



SEMITRANS® 3

Trench IGBT Modules

SKM200GBD126D

Preliminary Data

Features

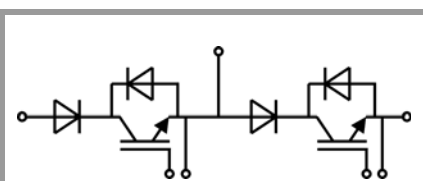
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$
- UL recognized, file no. E63532

Typical Applications*

- Current source inverter

Remarks

- The Fig.1 to Fig.9 are based on measurements of the SKM200GB126D
- The series diodes (FWD) have the data of the inverse diodes of the SKM300GB126D



GBD

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	264	A
		T _c = 80 °C	186	A
I _{Cnom}			150	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		300	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 900 V V _{GE} ≤ 15 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	34	A
		T _c = 80 °C	23	A
I _{Fnom}			30	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		60	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		414	A
T _j			-40 ... 150	°C
Freewheeling diode				
I _F	T _j = 150 °C	T _c = 25 °C	250	A
		T _c = 80 °C	169	A
I _{Fnom}			200	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		400	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		1656	A
T _j			-40 ... 150	°C
Module				
I _{t(RMS)}			500	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50 Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 150 A	T _j = 25 °C		1.71	2.10	V
	V _{GE} = 15 V chiplevel	T _j = 125 °C		2.00	2.45	V
V _{CE0}	chiplevel	T _j = 25 °C		1	1.2	V
		T _j = 125 °C		0.9	1.1	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		4.7	6.0	mΩ
		T _j = 125 °C		7.3	9.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 6 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			2.0	mA
	V _{CE} = 1200 V	T _j = 125 °C				mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		10.7		nF
C _{oes}		f = 1 MHz		0.56		nF
C _{res}		f = 1 MHz		0.48		nF
Q _G	V _{GE} = - 8 V...+ 20 V			1530		nC
R _{Gint}	T _j = 25 °C			5.0		Ω



SEMITRANS® 3

Trench IGBT Modules

SKM200GBD126D

Preliminary Data

Features

- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$
- UL recognized, file no. E63532

