

SKM150GB12V



SEMITRANS® 2

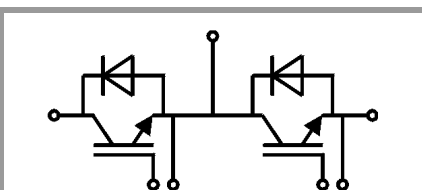
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Features

- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Fast & soft inverse CAL diodes
- Large clearance (10 mm) and creepage distances (20 mm)
- Isolated copper baseplate using DBC Technology (Direct Copper Bonding)
- UL recognized, file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders at fsw up to 20 kHz



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V_{CES}	$T_j = 25\text{ °C}$		1200	V
I_C	$T_j = 175\text{ °C}$	$T_c = 25\text{ °C}$	231	A
		$T_c = 80\text{ °C}$	176	A
I_{Cnom}			150	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$		450	A
V_{GES}			-20 ... 20	V
t_{psc}	$V_{CC} = 720\text{ V}$	$T_j = 125\text{ °C}$	10	μs
	$V_{GE} \leq 20\text{ V}$			
	$V_{CES} \leq 1200\text{ V}$			
T_j			-40 ... 175	$^{\circ}\text{C}$
Inverse diode				
I_F	$T_j = 175\text{ °C}$	$T_c = 25\text{ °C}$	189	A
		$T_c = 80\text{ °C}$	141	A
I_{Fnom}			150	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$		450	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^{\circ}, T_j = 25\text{ °C}$		900	A
T_j			-40 ... 175	$^{\circ}\text{C}$
Module				
$I_{t(RMS)}$	$T_{terminal} = 80\text{ °C}$		200	A
T_{stg}			-40 ... 125	$^{\circ}\text{C}$
V_{isol}	AC sinus 50Hz, $t = 1\text{ min}$		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
$V_{CE(sat)}$	$I_C = 150\text{ A}$	$T_j = 25\text{ °C}$	1.75	2.20		V
		$T_j = 150\text{ °C}$	2.20	2.50		V
V_{CE0}		$T_j = 25\text{ °C}$	0.94	1.04		V
		$T_j = 150\text{ °C}$	0.88	0.98		V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	5.40	7.73		$\text{m}\Omega$
		$T_j = 150\text{ °C}$	8.80	10.13		$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$		5.5	6	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$	$T_j = 25\text{ °C}$	0.1	0.3		mA
		$T_j = 150\text{ °C}$				mA
C_{ies}	$V_{CE} = 25\text{ V}$	$f = 1\text{ MHz}$	9			nF
C_{oes}		$f = 1\text{ MHz}$	0.89			nF
C_{res}		$f = 1\text{ MHz}$	0.884			nF
Q_G	$V_{GE} = -8\text{ V...} + 15\text{ V}$		1650			nC
R_{Gint}			5.0			Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150\text{ °C}$	258			ns
t_r	$I_C = 150\text{ A}$	$T_j = 150\text{ °C}$	32			ns
		$V_{GE} = \pm 15\text{ V}$				
E_{on}	$R_{Gon} = 1.5\text{ }\Omega$	$T_j = 150\text{ °C}$	13.5			mJ
$t_{d(off)}$	$R_{Goff} = 1.5\text{ }\Omega$	$T_j = 150\text{ °C}$	388			ns
t_f	$di/dt_{on} = 4400\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$	62			ns
		$di/dt_{off} = 1800\text{ A}/\mu\text{s}$				
E_{off}	$du/dt_{off} = 8100\text{ V}/\mu\text{s}$	$T_j = 150\text{ °C}$	14.2			mJ
$R_{th(j-c)}$	per IGBT				0.19	K/W

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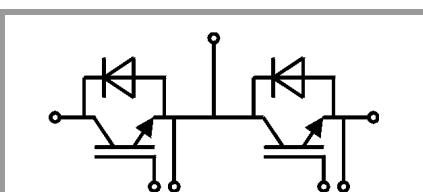
Features

