

SEMiX603GAL066HDs



SEMiX® 3s

Trench IGBT Modules

SEMiX603GAL066HDs

Features

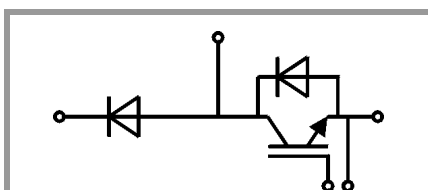
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- UL recognised file no. E63532

Typical Applications*

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_J=150^\circ\text{C}$
- For short circuit: Soft R_{Goff} recommended
- Take care of over-voltage caused by stray inductance



GAL

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _J = 25 °C		600	V
I _C	T _J = 175 °C	T _c = 25 °C	720	A
		T _c = 80 °C	541	A
I _{Cnom}			600	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		1200	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 360 V V _{GE} ≤ 15 V V _{CES} ≤ 600 V	T _J = 150 °C	6	μs
T _J			-40 ... 175	°C
Inverse diode				
I _F	T _J = 175 °C	T _c = 25 °C	771	A
		T _c = 80 °C	562	A
I _{Fnom}			600	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		1200	A
I _{FSM}	t _p = 10 ms, sin 180°, T _J = 25 °C		1800	A
T _J			-40 ... 175	°C
Freewheeling diode				
I _F	T _J = 175 °C	T _c = 25 °C	795	A
		T _c = 80 °C	577	A
I _{Fnom}			600	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		1200	A
I _{FSM}	t _p = 10 ms, sin 180°, T _J = 25 °C		1800	A
T _J			-40 ... 175	°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 = 600 A	T _j = 25 °C		1.45	1.85	V
	V _{GE} = 15 V chipllevel	T _j = 150 °C		1.7	2.1	V
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		0.9	1.4	mΩ
		T _j = 150 °C		1.4	2.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 9.6 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C		0.15	0.45	mA
	V _{CE} = 600 V	T _j = 150 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		37.0		nF
C _{oes}		f = 1 MHz		2.31		nF
C _{res}		f = 1 MHz		1.10		nF
Q _G	V _{GE} = - 8 V...+ 15 V			4800		nC
R _{Gint}	T _j = 25 °C			0.67		Ω



SEMiX® 3s

Trench IGBT Modules

SEMiX603GAL066HDs

Features

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

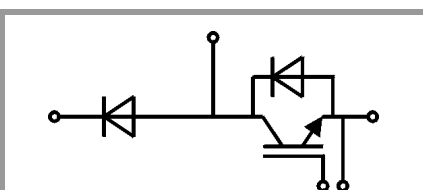
Typical Applications*

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_J=150^\circ\text{C}$
- For short circuit: Soft R_{Goff} recommended
- Take care of over-voltage caused by stray inductance

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
t _{d(on)}	V _{CC} = 300 V	T _j = 150 °C		150		ns
t _r	I _C = 600 A	T _j = 150 °C		145		ns
E _{on}	V _{GE} = ±15 V	T _j = 150 °C		12		mJ
t _{d(off)}	R _{G on} = 3 Ω	T _j = 150 °C		1050		ns
t _f	R _{G off} = 3 Ω	T _j = 150 °C		105		ns
E _{off}		T _j = 150 °C		43		mJ
R _{th(j-c)}	per IGBT				0.087	K/W
Inverse diode						
V _F = V _{EC}	I _F = 600 A	T _j = 25 °C		1.4	1.60	V
	V _{GE} = 0 V	T _j = 150 °C		1.4	1.6	V
	chip					
V _{F0}		T _j = 25 °C	0.9	1	1.1	V
		T _j = 150 °C	0.75	0.85	0.95	V
r _F		T _j = 25 °C	0.5	0.7	0.8	mΩ
		T _j = 150 °C	0.8	0.9	1.1	mΩ
I _{RRM}	I _F = 600 A	T _j = 150 °C		350		A
Q _{rr}	di/dt _{off} = 3800 A/μs	T _j = 150 °C		63		μC
E _{rr}	V _{GE} = -8 V	T _j = 150 °C		13		mJ
	V _{CC} = 300 V					
R _{th(j-c)}	per diode				0.11	K/W
Freewheeling diode						
V _F = V _{EC}	I _F = 600 A	T _j = 25 °C		1.3	1.53	V
	V _{GE} = 0 V	T _j = 150 °C		1.3	1.5	V
	chip					
V _{F0}		T _j = 25 °C	0.9	1	1.1	V
		T _j = 150 °C	0.75	0.85	0.95	V
r _F		T _j = 25 °C	0.4	0.6	0.7	mΩ
		T _j = 150 °C	0.7	0.8	0.9	mΩ
I _{RRM}	I _F = 600 A	T _j = 150 °C		350		A
Q _{rr}	di/dt _{off} = 3800 A/μs	T _j = 150 °C		63		μC
E _{rr}	V _{GE} = -8 V	T _j = 150 °C		13		mJ
	V _{CC} = 300 V					
R _{th(j-c)}	per diode				0.11	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					300	g
Temperatur Sensor						
R ₁₀₀	T _C =100°C (R ₂₅ =5 kΩ)			493 ± 5%		Ω
B _{100/125}	R(T)=R ₁₀₀ exp[B _{100/125} (1/T-1/T ₁₀₀)]; T[K];			3550 ±2%		K



