



SEMITRANS® 3

IGBT4 Modules

SKM150GB17E4G

Features

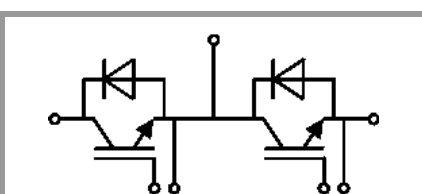
- IGBT4 = 4. generation medium fast trench IGBT (Infineon)
- CAL4 = Soft switching 4. Generation CAL-Diode
- Insulated copper baseplate using DBC Technology (Direct Copper Bonding)
- With integrated Gate resistor
- For switching frequencies up to 8kHz
- UL recognized, file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders
- Wind power
- Public transport

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 $T_j = 150^\circ\text{C}$



GB

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1700	V
I _C	T _j = 175 °C	T _c = 25 °C	242	A
		T _c = 80 °C	187	A
I _{Cnom}			150	A
I _{CRM}	I _{CRM} = 3xI _{Cnom}		450	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 1000 V V _{GE} ≤ 15 V V _{CES} ≤ 1700 V	T _j = 150 °C	10	μs
T _j			-40 ... 175	°C
Inverse diode				
V _{RRM}	T _j = 25 °C		1700	V
I _F	T _j = 175 °C	T _c = 25 °C	163	A
		T _c = 80 °C	121	A
I _{Fnom}			150	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		300	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		918	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 = 150 A	T _j = 25 °C		1.90	2.21	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.35	2.60	V
V _{CE0}	chiplevel	T _j = 25 °C		0.80	0.90	V
		T _j = 150 °C		0.70	0.80	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		7.3	8.7	mΩ
		T _j = 150 °C		11	12	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 6 mA		5.2	5.8	6.4	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1700 V, T _j = 25 °C				2.0	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		13.6		nF
C _{oes}		f = 1 MHz		0.53		nF
C _{res}		f = 1 MHz		0.44		nF
Q _G	V _{GE} = - 8 V...+ 15 V			1200		nC
R _{Gint}	T _j = 25 °C			4.3		Ω
t _{d(on)}	V _{CC} = 1200 V	T _j = 150 °C		205		ns
t _r	I _C = 150 A	T _j = 150 °C		23.5		ns
E _{on}	V _{GE} = +15/-15 V	T _j = 150 °C		39		mJ
t _{d(off)}	R _{G on} = 1 Ω	T _j = 150 °C		550		ns
t _f	R _{G off} = 1 Ω	T _j = 150 °C		150		ns
E _{off}		T _j = 150 °C		59		mJ
R _{th(j-c)}	per IGBT				0.161	K/W
R _{th(c-s)}	per IGBT (λ _{grease} =0.81 W/(m²K))			0.064		K/W



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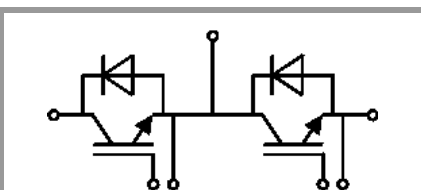
Typical Applications*

- AC inverter drives
- UPS
- Electronic welders
- Wind power
- Public transport

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 $T_j = 150^\circ\text{C}$

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 150 A	T _j = 25 °C		2.00	2.40	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.14	2.56	V
V _{F0}	chiplevel	T _j = 25 °C		1.32	1.56	V
		T _j = 150 °C		1.08	1.22	V
r _F	chiplevel	T _j = 25 °C		4.5	5.6	mΩ
		T _j = 150 °C		7.1	9.0	mΩ
I _{RRM}	I _F = 150 A	T _j = 150 °C		185		A
Q _{rr}	V _{GE} = ±15 V V _{CC} = 1200 V	T _j = 150 °C		49		μC
E _{rr}		T _j = 150 °C		33		mJ
R _{th(j-c)}	per diode				0.356	K/W
R _{th(c-s)}	per diode (λ _{grease} =0.81 W/(m*K))			0.072		K/W
Module						
L _{CE}				15		nH
R _{CC'+EE'}	measured per	T _C = 25 °C		0.55		mΩ
	switch	T _C = 125 °C		0.85		mΩ
R _{th(c-s)1}	calculated without thermal coupling (λ _{grease} =0.81 W/(m*K))			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



