

SEMiX151GD126HDs



Trench IGBT Modules

SEMiX151GD126HDs

Features

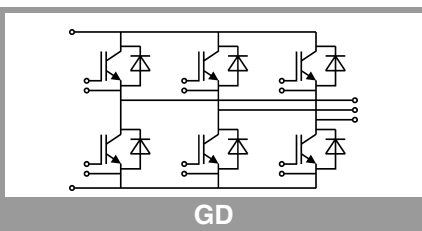
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- UL recognised file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic Welding

Remarks

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



Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _c = 25 °C	168	A
		T _c = 80 °C	119	A
I _{Cnom}			100	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		200	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 600 V V _{GE} ≤ 20 V V _{CES} ≤ 1200 V	T _j = 125 °C	10	µs
T _j			-40 ... 150	°C
Inverse diode				
I _F	T _j = 150 °C	T _c = 25 °C	152	A
		T _c = 80 °C	105	A
I _{Fnom}			100	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		200	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		700	A
T _j			-40 ... 150	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C		600	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 100 A	T _j = 25 °C		1.7	2.10	V
	V _{GE} = 15 V chipelevel	T _j = 125 °C		2.0	2.45	V
V _{CE0}	chipelevel	T _j = 25 °C		1	1.2	V
		T _j = 125 °C		0.9	1.1	V
r _{CE}	V _{GE} = 15 V chipelevel	T _j = 25 °C		7.0	9.0	mΩ
		T _j = 125 °C		11.0	13.5	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 4 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			1	mA
	V _{CE} = 1200 V	T _j = 125 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		7.2		nF
C _{oes}		f = 1 MHz		0.38		nF
C _{res}		f = 1 MHz		0.33		nF
Q _G	V _{GE} = - 8 V...+ 15 V			800		nC
R _{Gint}	T _j = 25 °C			7.50		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 125 °C		290		ns
t _r	I _C = 100 A	T _j = 125 °C		50		ns
E _{on}	V _{GE} = ±15 V	T _j = 125 °C		12		mJ
t _{d(off)}	R _{G on} = 1.7 Ω	T _j = 125 °C		605		ns
t _f	R _{G off} = 1.7 Ω	T _j = 125 °C		110		ns
E _{off}		T _j = 125 °C		14		mJ
R _{th(j-c)}	per IGBT				0.21	K/W

SEMiX151GD126HDs



SEMiX® 13

Trench IGBT Modules

SEMiX151GD126HDs

Features

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

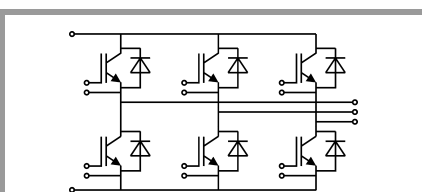
Typical Applications*

- AC inverter drives
- UPS
- Electronic Welding

Remarks

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

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 100 A	T _j = 25 °C		1.6	1.80	V
	V _{GE} = 0 V chiplevel	T _j = 125 °C		1.6	1.8	V
V _{F0}	chiplevel	T _j = 25 °C	0.9	1	1.1	V
		T _j = 125 °C	0.7	0.8	0.9	V
r _F	chiplevel	T _j = 25 °C	5.0	6.0	7.0	mΩ
		T _j = 125 °C	7.0	8.0	9.0	mΩ
I _{RRM}	I _F = 100 A	T _j = 125 °C	125			A
Q _{rr}	di/dt _{off} = 2900 A/μs	T _j = 125 °C	26			μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 125 °C	11.5			mJ
R _{th(j-c)}	per diode				0.36	K/W
Module						
L _{CE}			20			nH
R _{CC'+EE'}	res., terminal-chip	T _C = 25 °C	0.7			mΩ
		T _C = 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
						Nm
w			350			g
Temperature Sensor						
R ₁₀₀	T _c =100°C (R ₂₅ =5 kΩ)		493 ± 5%			Ω
B _{100/125}	R(Τ)=R ₁₀₀ exp[B _{100/125} (1/T-1/T ₁₀₀)]; T[K];		3550 ±2%			K



