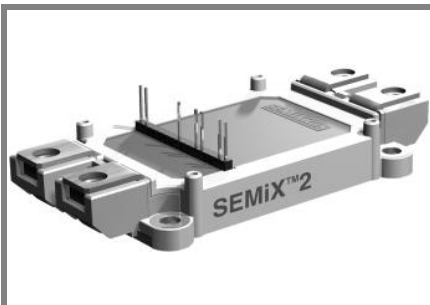


# SEMiX 402GB066HD



SEMiX<sup>®</sup> 2

## Trench IGBT Modules

### SEMiX 402GB066HD

Preliminary Data

#### Features

- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$  with positive temperature coefficient

#### Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

#### Remarks

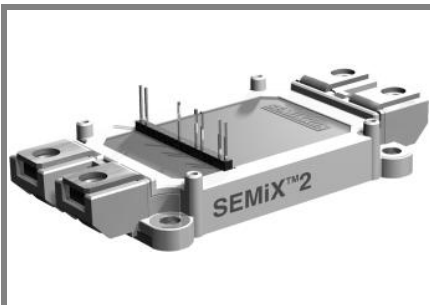
- Case temperature limited to  $T_C=125^\circ\text{C}$  max.
- Product reliability results are valid for  $T_j=150^\circ\text{C}$
- use of soft RG necessary take care of over-voltage caused by stray inductance
- not for new design



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Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values	Units	
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	600	V	
$I_C$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	505	A
		$T_c = 80^\circ\text{C}$	380	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	800	A	
$V_{GES}$		$\pm 20$	V	
$t_{psc}$	$V_{CC} = 360\text{ V}; V_{GE} \leq 15\text{ V}; T_j = 150^\circ\text{C}$ $V_{CES} < 600\text{ V}$	6	$\mu\text{s}$	
<b>Inverse Diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	540	A
		$T_c = 80^\circ\text{C}$	395	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	800	A	
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 25^\circ\text{C}$	1800	A
<b>Module</b>				
$I_{t(RMS)}$		600	A	
$T_{vj}$		- 40 ... + 175	$^\circ\text{C}$	
$T_{stg}$		- 40 ... + 125	$^\circ\text{C}$	
$V_{isol}$	AC, 1 min.	4000	V	

Characteristics		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6,4\text{ mA}$		5,8		V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$			0,45	mA
$V_{CE0}$		$T_j = 25^\circ\text{C}$	0,9	1	V
		$T_j = 150^\circ\text{C}$	0,85	0,9	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	1,4	2,25	m $\Omega$
		$T_j = 150^\circ\text{C}$	2,15	3	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 400\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,45	1,9	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	1,7	2,1	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	25		nF
$C_{oes}$			1,5		nF
$C_{res}$			0,8		nF
$Q_G$	$V_{GE} = -8 \dots +15\text{V}$		3200		nC
$t_{d(on)}$	$R_{Gon} = 4,5\ \Omega$	$V_{CC} = 300\text{V}$ $I_{Cnom} = 400\text{A}$	150		ns
$t_r$			125		ns
$E_{on}$	$R_{Goff} = 4,5\ \Omega$	$T_j = 150^\circ\text{C}$	22		mJ
$t_{d(off)}$			900		ns
$t_f$			65		ns
$E_{off}$			24		mJ
$R_{th(j-c)}$	per IGBT		0,12		K/W



