



SEMITRANS® 3

Trench IGBT Modules

SKM300GB066D

Features*

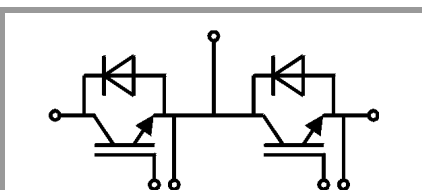
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Remarks

- Case temperature limited to $T_c = 125^\circ\text{C}$ max, recommended $T_{op} = -40 \dots +150^\circ\text{C}$
- Product reliability results are valid for $T_j \leq 150^\circ\text{C}$
- Short circuit data: $t_p \leq 6\mu\text{s}$; $V_{GE} \leq 15\text{V}$; $T_j = 150^\circ\text{C}$; $V_{CC} \leq 360\text{V}$, use of soft R_G necessary!
- Take care of over-voltage caused by stray inductances



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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	390	A
		T _c = 80 °C	300	A
I _{Cnom}			300	A
I _{CRM}			600	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	350	A
		T _c = 80 °C	250	A
I _{FRM}			600	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		1760	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}			500	A
T _{stg}	module without TIM		-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 = 300 A V _{GE} = 15 V chipevel	T _j = 25 °C		1.44	1.85	V
		T _j = 150 °C		1.66	2.04	V
V _{CE0}	chipevel	T _j = 25 °C		0.90	1.00	V
		T _j = 150 °C		0.85	0.90	V
r _{CE}	V _{GE} = 15 V chipevel	T _j = 25 °C		1.8	3	mΩ
		T _j = 150 °C		2.7	3.8	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 4.8 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V V _{CE} = 600 V	T _j = 25 °C		0.15	0.45	mA
		T _j = 150 °C		-		mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		18.5		nF
C _{oes}		f = 1 MHz		1.15		nF
C _{res}		f = 1 MHz		0.55		nF
Q _G	V _{GE} = - 8 V...+ 15 V			2400		nC
R _{Gint}	T _j = 25 °C			1.0		Ω
t _{d(on)}	V _{CC} = 300 V	T _j = 150 °C		150		ns
t _r	I _C = 300 A			48		ns
E _{on}	V _{GE} = +15/-8 V			7.5		mJ
t _{d(off)}	R _{G on} = 2.4 Ω			540		ns
t _f	R _{G off} = 2.4 Ω			53		ns
E _{off}	di/dt _{on} = 7100 A/μs di/dt _{off} = 5200 A/μs		T _j = 150 °C		11.5	
R _{th(j-c)}	per IGBT				0.15	K/W



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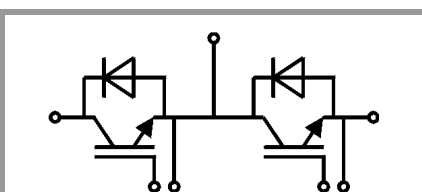
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 300 A	T _j = 25 °C		1.40	1.6	V
	V _{GE} = 0 V	T _j = 150 °C		-	-	V
	chiplevel					
V _{F0}	chiplevel	T _j = 25 °C		0.95	1	V
		T _j = 150 °C		-	-	V
r _F	chiplevel	T _j = 25 °C		1.5	2	mΩ
		T _j = 150 °C		-	-	mΩ
I _{RRM}	I _F = 300 A	T _j = 150 °C		340		A
Q _{rr}	di/dt _{off} = 7000 A/μs	T _j = 150 °C		47		μC
	V _{GE} = -8 V					
E _{rr}	V _{CC} = 300 V	T _j = 150 °C		10.5		mJ
R _{th(j-c)}	per diode				0.25	K/W
Module						
L _{CE}				15	20	nH
R _{CC'+EE'}	measured per	T _C = 25 °C		0.35		mΩ
	switch	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



