



SKiM[®] 4

Trench IGBT Modules

SKiM 304GD12T4D

Preliminary Data

Features

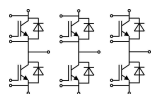
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications*

- Automotive inverter
- AC inverter drives

Absolute Maximum Ratings		$T_{case} = 25^{\circ}C$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25^{\circ}C$	1200	V	
I_C	$T_j = 150^{\circ}C$	$T_s = 25^{\circ}C$	285	A
		$T_s = 70^{\circ}C$	215	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	900	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 800 V$; $V_{GE} \leq 15 V$; $T_j = 150^{\circ}C$ $V_{CES} < 1200 V$	10	μs	
Inverse Diode				
I_F	$T_j = 150^{\circ}C$	$T_s = 25^{\circ}C$	220	A
		$T_s = 70^{\circ}C$	160	A
I_{FRM}		400	A	
Module				
$I_{t(RMS)}$		400	A	
T_{vj}		- 40 + 150	$^{\circ}C$	
T_{stg}		- 40 + 125	$^{\circ}C$	
V_{isol}	AC, 1 min.	2500	V	

Characteristics		$T_{case} = 25^{\circ}C$, unless otherwise specified			Units		
Symbol	Conditions	min.	typ.	max.	Units		
IGBT							
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 12 mA$	5	5,8	6,5	V		
I_{CES}	$V_{GE} = 0 V$, $V_{CE} = V_{CES}$			0,3	mA		
V_{CE0}				$T_j = 25^{\circ}C$	0,8	V	
				$T_j = 125^{\circ}C$	0,72	0,82	V
r_{CE}	$V_{GE} = 15 V$			$T_j = 25^{\circ}C$	3,3	3,7	$m\Omega$
				$T_j = 125^{\circ}C$	4,7	5	$m\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 300 A$, $V_{GE} = 15 V$			$T_j = 25^{\circ}C_{chiplev.}$	1,8	2	V
				$T_j = 125^{\circ}C_{chiplev.}$	2,1	2,3	V
C_{ies}	$V_{CE} = 25$, $V_{GE} = 0 V$			$f = 1 MHz$	19	nF	
C_{oes}					1,2	nF	
C_{res}					1	nF	
Q_G	$V_{GE} = -15V...+15V$				1700	nC	
$t_{d(on)}$	$R_{Gon} = 1 \Omega$ $di/dt = 9250 A/\mu s$	$V_{CC} = 600V$ $I_C = 300A$			225	ns	
t_r					40	ns	
E_{on}					21	mJ	
$t_{d(off)}$	$R_{Goff} = 1 \Omega$ $di/dt = 4060 A/\mu s$			$T_j = 125^{\circ}C$ $V_{GE} = -15V/+15V$	435	ns	
					t_f	60	ns
E_{off}					23	mJ	
$R_{th(j-s)}$	per IGBT				0,19	K/W	



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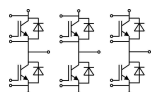
Typical Applications*