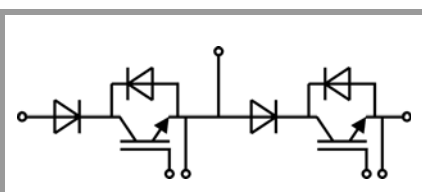
Typical Applications*

- Current source inverter

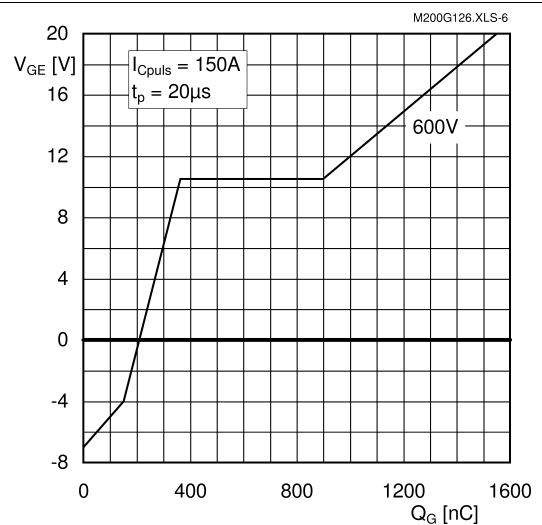
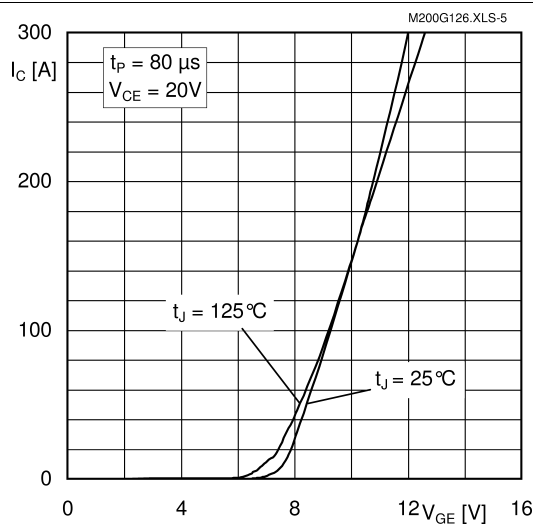
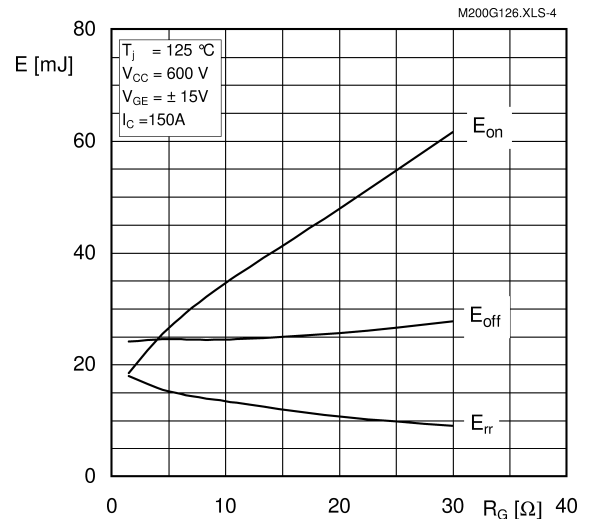
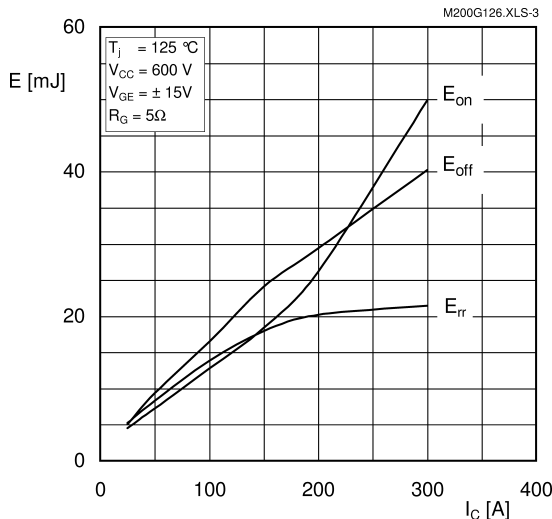
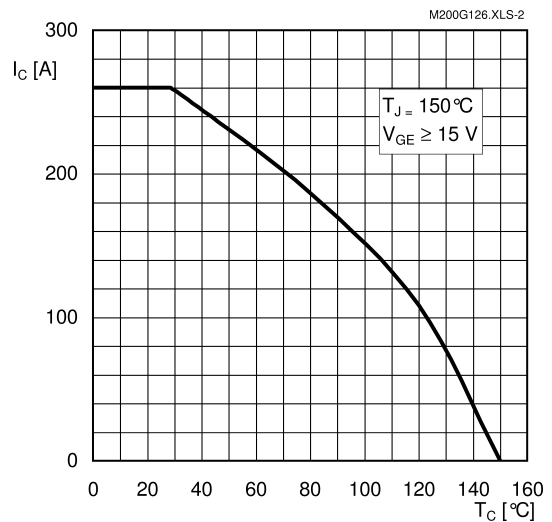
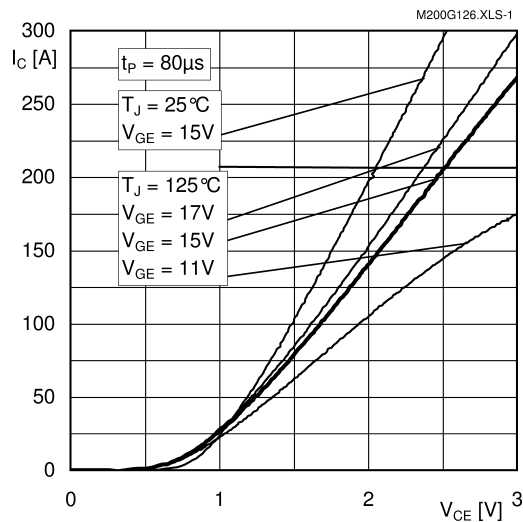
Remarks

- The Fig.1 to Fig.9 are based on measurements of the SKM200GB126D
- The series diodes (FWD) have the data of the inverse diodes of the SKM300GB126D

