

SKM800GA125D



SEMITRANS® 4

SKM800GA125D

Features

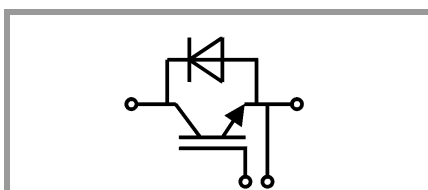
- Homogeneous Si
- NPT-IGBT
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications*

- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at $f_{sw} > 20$ kHz

Remarks

- $I_{DC} \leq 500$ A limited by terminals
- Take care of over-voltage caused by stray inductances



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Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
IGBT			
V_{CES}	$T_j = 25\text{ °C}$	1200	V
I_C	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	760
		$T_c = 80\text{ °C}$	530
I_{Cnom}		600	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	1200	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 600\text{ V}$	$T_j = 125\text{ °C}$	10
	$V_{GE} \leq 15\text{ V}$		
	$V_{CES} \leq 1200\text{ V}$		μs
T_j		-40 ... 150	°C
Inverse diode			
I_F	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	720
		$T_c = 80\text{ °C}$	500
I_{Fnom}		600	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	1200	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25\text{ °C}$	5760	A
T_j		-40 ... 150	°C
Module			
$I_{t(RMS)}$		500	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$	4000	V

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_C = 600\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25\text{ °C}$	3.20	3.70	V
		$T_j = 125\text{ °C}$	4.00	4.80	V
V_{CE0}	chipelevel	$T_j = 25\text{ °C}$	1.50	1.75	V
		$T_j = 125\text{ °C}$	1.70	1.95	V
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25\text{ °C}$	2.83	3.25	m Ω
		$T_j = 125\text{ °C}$	3.83	4.75	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 24\text{ mA}$	4.5	5.5	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25\text{ °C}$		0.6	mA
				-	mA
C_{ies}	$V_{CE} = 25\text{ V}$	$f = 1\text{ MHz}$	37.2		nF
C_{oes}	$V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	5.6		nF
C_{res}		$f = 1\text{ MHz}$	2.80		nF
Q_G	$V_{GE} = -8\text{ V...} + 15\text{ V}$		4200		nC
R_{Gint}	$T_j = 25\text{ °C}$		0.5		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 600\text{ A}$	$T_j = 125\text{ °C}$	480		ns
t_r	$V_{GE} = +15/-15\text{ V}$	$T_j = 125\text{ °C}$	116		ns
E_{on}	$R_{Gon} = 0.5\text{ }\Omega$	$T_j = 125\text{ °C}$	88		mJ
$t_{d(off)}$	$R_{Goff} = 0.5\text{ }\Omega$	$T_j = 125\text{ °C}$	666		ns
t_f		$T_j = 125\text{ °C}$	58		ns
E_{off}		$T_j = 125\text{ °C}$	48		mJ
$R_{th(j-c)}$	per IGBT			0.03	K/W



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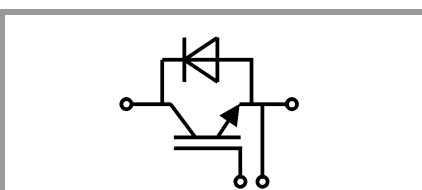
Typical Applications*

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- Inductive heating
- Electronic welders at $f_{sw} > 20$ kHz

Remarks

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- Take care of over-voltage caused by stray inductances