GD

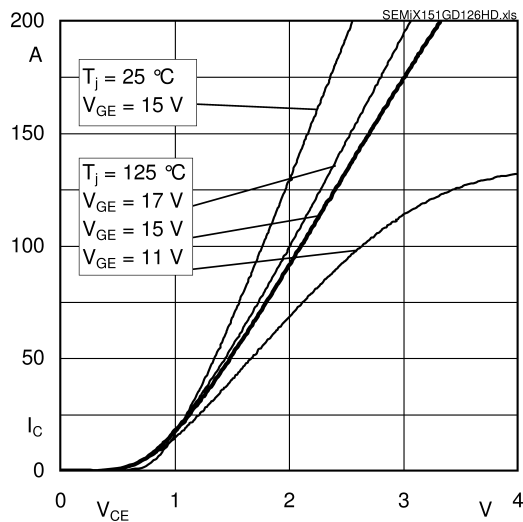


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

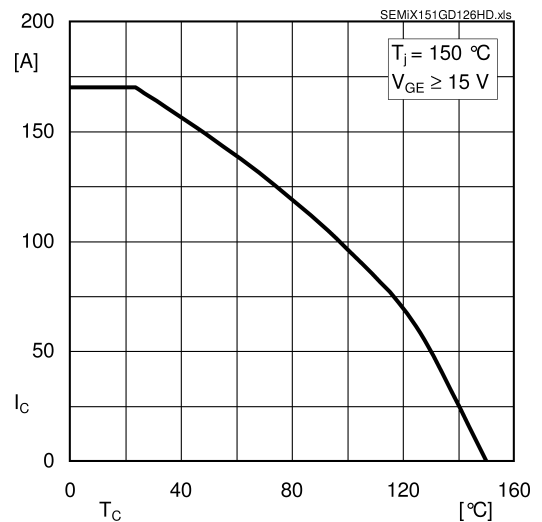


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

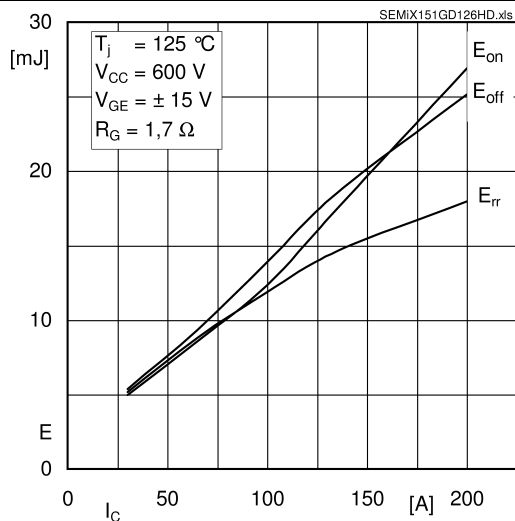


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

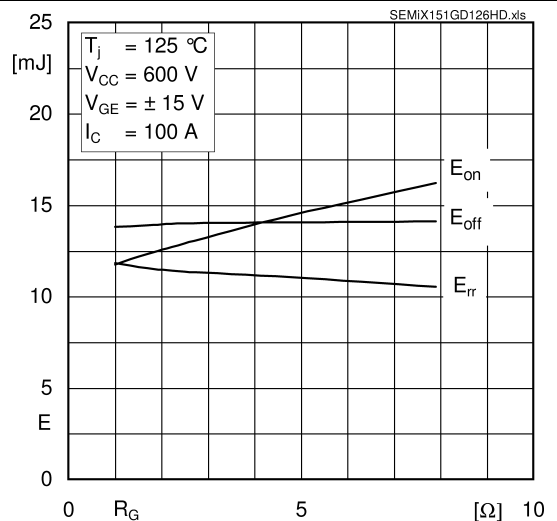


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

