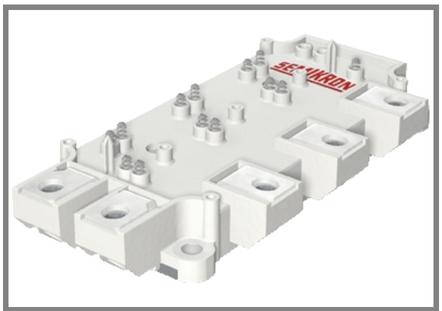
SEMiX 151GD066HDs



SEMiX®13s

Trench IGBT Modules

SEMiX 151GD066HDs

Preliminary Data

Features

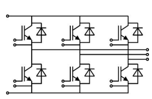
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

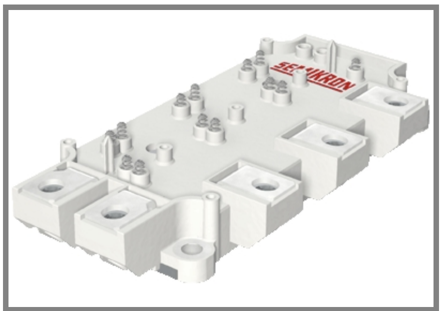
- Case temperatur limited to T_C=125°C max.
- Product reliability results are valid for T_j=150°C
- use of soft RG necessary
- take care of over-voltage caused by stray inductance



GD

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	200	A
		T_c = 80 °C	150	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		300	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 360 V; $V_{GE} \leq$ 15 V; VCES < 600 V	T_j = 150 °C	6	µs
Inverse Diode				
I_F	T_j = 175 °C	T_c = 25 °C	220	A
		T_c = 80 °C	160	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		300	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 25 °C	980	A
Module				
$I_{t(RMS)}$			600	A
T_{vj}			- 40 ... + 175 (125)	°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 = 2,4 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		3,7	6	mΩ
		T_j = 150°C		5,7	8	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 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		9,2		nF
C_{oes}				0,6		nF
C_{res}				0,28		nF
Q_G	V_{GE} = -8 ... +15V			1200		nC
$t_{d(on)}$	R_{Gon} = 4,5 Ω	V_{CC} = 300V		140		ns
t_r		I_{Cnom}= 150A		40		ns
E_{on}		T_j = 150 °C		3,8		mJ
$t_{d(off)}$	R_{Goff} = 4,5 Ω			385		ns
t_f				40		ns
E_{off}				6,1		mJ
$R_{th(j-c)}$	per IGBT				0,29	K/W



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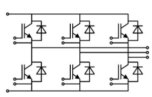


GD

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 150 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,4	1,6	V
		T_j = 150 °$C_{chiplev.}$		1,4	1,6	V
V_{F0}		T_j = 25 °C		1	1,1	V
		T_j = 150 °C		0,85	0,95	V
r_F		T_j = 25 °C		2,7	3,5	mΩ
		T_j = 150 °C		3,7	4,5	mΩ
I_{RRM}	I_{Fnom} = 150 A	T_j = 150 °C		155		A
Q_{rr}	di/dt = 3000 A/µs			24		µC
E_{rr}	V_{GE} = -8 V; V_{CC} = 300 V			5,8		mJ
$R_{th(j-c)D}$	per diode				0,36	K/W
Module						
L_{CE}				20		nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,7		mΩ
		T_{case}= 125 °C		1		mΩ
$R_{th(c-s)}$	per module			0,04		K/W
M_s	to heat sink (M5)		3		5	Nm
M_t	to terminals (M6)		2,5		5	Nm
w					350	g
Temperature sensor						
R_{100}	T_c=100°C (R_{25}=5 kΩ)			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.

