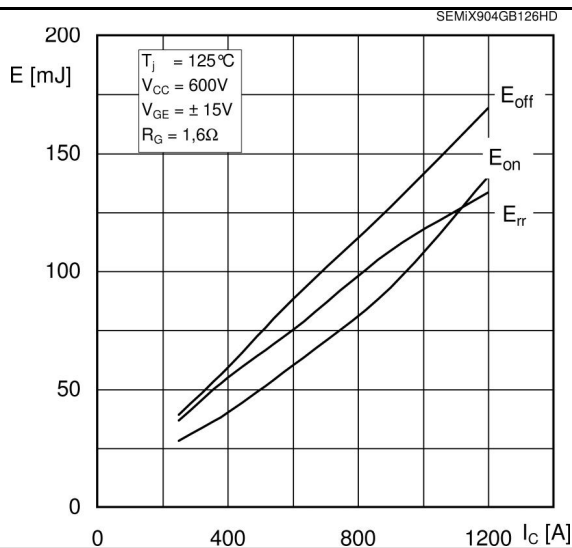


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

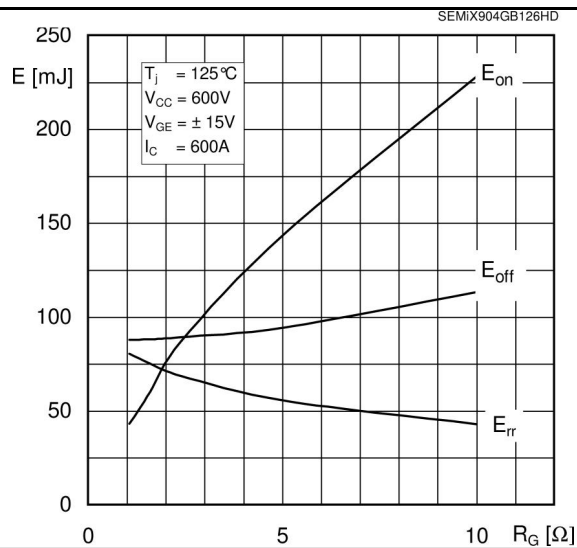


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

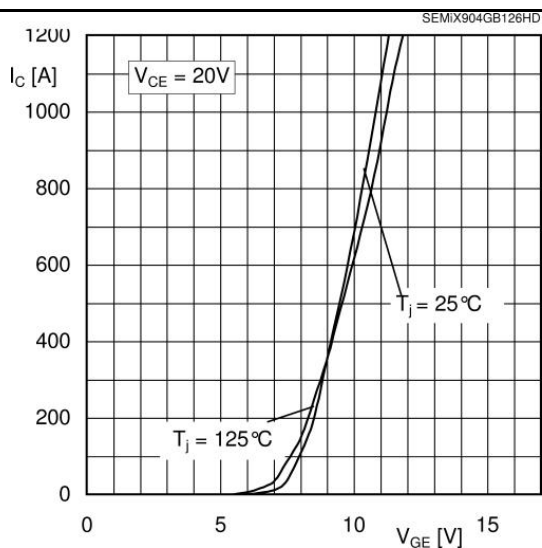


Fig. 5 Typ. transfer characteristic

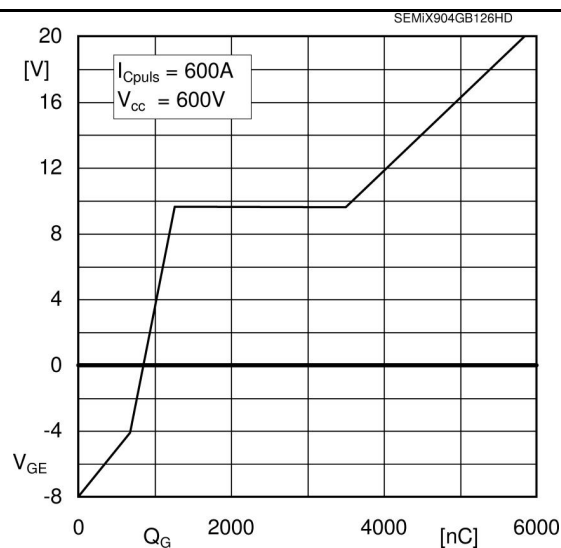


Fig. 6 Typ. gate charge characteristic

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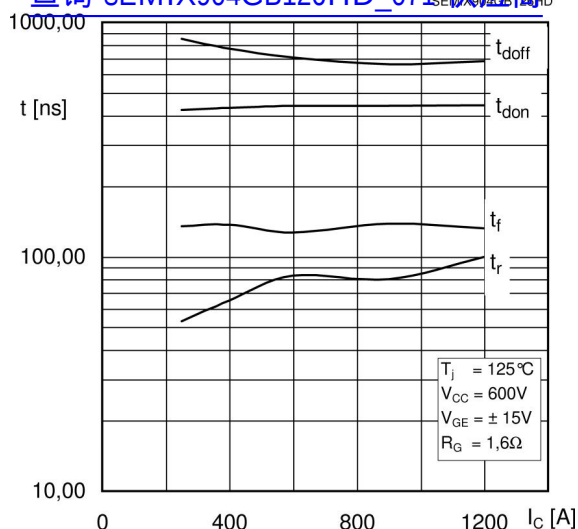


