

SEMiX 302GB066HDs

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SEMiX® 2s

Trench IGBT Modules

SEMiX 302GB066HDs

Preliminary Data

Features

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

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

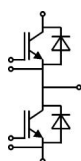
Remarks

- Case temperatur limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_J=150^\circ\text{C}$
- use of soft RG necessary
- take care of over-voltage caused by stray inductance

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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	600	V
I _C	T _j = 175 °C	T _c = 25 °C 380 T _c = 80 °C 285	A A
I _{CRM}	I _{CRM} =2xI _{Cnom}	600	A
V _{GES}		± 20	V
t _{psc}	V _{CC} = 360 V; V _{GE} ≤ 15 V; T _j = 150 °C V _{CES} < 600 V	6	μs
Inverse Diode			
I _F	T _j = 175 °C	T _c = 25 °C 420 T _c = 80 °C 310	A A
I _{FRM}	I _{FRM} =2xI _{Fnom}	600	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 25 °C 1400	A
Module			
I _{t(RMS)}		600	A
T _{vj}		- 40 ... + 175	°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 = 4,8 mA		5,8		V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C			0,45	mA
V _{CE0}		T _j = 25 °C	0,9	1	V
		T _j = 150 °C	0,85	0,9	V
r _{CE}	V _{GE} = 15 V	T _j = 25°C	1,8	3	mΩ
		T _j = 150°C	2,8	4	mΩ
V _{CE(sat)}	I _{Cnom} = 300 A, V _{GE} = 15 V	T _j = 25°C _{chiplev.}	1,45	1,9	V
		T _j = 150°C _{chiplev.}	1,7	2,1	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz		18,5		nF
C _{oes}			1,2		nF
C _{res}			0,55		nF
Q _G	V _{GE} = -8 ... +15V		2400		nC
t _{d(on)}	R _{Gon} = 5,1 Ω	V _{CC} = 300V I _{Cnom} = 300A T _j = 150 °C	110		ns
t _r			85		ns
E _{on}	11,5			mJ	
t _{d(off)}	R _{Goff} = 5,1 Ω		820		ns
t _f			70		ns
E _{off}		15		mJ	
R _{th(j-c)}	per IGBT			0,16	K/W



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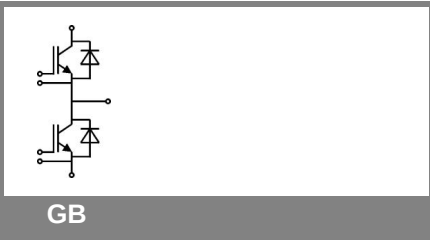
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Characteristics					
Symbol	Conditions		min.	typ.	max. Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}; V_{GE} = 0\text{ V}$	$T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$		1,4	1,6 V
		$T_j = 150\text{ }^{\circ}\text{C}_{chiplev.}$		1,4	1,6 V
V_{F0}		$T_j = 25\text{ }^{\circ}\text{C}$		1	1,1 V
		$T_j = 150\text{ }^{\circ}\text{C}$		0,85	0,95 V
r_F		$T_j = 25\text{ }^{\circ}\text{C}$		1,3	1,7 mΩ
		$T_j = 150\text{ }^{\circ}\text{C}$		1,8	2,2 mΩ
I_{RRM}	$I_{Fnom} = 300\text{ A}$	$T_j = 150\text{ }^{\circ}\text{C}$		240	A
Q_{rr}	$di/dt = 3600\text{ A}/\mu s$			35	μC
E_{rr}	$V_{GE} = -8\text{ V}; V_{CC} = 300\text{ V}$			7,5	mJ
$R_{th(j-c)D}$	per diode				0,19 K/W
Module					
L_{CE}				18	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			0,045	K/W
M_s	to heat sink (M5)		3		5 Nm
M_t	to terminals (M6)		2,5		5 Nm
w					250 g
Temperature sensor					
R_{100}	$T_c=100^{\circ}\text{C}$ ($R_{25}=5\text{ k}\Omega$)			0,493±5%	kΩ
$B_{100/125}$	$R(T)=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[K]; B$			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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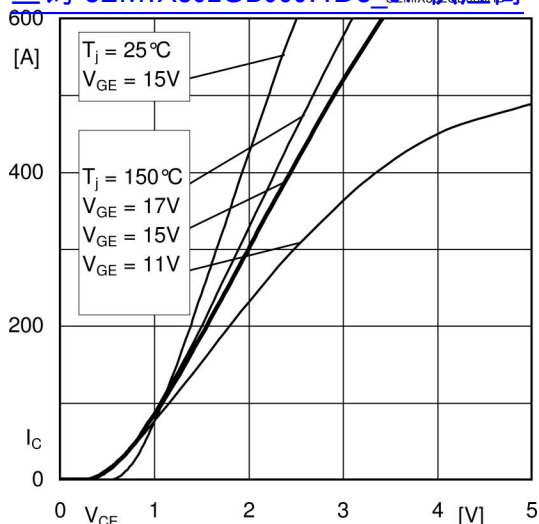