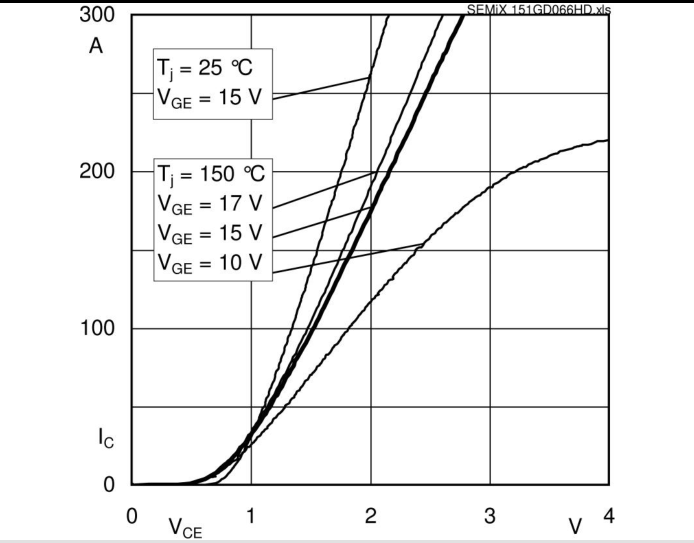


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

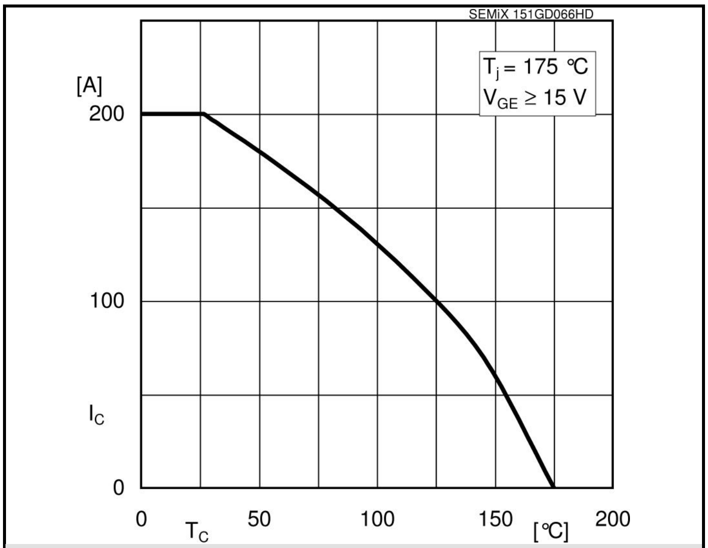


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

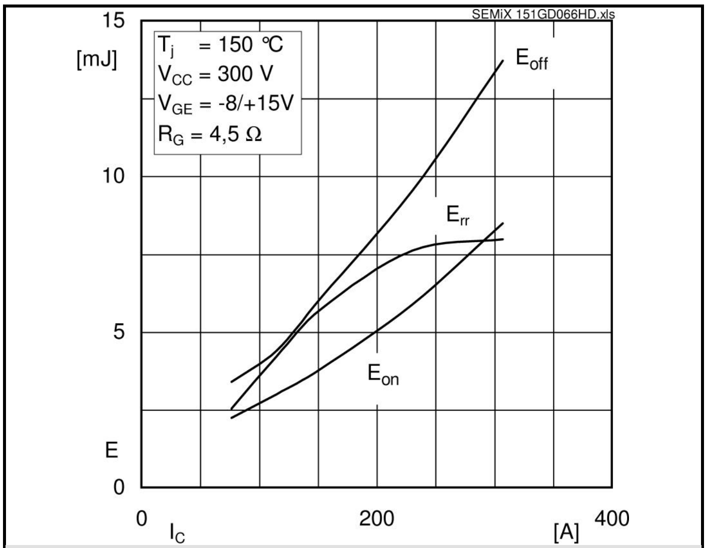


Fig. 3 Typ. turn-on /-off energy = f (I_C)

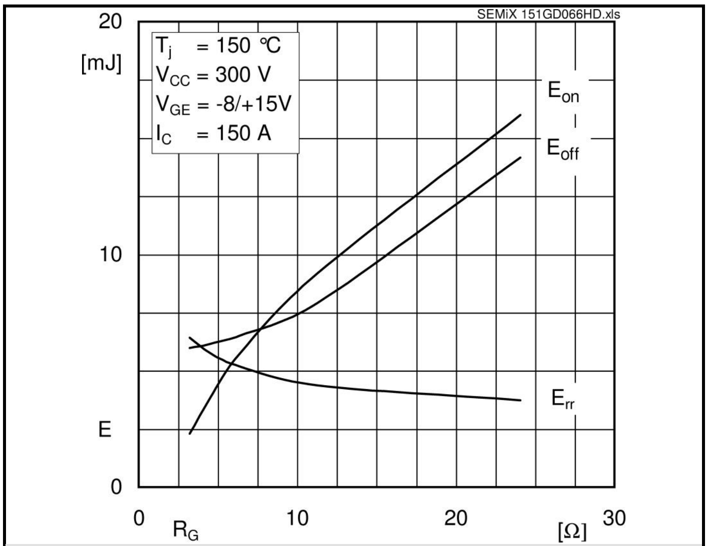


Fig. 4 Typ. turn-on /-off energy = f (R_G)