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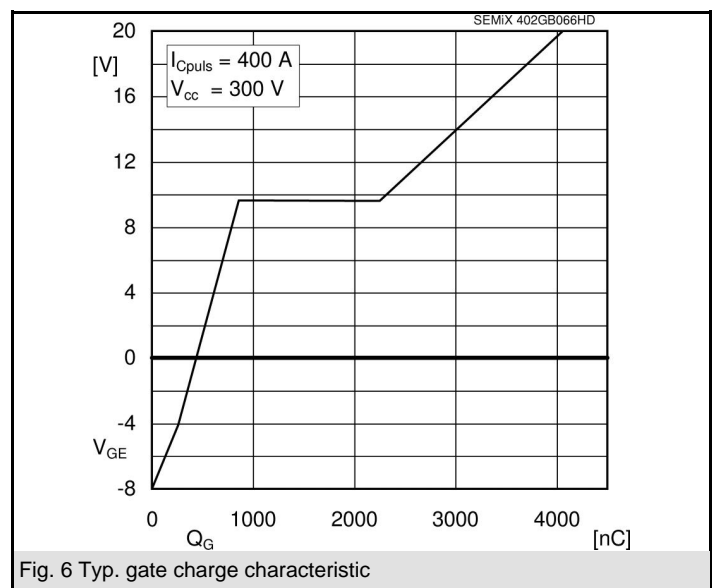
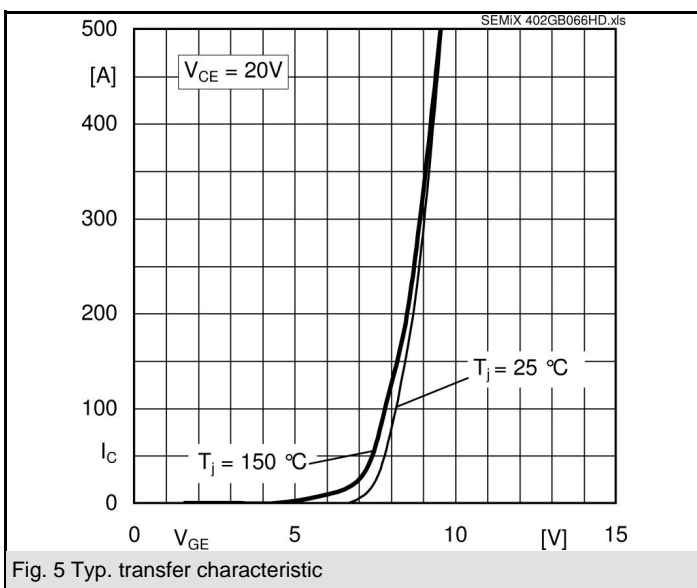