GAL

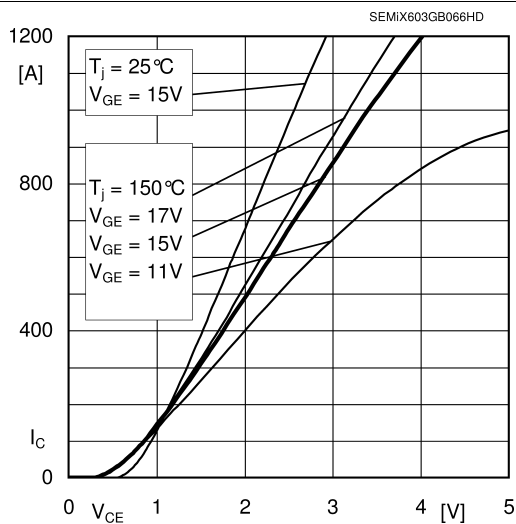


Fig. 1: Typ. output characteristic, inclusive $R_{CC'} + E_{E'}$

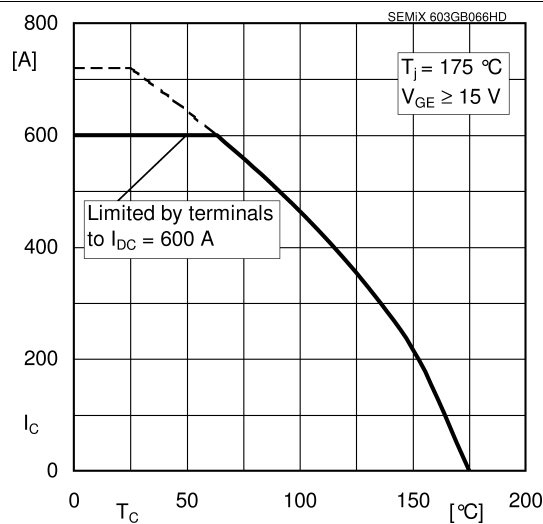


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

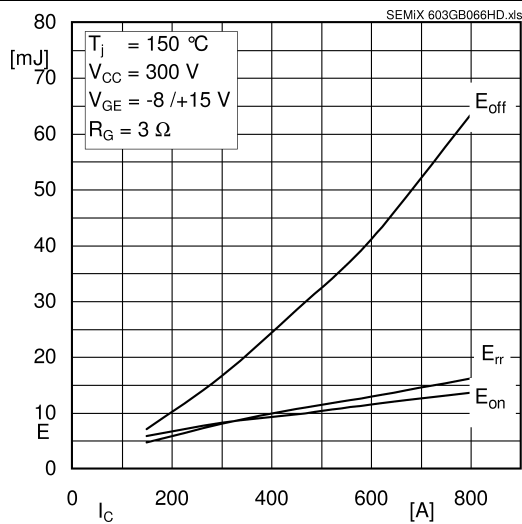


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

