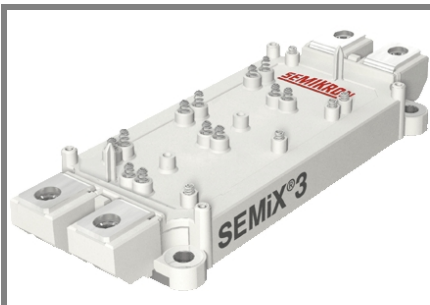


SEMiX 453GB12T4s



SEMiX® 3s

Trench IGBT Modules

SEMiX 453GB12T4s

SEMiX 453GAL12T4s

SEMiX 453GAR12T4s

Target Data

Features

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

Typical Applications

- AC inverter drives
- UPS
- Electronic Welding

Remarks

- Case temperature limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j=150^\circ\text{C}$
- Dynamic values apply to the following combination of resistors:

$$R_{Gon,main} = 1,0\Omega,$$

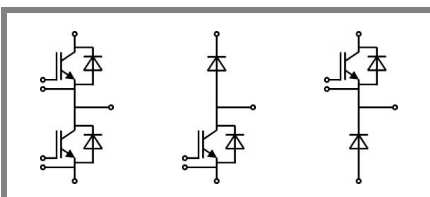
$$R_{Goff,main} = 1,0\Omega,$$

$$R_{G,x} = 2,2\Omega \text{ each,}$$

$$R_{E,x} = 0,5\Omega \text{ each}$$

Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	685	A
		$T_c = 80^\circ\text{C}$	525	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	1350	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 150^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10	μs	
Inverse Diode				
I_F	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	545	A
		$T_c = 80^\circ\text{C}$	405	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	1350	A	
Module				
$I_{t(RMS)}$		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
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 18\text{ mA}$	5	5,8	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$			0,3	mA
V_{CE0}		$T_j = 25^\circ\text{C}$	0,8	0,9	V
		$T_j = 150^\circ\text{C}$	0,7	0,8	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	2,2	2,4	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	3,3	3,6	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 450\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,8	2	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	2,2	2,4	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	27,9		nF
C_{oes}			1,7		nF
C_{res}			1,5		nF
Q_G	$V_{GE} = -8 \dots +15\text{ V}$	2600		nC	
R_{Gint}	$T_j = 25^\circ\text{C}$	1,7		Ω	
$t_{d(on)}$	$R_{Gon} = 1,9\ \Omega$ $di/dt = 4000\text{ A}/\mu\text{s}$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 450\text{ A}$ $T_j = 150^\circ\text{C}$	305		ns
t_r			80		ns
E_{on}			45		mJ
$t_{d(off)}$			535		ns
t_f			100		ns
E_{off}	$R_{Goff} = 1,9\ \Omega$ $di/dt = 5000\text{ A}/\mu\text{s}$	50		mJ	
$R_{th(j-c)}$	per IGBT	0,065		K/W	

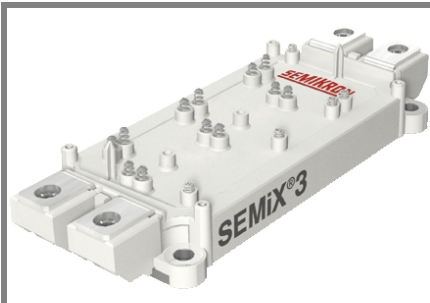


GB

GAL

GAR

SEMiX 453GB12T4s



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Trench IGBT Modules

SEMiX 453GB12T4s

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SEMiX 453GAR12T4s

Target Data

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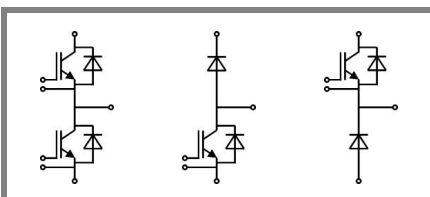
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GB