- Automotive inverter
- AC inverter drives

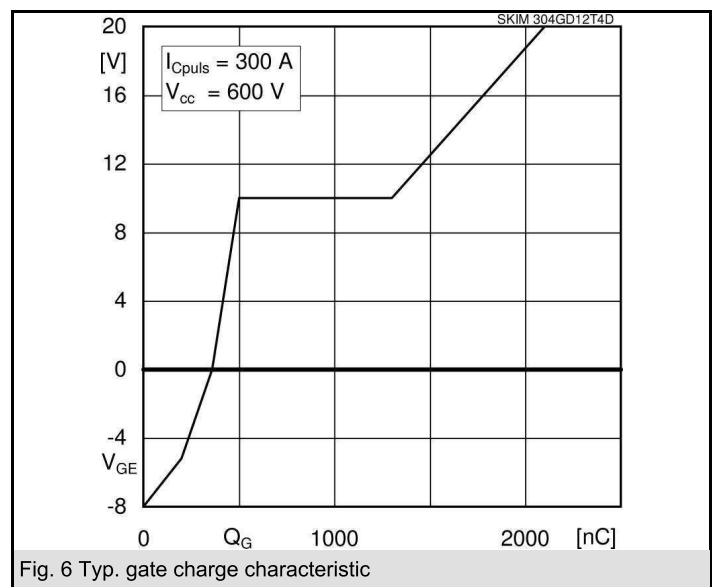
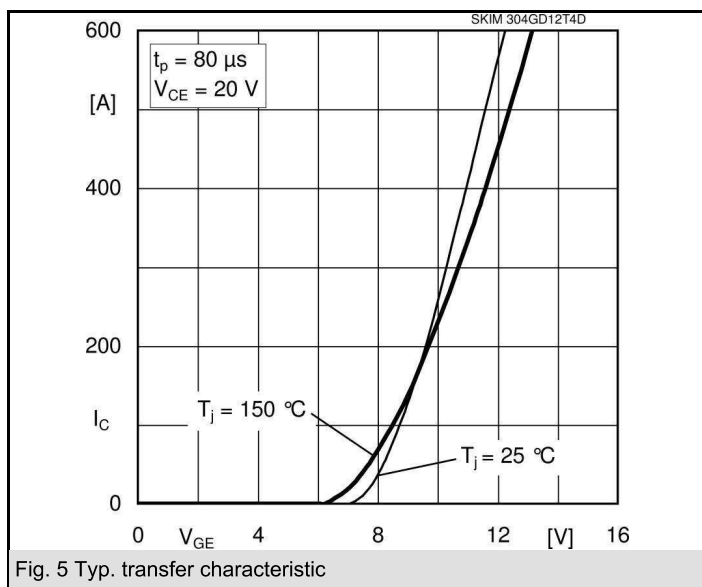
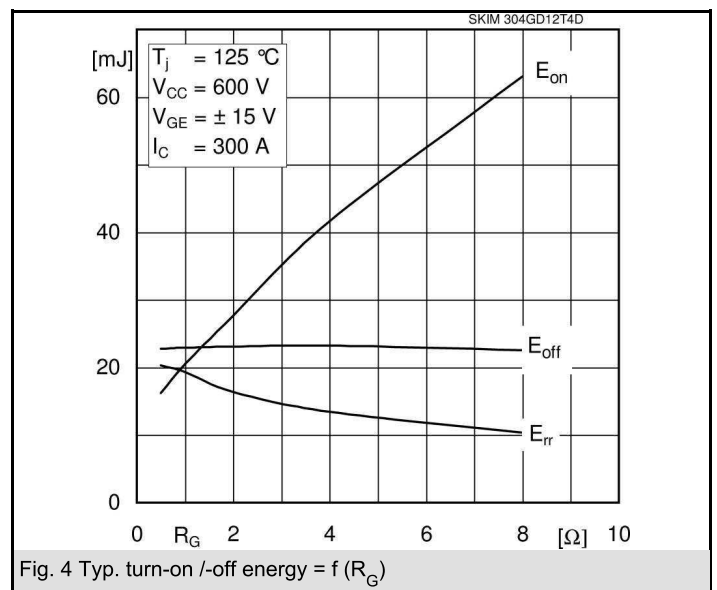
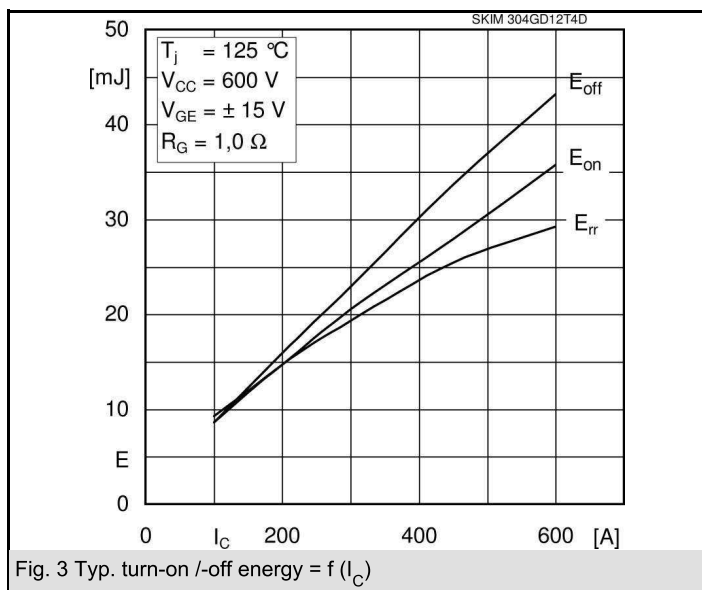
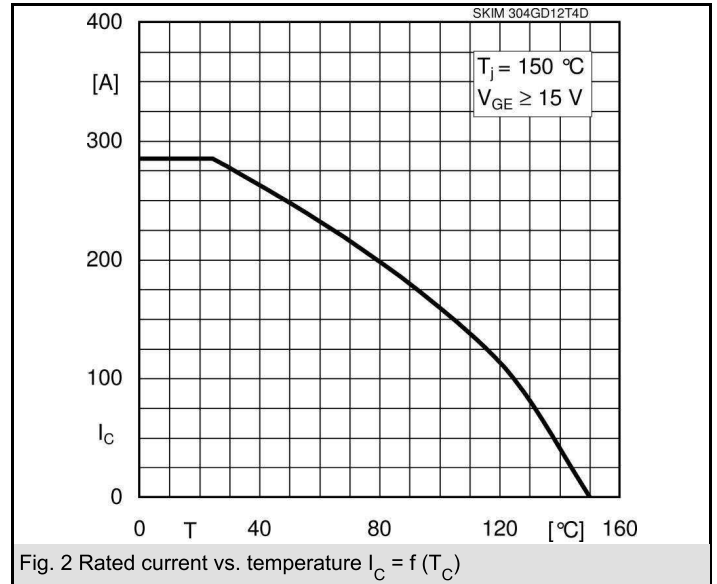
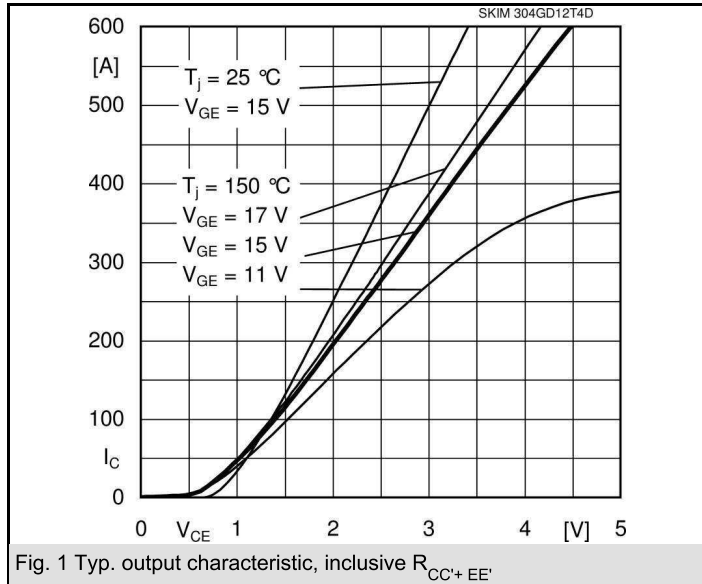
Characteristics			min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		2,3	2,8	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		2,2	2,7	V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$		1,2	1,6	V
		$T_j = 125 \text{ }^\circ\text{C}$		0,9	1,3	V
r_F		$T_j = 25 \text{ }^\circ\text{C}$		3,5	4	m Ω
		$T_j = 125 \text{ }^\circ\text{C}$		4,2	4,7	m Ω
I_{RRM}	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		430		A
Q_{rr}				45		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			19,3		mJ
$R_{th(j-s)D}$	per diode				0,25	K/W
Module						
L_{CE}					20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$		1,35		m Ω
		$T_{case} = 125 \text{ }^\circ\text{C}$		1,75		m Ω
M_s	to heat sink M4					Nm
M_t	to terminals M6		4		5	Nm
w					310	g
Temperature sensor						
R_{100}	$T_c = 100 \text{ }^\circ\text{C}$ ($R_{25} = 1,0 \text{ k}\Omega$)			1,67		k Ω
$B_{100/125}$	$R(T) = R_{100} \cdot \exp[B_{100/125} \cdot (1/T - 1/373)]$; $T[\text{K}]$					K