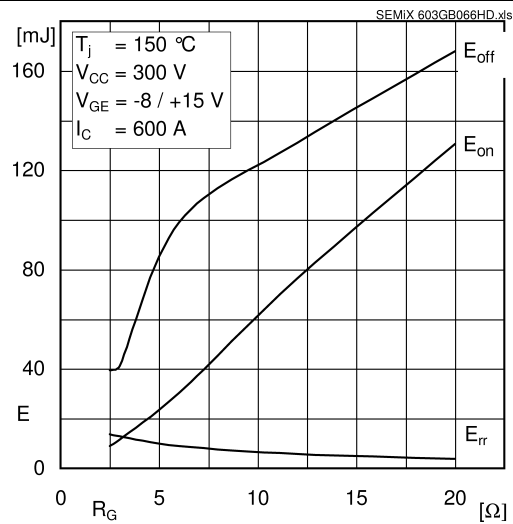


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

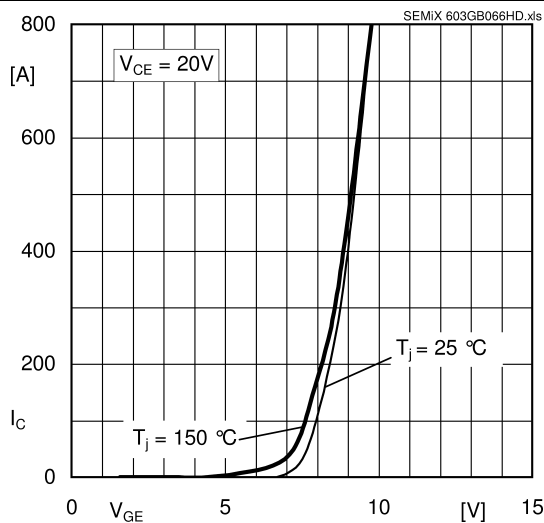


Fig. 5: Typ. transfer characteristic

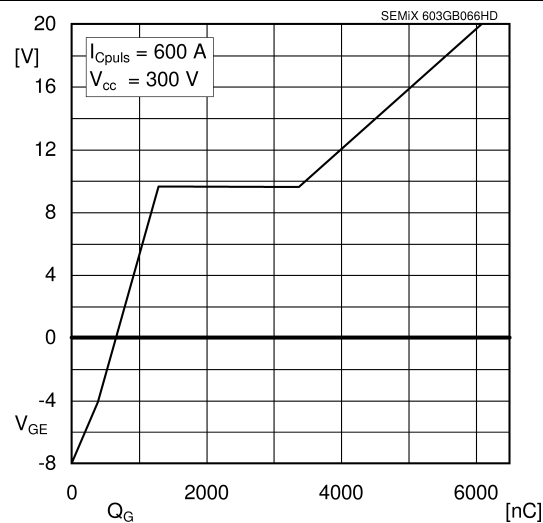
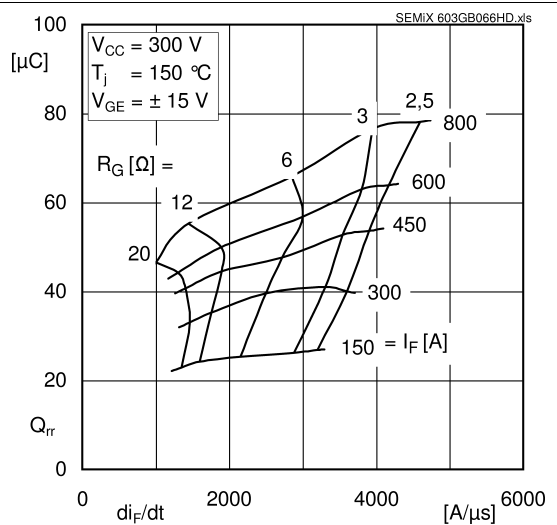
