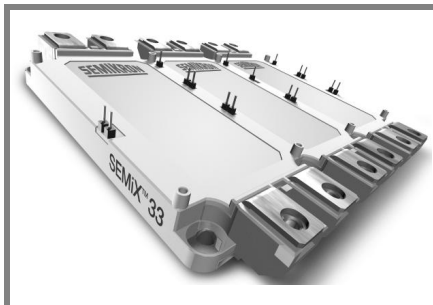


SEMiX 453GD12T4c



SEMiX® 33c

Trench IGBT Modules

SEMiX 453GD12T4c

Target Data

Features

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

Typical Applications

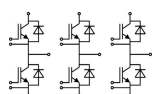
- AC inverter drives
- UPS
- Electronic Welding

Remarks

- Case temperature limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j=150^\circ\text{C}$

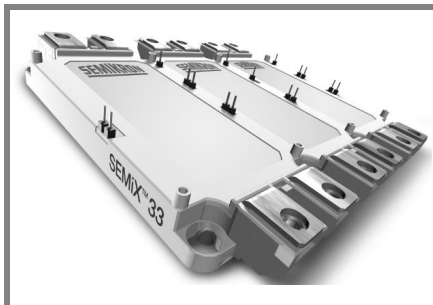
Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	Values			Units
IGBT					
V_{CES}	$T_j = 25^\circ\text{C}$	1200			V
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	685		A
		$T_c = 80^\circ\text{C}$	525		A
I_{CRM}	$I_{CRM}=3 \times I_{Cnom}$	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}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$				$T_j = 25^\circ\text{C}$ mA	
V_{CE0}					$T_j = 25^\circ\text{C}$ V	
					$T_j = 150^\circ\text{C}$ V	
r_{CE}	$V_{GE} = 15\text{ V}$				$T_j = 25^\circ\text{C}$ m Ω	
					$T_j = 150^\circ\text{C}$ m Ω	
$V_{CE(sat)}$	$I_{Cnom} = 450\text{ A}, V_{GE} = 15\text{ V}$				$T_j = 25^\circ\text{C}_{chiplev.}$ V	
					$T_j = 150^\circ\text{C}_{chiplev.}$ V	
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$				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	
$t_{d(on)}$	$R_{Gon} = 1,9\ \Omega$ $di/dt = 4000\text{ A}/\mu\text{s}$				305 ns	
t_r					80 ns	
E_{on}					45 mJ	
$t_{d(off)}$		$R_{Goff} = 1,9\ \Omega$ $di/dt = 5000\text{ A}/\mu\text{s}$				535 ns
t_f						100 ns
E_{off}				50 mJ		
$R_{th(j-c)}$	per IGBT				0,065 K/W	



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- High short circuit capability

Typical Applications

- AC inverter drives
- UPS
- Electronic Welding

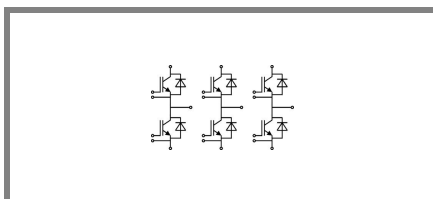
Remarks

- Case temperature limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j=150^\circ\text{C}$