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Typical Applications*

- AC inverter drives
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 150 \text{ A}$ $V_{GE} = 0 \text{ V}$ chip	$T_j = 25 \text{ }^\circ\text{C}$		2.14	2.46	V
		$T_j = 150 \text{ }^\circ\text{C}$		2.07	2.38	V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$	1.1	1.3	1.5	V
		$T_j = 150 \text{ }^\circ\text{C}$	0.7	0.9	1.1	V
r_F		$T_j = 25 \text{ }^\circ\text{C}$		5.6	6.4	m Ω
		$T_j = 150 \text{ }^\circ\text{C}$		7.8	8.5	m Ω
I_{RRM}	$I_F = 150 \text{ A}$ $di/dt_{off} = 5500 \text{ A}/\mu\text{s}$ $V_{GE} = \pm 15 \text{ V}$ $V_{CC} = 600 \text{ V}$	$T_j = 150 \text{ }^\circ\text{C}$		160		A
Q_{rr}		$T_j = 150 \text{ }^\circ\text{C}$		21.5		μC
E_{rr}		$T_j = 150 \text{ }^\circ\text{C}$			8.9	
$R_{th(j-c)}$	per diode				0.31	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	terminal-chip	$T_C = 25 \text{ }^\circ\text{C}$		0.65		m Ω
		$T_C = 125 \text{ }^\circ\text{C}$		1		m Ω
$R_{th(c-s)}$	per module			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



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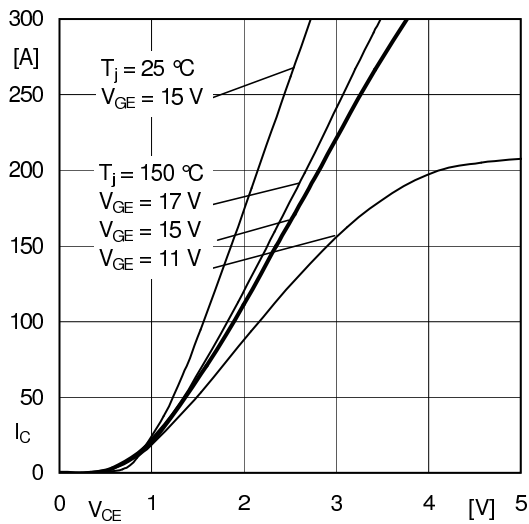


