



SEMITRANS® 3

High Speed IGBT4 Modules

SKM200GB12F4

Target Data

Features

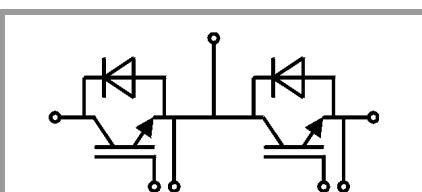
- High speed trench and field-stop IGBT
- CAL4 ultra-fast = soft switching 4. generation CAL-diode
- Insulated copper baseplate using DBC technology (Direct Bonded Copper)
- Increased power cycling capability
- For higher switching frequencies above 15kHz
- UL recognized, file no. E63532

Typical Applications*

- UPS
- Electronic welders
- Inductive heating
- Switched mode power supplies

Remarks

- Case temperature limited to $T_c = 125^\circ\text{C}$ max.
- Recommended $T_{op} = -40 \dots +150^\circ\text{C}$
- Product reliability results valid for $T_j = 150^\circ\text{C}$



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 175 °C	T _c = 25 °C	279	A
		T _c = 80 °C	213	A
I _{Cnom}			200	A
I _{CRM}	I _{CRM} = 3xI _{Cnom}		600	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 150 °C	10	μs
T _j			-40 ... 175	°C
Inverse diode				
V _{RRM}	T _j = 25 °C		1200	V
I _F	T _j = 175 °C	T _c = 25 °C	210	A
		T _c = 80 °C	152	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		990	A
T _j			-40 ... 175	°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 = 200 A	T _j = 25 °C		2.06	2.42	V
	V _{GE} = 15 V chipelevel	T _j = 150 °C		2.59	2.97	V
V _{CE0}	chipelevel	T _j = 25 °C		1.10	1.28	V
		T _j = 150 °C		0.95	1.13	V
r _{CE}	V _{GE} = 15 V chipelevel	T _j = 25 °C		4.8	5.7	mΩ
		T _j = 150 °C		8.2	9.2	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 7.6 mA		5.2	5.8	6.4	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C				2.7	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		12.3		nF
C _{oes}		f = 1 MHz		0.81		nF
C _{res}		f = 1 MHz		0.69		nF
Q _G	V _{GE} = - 8 V...+ 15 V			1134		nC
R _{Gint}	T _j = 25 °C			1.0		Ω
t _{d(on)}	V _{CC} = 600 V I _C = 200 A V _{GE} = +15/-15 V R _{G on} = 1 Ω R _{G off} = 1 Ω	T _j = 150 °C		t.b.d.		ns
t _r		T _j = 150 °C		t.b.d.		ns
E _{on}		T _j = 150 °C		15		mJ
t _{d(off)}		T _j = 150 °C		t.b.d.		ns
t _f		T _j = 150 °C		t.b.d.		ns
E _{off}		T _j = 150 °C		14		mJ
R _{th(j-c)}	per IGBT				0.14	K/W
R _{th(c-s)}	per IGBT (λ _{grease} =0.81 W/(m²K))			0.061		K/W



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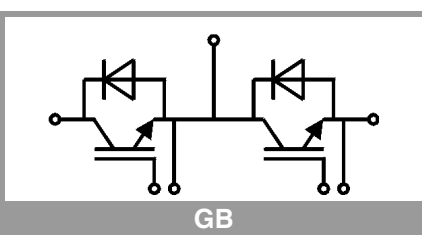
Typical Applications*