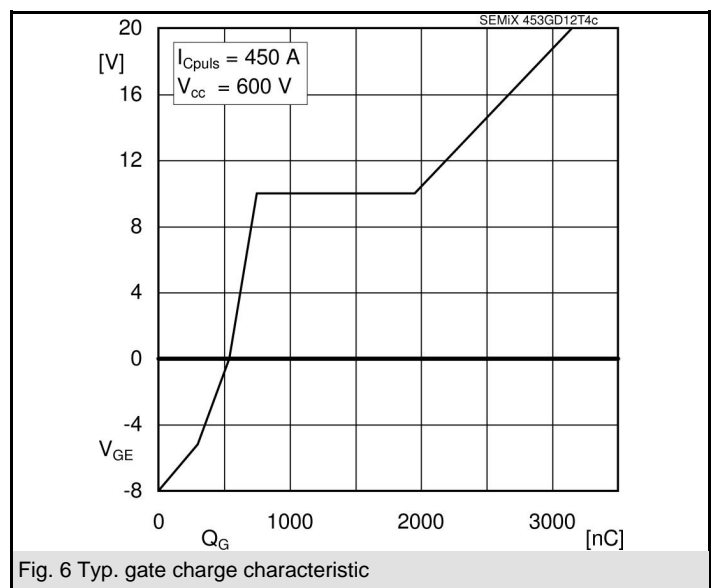
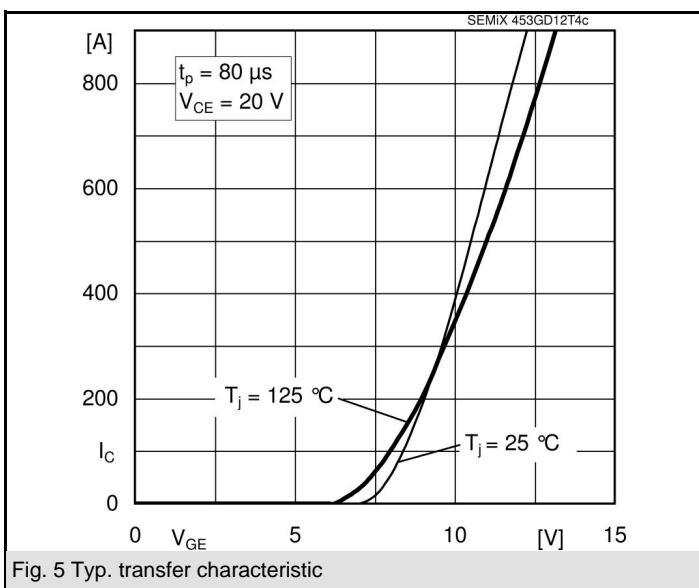
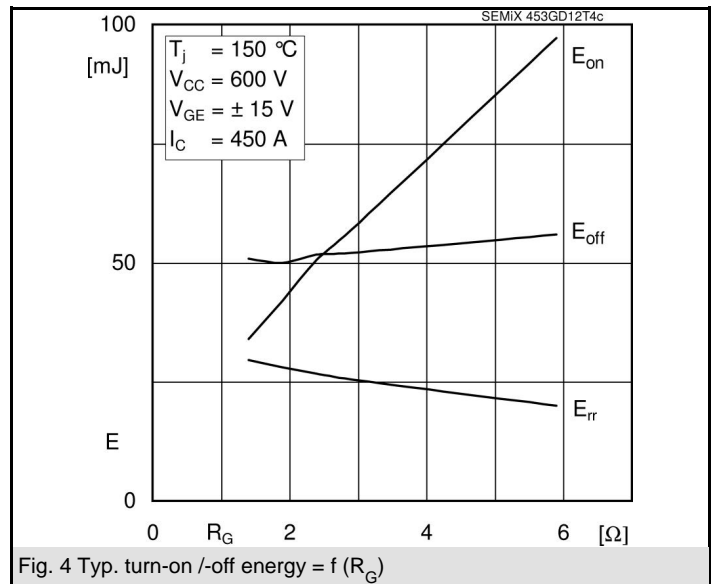
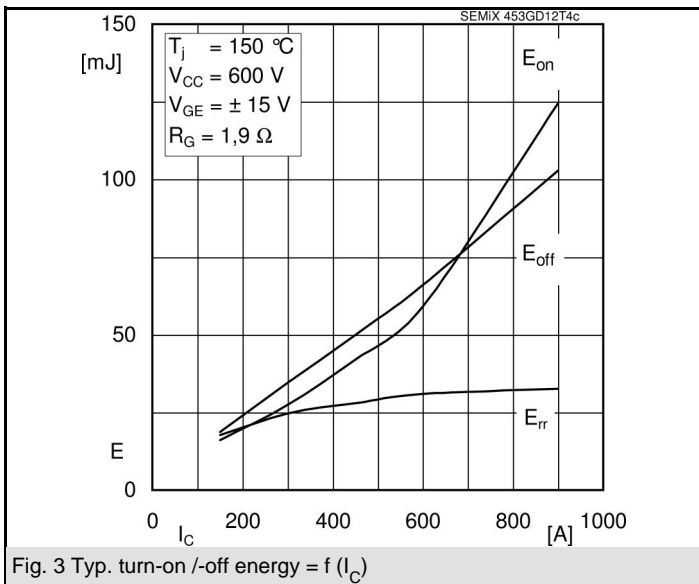
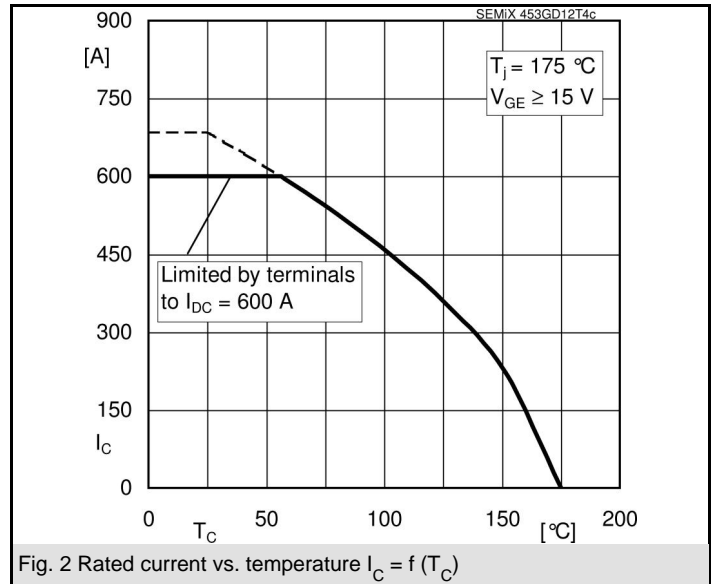
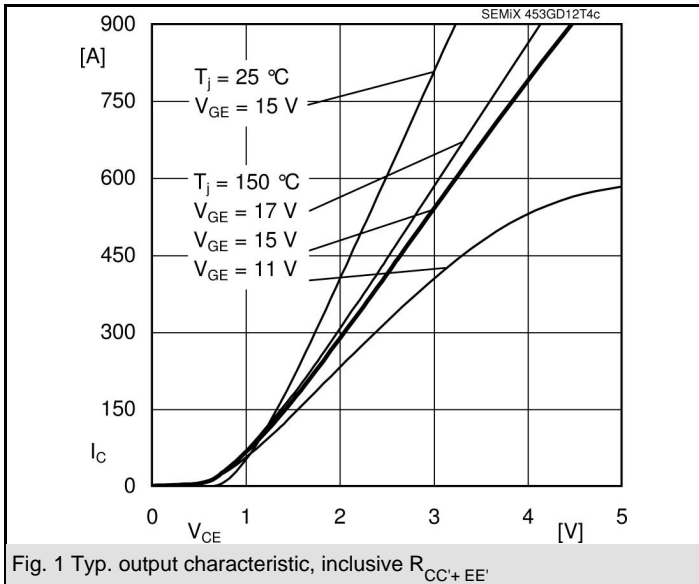
Characteristics			min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 450 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$		2,15	2,45	V
		$T_j = 150^\circ\text{C}_{chiplev.}$		2,05	2,4	V
V_{F0}		$T_j = 25^\circ\text{C}$		1,3	1,5	V
		$T_j = 150^\circ\text{C}$		0,9	1,1	V
r_F		$T_j = 25^\circ\text{C}$		1,9	2,1	mΩ
		$T_j = 150^\circ\text{C}$		2,6	2,9	mΩ
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		mΩ
		$T_{case} = 125^\circ\text{C}$		1		mΩ
$R_{th(c-s)}$	per module			0,014		K/W
M_s	to heat sink (M5)			3	5	Nm
M_t	to terminals (M6)			2,5	5	Nm
w					900	g
Temperature sensor						
R_{100}	$T_c = 100^\circ\text{C}$ ($R_{25} = 5 \text{ k}\Omega$)			0,493±5%		kΩ
$B_{100/125}$	$R(T) = R_{100} \exp[B_{100/125} (1/T - 1/T_{100})]$; $T[\text{K}]$			3550±2%		K

