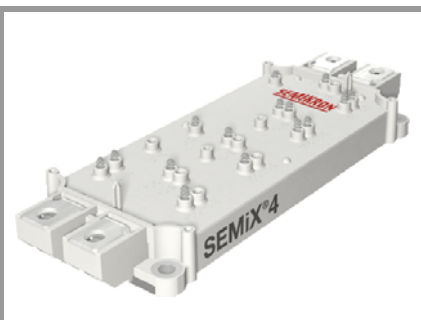


SEMiX604GB176HDs



SEMiX[®]4s

Trench IGBT Modules

SEMiX604GB176HDs

Preliminary Data

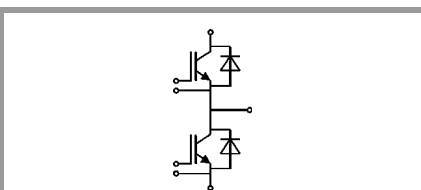
Features

- 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

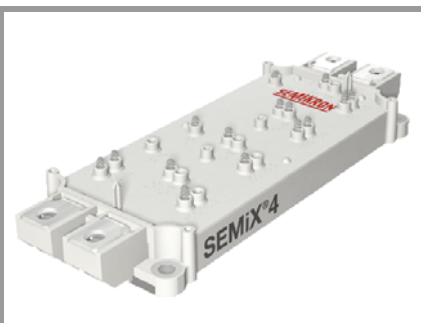


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Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
IGBT				
V_{CES}		1700	V	
I_C	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	567	A
		$T_c = 80^\circ\text{C}$	402	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	800	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 1000\text{V}$ $V_{GE} \leq 20\text{V}$ $T_j = 125^\circ\text{C}$ $V_{CES} \leq 1700\text{V}$		10	μs
T_j		-55 ... 150	$^\circ\text{C}$	
Inverse diode				
I_F	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	740	A
		$T_c = 80^\circ\text{C}$	496	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800	A	
I_{FSM}	$t_p = 10\text{ms}$, half sine wave, $T_j = 25^\circ\text{C}$	2700	A	
T_j		-40 ... 150	$^\circ\text{C}$	
Module				
$I_{t(RMS)}$		600	A	
T_{stg}		-40 ... 125	$^\circ\text{C}$	
V_{isol}	AC sinus 50Hz, $t = 60\text{s}$	4000	V	

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_{Cnom} = 400\text{A}$ $V_{GE} = 15\text{V}$ chiplevel	$T_j = 25^\circ\text{C}$	2	2.45	V
		$T_j = 125^\circ\text{C}$	2.45	2.9	V
V_{CE0}		$T_j = 25^\circ\text{C}$	1	1.2	V
		$T_j = 125^\circ\text{C}$	0.9	1.1	V
r_{CE}	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	2.5	3.1	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	3.9	4.5	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 16\text{mA}$	5.2	5.8	6.4	V
I_{CES}	$V_{GE} = 0\text{V}$ $V_{CE} = 1700\text{V}$	$T_j = 25^\circ\text{C}$	0.12	0.36	mA
		$T_j = 125^\circ\text{C}$			mA
C_{ies}	$V_{CE} = 25\text{V}$		35.3		nF
C_{oes}	$V_{GE} = 0\text{V}$		1.46		nF
C_{res}			1.17		nF
Q_G	$V_{GE} = -8\text{V} \dots +15\text{V}$		3732		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		1.88		Ω
$t_{d(on)}$	$V_{CC} = 1200\text{V}$		360		ns
t_r	$I_{Cnom} = 400\text{A}$ $T_j = 125^\circ\text{C}$		65		ns
E_{on}	$R_{G on} = 3\Omega$		215		mJ
$t_{d(off)}$	$R_{G off} = 3\Omega$		900		ns
t_f			165		ns
E_{off}			165		mJ
$R_{th(j-c)}$	per IGBT			0.058	K/W

SEMiX604GB176HDs



SEMiX®4s

Trench IGBT Modules

SEMiX604GB176HDs

Preliminary Data

Features

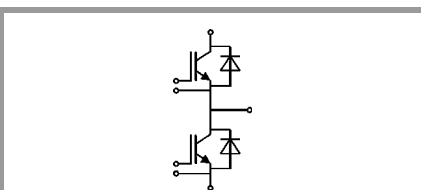
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- UL recognised file no. E63532