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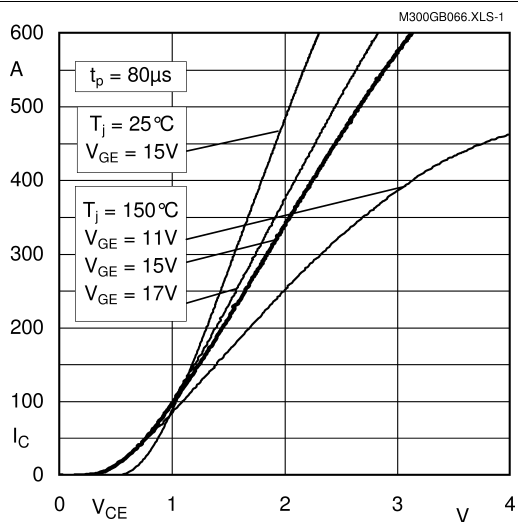


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

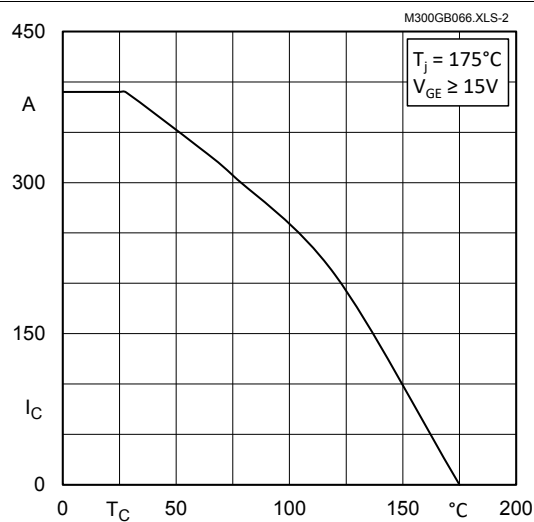


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

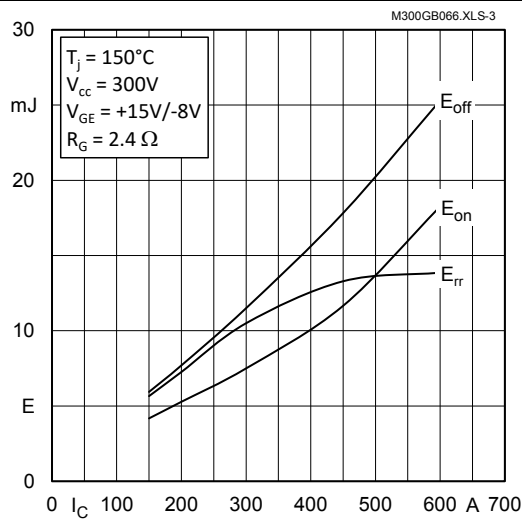


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