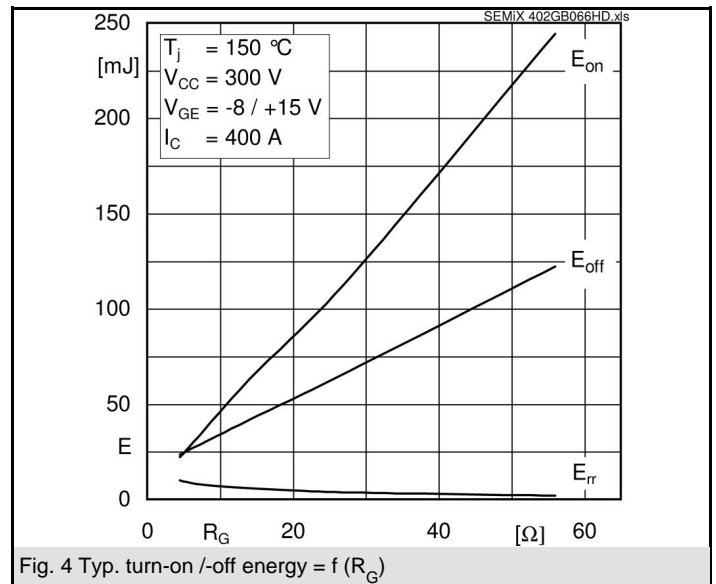
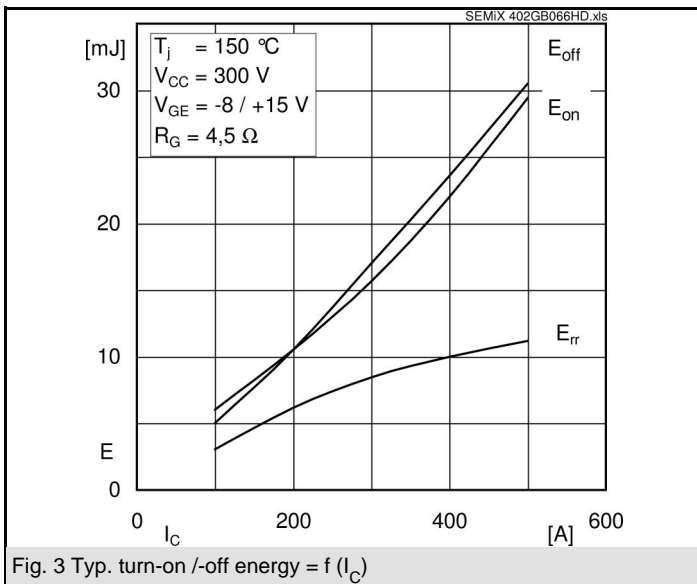
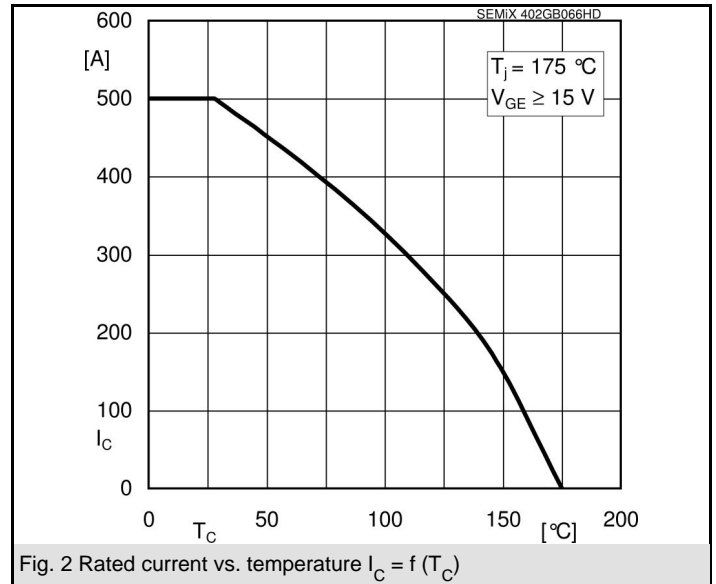
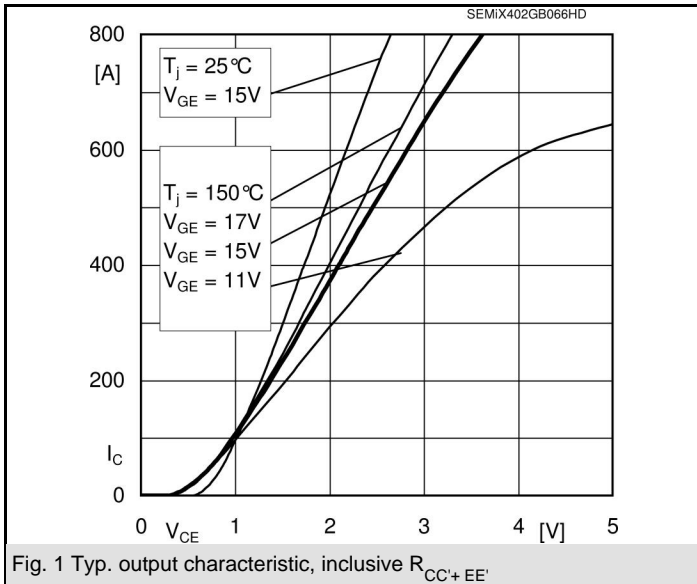