Fig. 1 Typ. output characteristic, inclusive $R_{CC+EE'}$

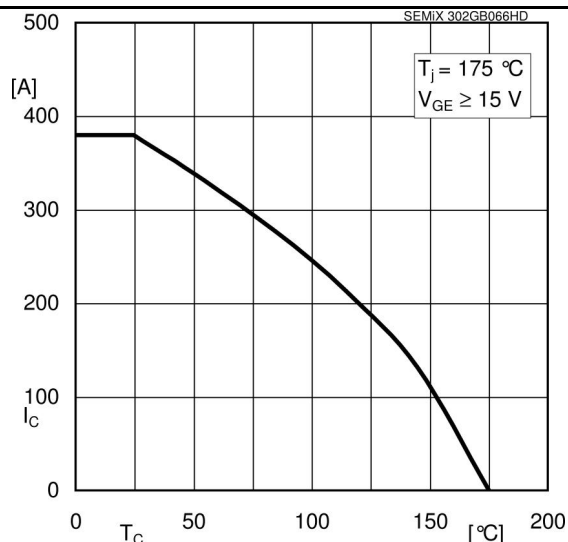


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

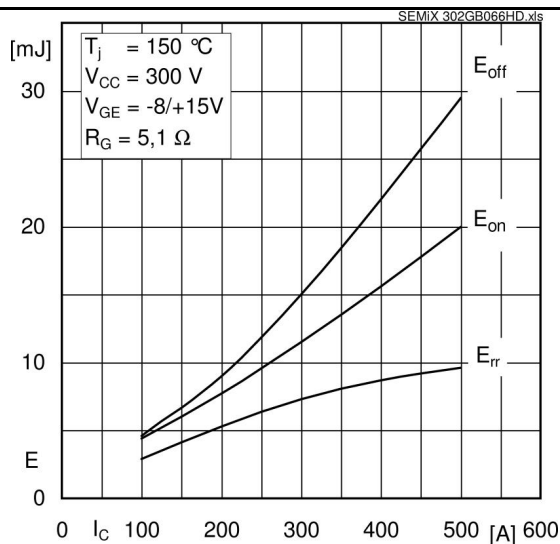


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