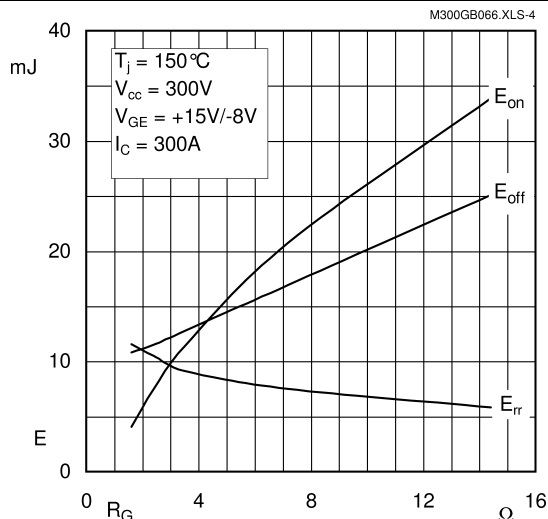


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

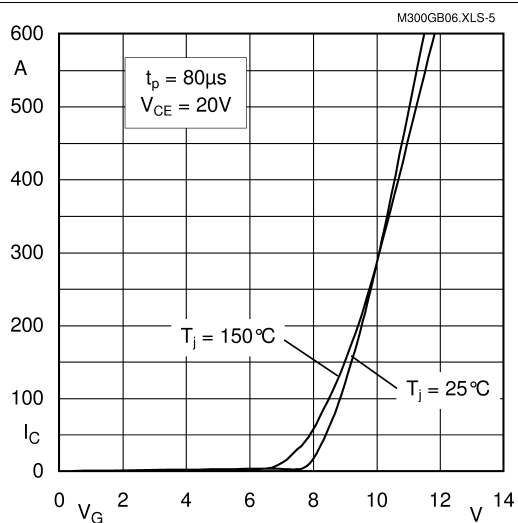


Fig. 5: Typ. transfer characteristic

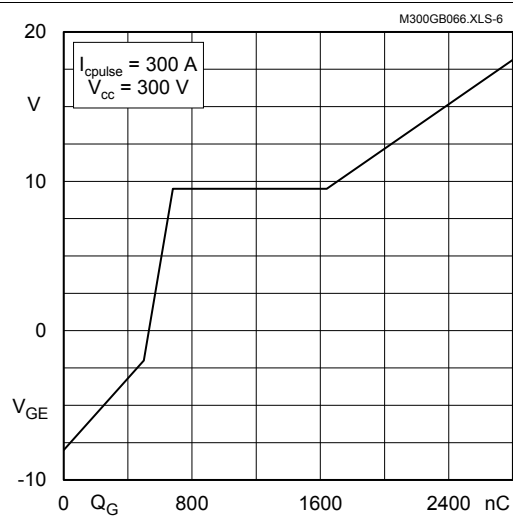
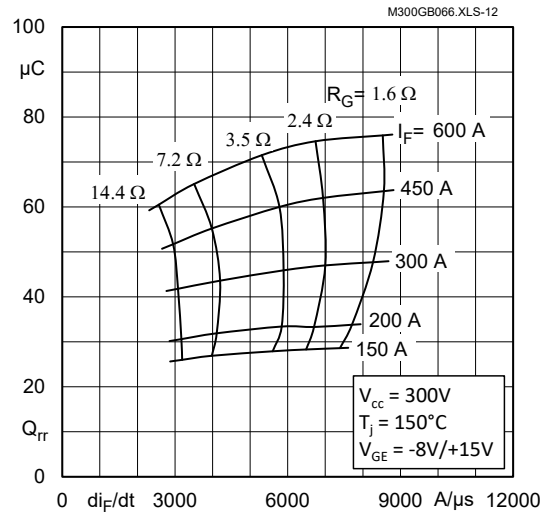
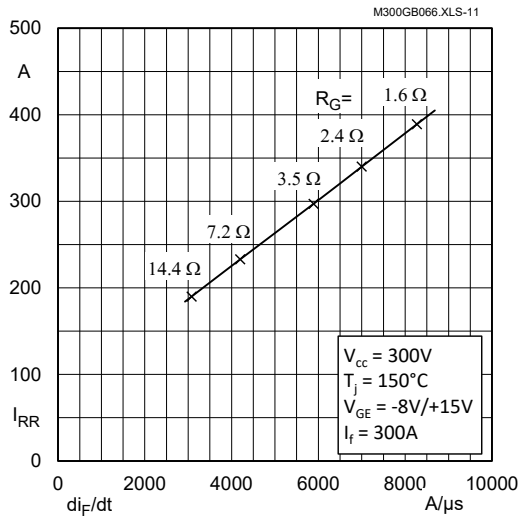