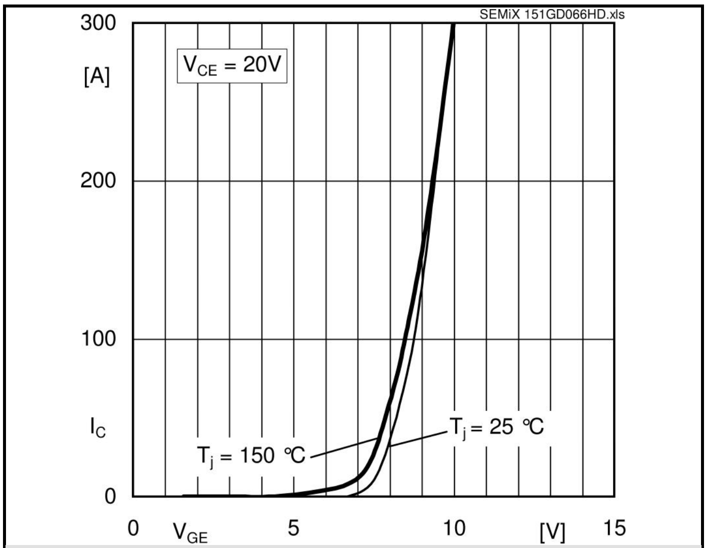


Fig. 5 Typ. transfer characteristic

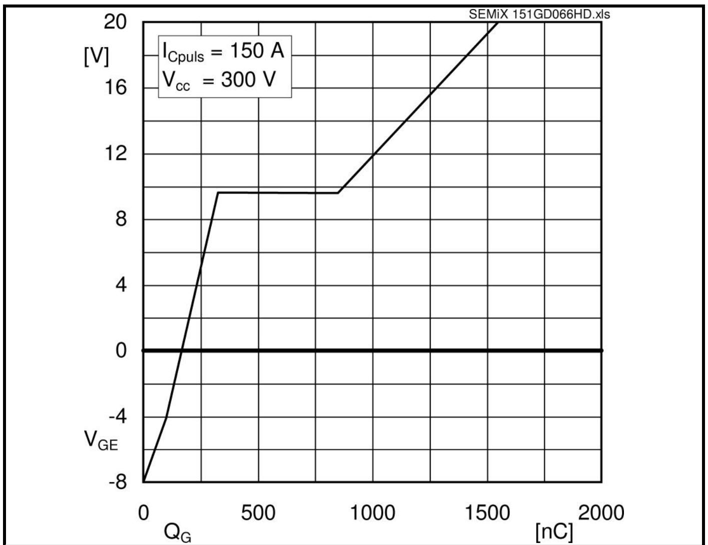


Fig. 6 Typ. gate charge characteristic

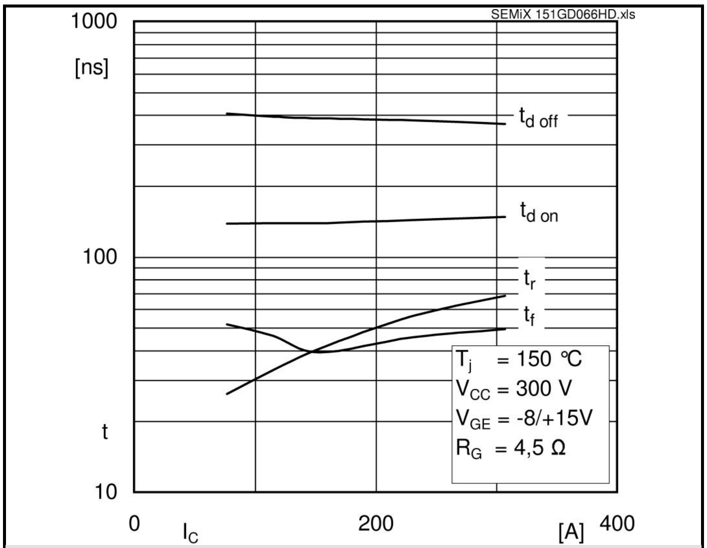


Fig. 7 Typ. switching times vs. I_C

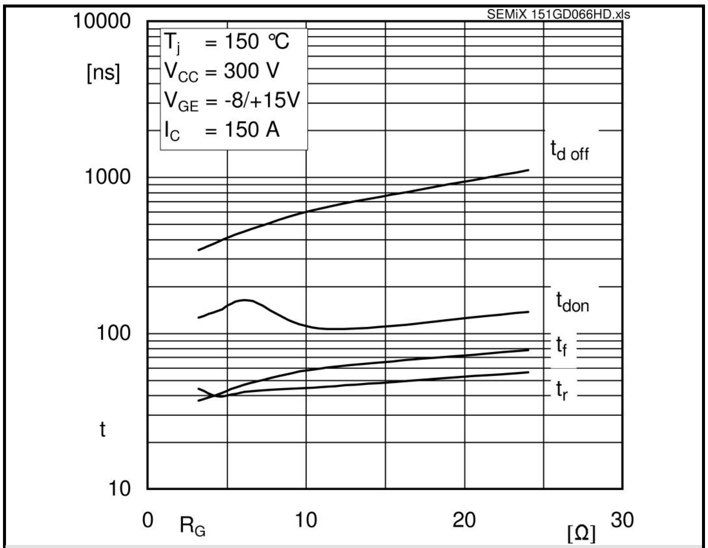