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 600$ A $V_{GE} = 0$ V chipelevel	$T_j = 25$ °C		2.3	2.58	V
		$T_j = 125$ °C		1.87	2.38	V
V_{F0}	chipelevel	$T_j = 25$ °C		1.10	1.45	V
		$T_j = 125$ °C		0.85	1.20	V
r_F	chipelevel	$T_j = 25$ °C		1.61	1.88	mΩ
		$T_j = 125$ °C		1.70	1.96	mΩ
I_{RRM}	$I_F = 600$ A	$T_j = 125$ °C		370		A
Q_{rr}	$V_{GE} = \pm 15$ V $V_{CC} = 600$ V	$T_j = 125$ °C		83		μC
E_{rr}		$T_j = 125$ °C		28		mJ
$R_{th(j-c)}$	per diode				0.07	K/W
Module						
L_{CE}				15		nH
$R_{CC'+EE'}$	terminal-chip	$T_C = 25$ °C		0.18		mΩ
		$T_C = 125$ °C		0.22		mΩ
$R_{th(c-s)}$	per module			0.02	0.038	K/W
M_s	to heat sink M6			3	5	Nm
M_t	to terminals	M6		2.5	5	Nm
		M4		1.1	2	Nm
w					330	g



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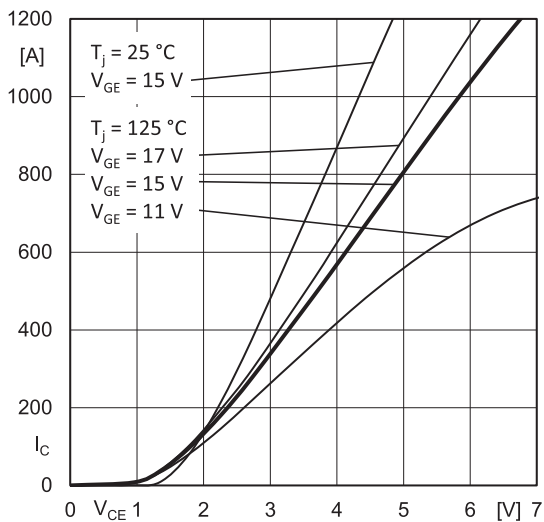


