SKM225GB07L5D1

SEMITRANS® 2

Trench IGBT Modules

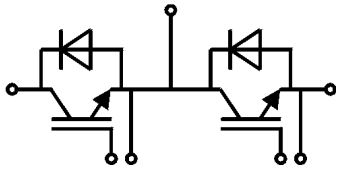
SKM225GB07L5D1

Features*

- Low $V_{CE(sat)}$ due to Trench Stop L5 IGBT technology
- Fast & soft inverse CAL diodes
- Large clearance (10 mm) and creepage distances (20 mm)
- Insulated copper baseplate using DBC Technology (Direct Bonded Copper)
- UL recognized, file no. E63532

Typical Applications

- Grid Frequency Polarity Switch
- Electronic welders



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Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT				
V_{CES}	T_j = 25 °C		650	V
I_C	T_j = 175 °C	T_c = 25 °C	292	A
		T_c = 80 °C	217	A
I_{Cnom}			225	A
I_{CRM}			450	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 650 V	T_j = 150 °C	n.c.	µs
T_j			-40 ... 175	°C
Inverse diode				
I_F	T_j = 175 °C	T_c = 25 °C	151	A
		T_c = 80 °C	111	A
I_{FRM}			200	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 25 °C		990	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$			200	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 = 225 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.10	1.55	V
		T_j = 150 °C		1.17	1.62	V
V_{CE0}	chiplevel	T_j = 25 °C		0.80	1.00	V
		T_j = 150 °C		0.63	0.83	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		1.33	2.4	mΩ
				2.4	3.5	mΩ
$V_{GE(th)}$	V_{CE}= 20 V, I_C = 3 mA		4.25	5	5.75	V
I_{CES}	V_{GE} = 0 V V_{CE} = 650 V	T_j = 25 °C			0.3	mA
		T_j = 150 °C		-		mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		34.1		nF
C_{oes}		f = 1 MHz		0.42		nF
C_{res}		f = 1 MHz		0.11		nF
Q_G	V_{GE} = - 8 V...+ 15 V			2000		nC
R_{Gint}	T_j = 25 °C			1.6		Ω
$t_{d(on)}$	V_{CC} = 300 V I_C = 225 A V_{GE} = +15/-7.5 V $R_{G\ on}$ = 15 Ω $R_{G\ off}$ = 1 Ω di/dt_{on} = 1700 A/µs di/dt_{off} = 1250 A/µs dv/dt = 2560 V/µs L_s = 35 nH	T_j = 150 °C		257		ns
t_r		T_j = 150 °C		108		ns
E_{on}		T_j = 150 °C		9		mJ
$t_{d(off)}$		T_j = 150 °C		372		ns
t_f		T_j = 150 °C		153		ns
E_{off}		T_j = 150 °C		14		mJ
$R_{th(j-c)}$	per IGBT				0.275	K/W

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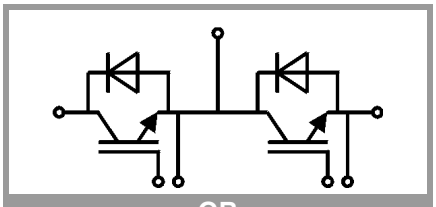

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Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	I_F = 100 A V_{GE} = 0 V chiplevel	T_j = 25 °C		1.37	1.73	V
		T_j = 150 °C		1.35	1.72	V
V_{F0}	chiplevel	T_j = 25 °C		1.04	1.24	V
		T_j = 150 °C		0.85	0.99	V
r_F	chiplevel	T_j = 25 °C		3.3	4.9	mΩ
		T_j = 150 °C		5.0	7.3	mΩ
I_{RRM}	I_F = 100 A di/dt_{off} = 1950 A/µs V_{GE} = -7.5 V V_{CC} = 300 V L_s = 35 nH	T_j = 150 °C		75		A
Q_{rr}		T_j = 150 °C		11		µC
E_{rr}		T_j = 150 °C		2.2		mJ
$R_{th(j-c)}$	per diode				0.5	K/W
Module						
L_{CE}				30		nH
$R_{CC'+EE'}$	measured per switch	T_C = 25 °C		0.65		mΩ
		T_C = 125 °C		1.09		mΩ
$R_{th(c-s)}$	calculated without thermal coupling (λ_{grease}=0.81 W/(m*K))			0.04	0.05	K/W
M_s	to heat sink M6		3		5	Nm
M_t		to terminals M5	2.5		5	Nm
				-		Nm
w					160	g