GAL

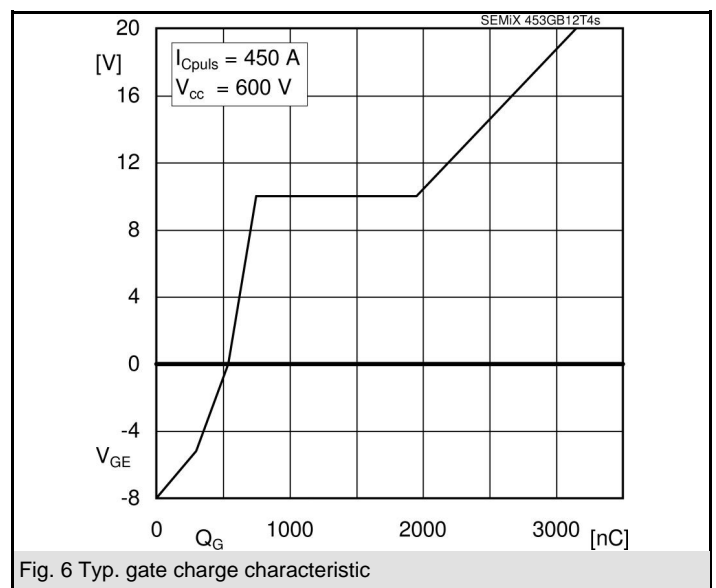
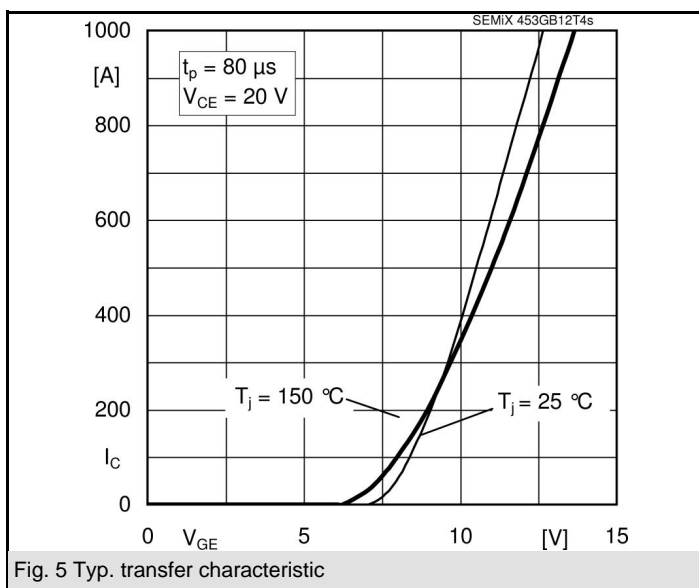
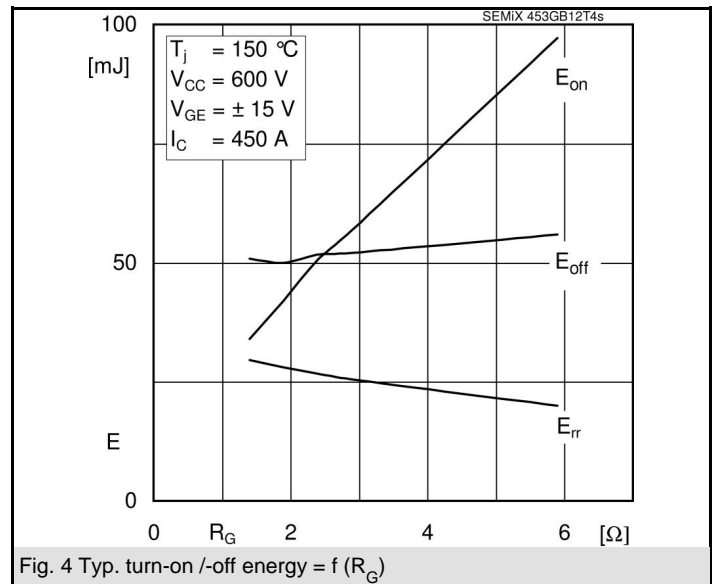
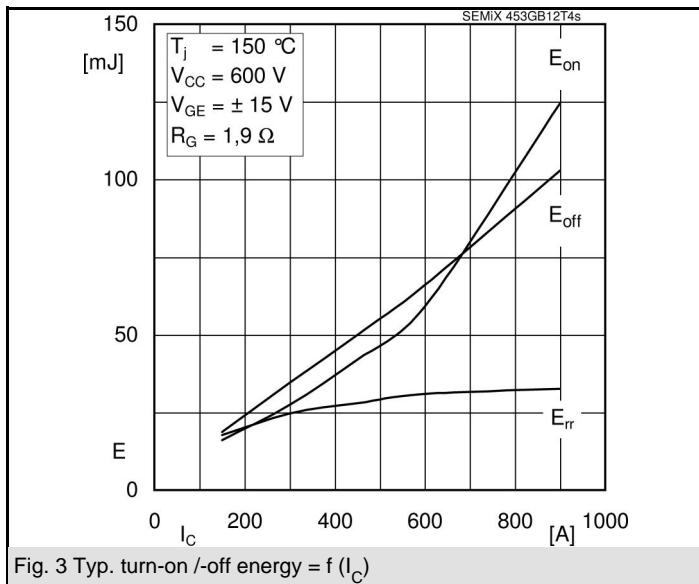
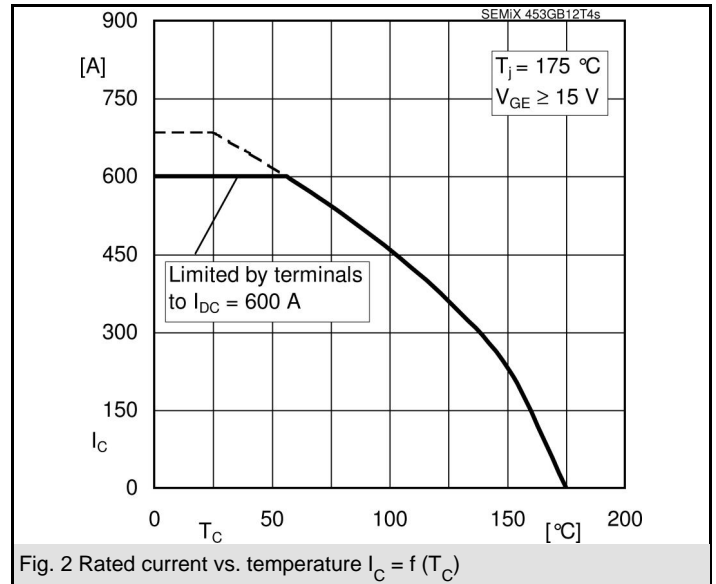
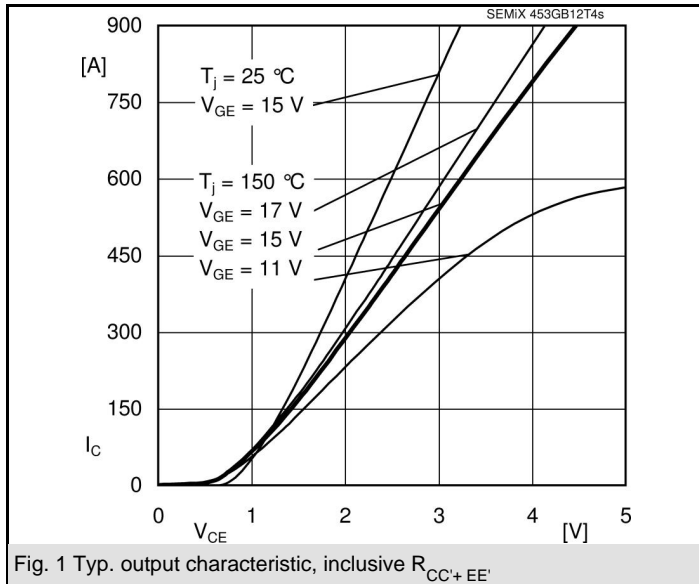
GAR