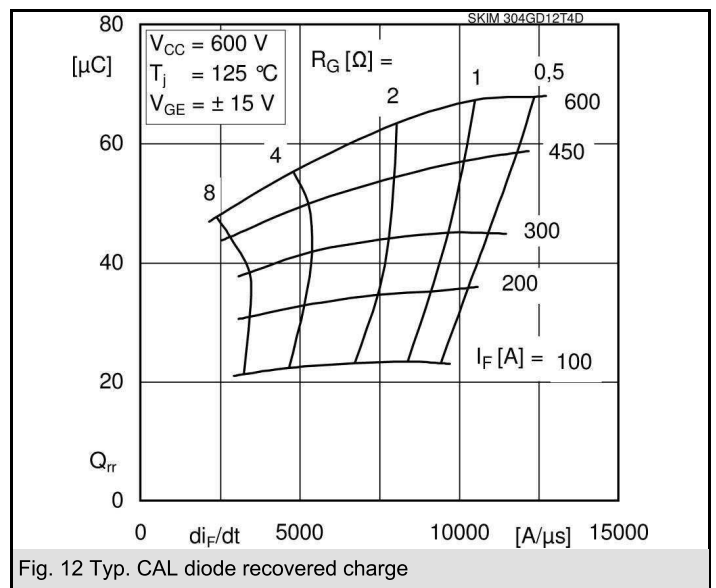
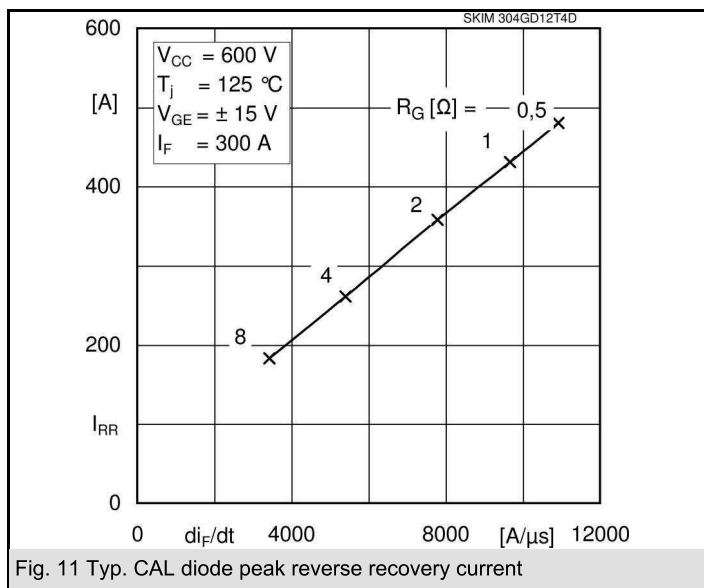
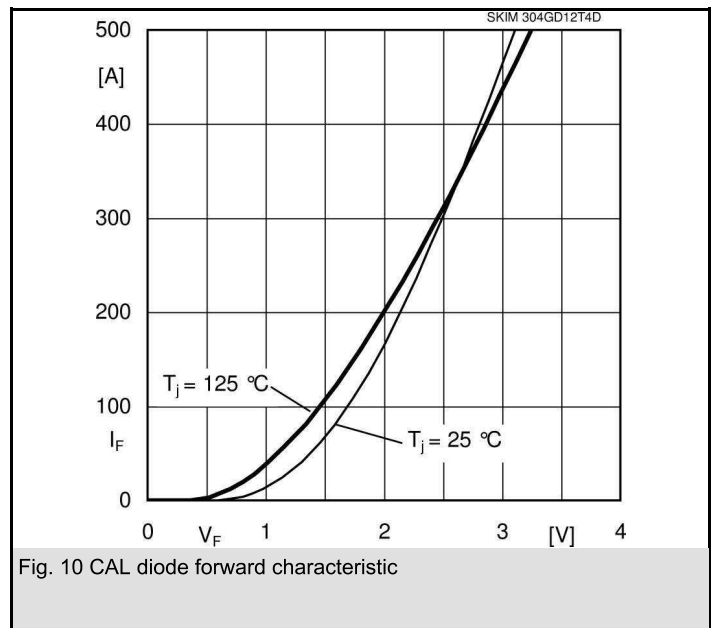
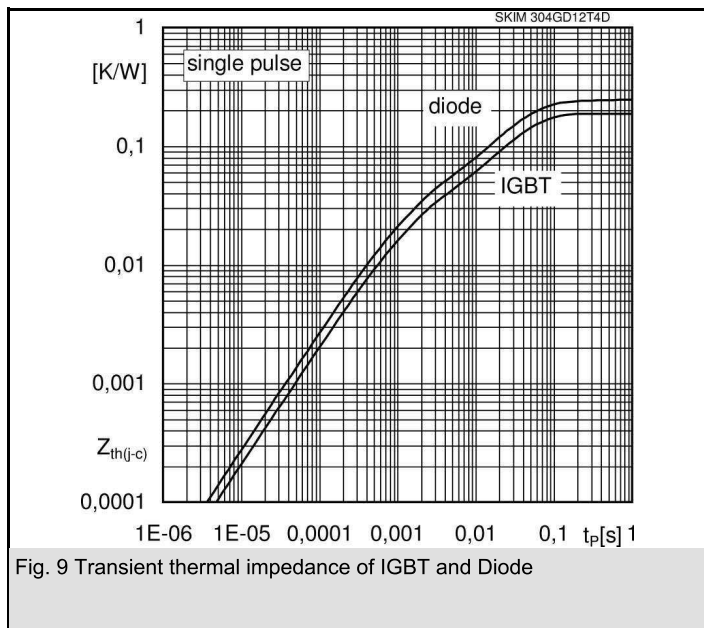