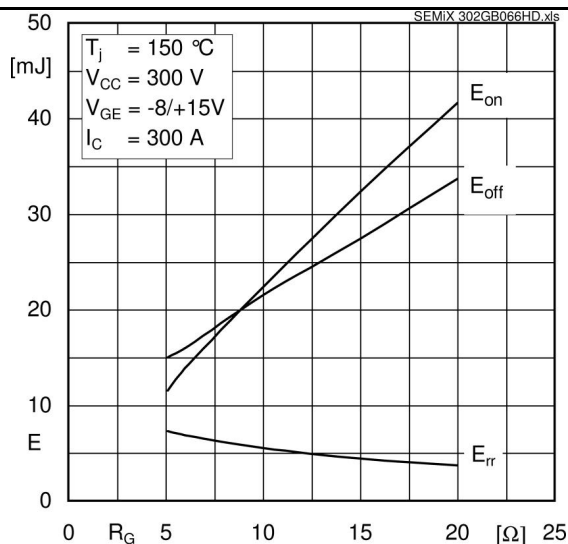


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

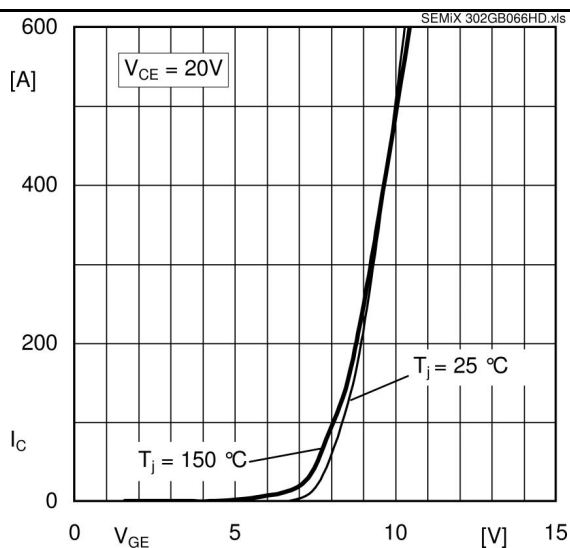


Fig. 5 Typ. transfer characteristic

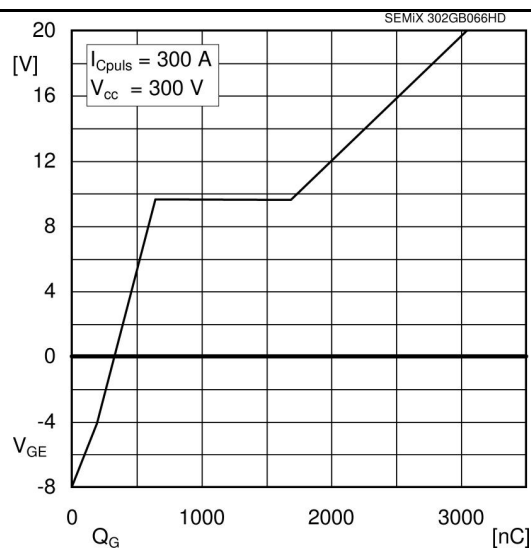