Fig. 1: Typ. output characteristic, inclusive R_{CC+EE}

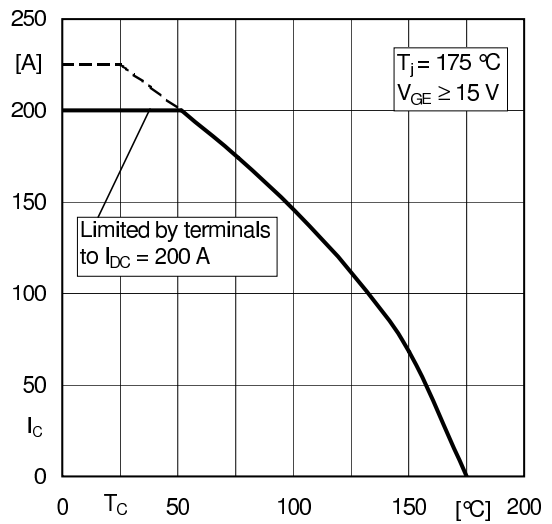


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

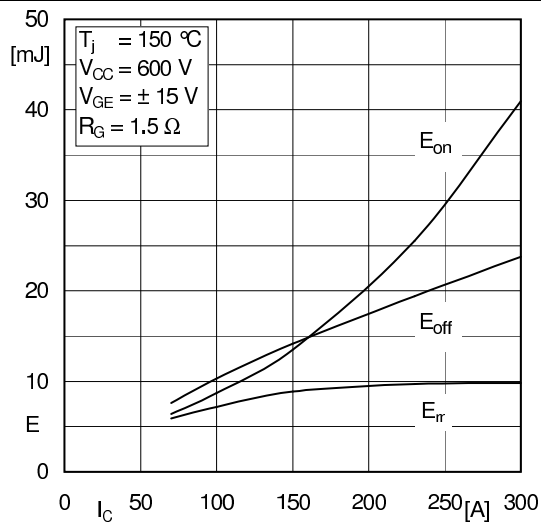


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

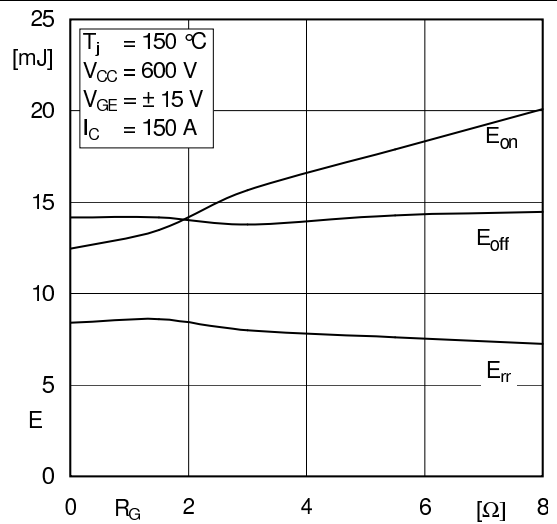