Fig. 7 Typ. switching times vs. I_C

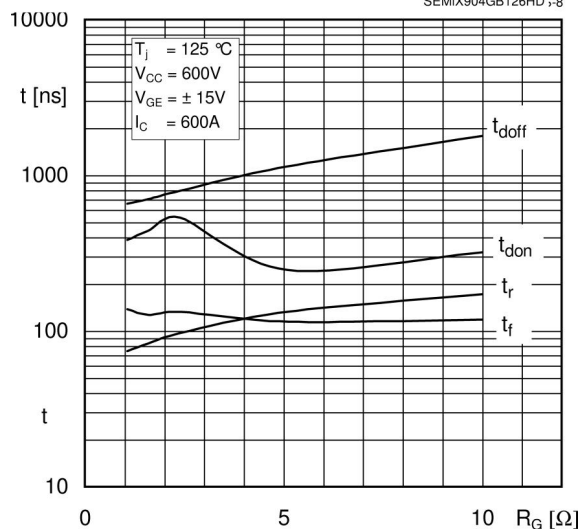


Fig. 8 Typ. switching times vs. gate resistor R_G

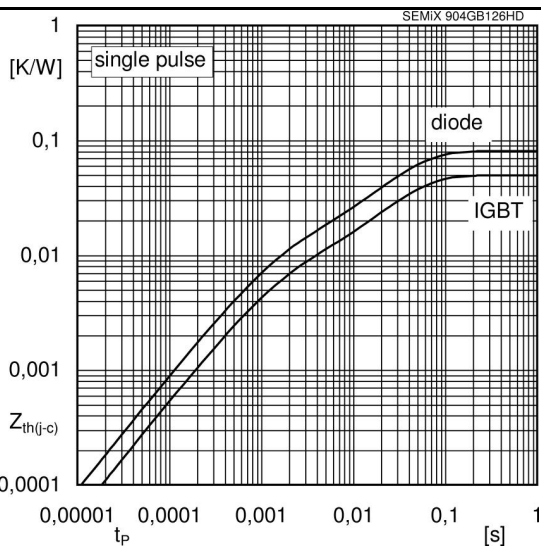


Fig. 9 Typ. transient thermal impedance

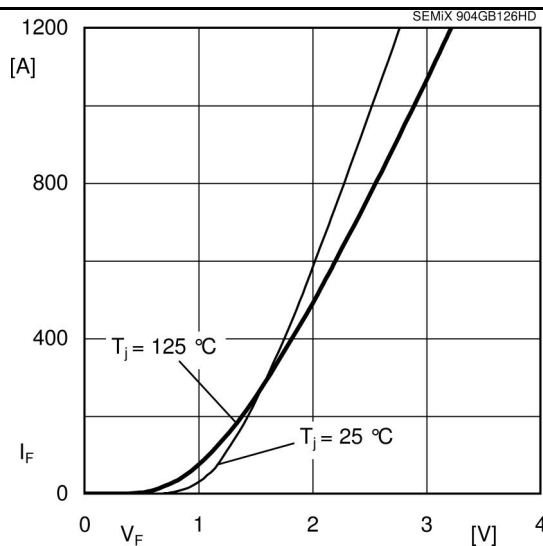


Fig. 10 Typ. CAL diode forward char., incl. $R_{CC'+EE'}$

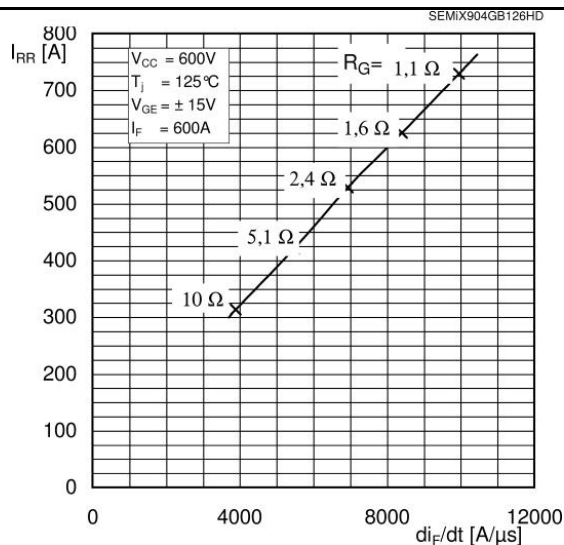