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Remarks

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_{Fnom} = 400A$ $V_{GE} = 0V$ chipllevel	$T_j = 25^\circ C$		1.5	1.7	V
		$T_j = 125^\circ C$		1.4	1.6	V
V_{F0}		$T_j = 25^\circ C$	0.9	1.1	1.3	V
		$T_j = 125^\circ C$	0.7	0.9	1.1	V
r_F		$T_j = 25^\circ C$	1.0	1.0	1.0	mΩ
		$T_j = 125^\circ C$	1.3	1.3	1.3	mΩ
I_{RRM}	$I_{Fnom} = 400A$ $di/dt_{off} = 6600A/\mu s$	$T_j = 125^\circ C$		560		A
Q_{rr}		$T_j = 125^\circ C$		131		μC
E_{rr}	$V_{GE} = -15V$ $V_{CC} = 1200V$	$T_j = 125^\circ C$		95		mJ
$R_{th(j-c)D}$	per diode				0.081	K/W
Module						
L_{CE}				22		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_C = 25^\circ C$		0.7		mΩ
		$T_C = 125^\circ C$		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
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[K]$;			3550 ±2%		K



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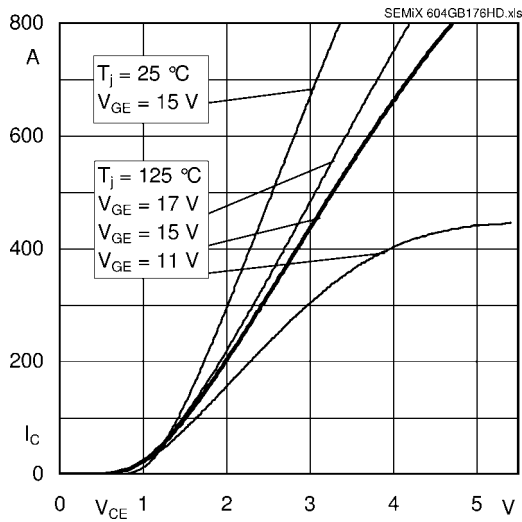