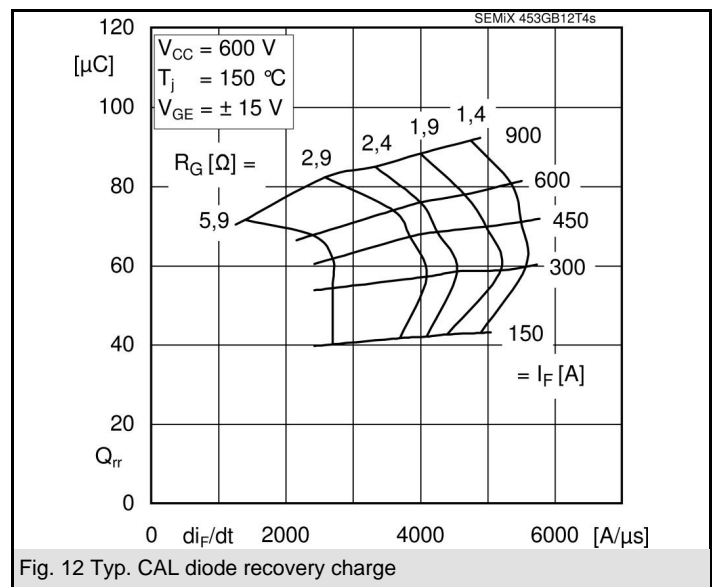
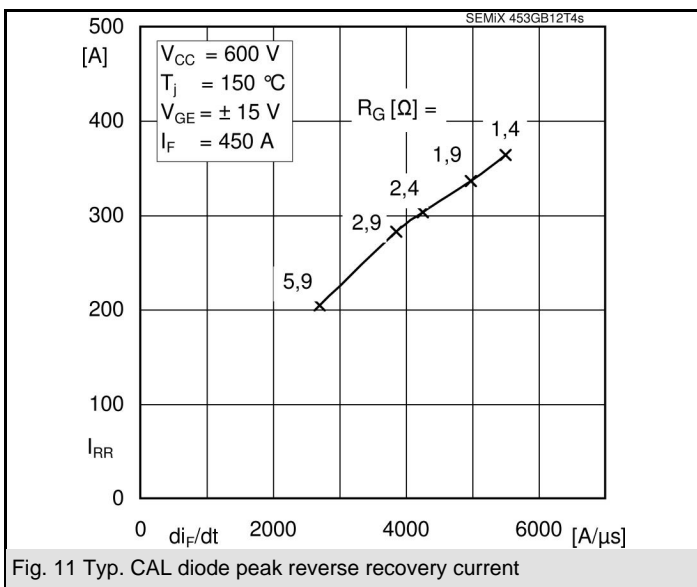
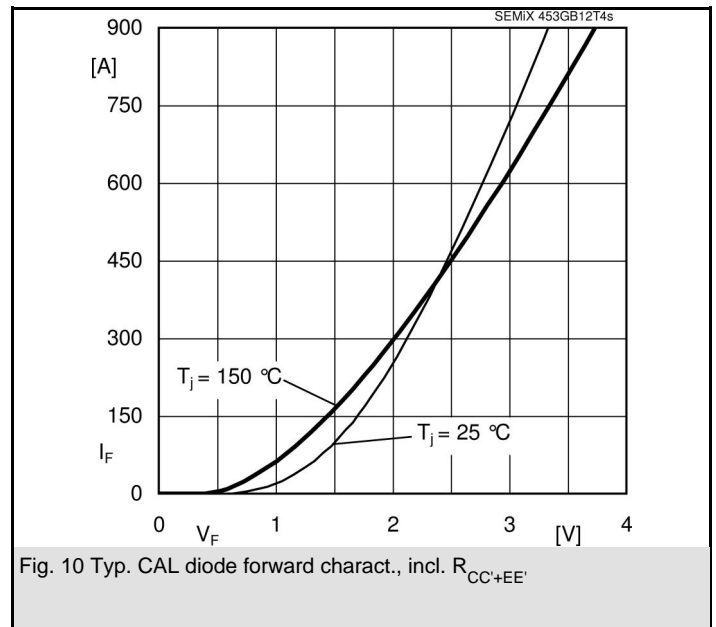