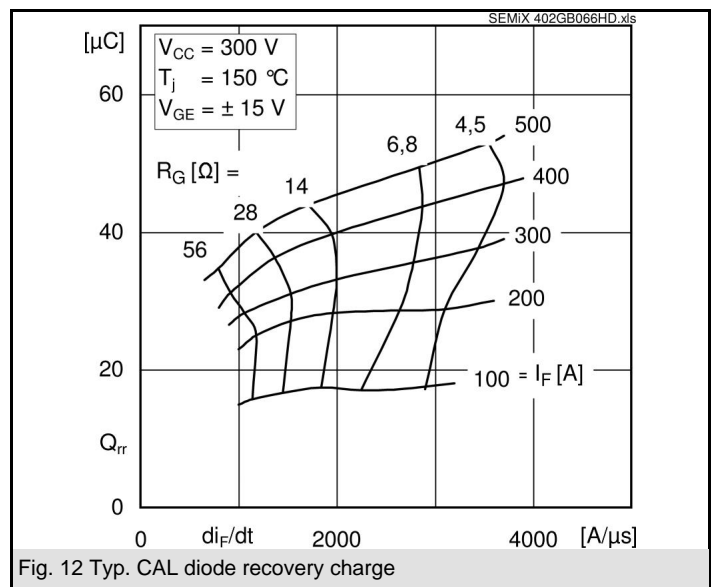
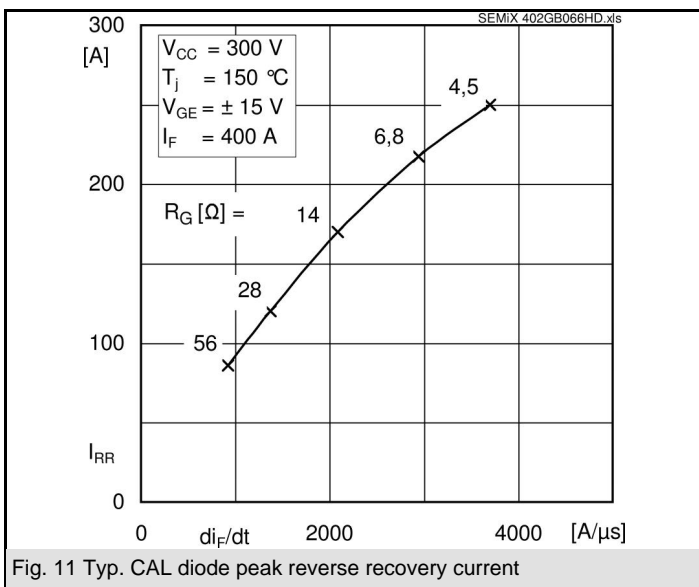
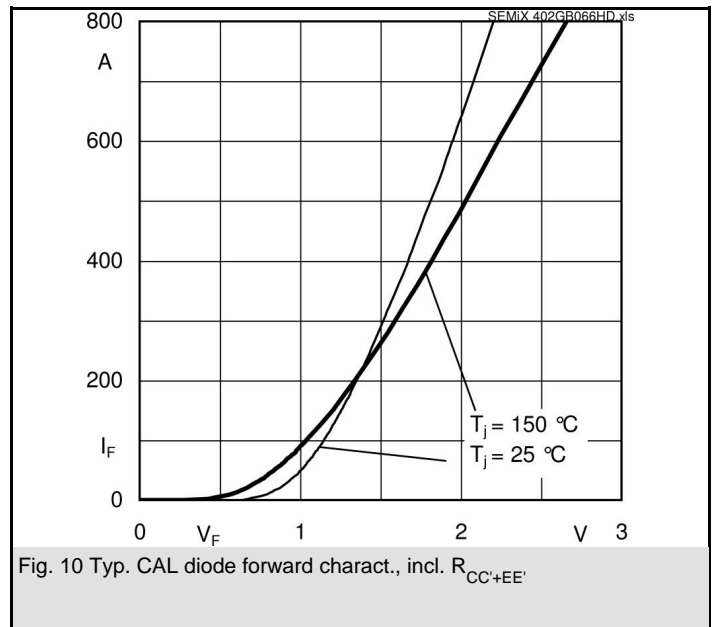
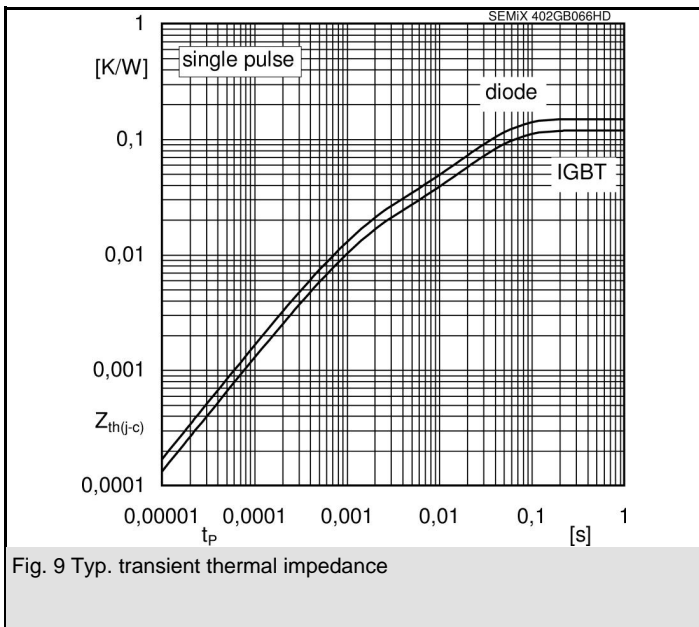
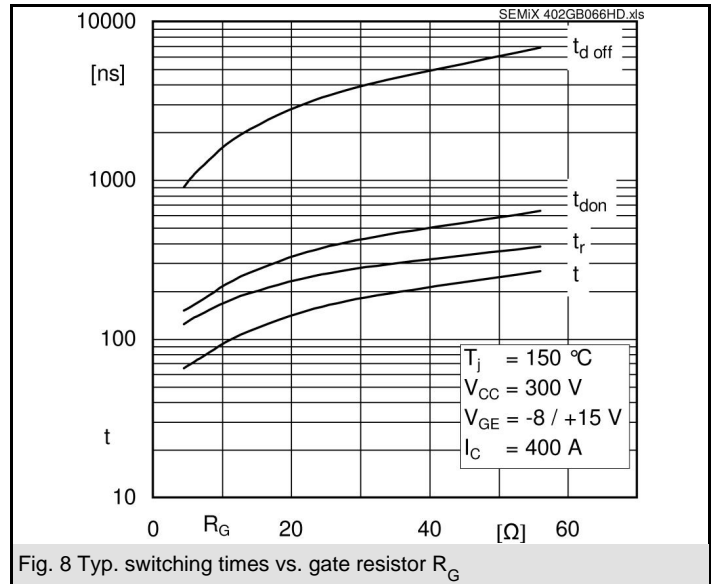
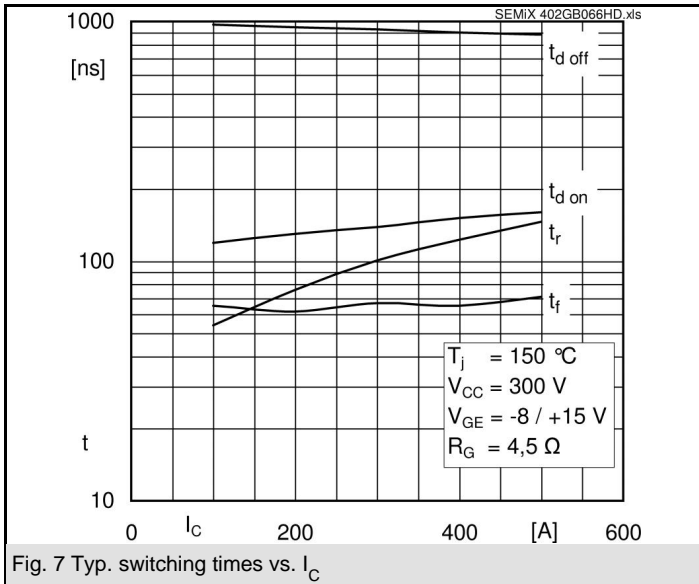
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Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
<b>Inverse Diode</b>							
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$		1,4	1,6		V
		$T_j = 150^\circ\text{C}_{chiplev.}$		1,4	1,6		V
$V_{F0}$		$T_j = 25^\circ\text{C}$		1	1,1		V
		$T_j = 150^\circ\text{C}$		0,85	0,95		V
$r_F$		$T_j = 25^\circ\text{C}$		1	1,25		mΩ
		$T_j = 150^\circ\text{C}$		1,4	1,65		mΩ
$I_{RRM}$	$I_{Fnom} = 400 \text{ A}$	$T_j = 150^\circ\text{C}$		250			A
$Q_{rr}$	$di/dt = 3700 \text{ A}/\mu\text{s}$			47			μC
$E_{rr}$	$V_{GE} = -8 \text{ V}; V_{CC} = 300 \text{ V}$			10			mJ
$R_{th(j-c)D}$	per diode				0,15		K/W
<b>Module</b>							
$L_{CE}$				18			nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25^\circ\text{C}$		0,7			mΩ
		$T_{case} = 125^\circ\text{C}$		1			mΩ
$R_{th(c-s)}$	per module			0,045			K/W
$M_s$	to heat sink (M5)			3	5		Nm
$M_t$	to terminals (M6)			2,5	5		Nm
w					250		g
<b>Temperature sensor</b>							
$R_{100}$	$T_c = 100^\circ\text{C}$ ( $R_{25} = 5 \text{ k}\Omega$ )			0,493±5%			kΩ
$B_{100/125}$	$R(T) = R_{100} \exp[B_{100/125} (1/T - 1/T_{100})]$ ; $T[\text{K}]; B$			3550±2%			K