Fig. 11 Typ. CAL diode peak reverse recovery current

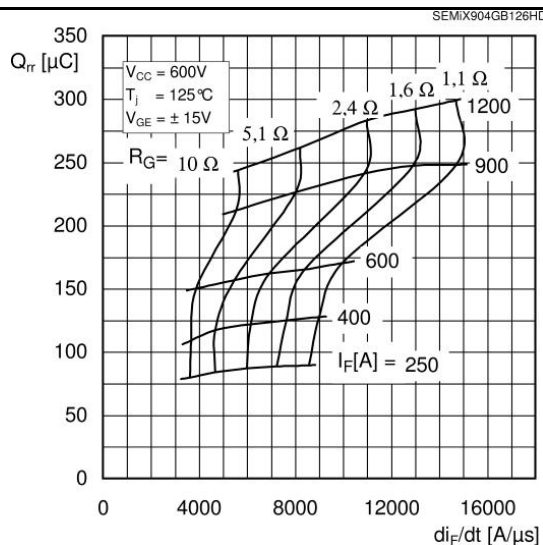
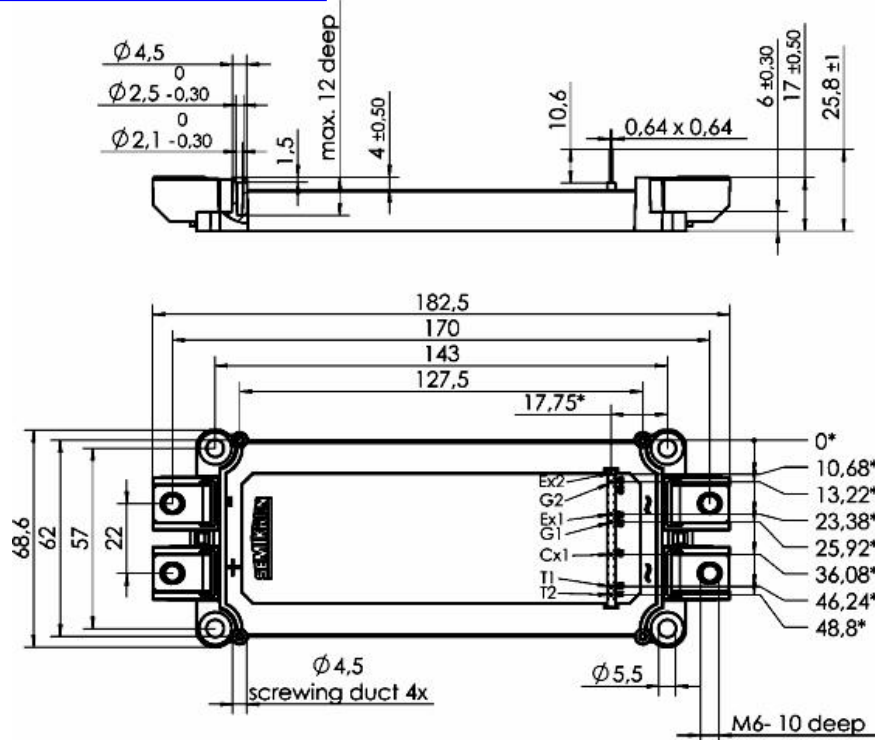


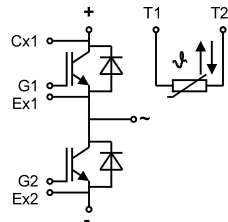
Fig. 12 Typ. CAL diode recovery charge

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

Case SEMiX 4



Pinout

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