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
t _{d(on)}	V _{CC} = 600 V	T _j = 125 °C		260		ns
t _r	I _C = 150 A	T _j = 125 °C		40		ns
E _{on}	V _{GE} = +15/-15 V	T _j = 125 °C		18		mJ
t _{d(off)}	R _{G on} = 1.5 Ω	T _j = 125 °C		540		ns
t _f	R _{G off} = 1.5 Ω	T _j = 125 °C		110		ns
E _{off}		T _j = 125 °C		24		mJ
R _{th(j-c)}	per IGBT				0.13	K/W
Inverse diode						
V _F = V _{EC}	I _F = 30 A	T _j = 25 °C		2.00	2.50	V
	V _{GE} = 0 V	T _j = 125 °C		1.80	2.30	V
	chiplevel					
V _{F0}	chiplevel	T _j = 25 °C		1.1	1.45	V
		T _j = 125 °C		0.85	1.2	V
r _F	chiplevel	T _j = 25 °C		30	35	mΩ
		T _j = 125 °C		32	37	mΩ
I _{RRM}	I _F = 15 A	T _j = 125 °C		12		A
Q _{rr}	di/dt _{off} = 150 A/μs	T _j = 125 °C		1		μC
E _{rr}	V _{GE} = -15 V	T _j = 125 °C				mJ
	V _{CC} = 600 V					
R _{th(j-c)}	per diode				1.5	K/W
Freewheeling diode						
V _F = V _{EC}	I _F = 200 A	T _j = 25 °C		1.60	1.80	V
	V _{GE} = 0 V	T _j = 125 °C		1.60	1.80	V
	chiplevel					
V _{F0}	chiplevel	T _j = 25 °C		1	1.1	V
		T _j = 125 °C		0.8	0.9	V
r _F	chiplevel	T _j = 25 °C		3.0	3.5	mΩ
		T _j = 125 °C		4.0	4.5	mΩ
I _{RRM}	I _F = 200 A	T _j = 125 °C		290		A
Q _{rr}	di/dt _{off} = 6200 A/μs	T _j = 125 °C		44		μC
E _{rr}	V _{GE} = ±15 V	T _j = 125 °C		18		mJ
	V _{CC} = 600 V					
R _{th(j-c)}	per Diode				0.25	K/W
Module						
L _{CE}				15		nH
R _{CC'+EE'}	terminal-chip	T _C = 25 °C		0.35		mΩ
		T _C = 125 °C		0.5		mΩ
R _{th(c-s)}	per module			0.02	0.038	K/W
M _s	to heat sink M6		3		5	Nm
M _t		to terminals M6	2.5		5	Nm
						Nm
w					325	g