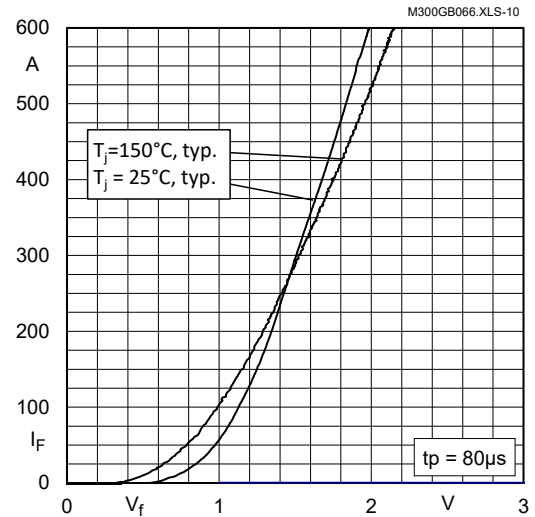
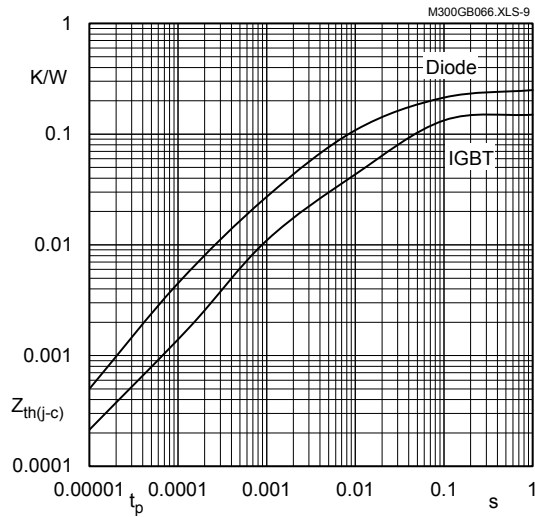
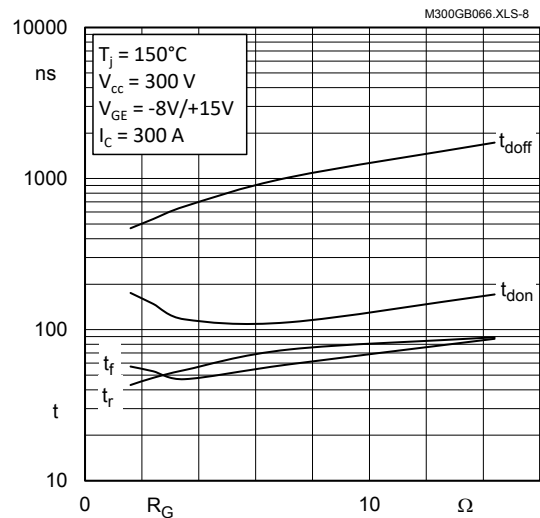
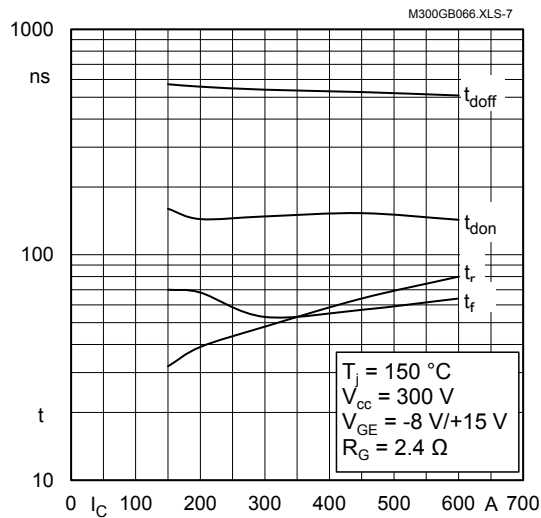
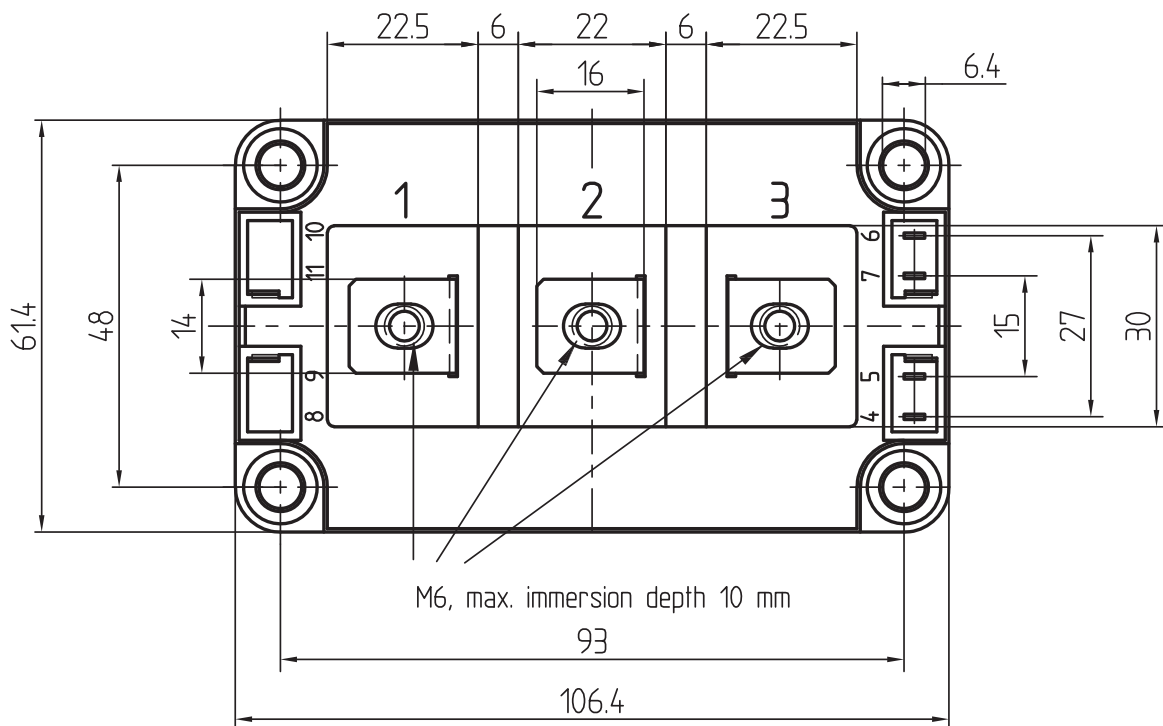
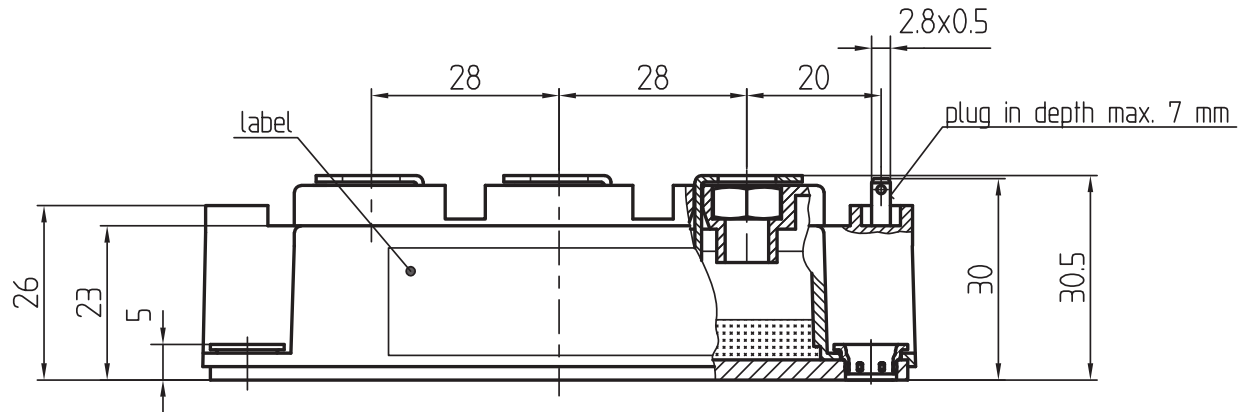


Fig. 6: Typ. gate charge characteristic



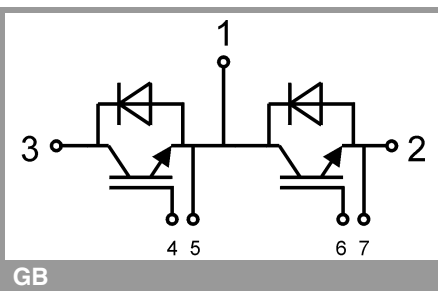
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Dimensions in mm



General tolerance +/- 0.5 mm

SEMITRANS 3



IMPORTANT INFORMATION AND WARNINGS

This is an electrostatic discharge sensitive device (ESDS) according to international standard IEC 61340.

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