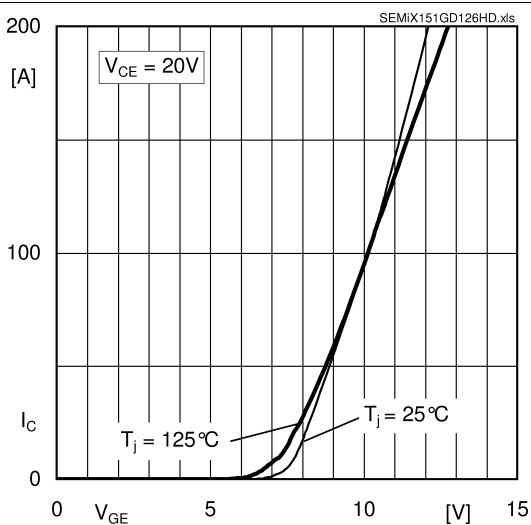


Fig. 5: Typ. transfer characteristic

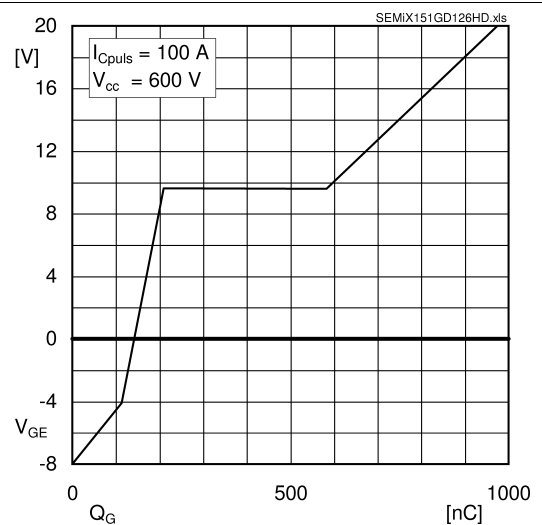


Fig. 6: Typ. gate charge characteristic

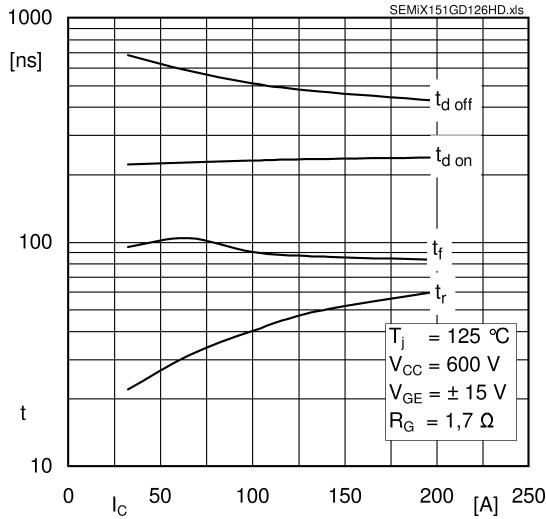


Fig. 7: Typ. switching times vs. I_C

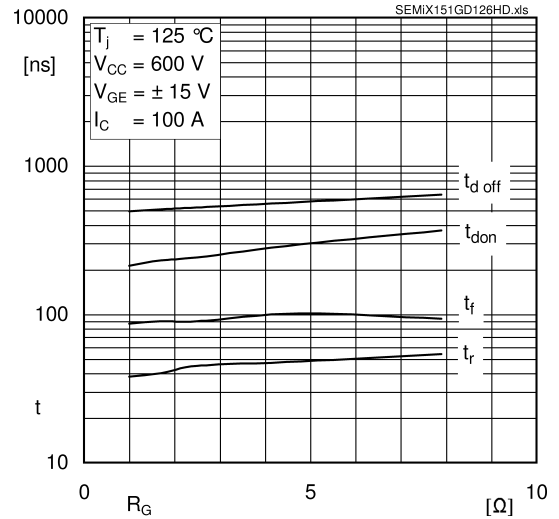


Fig. 8: Typ. switching times vs. gate resistor R_G

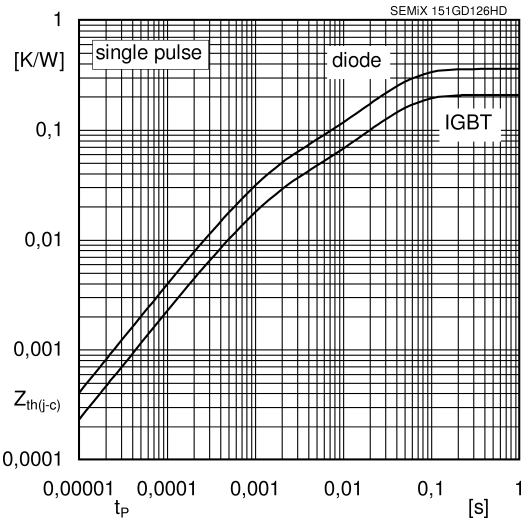