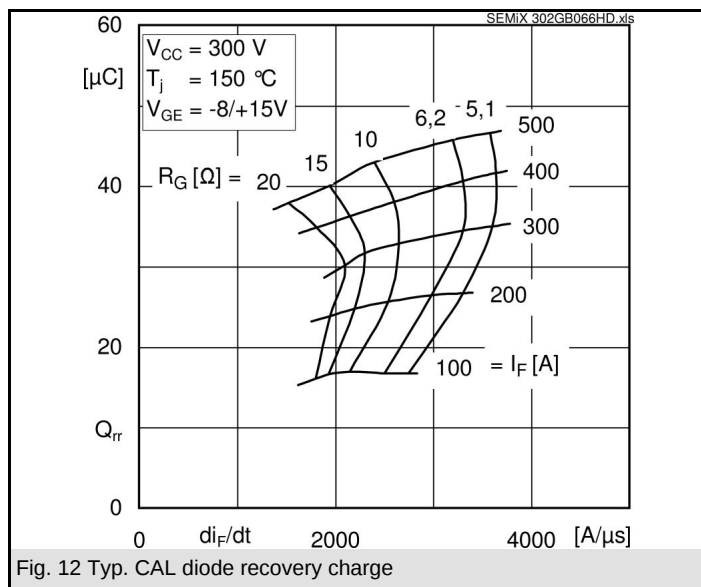
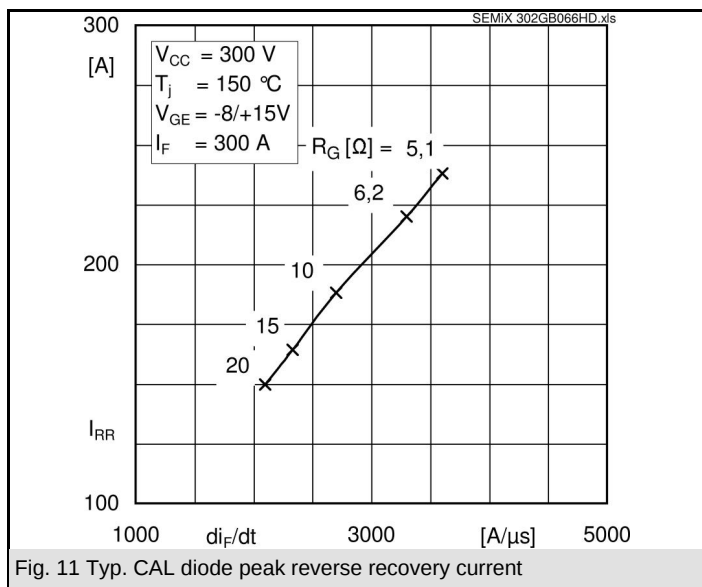
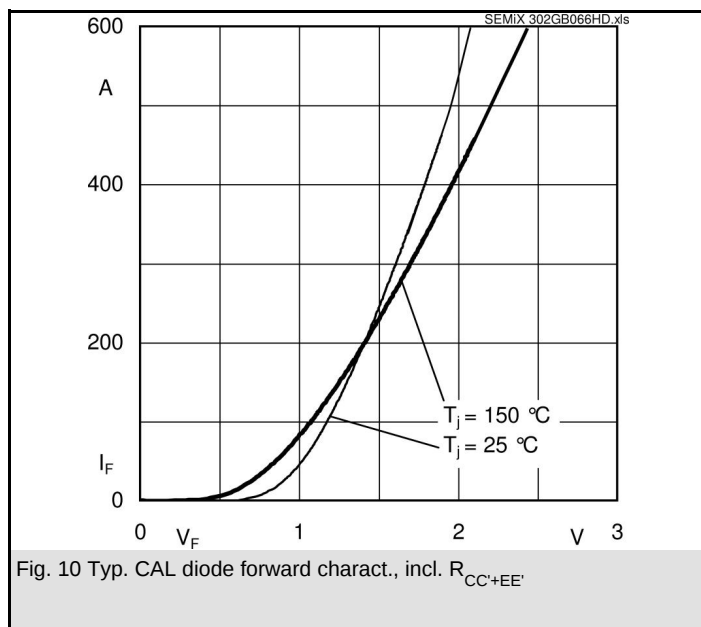
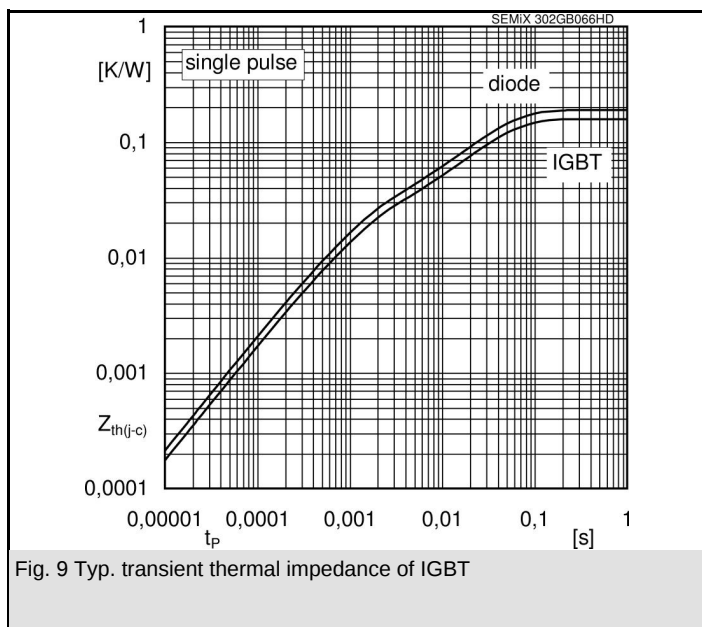
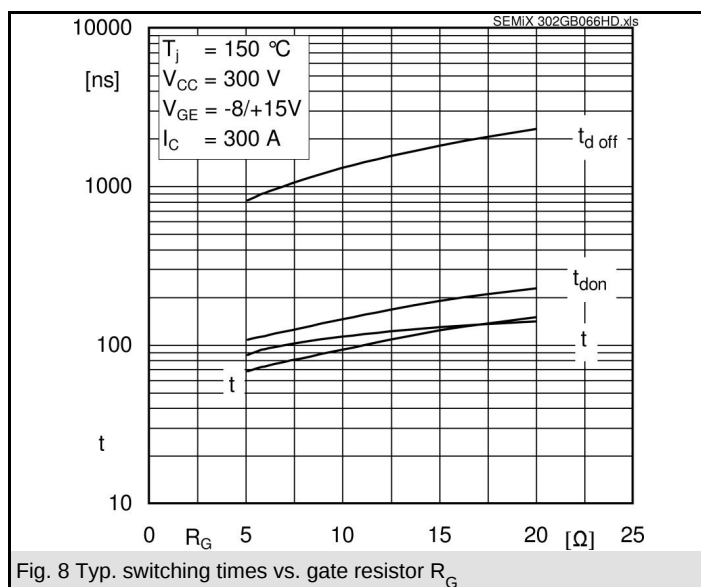
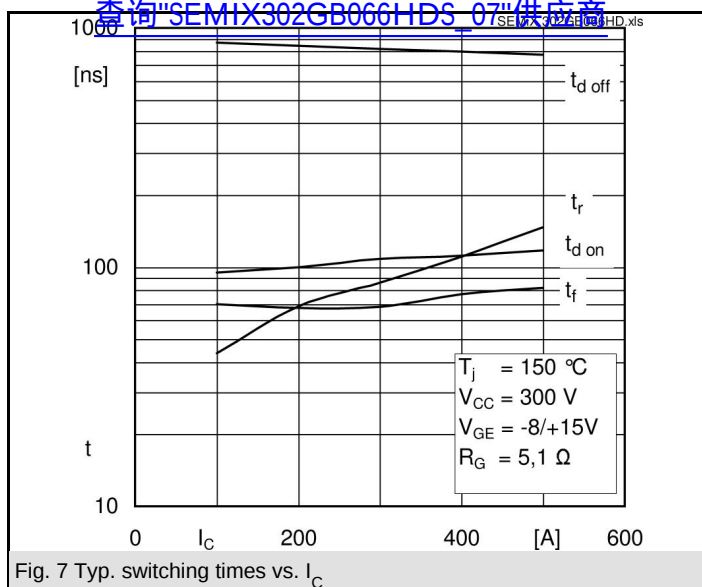


