

SKM50GB063D



SEMITRANS® 2

Superfast NPT-IGBT Modules

SKM50GB063D

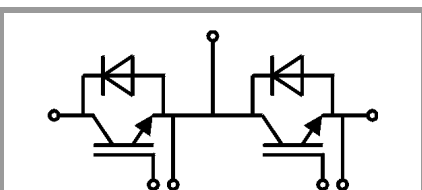
Target Data

Features

- NPT = non punch-through IGBT technology
- High short circuit capability, self limiting to 6 x IC
- Pos. temp.-coeff. of VCEsat
- Isolated copper baseplate

Typical Applications*

- Switched mode power supplies
- UPS
- Three phase inverters for servo / AC motor speed control



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Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
IGBT				
V _{CEs}	T _j = 25 °C	600	V	
I _C	T _j = 150 °C	T _c = 25 °C	70	A
		T _c = 75 °C	51	A
I _{Cnom}		50	A	
I _{CRM}	I _{CRM} = 2xI _{Cnom}	100	A	
V _{GES}		-20 ... 20	V	
t _{psc}	V _{CC} = 300 V	T _j = 125 °C	10	µs
	V _{GE} ≤ 20 V			
	V _{CEs} ≤ 600 V			
T _j		-55 ... 150		°C
Inverse diode				
I _F		T _c = 25 °C	75	A
		T _c = 80 °C	45	A
I _{Fnom}		50	A	
I _{FRM}	I _{FRM} = 2xI _{Fnom}	100	A	
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C			A
T _j		-40 ... 150		°C
Module				
I _{t(RMS)}	T _{terminal} < 80 °C	200		A
T _{stg}		-40 ... 125		°C
V _{isol}	AC sinus 50Hz, t = 1 min	2500		V

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
V _{CE(sat)}	I _C = 50 A V _{GE} = 15 V chipelevel	T _j = 25 °C	2.1	2.5	V
		T _j = 125 °C	2.4	2.8	V
V _{CE0}		T _j = 25 °C	1.05	1.3	V
		T _j = 125 °C	1	1.2	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C	21.0	24.0	mΩ
		T _j = 125 °C	28.0	32.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 1 mA	4.5	5.5	6.5	V
I _{CES}	V _{GE} = 0 V V _{CE} = 600 V	T _j = 25 °C	0.1	0.3	mA
					mA
C _{ies}	V _{CE} = 25 V		2.2		nF
C _{oes}	V _{GE} = 0 V				nF
C _{res}			0.2		nF
Q _G	V _{GE} = - 8 V...+ 20 V				nC
R _{Gint}	T _j = 25 °C				Ω
t _{d(on)}	V _{CC} = 300 V	T _j = 125 °C	50		ns
t _r	I _C = 50 A V _{GE} = ±15 V	T _j = 125 °C	40		ns
E _{on}	R _{G on} = 22 Ω	T _j = 125 °C	2.5		mJ
t _{d(off)}	R _{G off} = 22 Ω	T _j = 125 °C	300		ns
t _f		T _j = 125 °C	30		ns
E _{off}		T _j = 125 °C	1.8		mJ
R _{th(j-c)}	per IGBT			0.5	K/W



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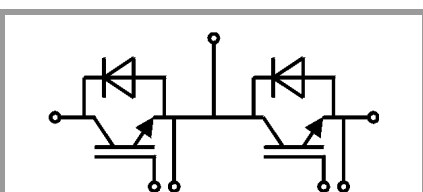
Features