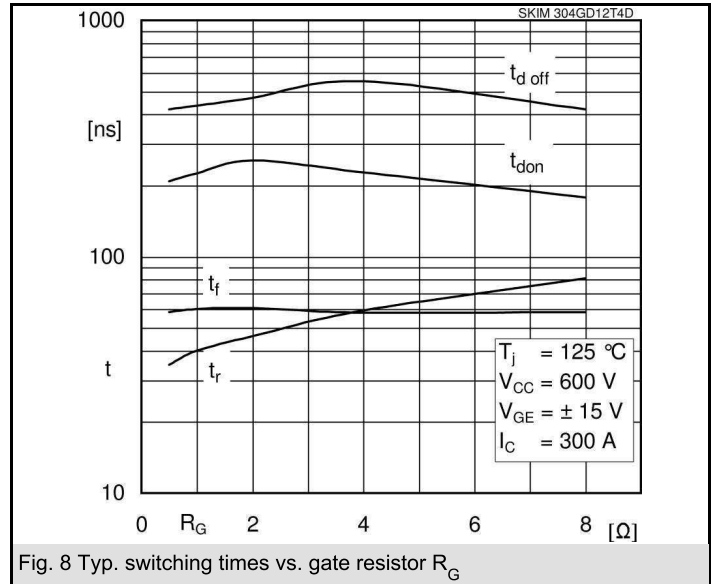
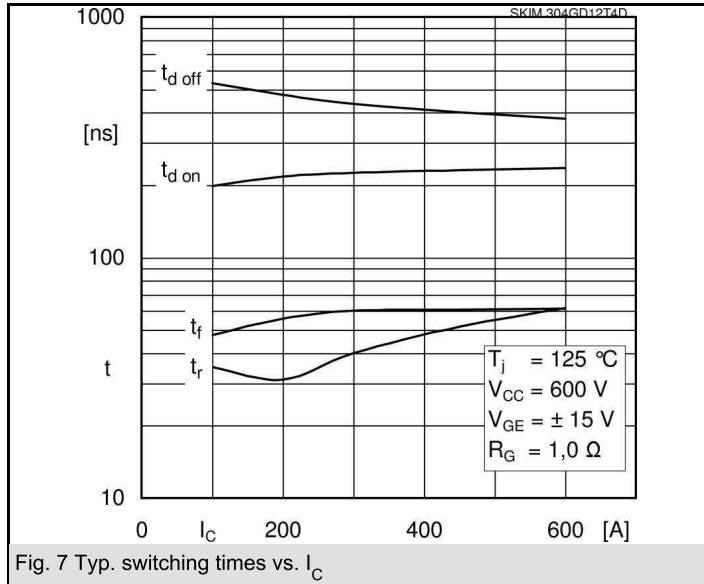
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