Fig. 8 Typ. switching times vs. gate resistor R_G

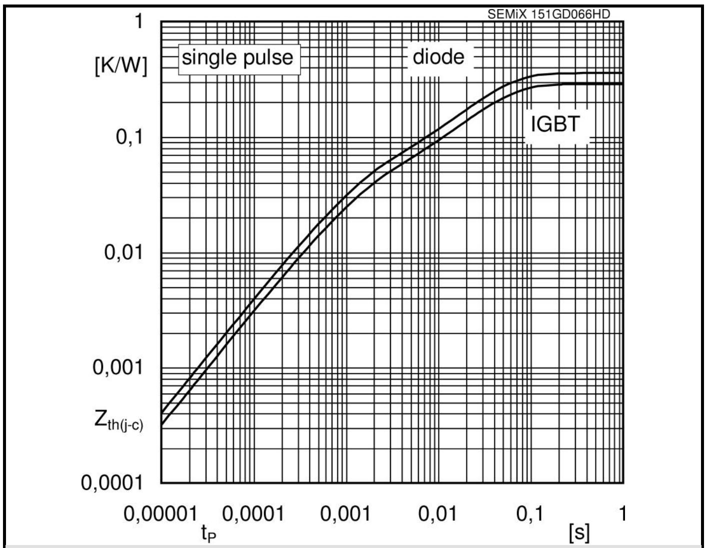


Fig. 9 Typ. transient thermal impedance

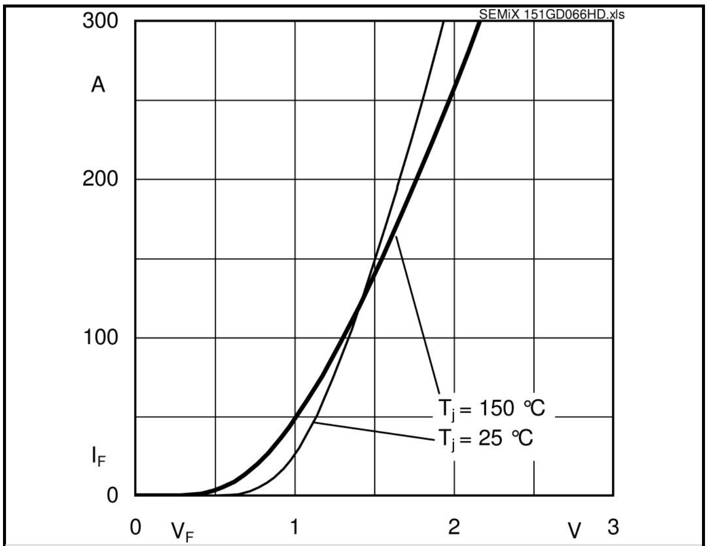


Fig. 10 Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