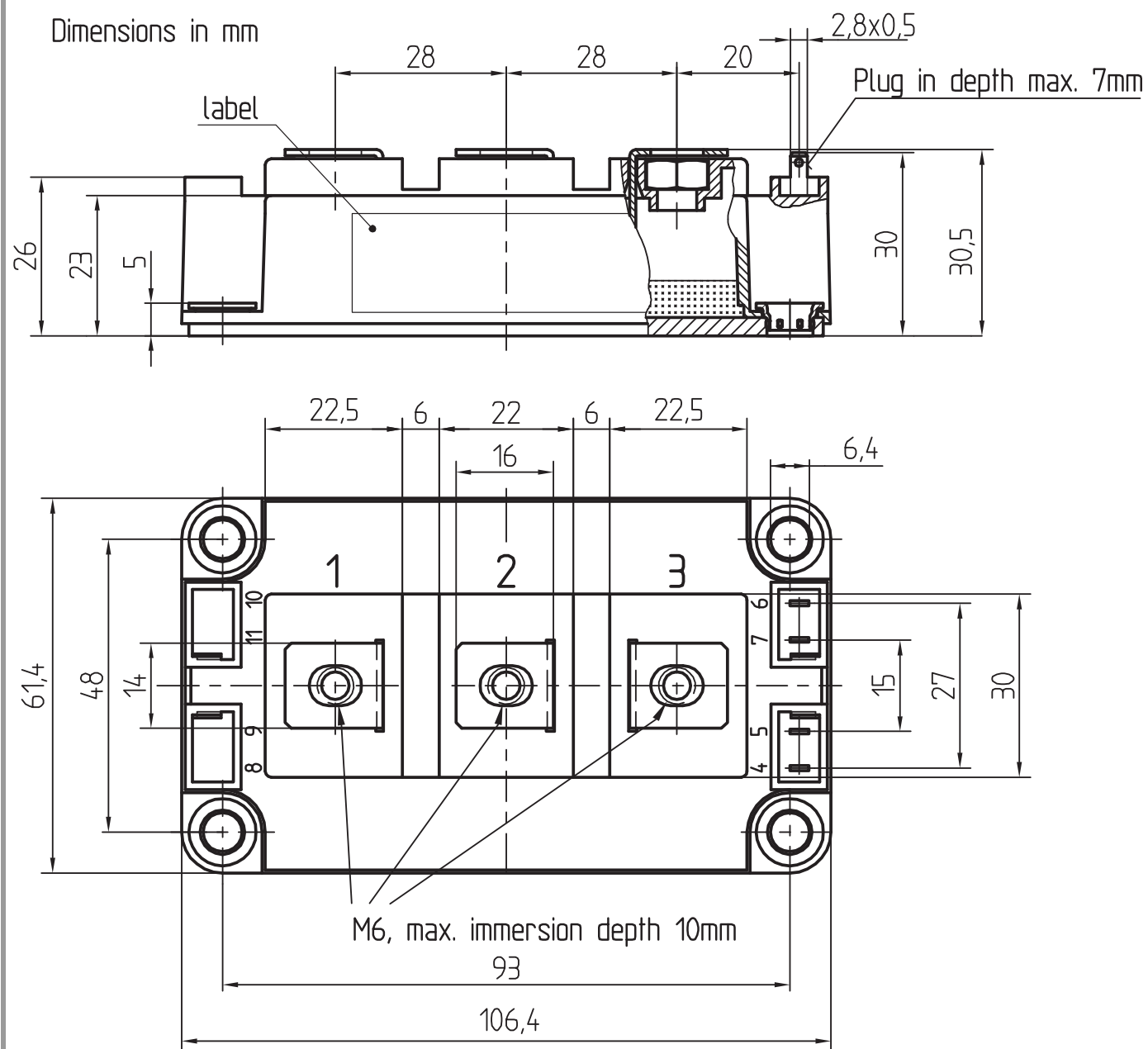
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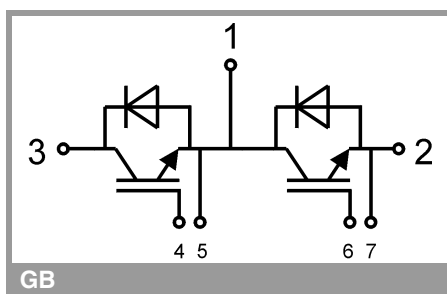
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 200 A	T _j = 25 °C		2.67	2.99	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.53	2.85	V
V _{F0}	chiplevel	T _j = 25 °C		1.79	1.99	V
		T _j = 150 °C		1.40	1.60	V
r _F	chiplevel	T _j = 25 °C		4.4	5.0	mΩ
		T _j = 150 °C		5.7	6.3	mΩ
I _{RRM}	I _F = 200 A	T _j = 150 °C		-		A
Q _{rr}	V _{GE} = ±15 V V _{CC} = 600 V	T _j = 150 °C		-		μC
E _{rr}		T _j = 150 °C		6.4		mJ
R _{th(j-c)}	per diode				0.26	K/W
R _{th(c-s)}	per diode (λ _{grease} =0.81 W/(m*K))			0.081		K/W
Module						
L _{CE}				15		nH
R _{CC'+EE'}	measured per switch	T _C = 25 °C		0.55		mΩ
		T _C = 125 °C		0.85		mΩ
R _{th(c-s)1}	calculated without thermal coupling			0.017		K/W
R _{th(c-s)2}	including thermal coupling, Ts underneath module (λ _{grease} =0.81 W/(m*K))			0.027		K/W
M _s	to heat sink M6		3		5	Nm
M _t		to terminals M6	2.5		5	Nm
						Nm
w					325	g





General tolerance $\pm 0,5$ mm

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

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