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Typical Applications*

- Switched mode power supplies
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 50\text{ A}$ $V_{GE} = 0\text{ V}$ chip	$T_j = 25\text{ °C}$		1.35	1.60	V
		$T_j = 125\text{ °C}$		1.35	1.60	V
V_{F0}		$T_j = 25\text{ °C}$		1.05	1.2	V
		$T_j = 125\text{ °C}$		0.9	1	V
r_F		$T_j = 25\text{ °C}$		6.0	8.0	mΩ
		$T_j = 125\text{ °C}$		9.0	12.0	mΩ
I_{RRM}	$I_F = 50\text{ A}$ $di/dt_{off} = 50\text{ A}/\mu\text{s}$ $V_{GE} = \pm 15\text{ V}$ $V_{CC} = 300\text{ V}$	$T_j = 125\text{ °C}$		31		A
Q_{rr}		$T_j = 125\text{ °C}$		3.2		μC
E_{rr}		$T_j = 125\text{ °C}$		0.48		mJ
$R_{th(j-c)}$	per diode				1	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	terminal-chip	$T_C = 25\text{ °C}$		0.65		mΩ
		$T_C = 125\text{ °C}$		1		mΩ
$R_{th(c-s)}$	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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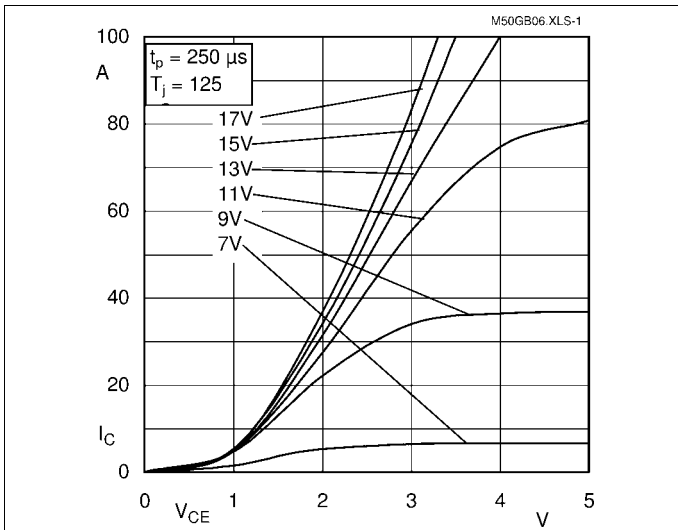