Fig. 9: Typ. transient thermal impedance

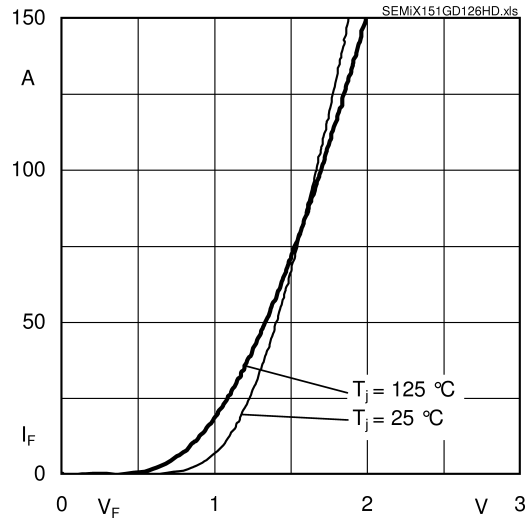


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'} + EE'$

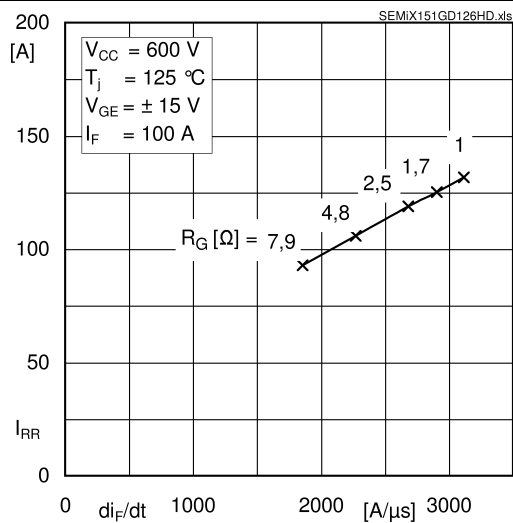


Fig. 11: Typ. CAL diode peak reverse recovery current

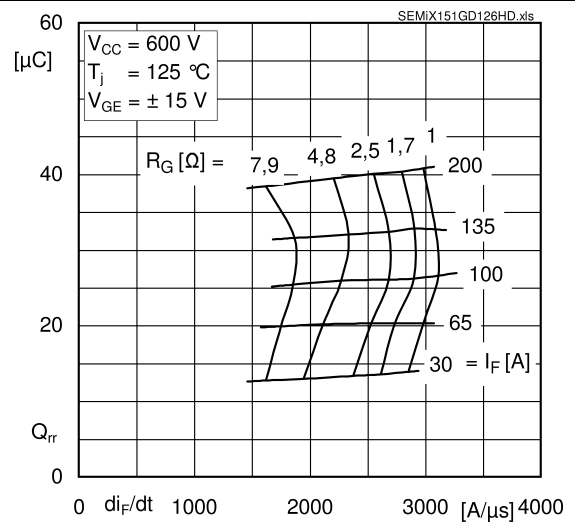


Fig. 12: Typ. CAL diode recovery charge



* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.