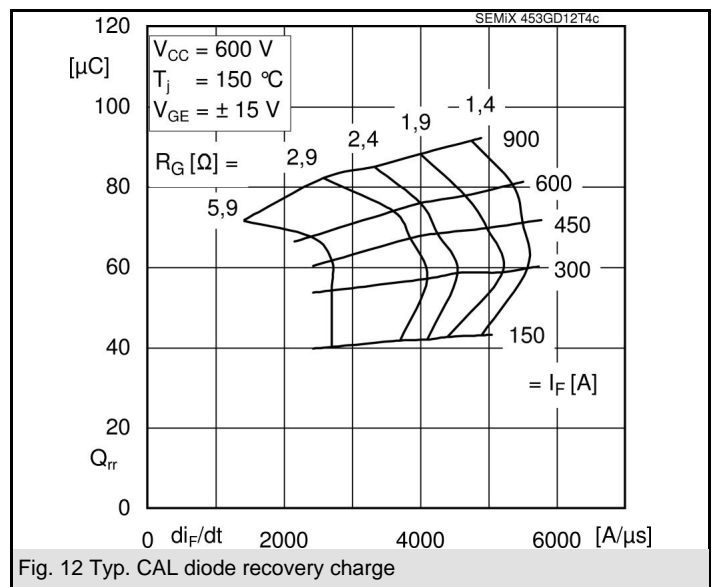
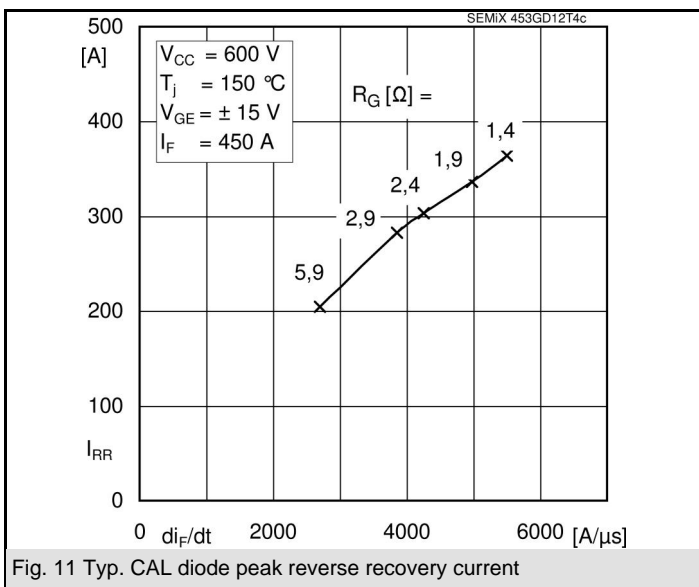
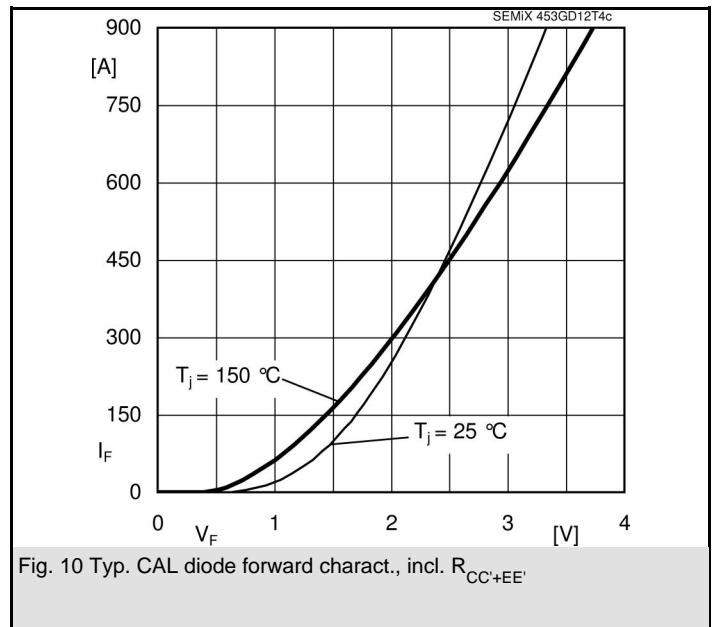
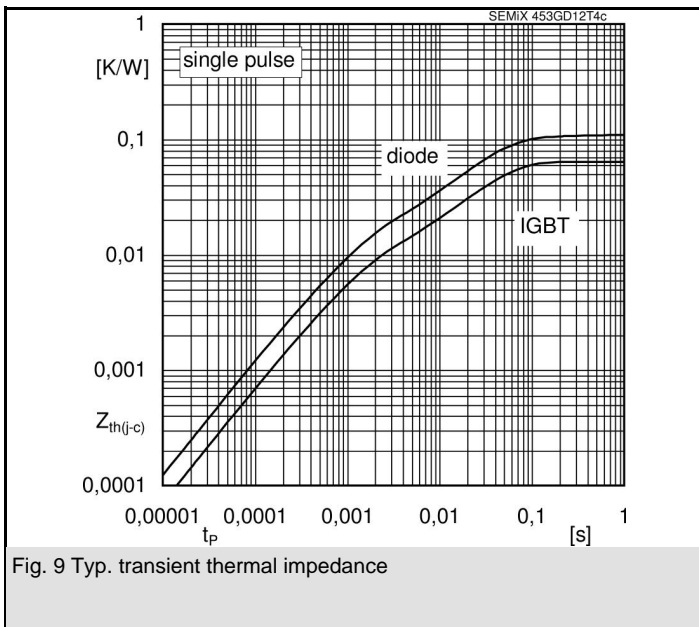
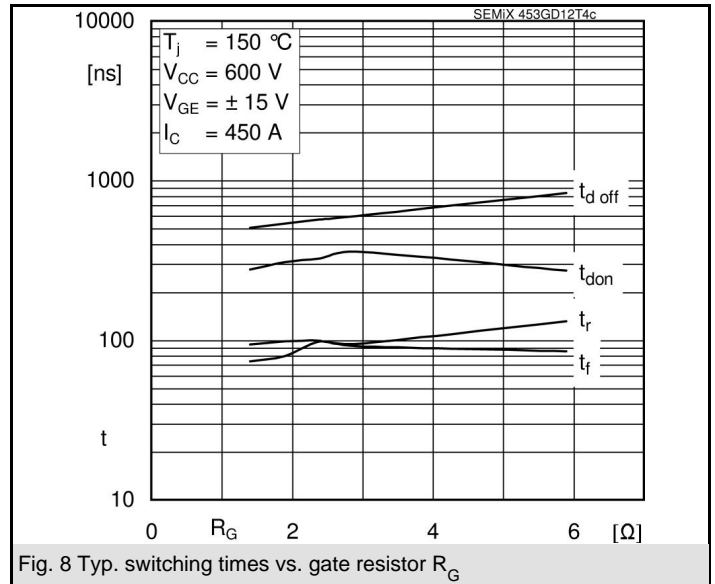
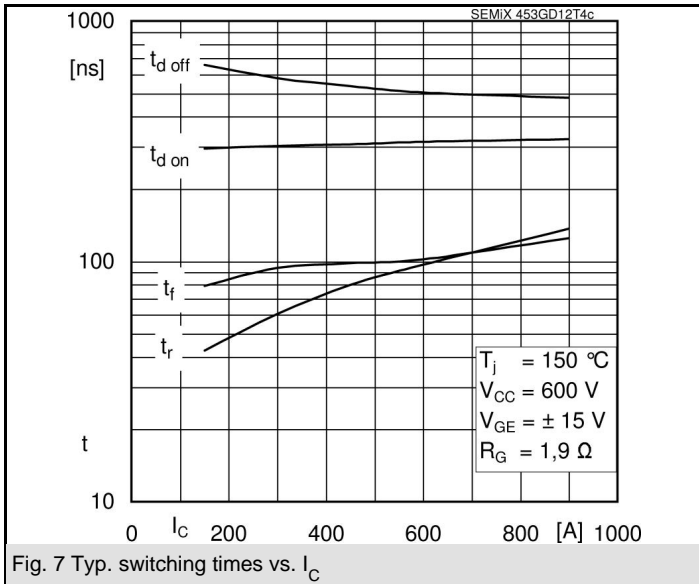
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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