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE}$

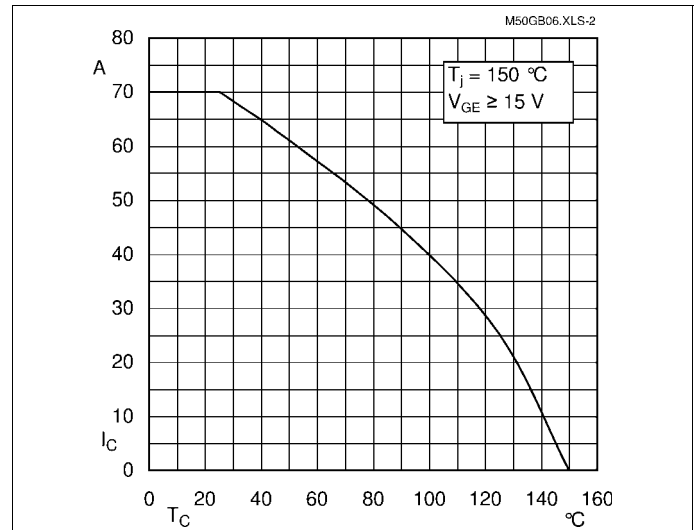


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

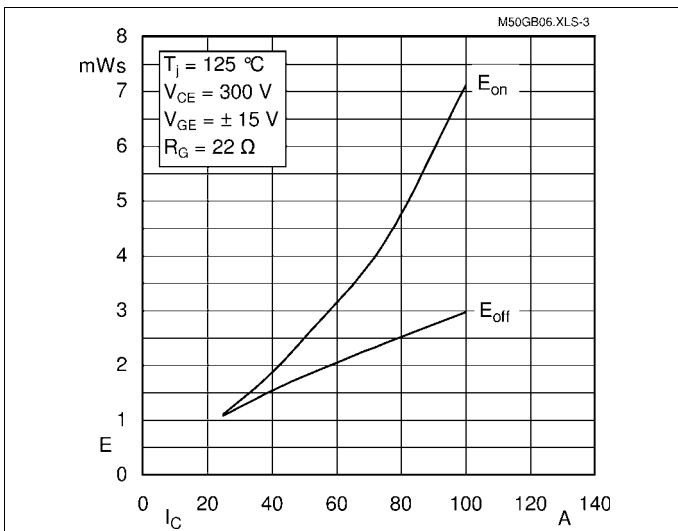


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

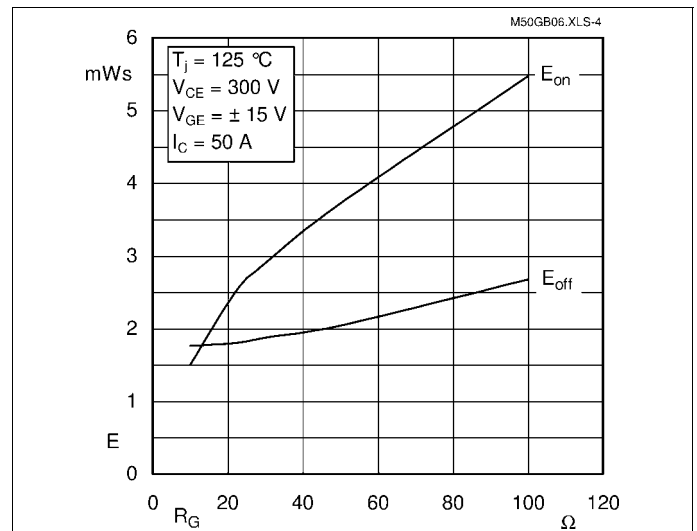