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

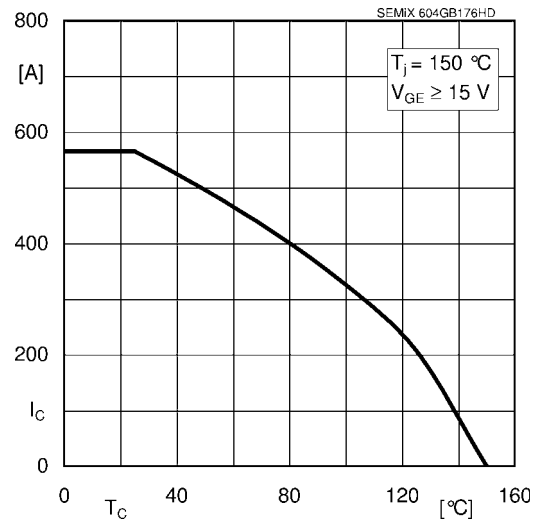


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

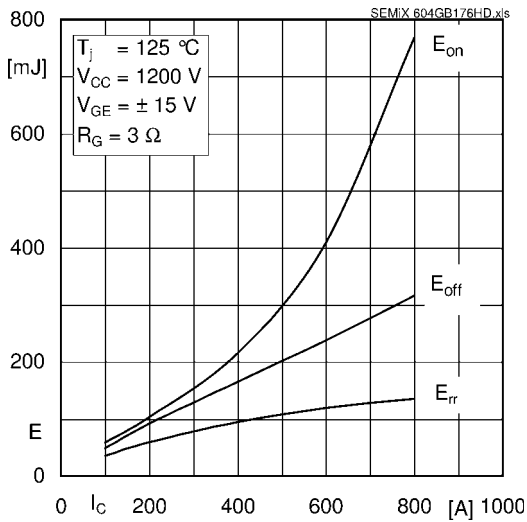


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

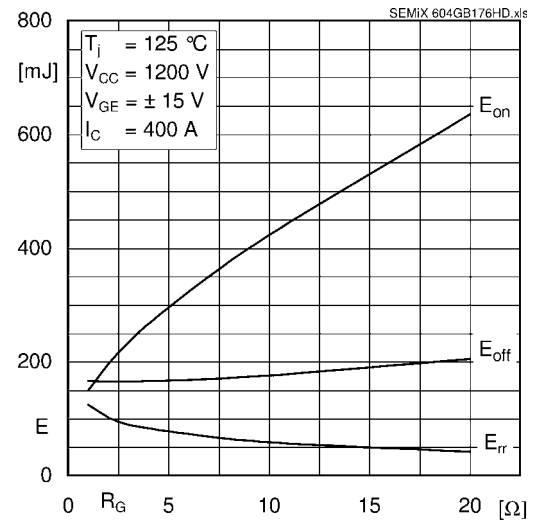


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

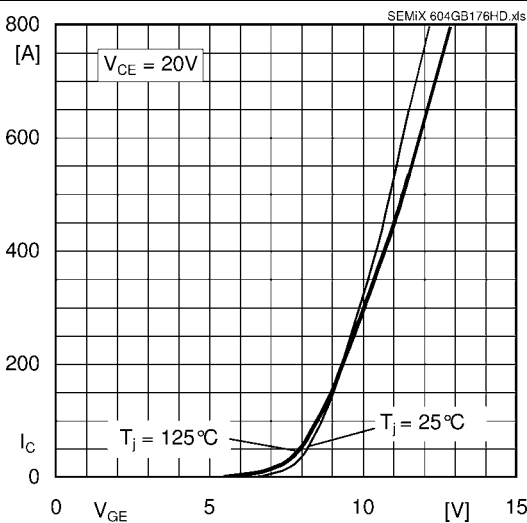


Fig. 5 Typ. transfer characteristic

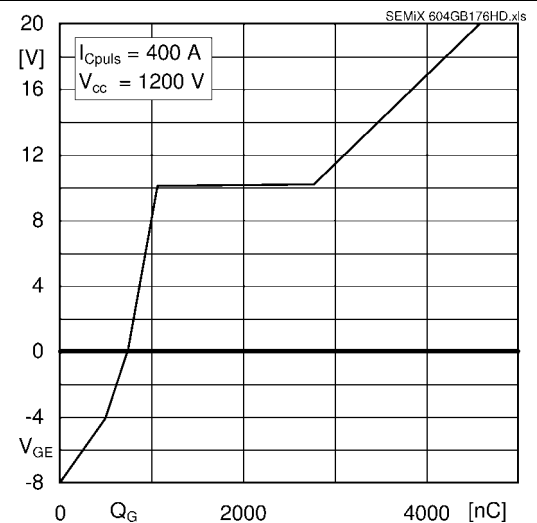


Fig. 6 Typ. gate charge characteristic