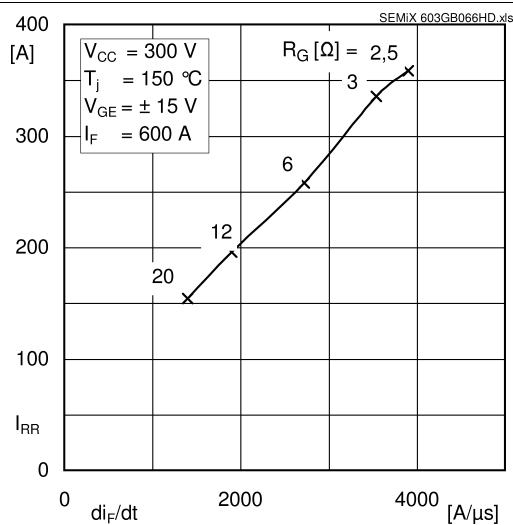
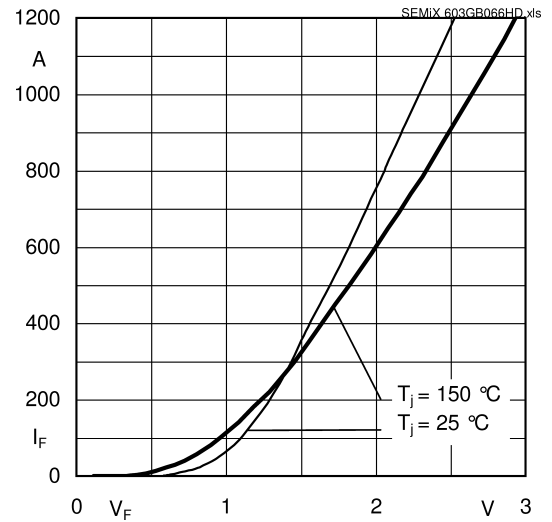
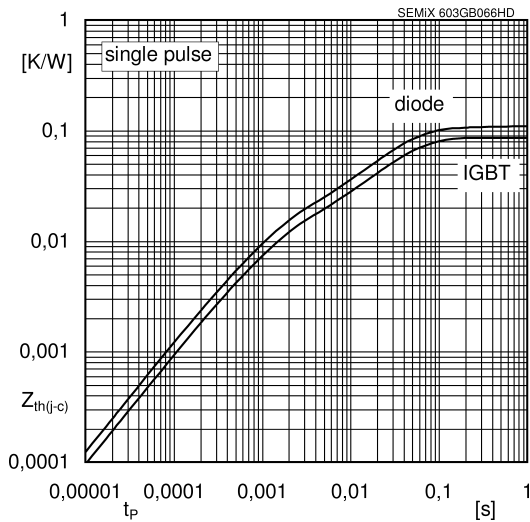
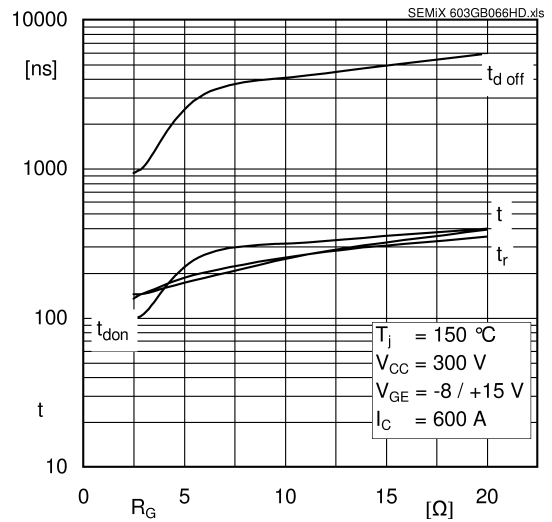
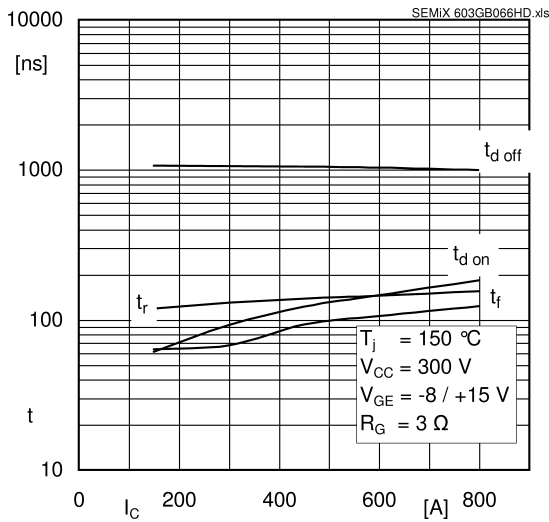
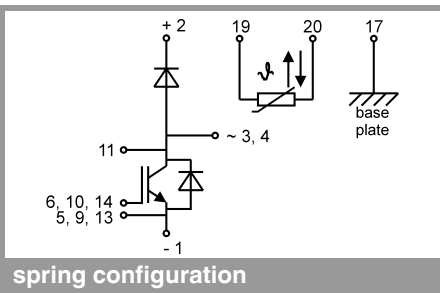


Fig. 6: Typ. gate charge characteristic





5