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

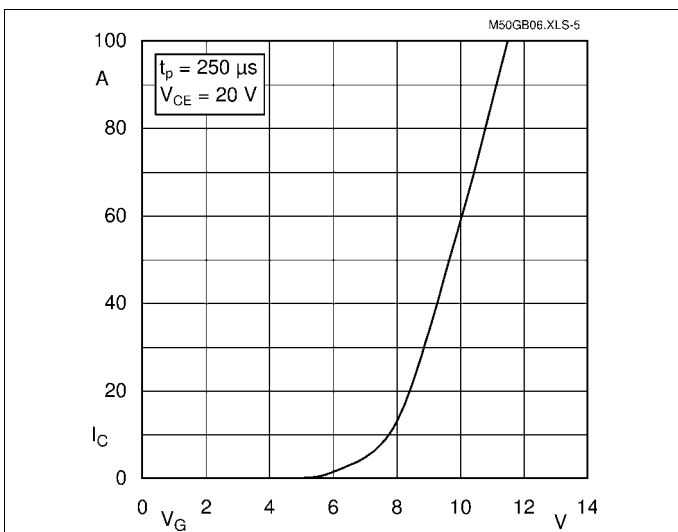


Fig. 5: Typ. transfer characteristic

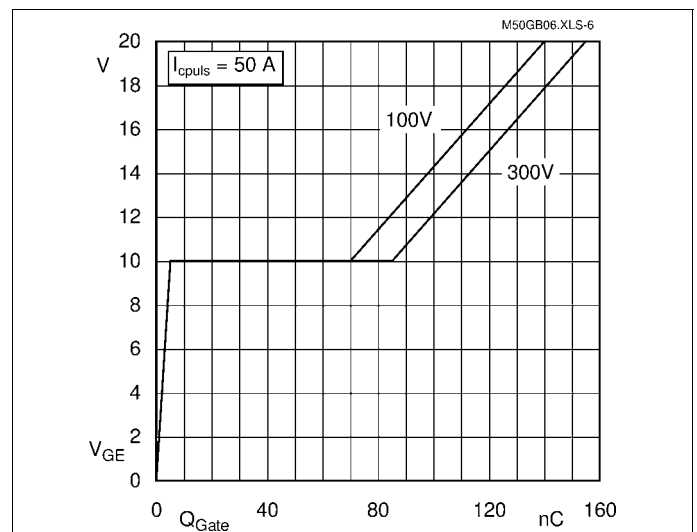


Fig. 6: Typ. gate charge characteristic

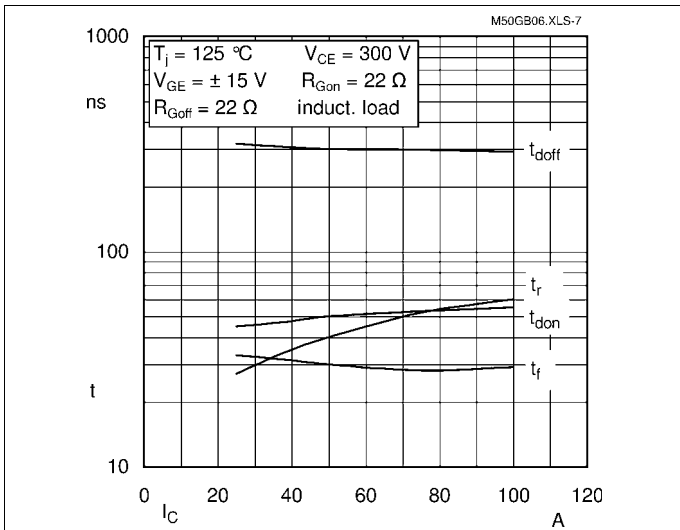


Fig. 7: Typ. switching times vs. I_C

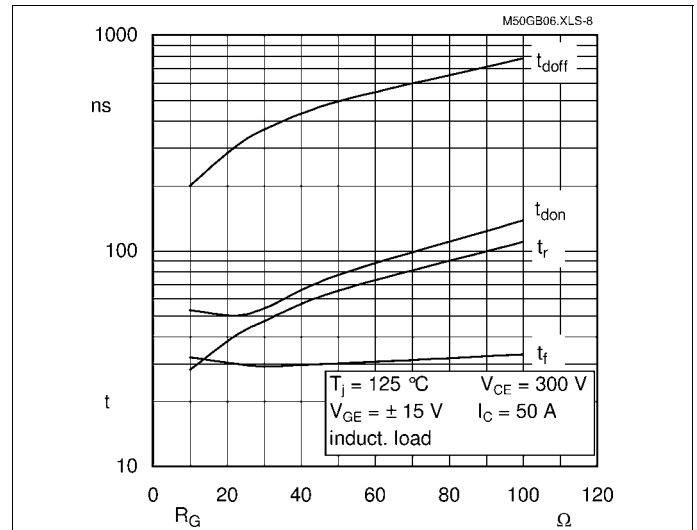