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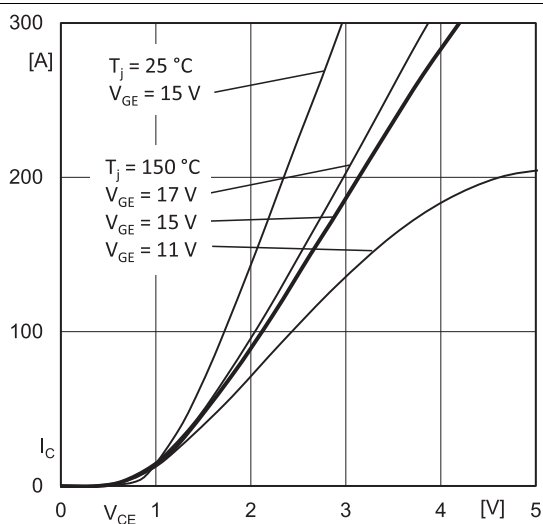


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

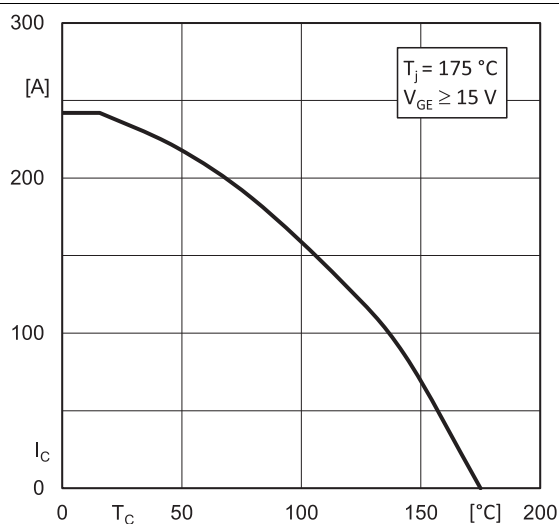


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

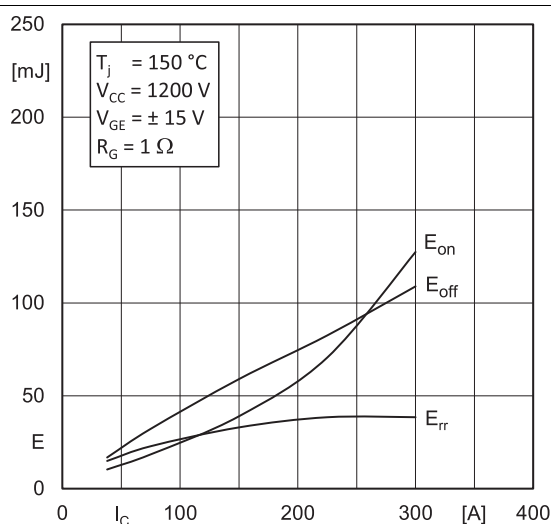


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