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

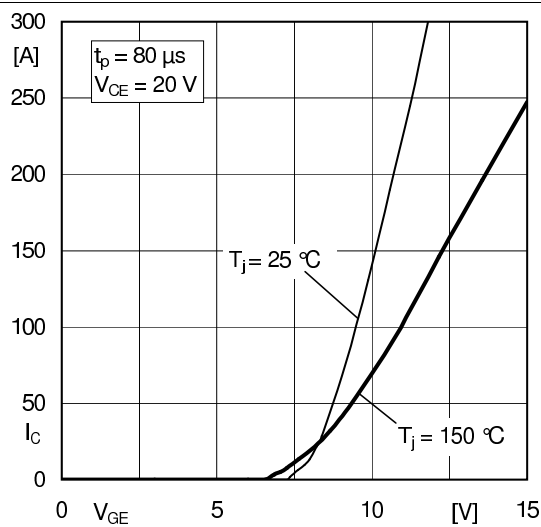


Fig. 5: Typ. transfer characteristic

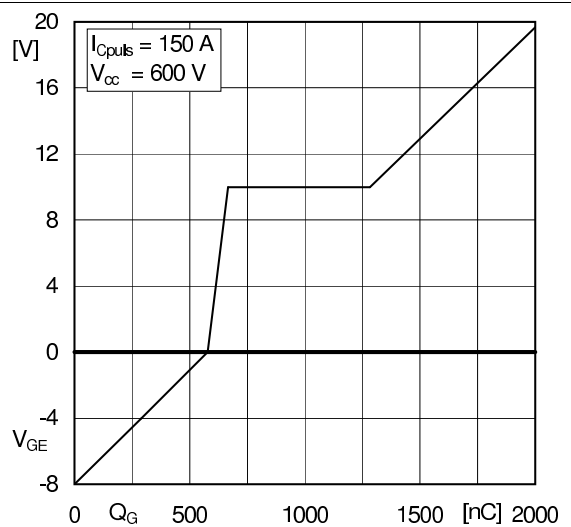


Fig. 6: Typ. gate charge characteristic

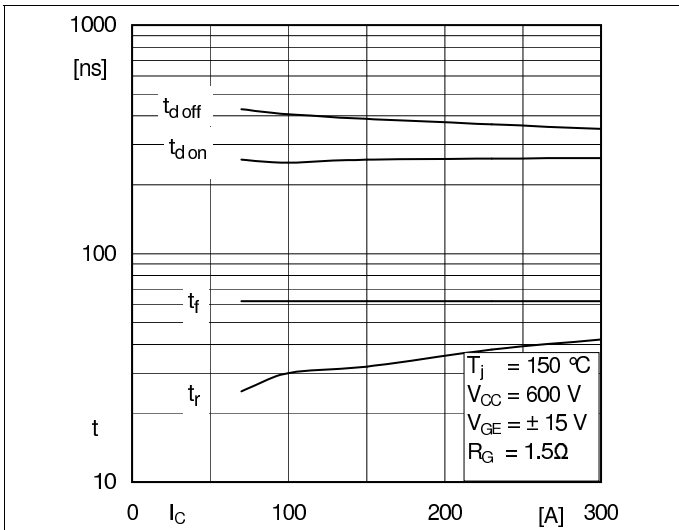


Fig. 7: Typ. switching times vs. I_C

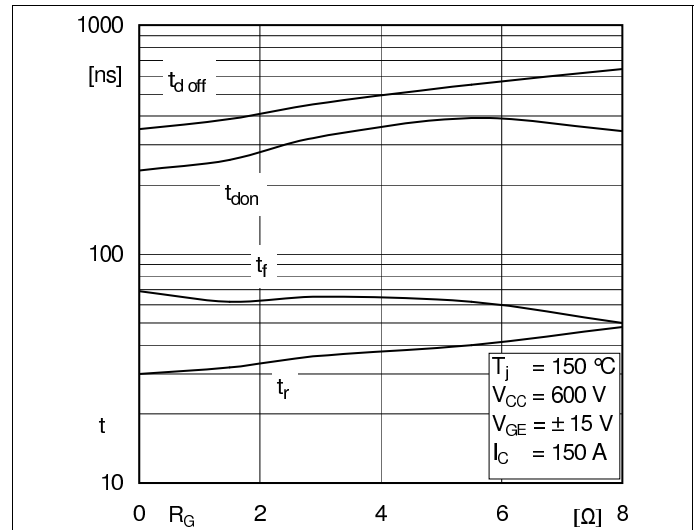