Fig. 1: Typ. output characteristic, inclusive R_{CC+EE}

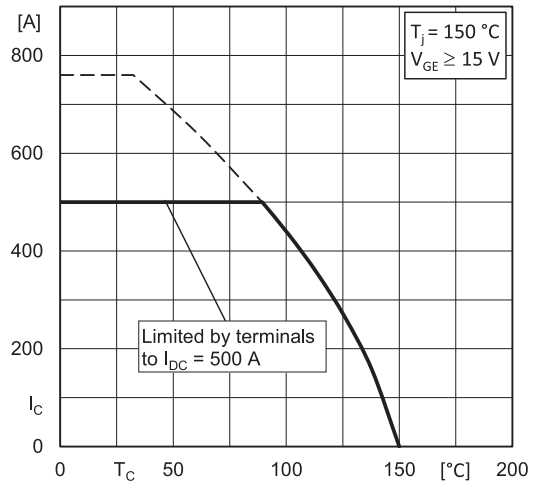


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

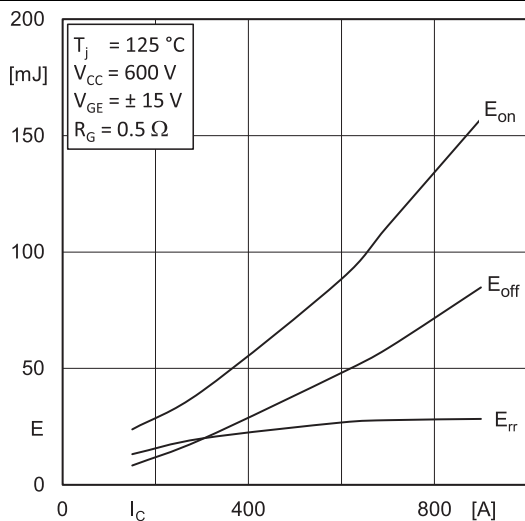


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

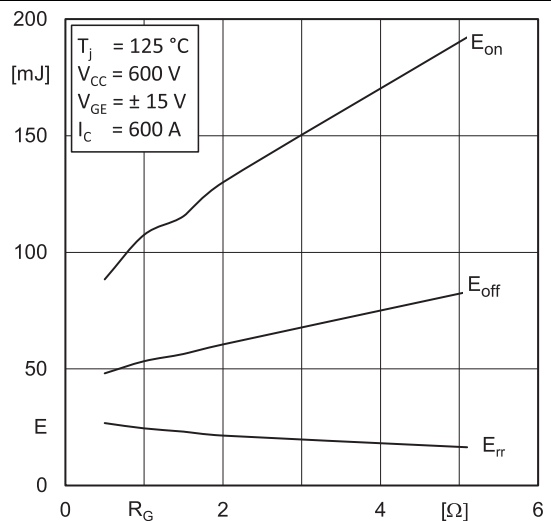


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