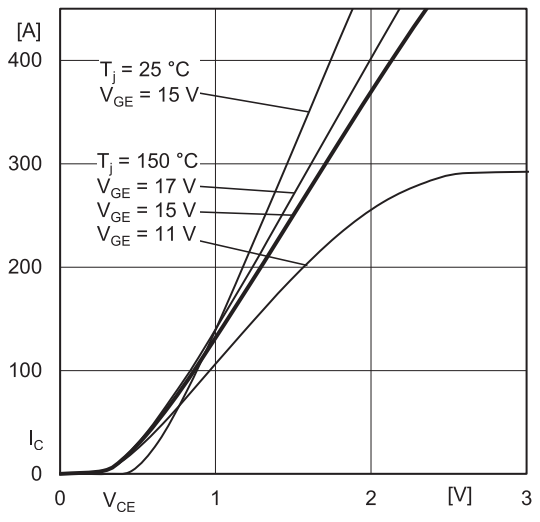


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

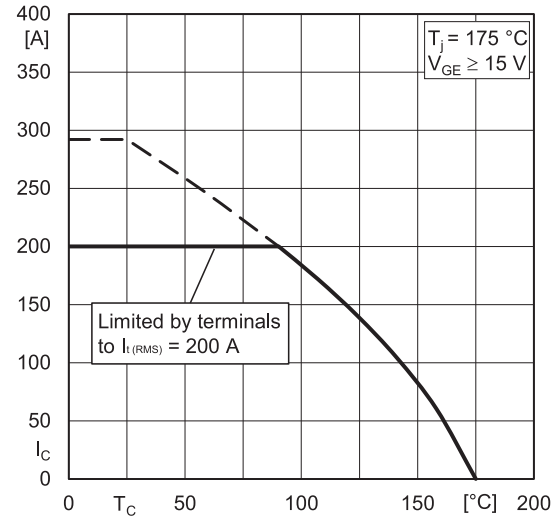


Fig. 2: Rated current vs. temperature $I_c = f(T_c)$

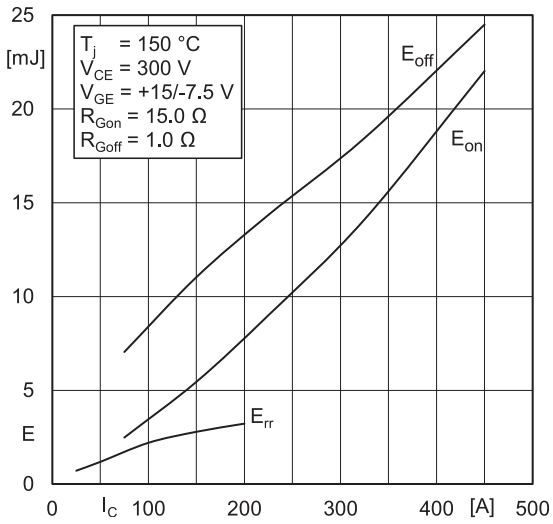


Fig. 3: Typ. turn-on /-off energy = f (I_C)

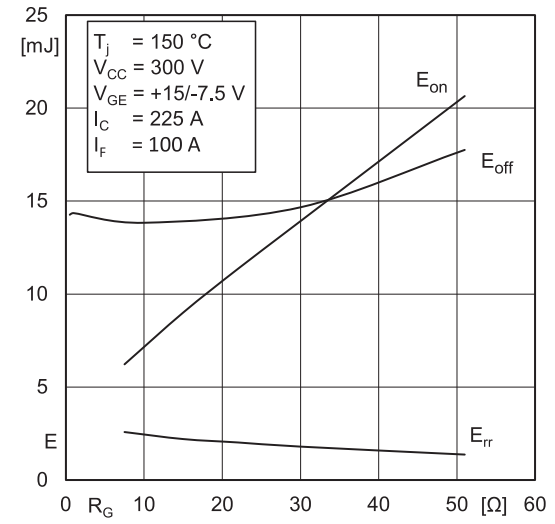


Fig. 4: Typ. turn-on /-off energy = f (R_G)