Fig. 8: Typ. switching times vs. gate resistor R_G

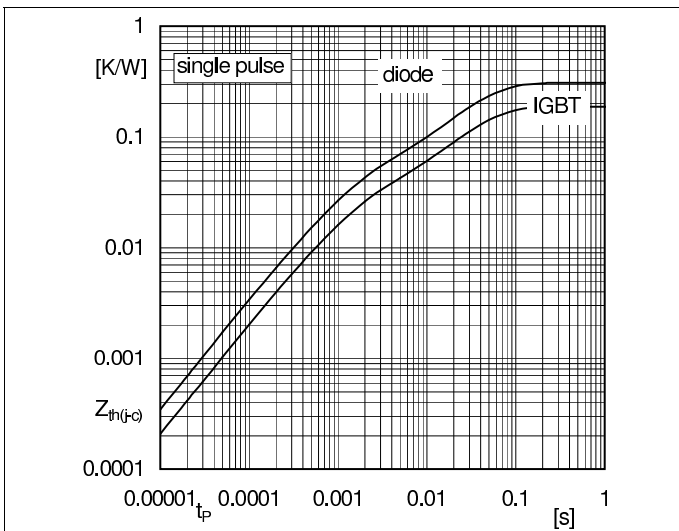


Fig. 9: Transient thermal impedance

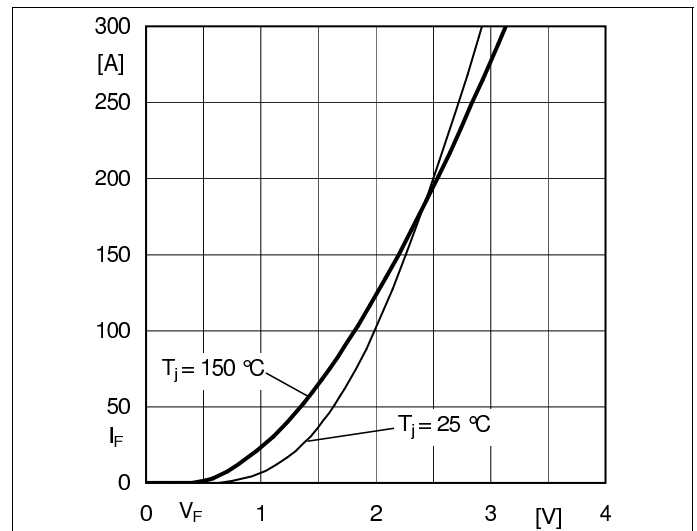


Fig. 10: Typ. CAL diode forward charact., incl. R_{CC+EE}

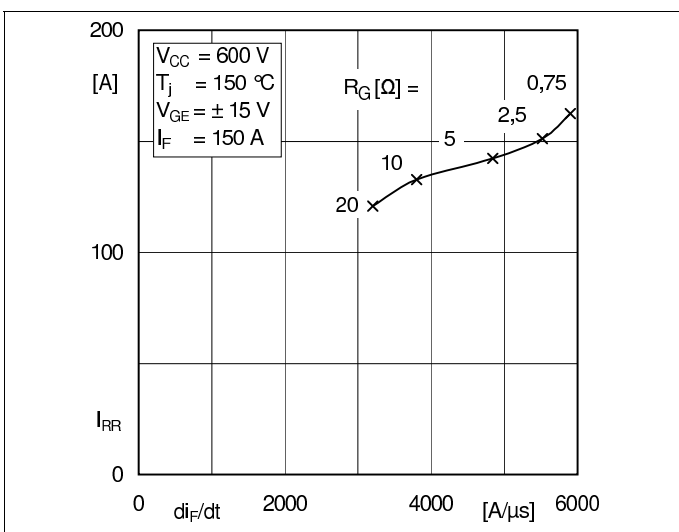