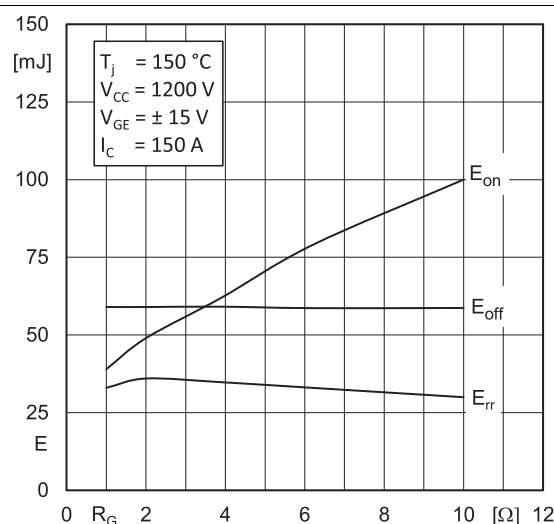


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

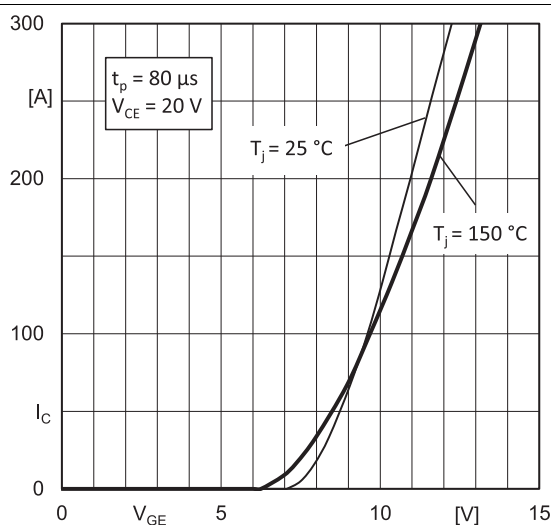


Fig. 5: Typ. transfer characteristic

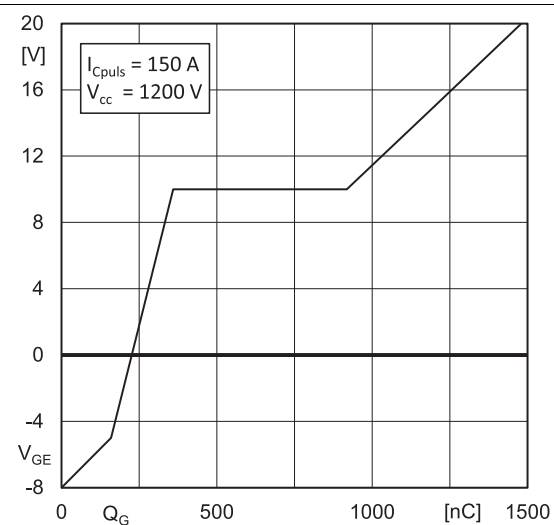
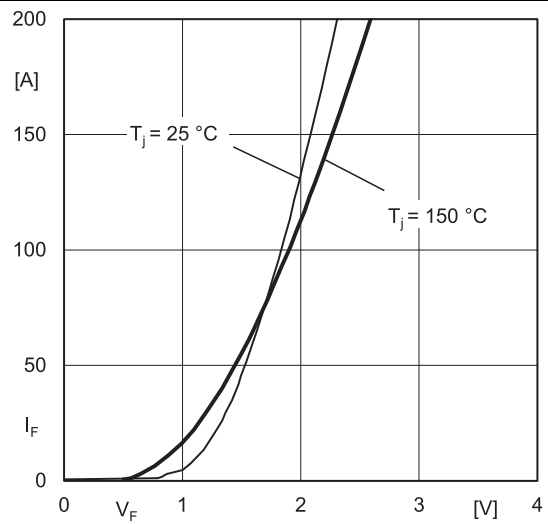
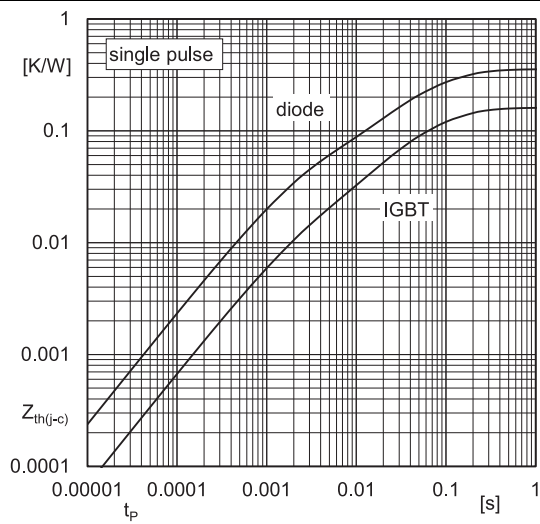