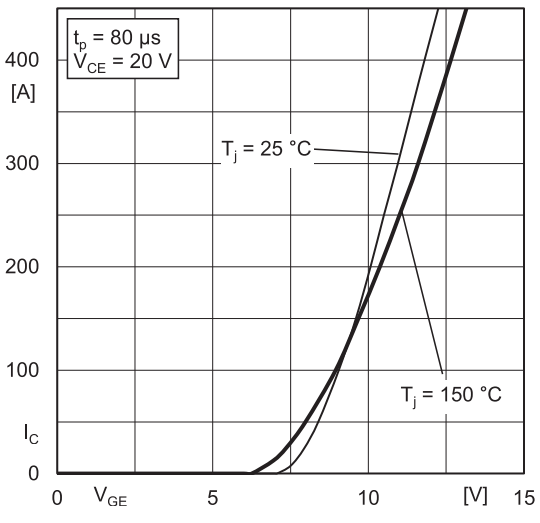


Fig. 5: Typ. transfer characteristic

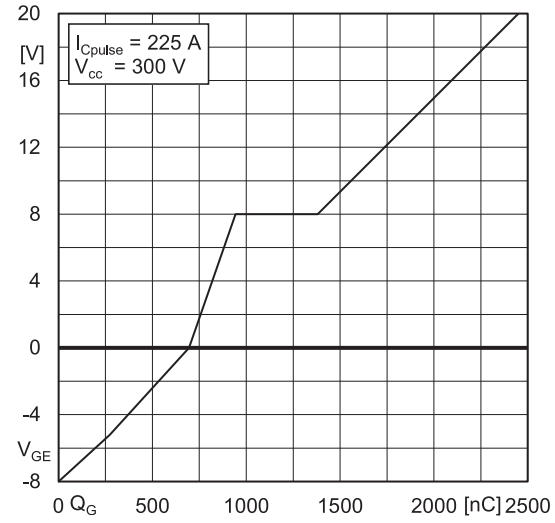


Fig. 6: Typ. gate charge characteristic

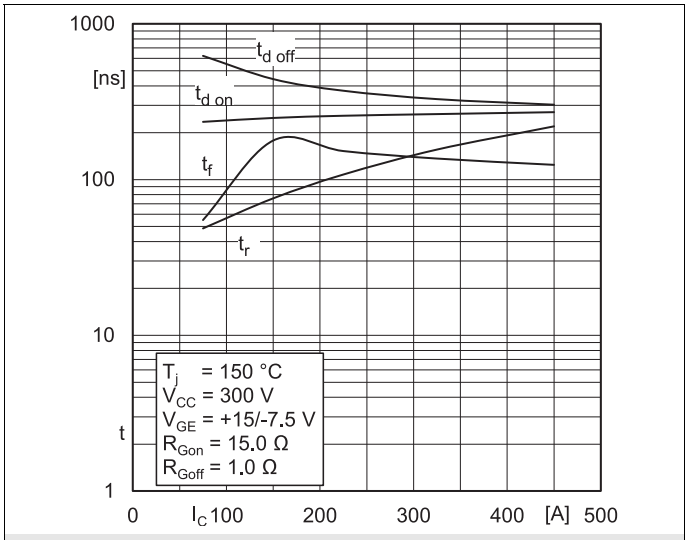


Fig. 7: Typ. switching times vs. I_C

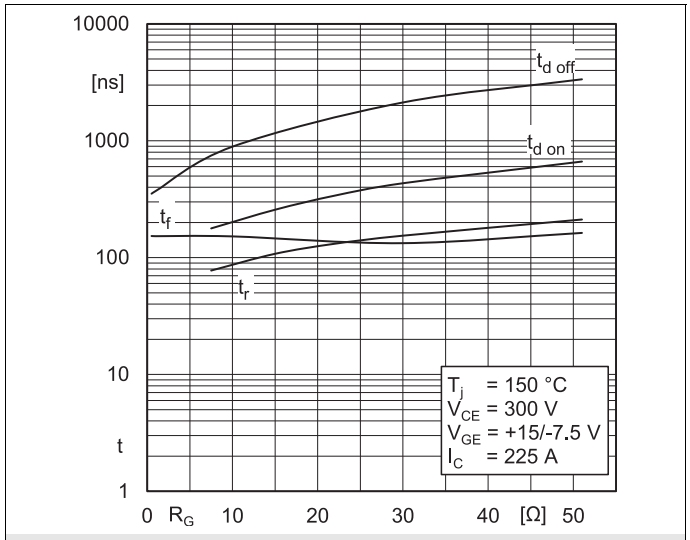


Fig. 8: Typ. switching times vs. gate resistor R_G