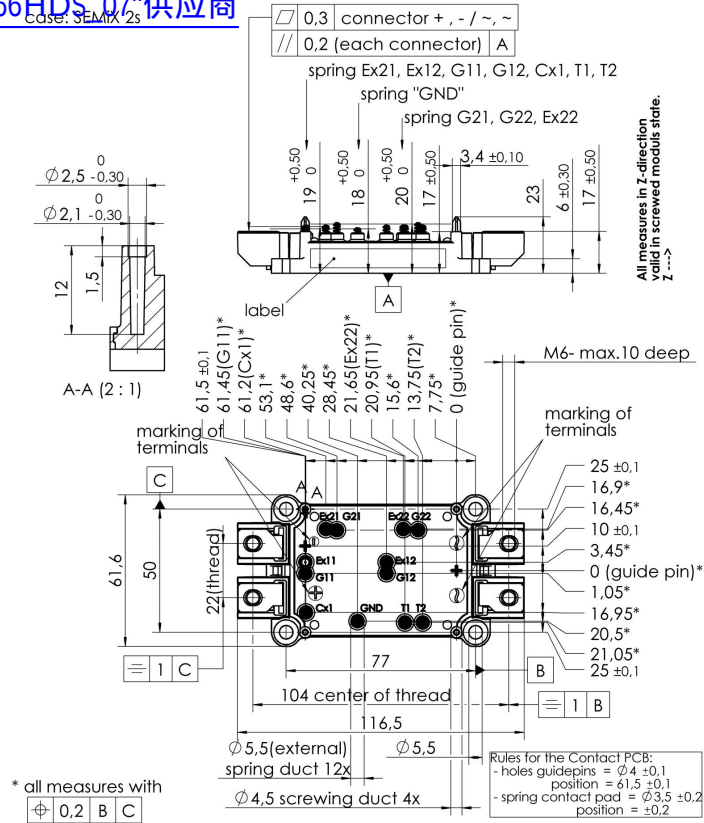
Fig. 6 Typ. gate charge characteristic

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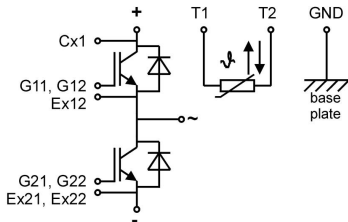


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case: SEMix 2s



Case SEMiX 2s



Pinout

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