

SKM100GB12F4



SEMITRANS® 2

High Speed IGBT4 Modules

SKM100GB12F4

Target Data

Features

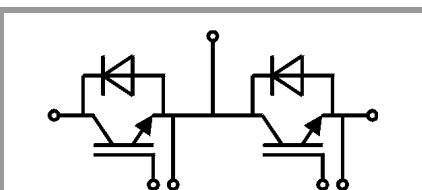
- High speed trench and field-stop IGBT
- CAL4 ultra-fast = soft switching 4. generation CAL-diode
- Insulated copper baseplate using DBC technology (Direct Bonded Copper)
- Increased power cycling capability
- For higher switching frequencies above 15kHz
- UL recognized, file no. E63532

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}	$T_j = 25^\circ\text{C}$	1200	V
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	142
		$T_c = 80^\circ\text{C}$	109
I_{Cnom}		100	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	300	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150^\circ\text{C}$	10
			μs
T_j		-40 ... 175	$^\circ\text{C}$
Inverse diode			
V_{RRM}	$T_j = 25^\circ\text{C}$	1200	V
I_F	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	111
		$T_c = 80^\circ\text{C}$	81
I_{Fnom}		100	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25^\circ\text{C}$	550	A
T_j		-40 ... 175	$^\circ\text{C}$
Module			
$I_{t(RMS)}$		200	A
T_{stg}		-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$	4000	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_C = 100\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	2.05	2.38	V
		$T_j = 150^\circ\text{C}$	2.55	2.93	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$	1.10	1.28	V
		$T_j = 150^\circ\text{C}$	0.95	1.13	V
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	9.5	11	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	16	18	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 3.8\text{ mA}$	5.2	5.8	6.4	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}, T_j = 25^\circ\text{C}$			1	mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	6.2		nF
C_{oes}		$f = 1\text{ MHz}$	0.41		nF
C_{res}		$f = 1\text{ MHz}$	0.35		nF
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		567		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		0		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 100\text{ A}$ $V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$	t.b.d.		ns
t_r		$T_j = 150^\circ\text{C}$	t.b.d.		ns
E_{on}	$R_{Gon} = 2\ \Omega$ $R_{Goff} = 2\ \Omega$	$T_j = 150^\circ\text{C}$	10		mJ
$t_{d(off)}$		$T_j = 150^\circ\text{C}$	t.b.d.		ns
t_f		$T_j = 150^\circ\text{C}$	t.b.d.		ns
E_{off}		$T_j = 150^\circ\text{C}$	7		mJ
$R_{th(j-c)}$	per IGBT			0.27	K/W
$R_{th(c-s)}$	per IGBT ($\lambda_{grease} = 0.81\text{ W}/(\text{m}^2\text{K})$)		0.122		K/W



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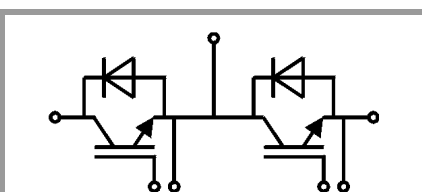
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 100\text{ A}$ $V_{GE} = 0\text{ V}$ chipllevel	$T_j = 25^\circ\text{C}$		2.67	2.99	V
		$T_j = 150^\circ\text{C}$		2.53	2.85	V
V_{F0}	chipllevel	$T_j = 25^\circ\text{C}$		1.79	1.99	V
		$T_j = 150^\circ\text{C}$		1.40	1.60	V
r_F	chipllevel	$T_j = 25^\circ\text{C}$		8.8	10.0	m Ω
		$T_j = 150^\circ\text{C}$		11	13	m Ω
I_{RRM}	$I_F = 100\text{ A}$	$T_j = 150^\circ\text{C}$		-		A
Q_{rr}	$V_{GE} = \pm 15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		-		μC
E_{rr}		$T_j = 150^\circ\text{C}$		3.2		mJ
$R_{th(j-c)}$	per diode				0.48	K/W
$R_{th(c-s)}$	per diode ($\lambda_{grease}=0.81\text{ W/(m}^2\text{K)}$)			0.134		K/W
Module						
L_{CE}				30		nH
R_{CC+EE}	measured per switch	$T_c = 25^\circ\text{C}$		0.65		m Ω
		$T_c = 125^\circ\text{C}$		1.09		m Ω
$R_{th(c-s)1}$	calculated without thermal coupling			0.032		K/W
$R_{th(c-s)2}$	including thermal coupling, T_s underneath module ($\lambda_{grease}=0.81\text{ W/(m}^2\text{K)}$)			0.051		K/W
M_s	to heat sink M6		3		5	Nm
M_t						Nm
	to terminals M5		2.5		5	Nm
W					160	g