Fig. 8: Typ. switching times vs. gate resistor R_G

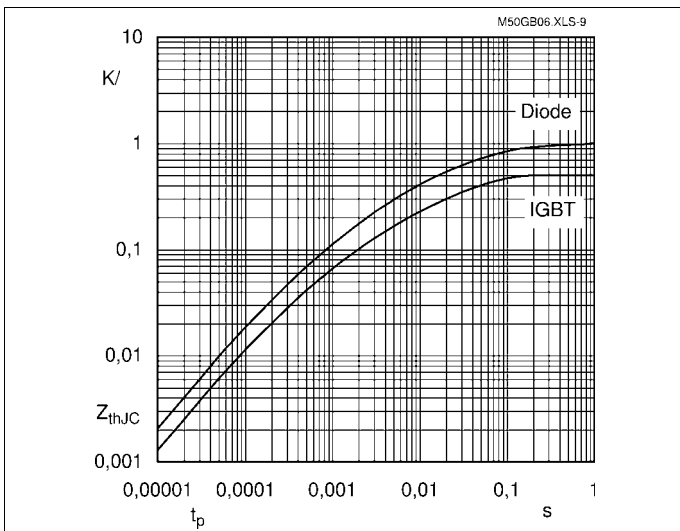


Fig. 9: Transient thermal impedance

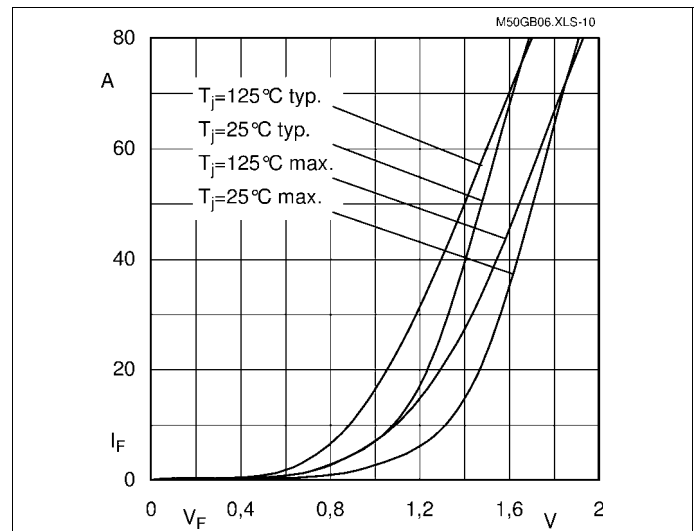


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC+EE'}$

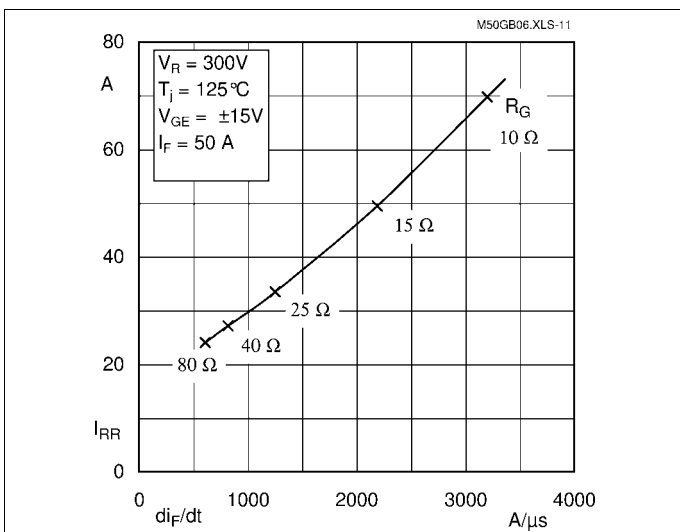


Fig. 11: CAL diode peak reverse recovery current