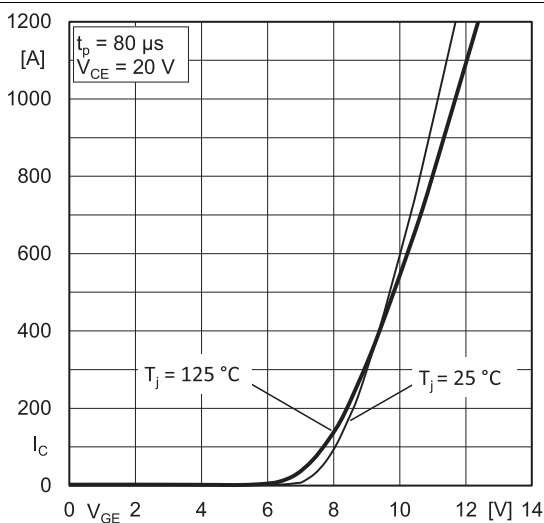


Fig. 5: Typ. transfer characteristic

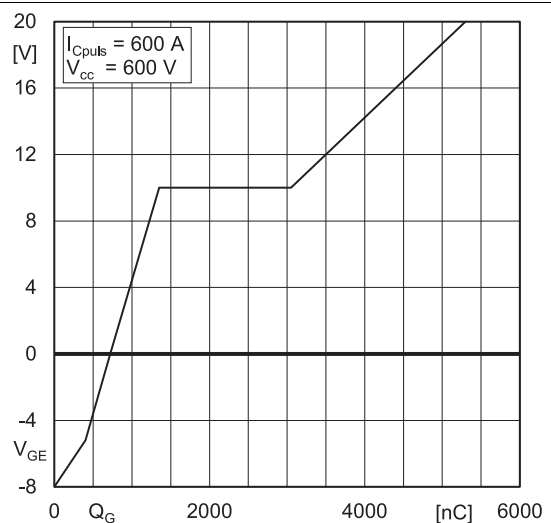


Fig. 6: Typ. gate charge characteristic

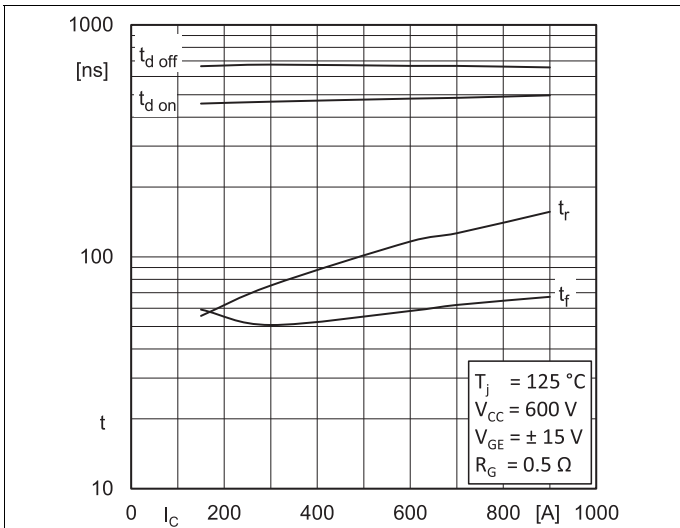


Fig. 7: Typ. switching times vs. I_C

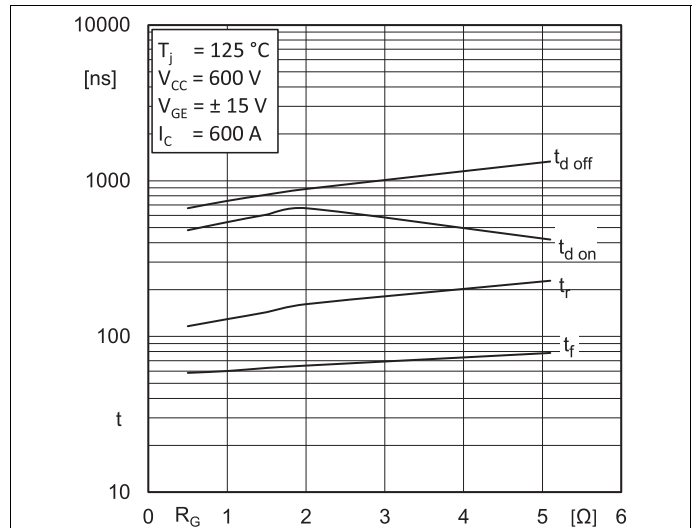