GBD



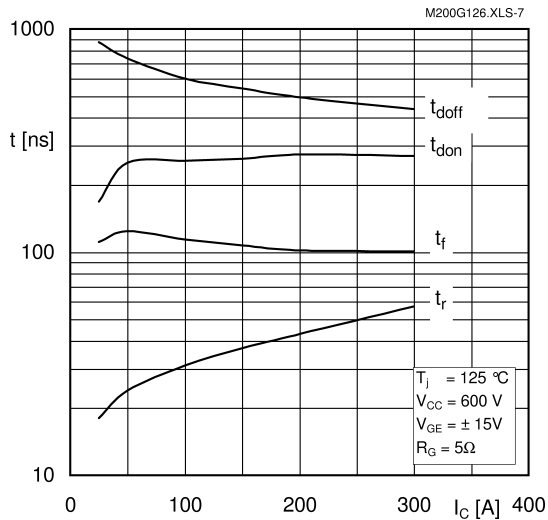


Fig. 7: Typ. switching times vs. I_C

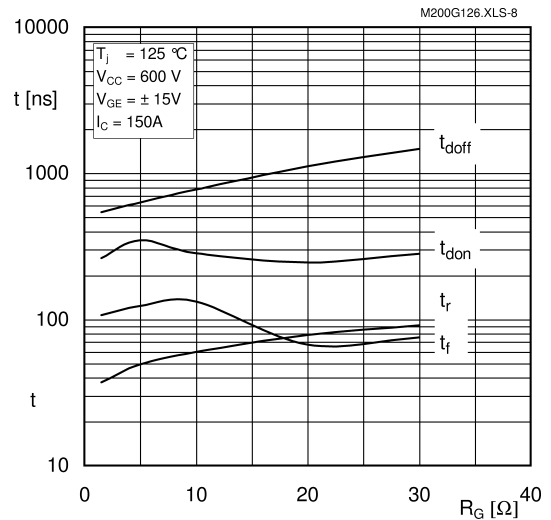


Fig. 8: Typ. switching times vs. gate resistor R_G

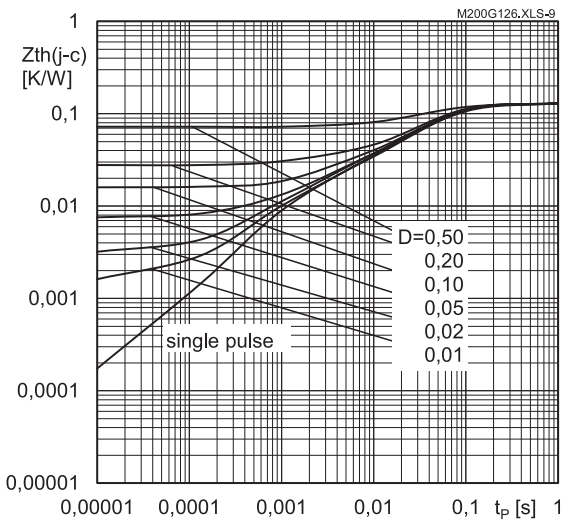


Fig. 9: Transient thermal impedance of IGBT
 $Z_{th(j-c)} = f(t_p)$; $D = t_p/t_c = t_p * f$

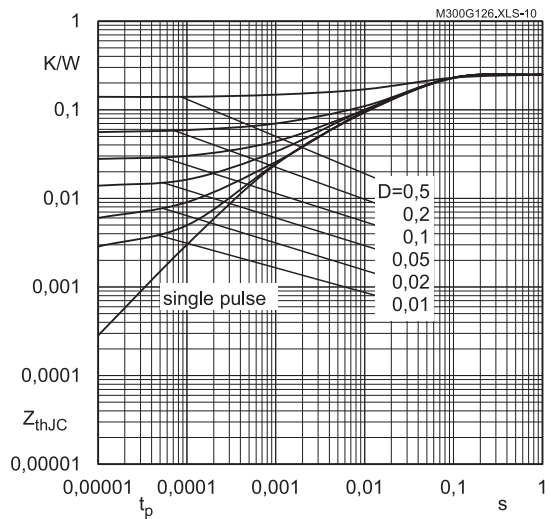


Fig. 10: Transient thermal impedance of FWD
 $Z_{th(j-c)} = f(t_p)$; $D = t_p/t_c = t_p * f$