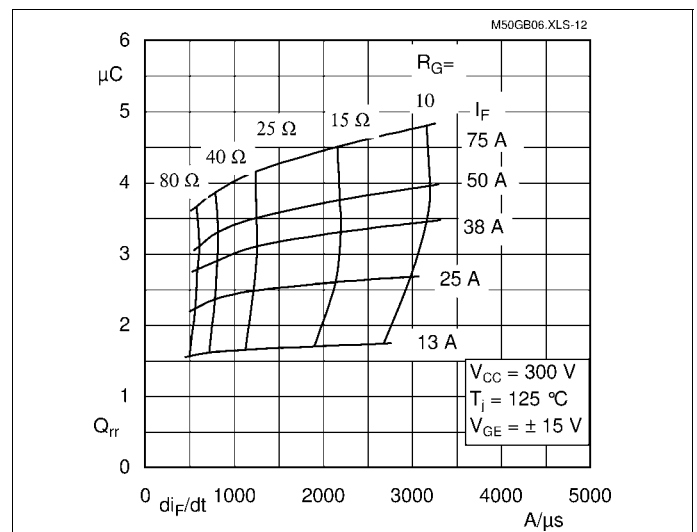
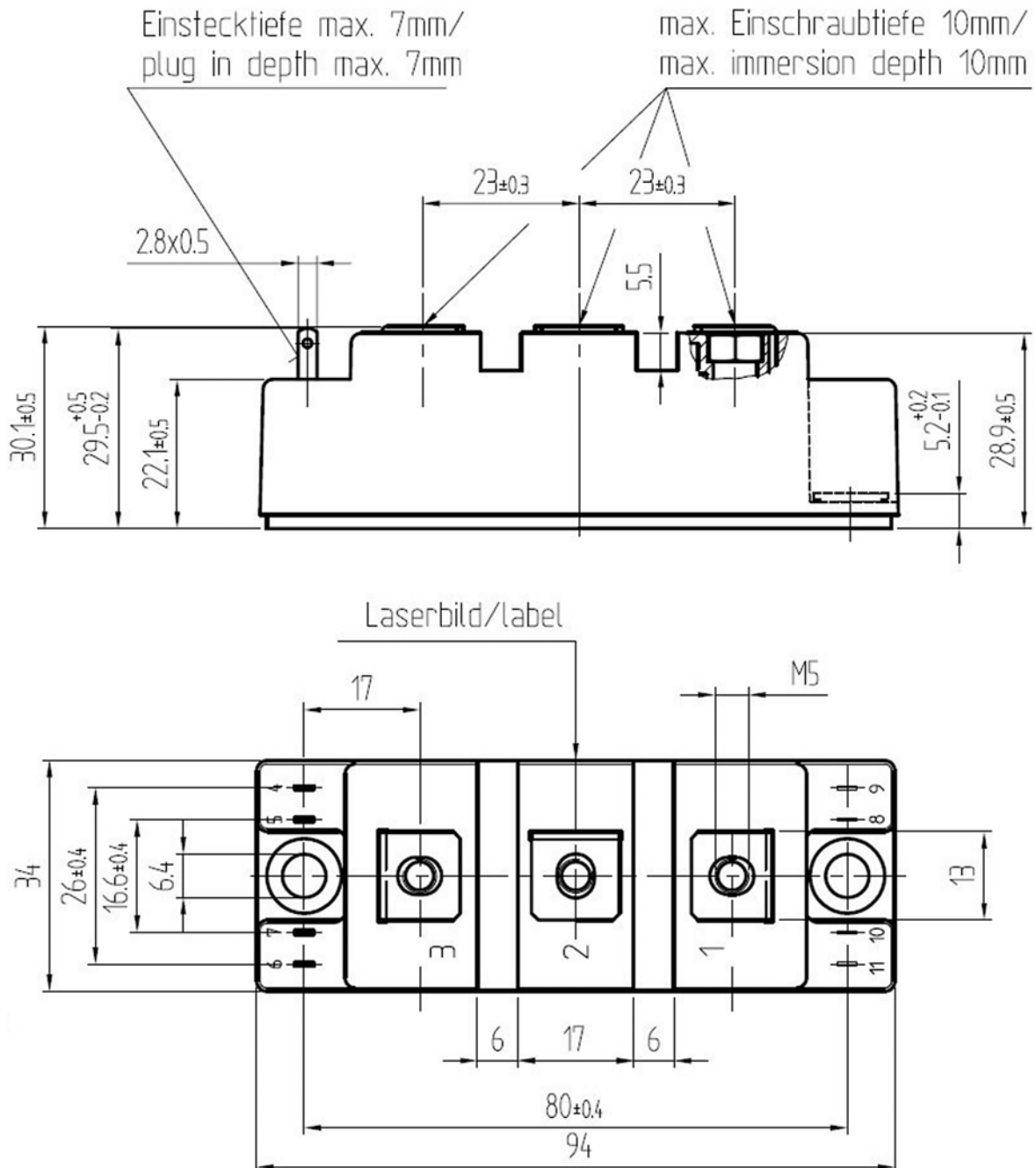
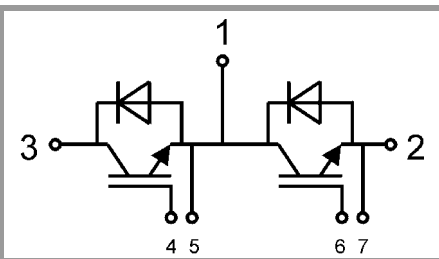


Fig. 12: Typ. CAL diode peak reverse recovery charge

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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 personal.