Fig. 8: Typ. switching times vs. gate resistor R_G

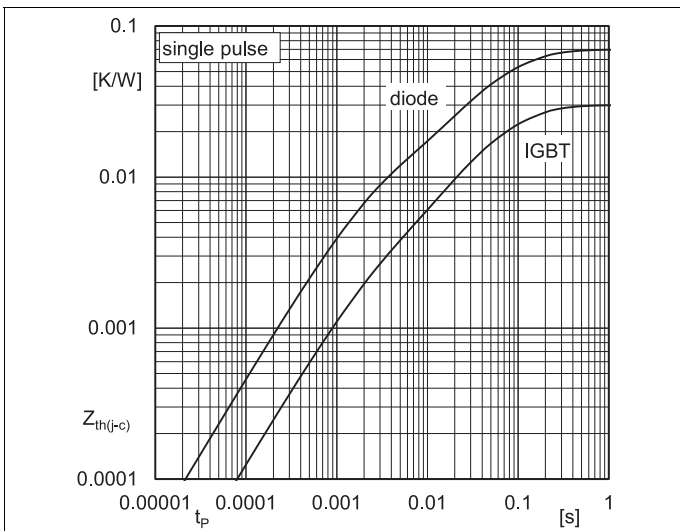


Fig. 9: Transient thermal impedance

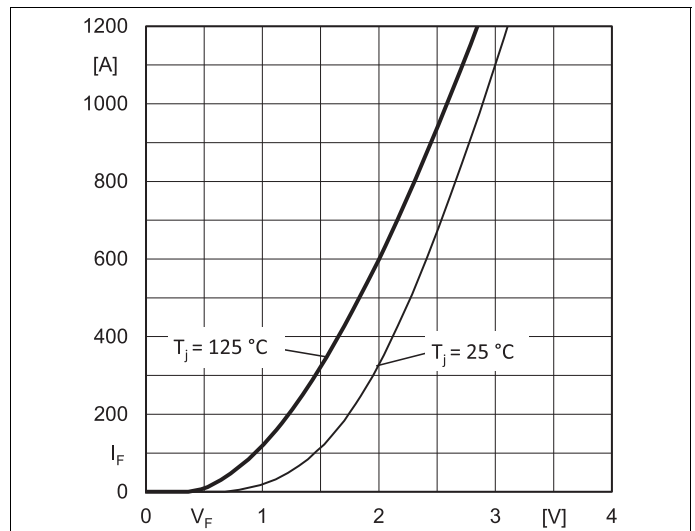


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC+EE'}$

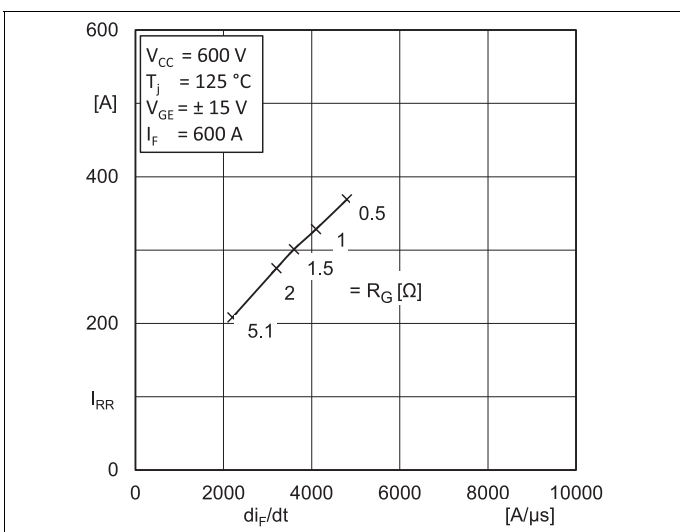


Fig. 11: CAL diode peak reverse recovery current