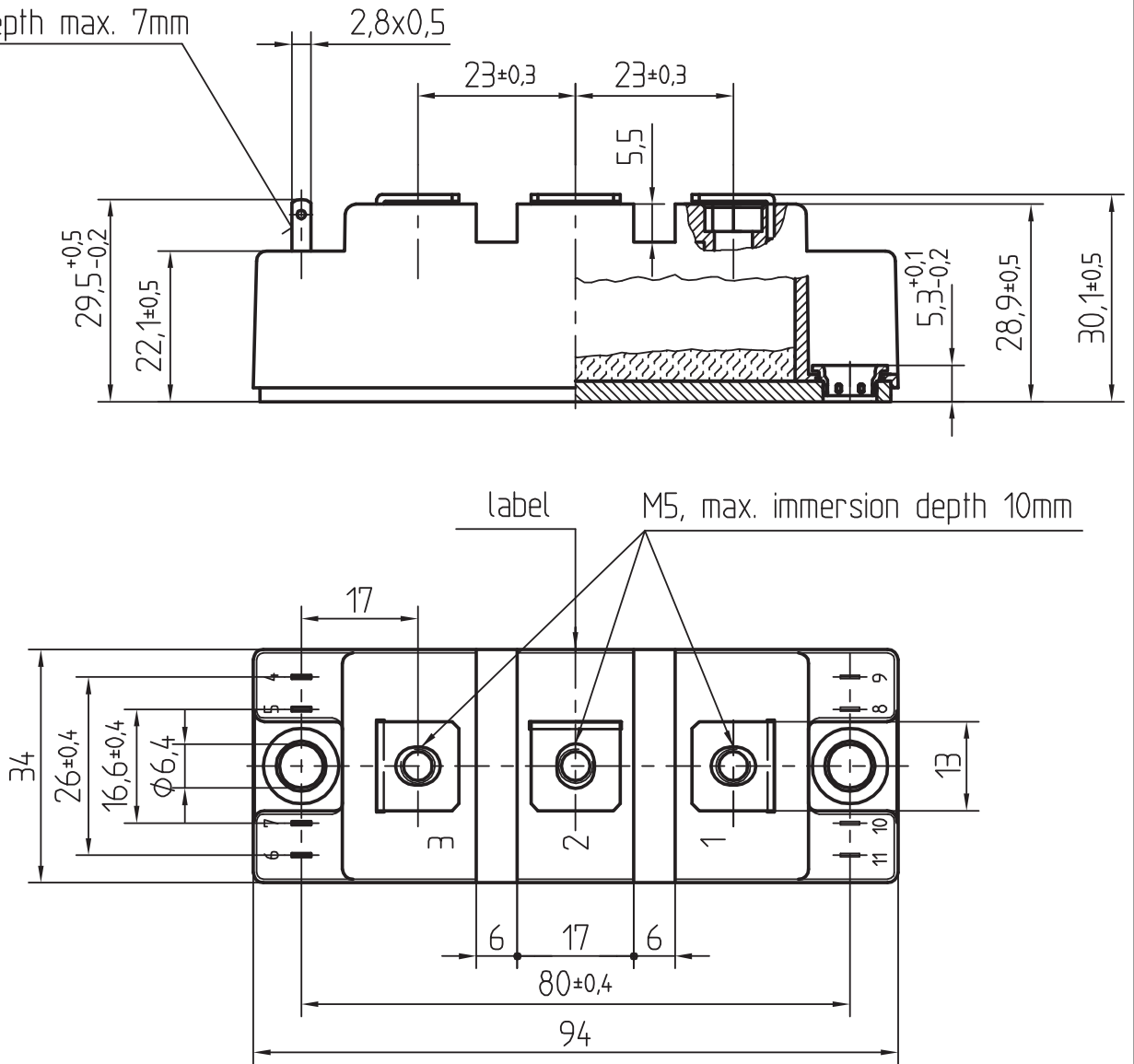


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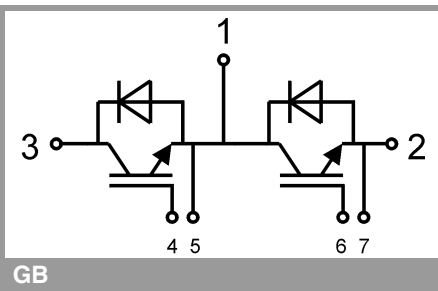
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Dimensions in mm

Plug in depth max. 7mm



General tolerance $\pm 0,5$ mm



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

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