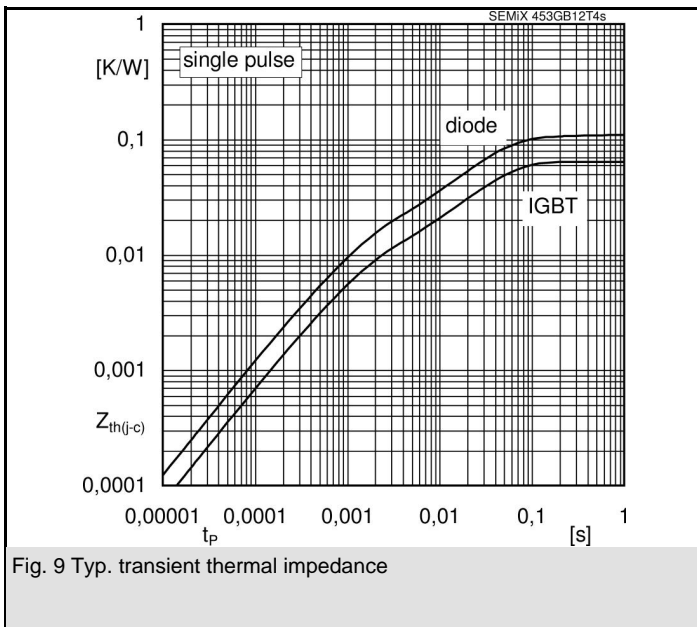
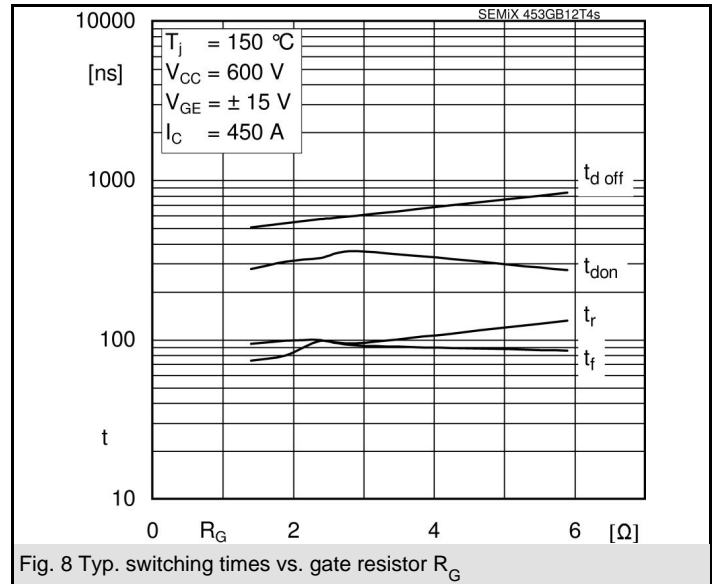
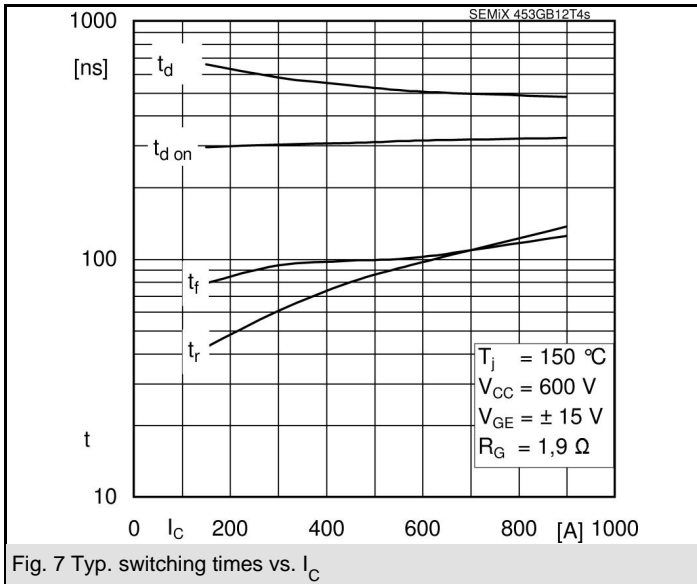
Characteristics