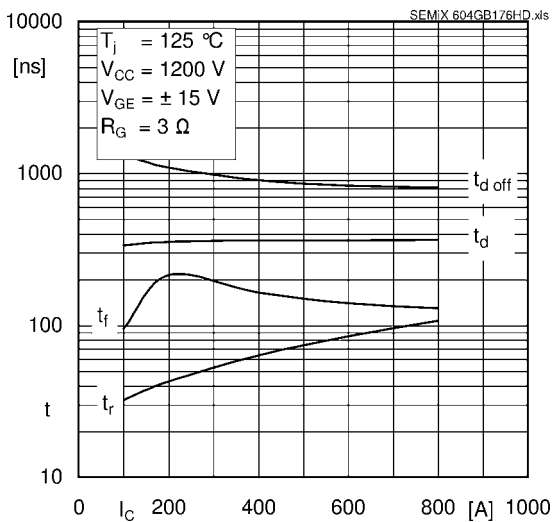


Fig. 7 Typ. switching times vs. I_C

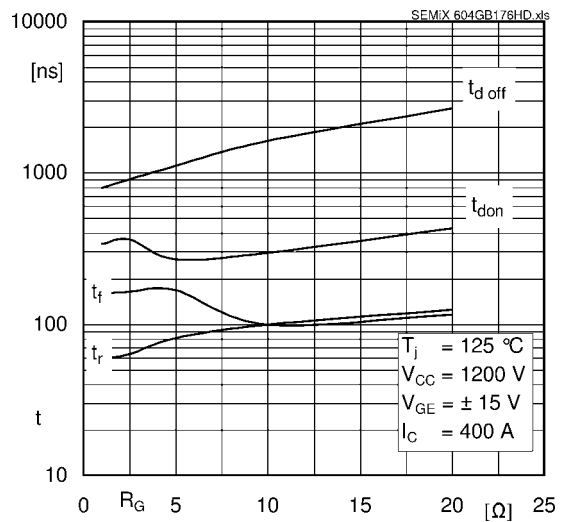


Fig. 8 Typ. switching times vs. gate resistor R_G

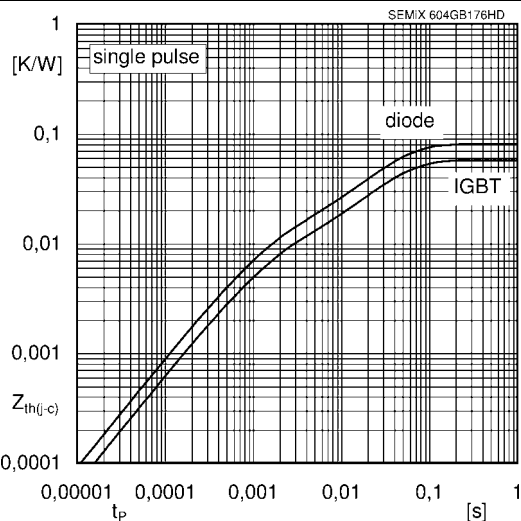


Fig. 9 Typ. transient thermal impedance

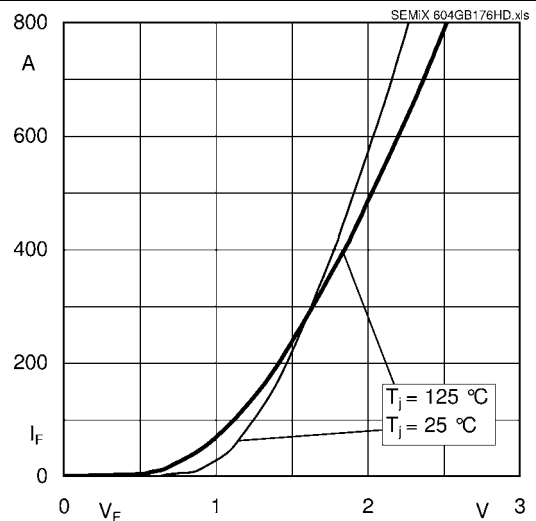


Fig. 10 Typ. CAL diode forward charact., incl. R_{CC+EE}

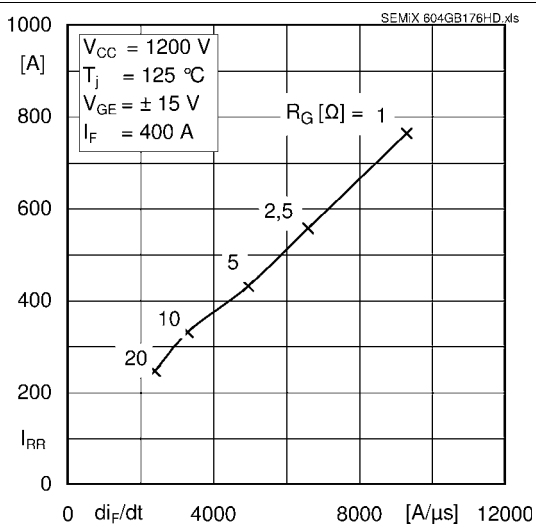


Fig. 11 Typ. CAL diode peak reverse recovery current

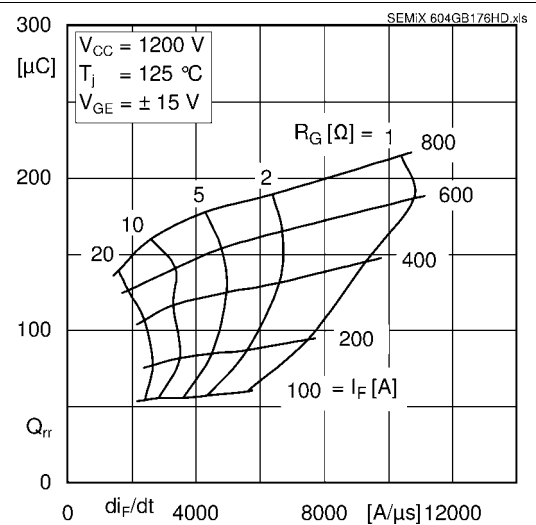
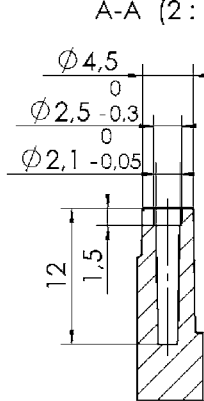