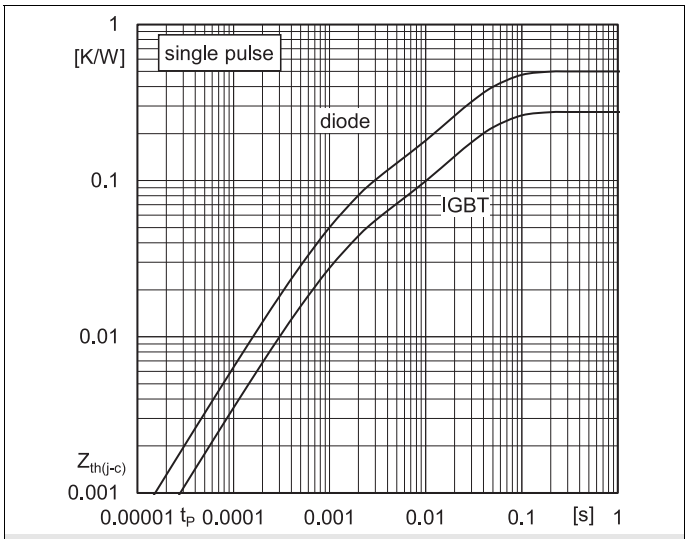


Fig. 9: Transient thermal impedance

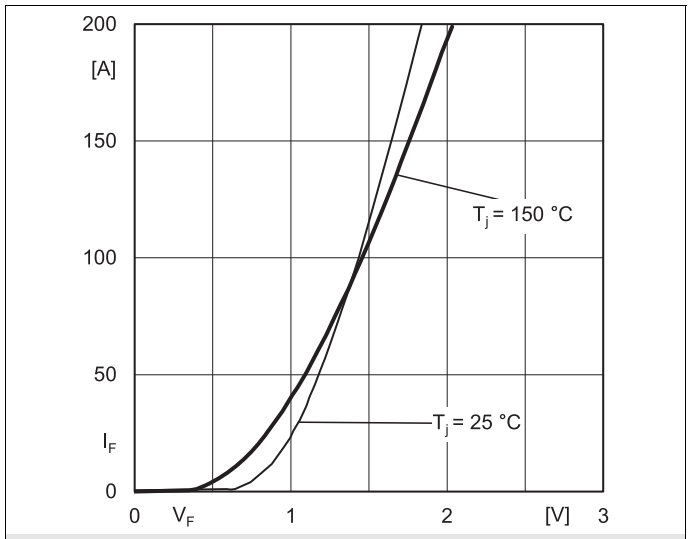


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

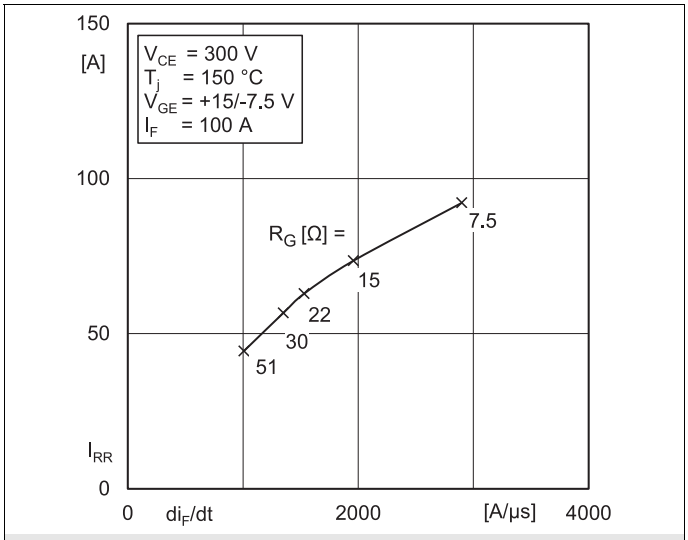


Fig. 11: Typ. CAL diode peak reverse recovery current

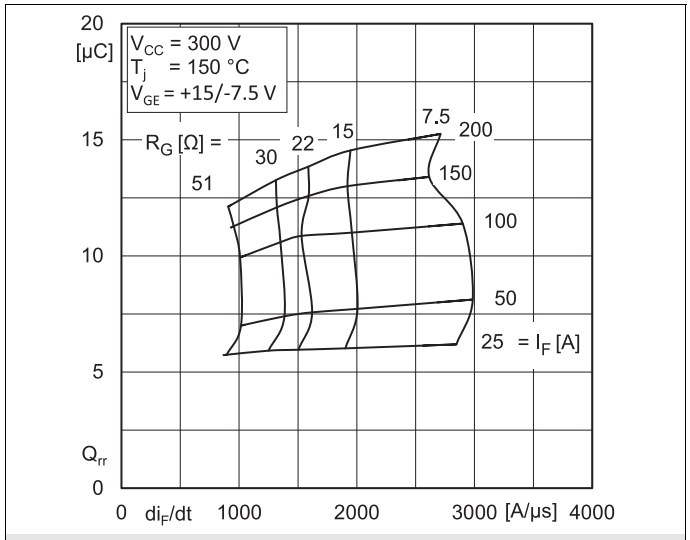
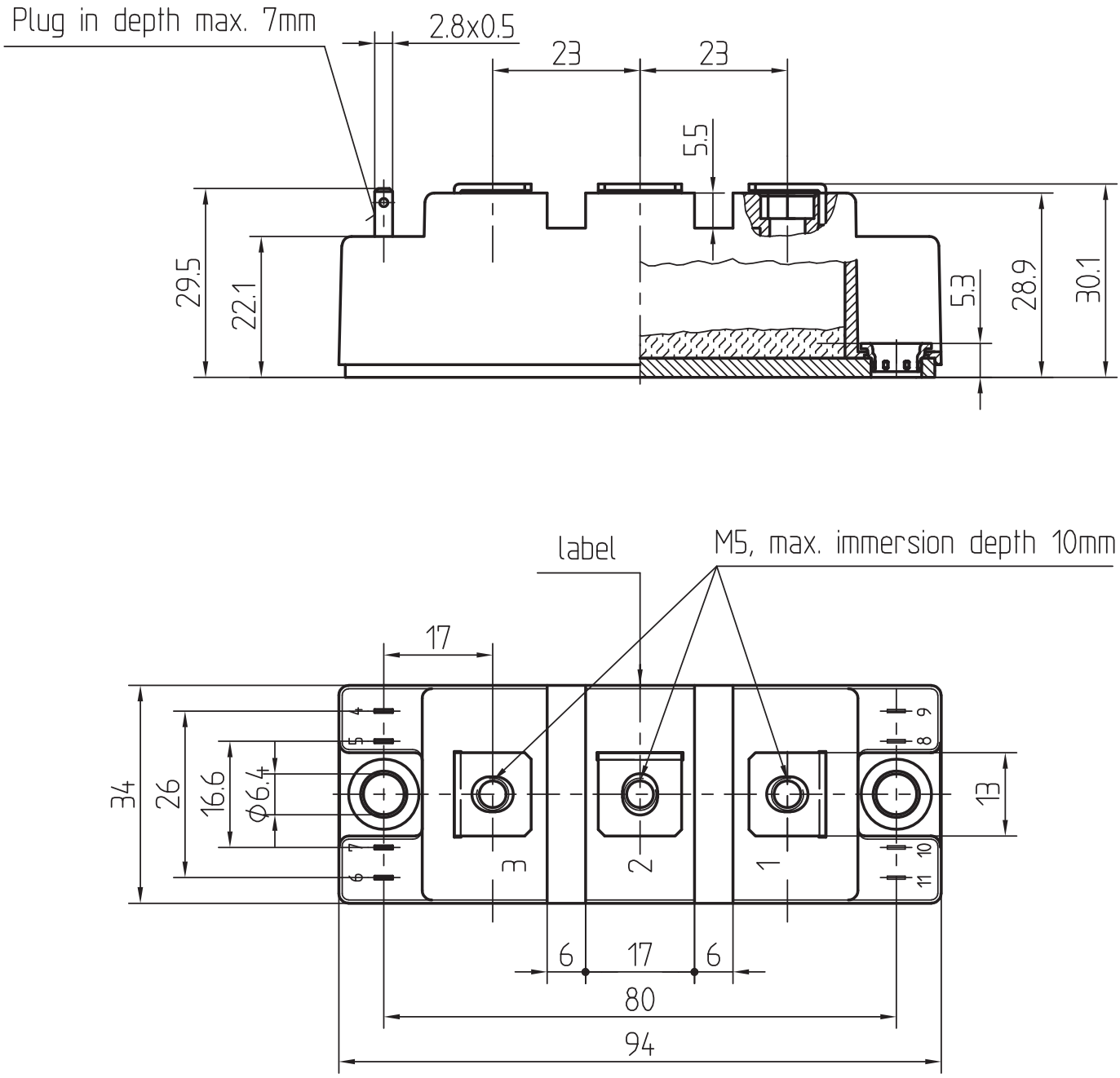


Fig. 12: Typ. CAL diode peak reverse recovery charge

Dimensions in mm



General tolerance +/- 0.5 mm

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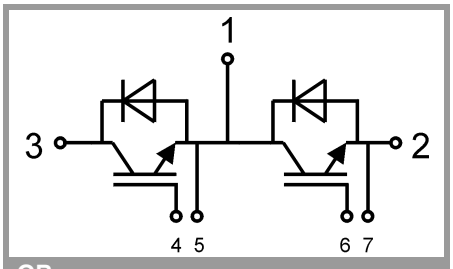

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This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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