Symbol	Conditions	min.	typ.	max.	Units	
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 450 \text{ A}; V_{GE} = 0 \text{ V}$		$T_j = 25^\circ\text{C}_{chiplev.}$	2,15	2,45	V
			$T_j = 150^\circ\text{C}_{chiplev.}$	2,05	2,4	V
V_{F0}			$T_j = 25^\circ\text{C}$	1,3	1,5	V
			$T_j = 150^\circ\text{C}$	0,9	1,1	V
r_F			$T_j = 25^\circ\text{C}$	1,9	2,1	m Ω
			$T_j = 150^\circ\text{C}$	2,6	2,9	m Ω
I_{RRM}	$I_{Fnom} = 450 \text{ A}$		$T_j = 150^\circ\text{C}$	350	A	
Q_{rr}	$di/dt = 5000 \text{ A}/\mu\text{s}$			70	μC	
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			28	mJ	
$R_{th(j-c)D}$	per diode			0,11	K/W	
Module						
L_{CE}				20	nH	
$R_{CC'+EE'}$	res., terminal-chip		$T_{case} = 25^\circ\text{C}$	0,7	m Ω	
			$T_{case} = 125^\circ\text{C}$	1	m Ω	
$R_{th(c-s)}$	per module			0,04	K/W	
M_s	to heat sink (M5)			3	5	Nm
M_t	to terminals (M6)			2,5	5	Nm
w					300	g
Temperature sensor						
R_{100}	$T_c = 100^\circ\text{C}$ ($R_{25}=5 \text{ k}\Omega$)			0,493 \pm 5%	k Ω	
$B_{100/125}$	$R(T)=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[\text{K}]$			3550 \pm 2%	K	