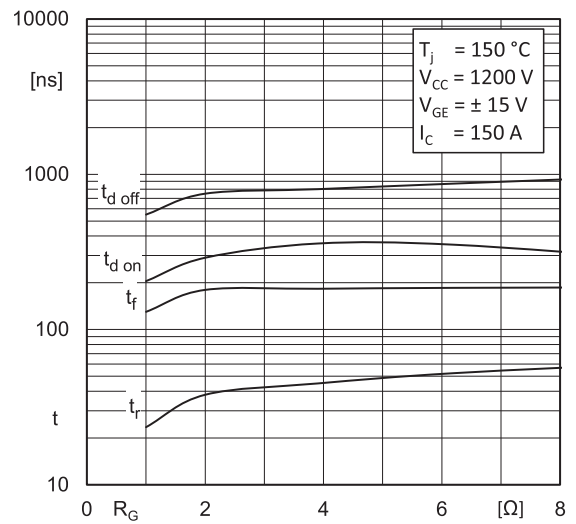
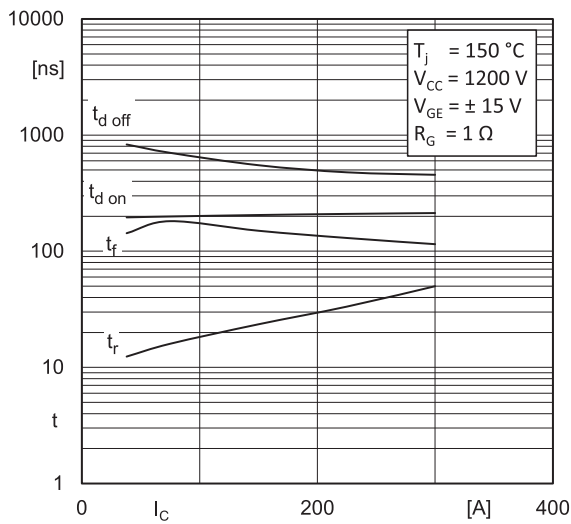
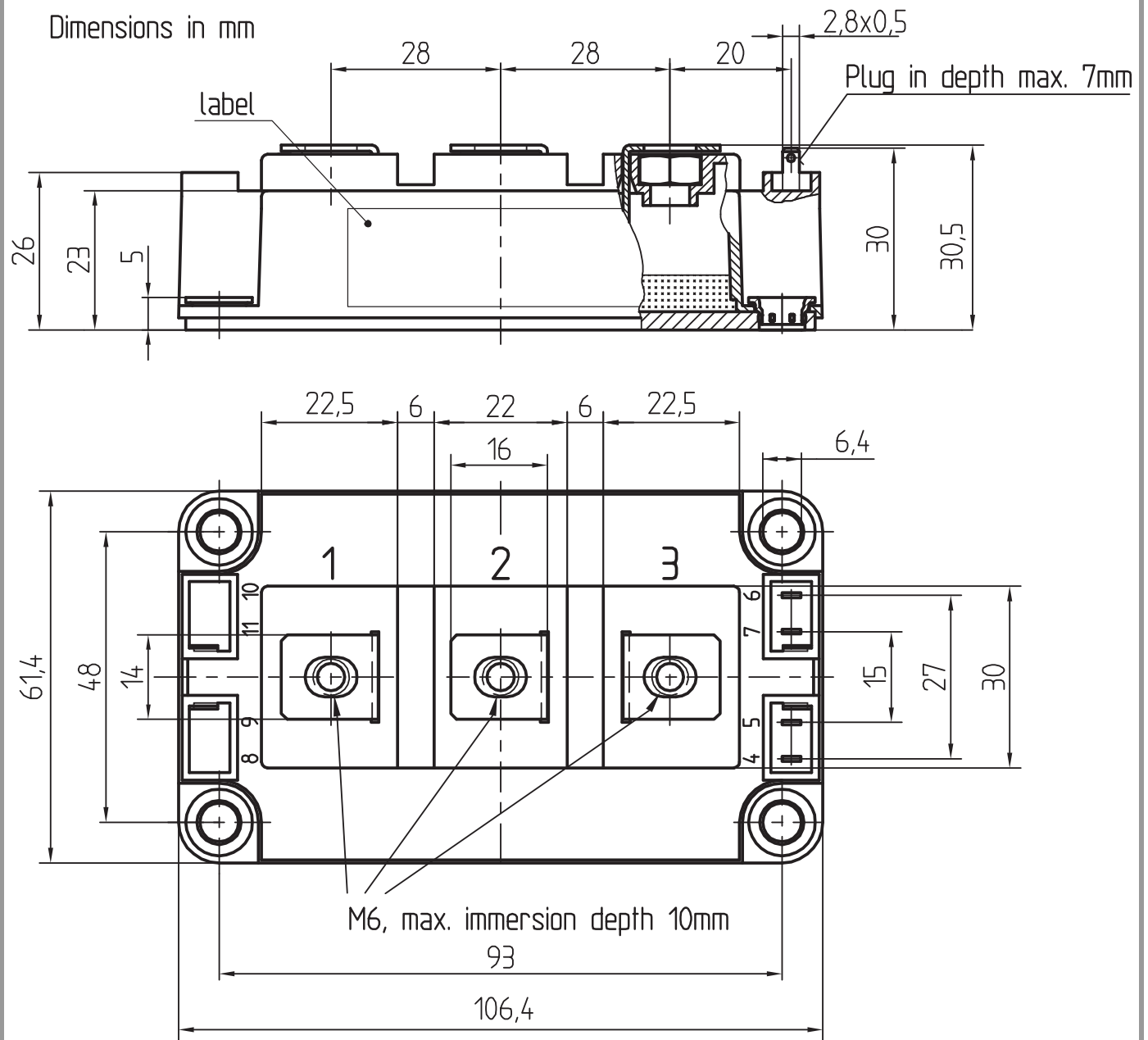


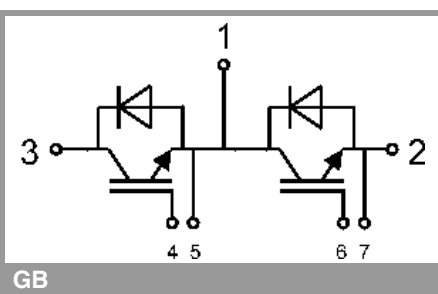
Fig. 6: Typ. gate charge characteristic





General tolerance +/- 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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