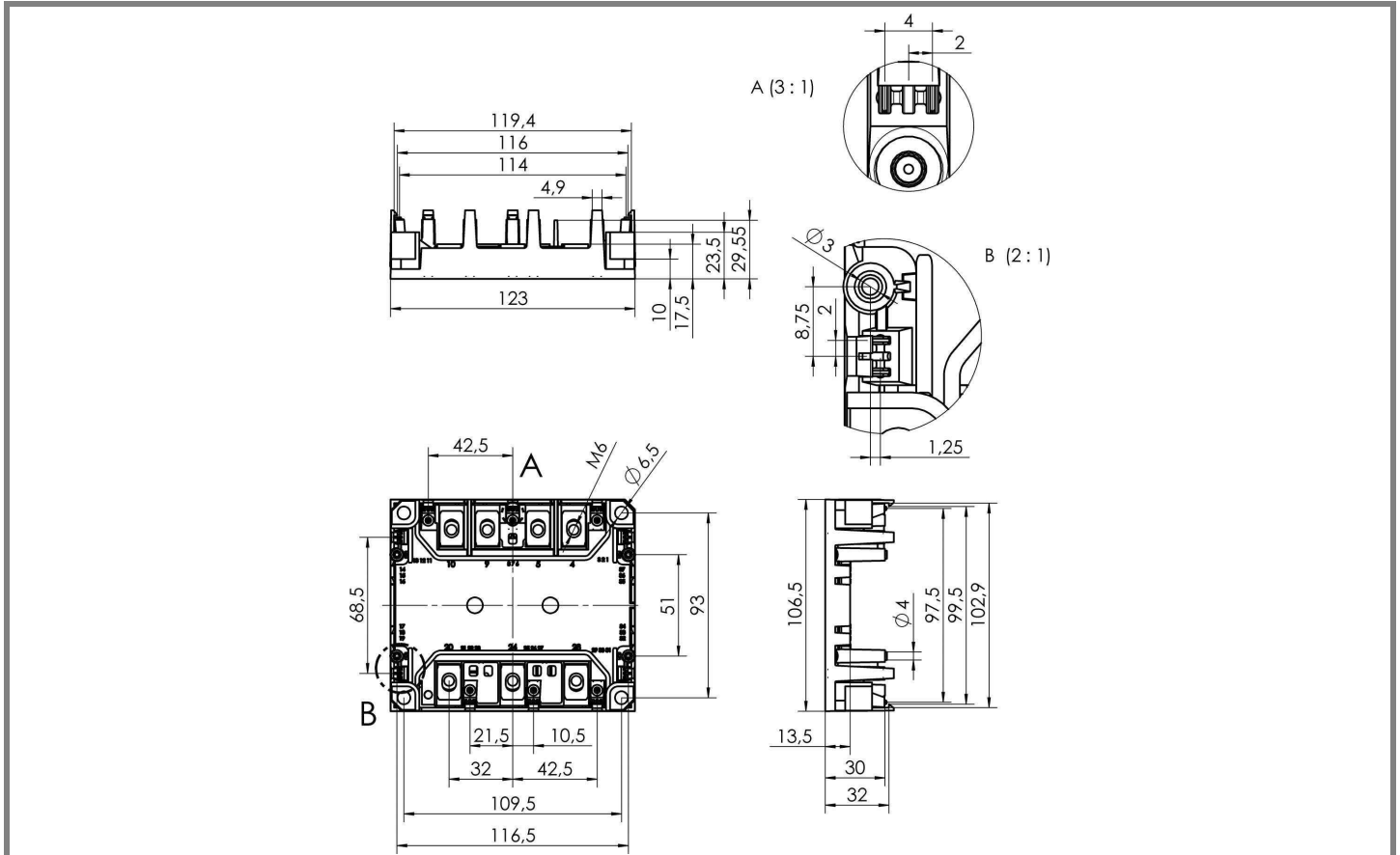
* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and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



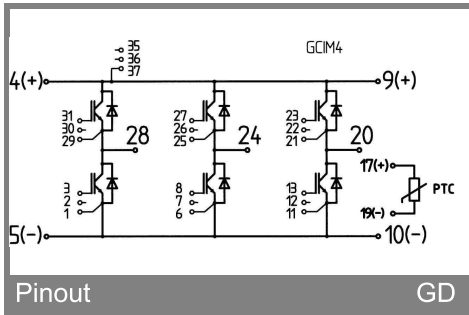
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Case SKiM 4



Pinout

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