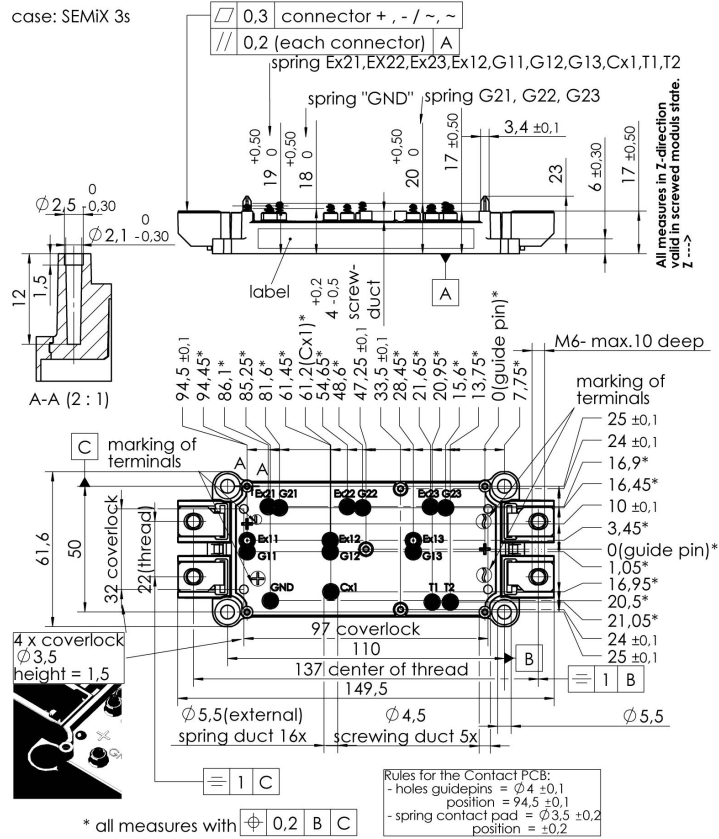
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.





SEMiX 453GB12T4s



Case SEMiX 3s