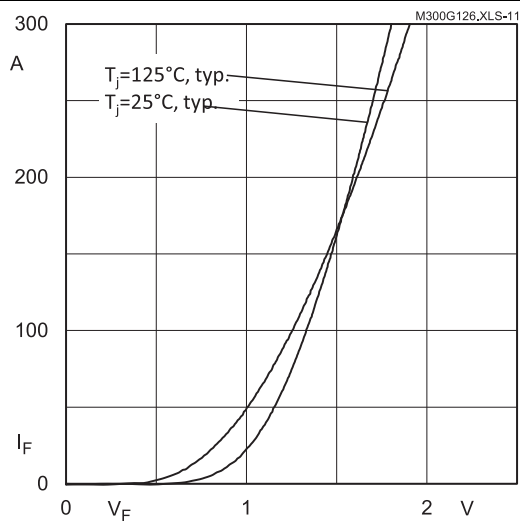


Fig. 11: CAL diode forward characteristic

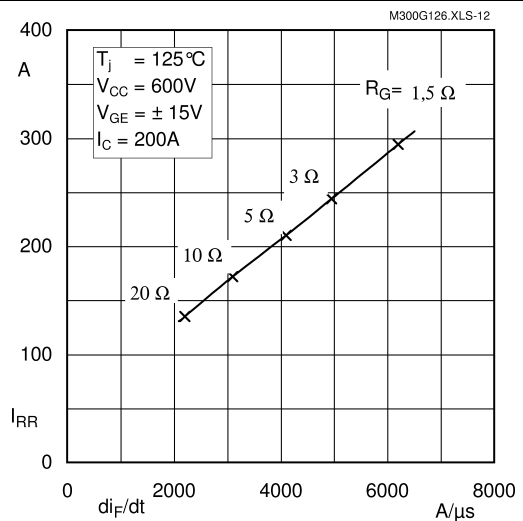
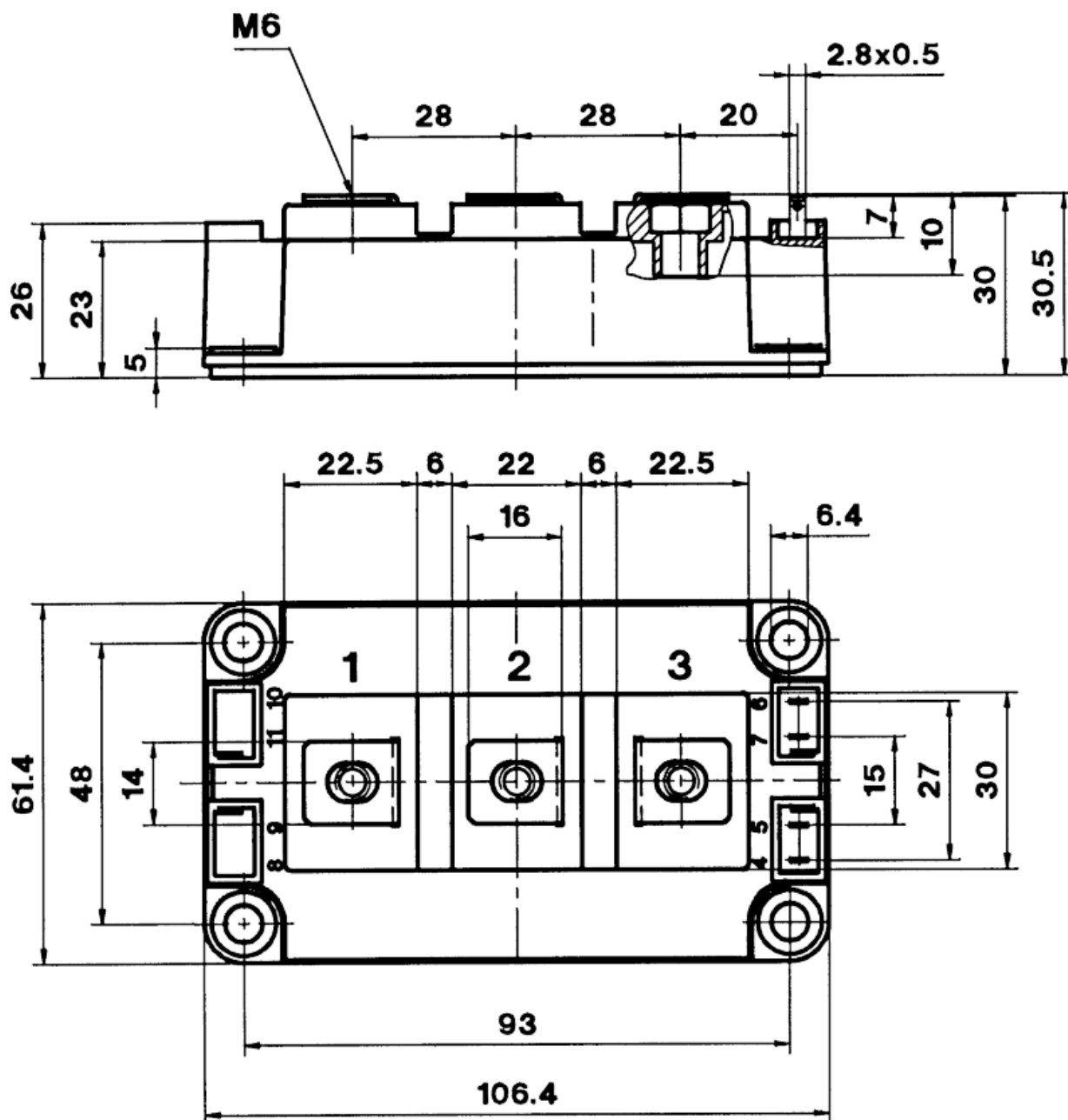
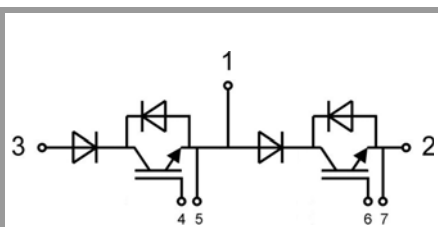


Fig. 12: Typ. CAL diode peak reverse recovery current



SEMITRANS 3



GBD

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

* 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.