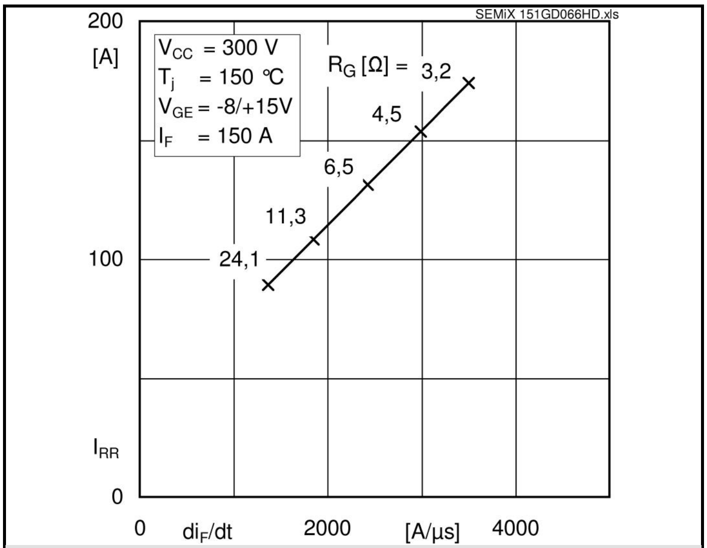


Fig. 11 Typ. CAL diode peak reverse recovery current

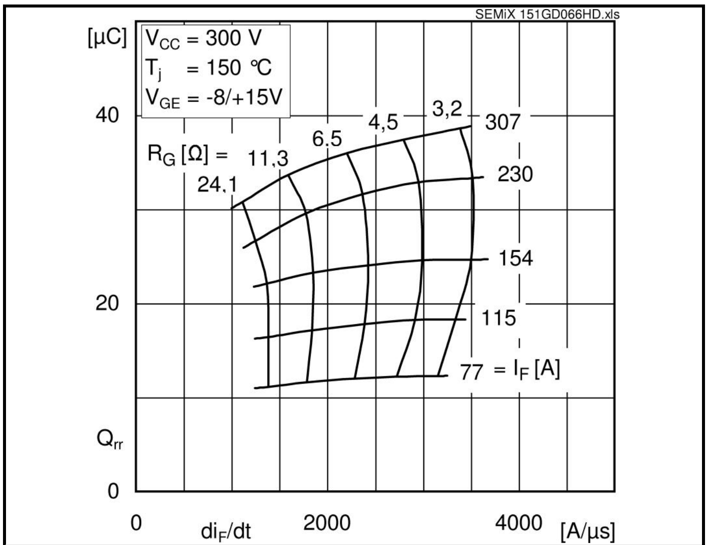
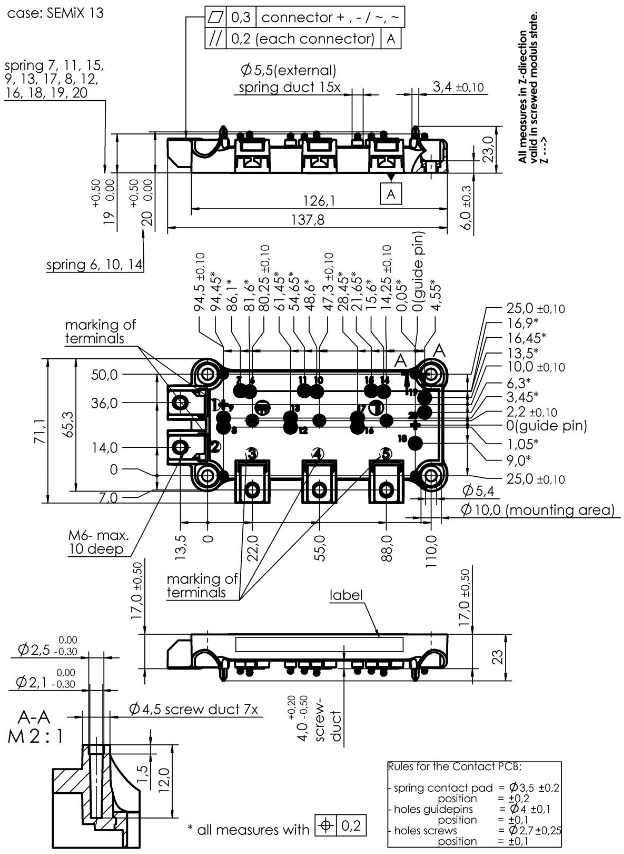
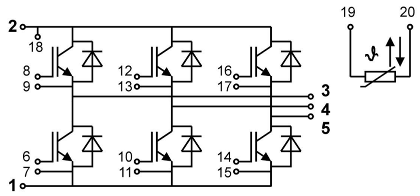


Fig. 12 Typ. CAL diode recovery charge



Case SEMiX 13s



Pinout GD