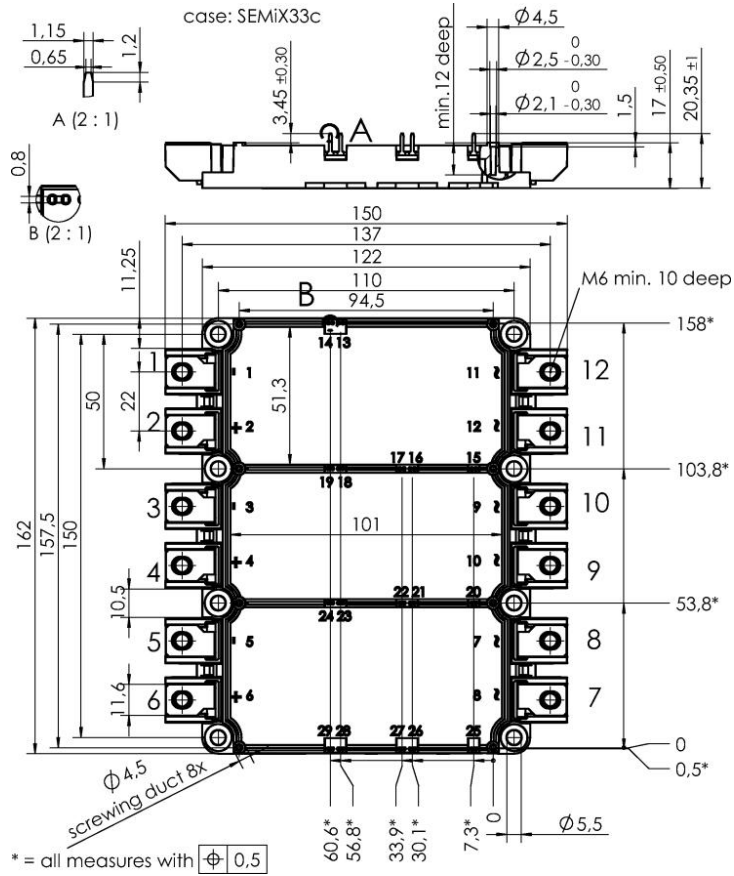


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SEMiX 453GD12T4c



Case SEMiX 33c