Fig. 12 Typ. CAL diode recovery charge

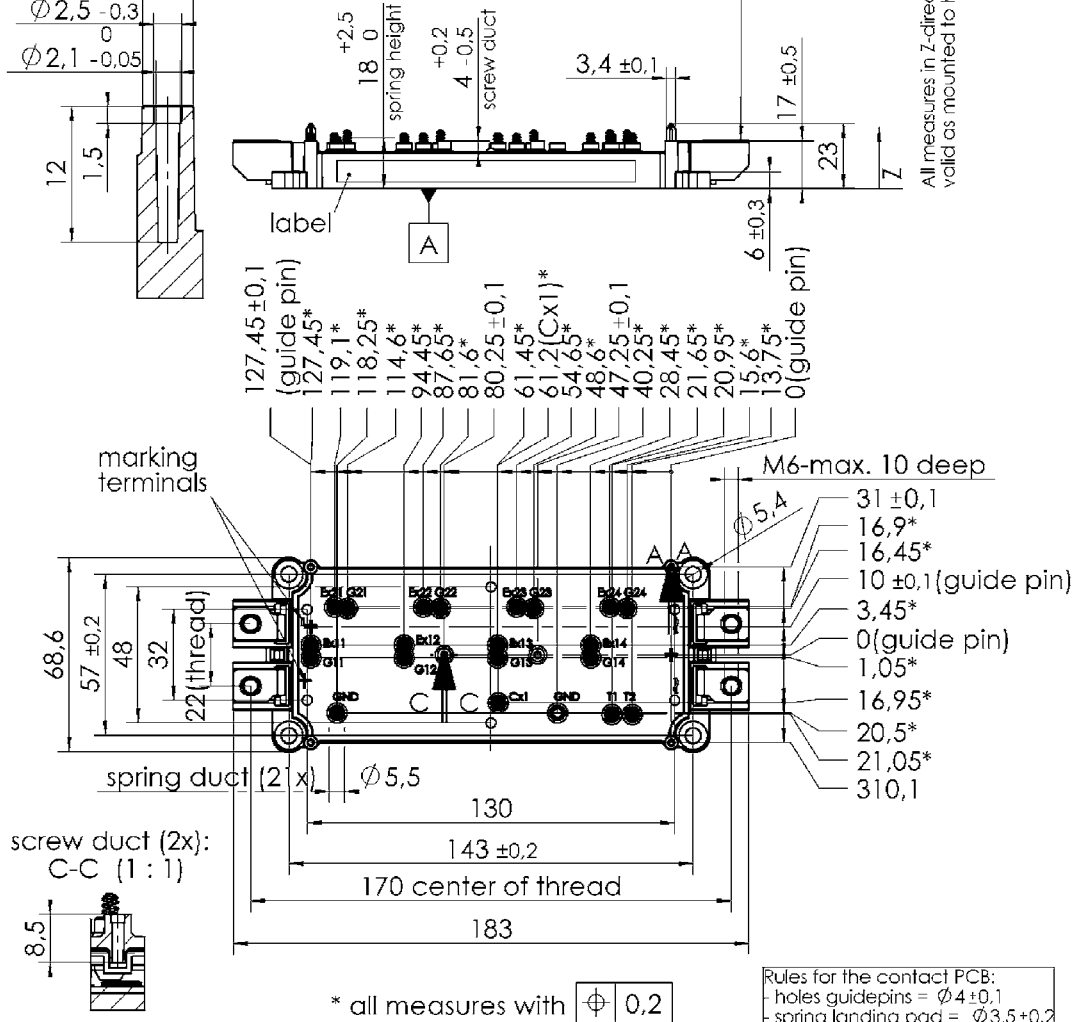
SEMiX604GB176HDs

case: SEMiX 4s

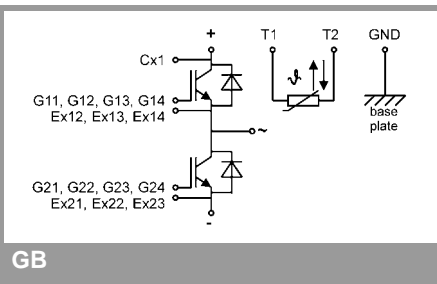
screw duct (4x):
A-A (2 : 1)



\square	0,3	main terminal +, - / ~, ~
\parallel	0,2	A



SEMiX 4s



GB

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

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