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

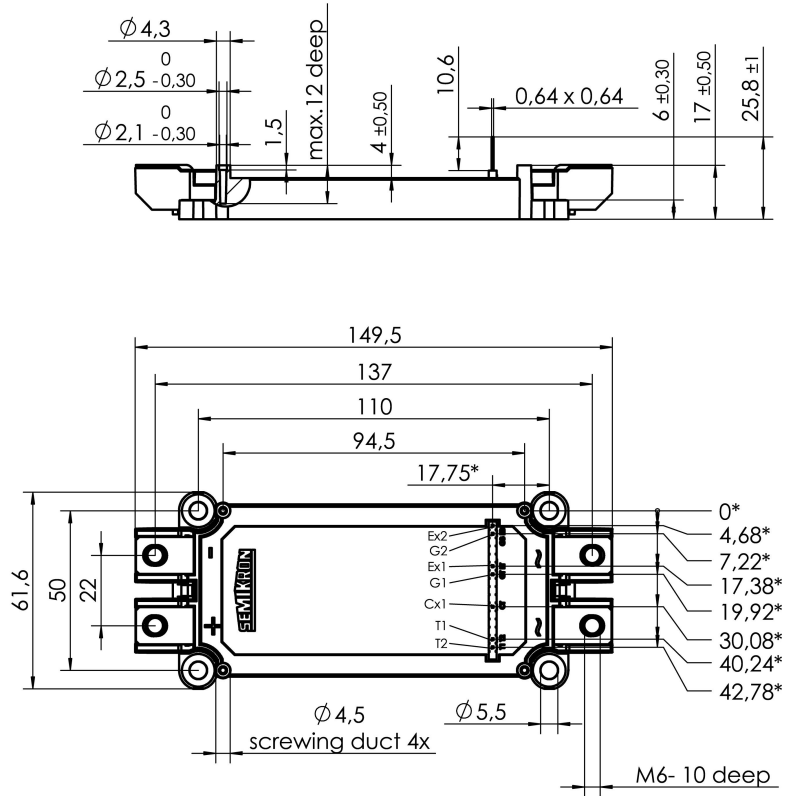
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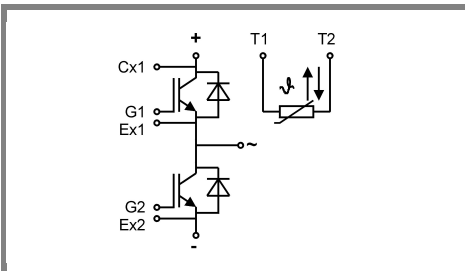
# SEMiX 402GB066HD

case: SEMiX 3



\* = all measures with  $\pm 0,5$

Case SEMiX 2s



Pinout

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