Fig. 11: CAL diode peak reverse recovery current

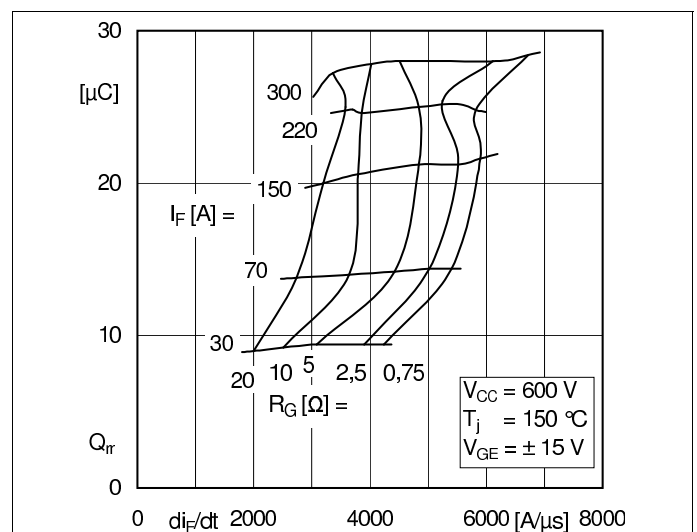
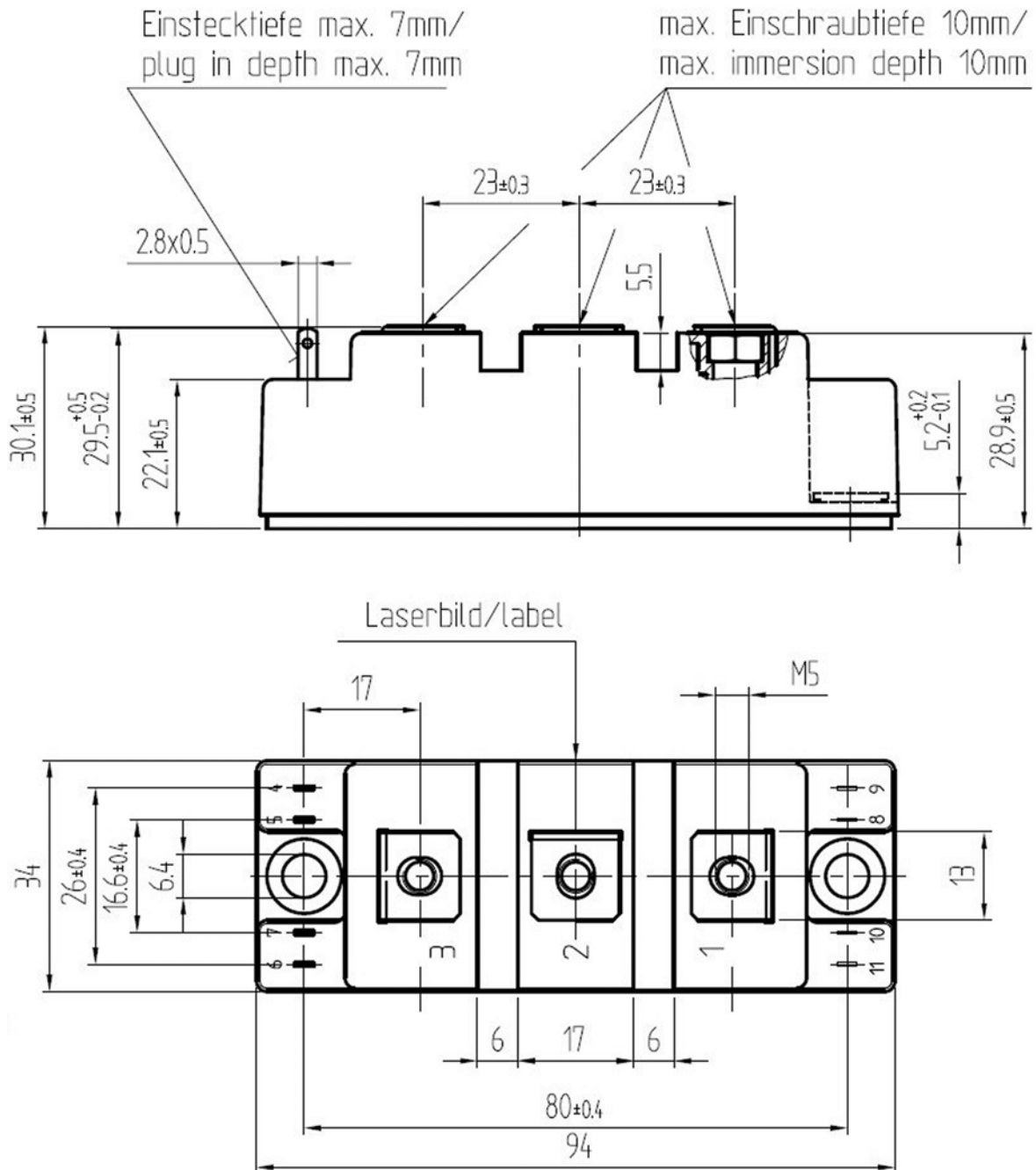
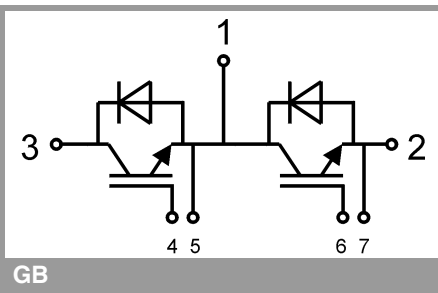


Fig. 12: Typ. CAL diode peak reverse recovery charge

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

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.