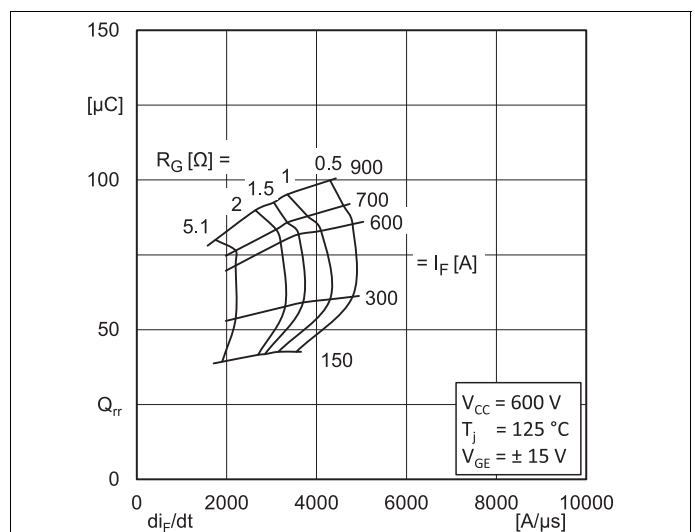
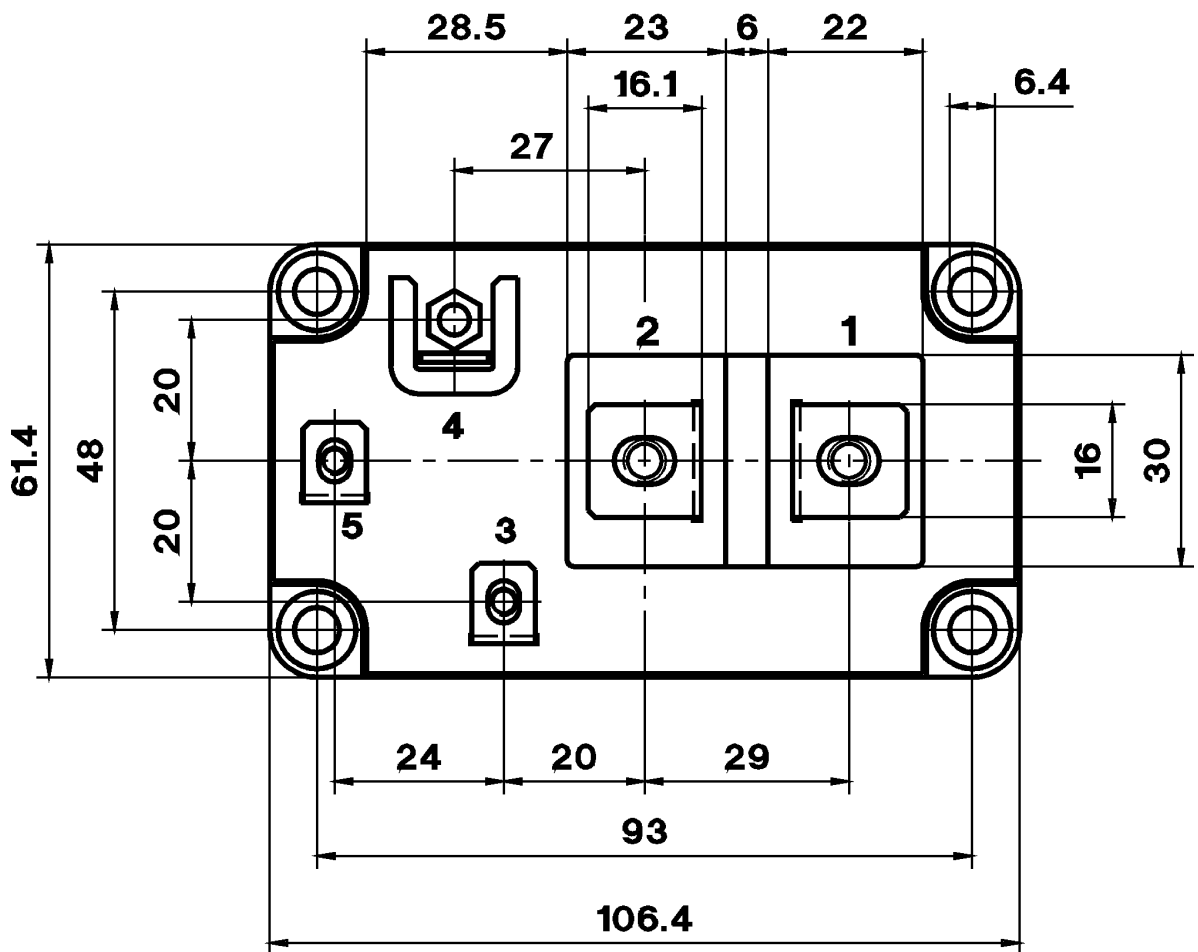
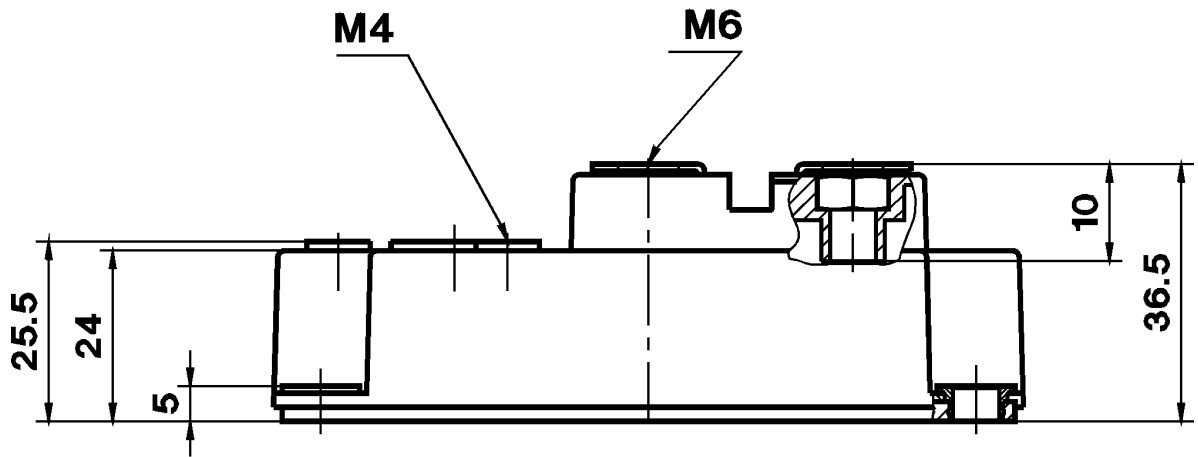
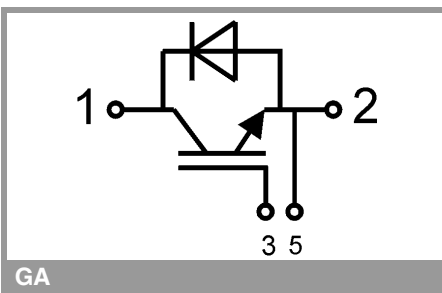


Fig. 12: Typ. CAL diode peak reverse recovery charge



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

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