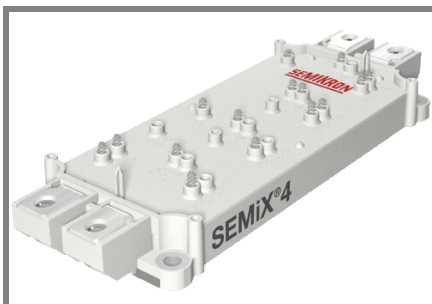


SEMiX 604GB12T4s



SEMiX® 4s

Trench IGBT Modules

SEMiX 604GB12T4s

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

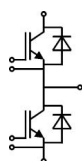
- Case temperature limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j=150^\circ\text{C}$
- Dynamic values apply to the following combination of resistors:

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

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

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

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

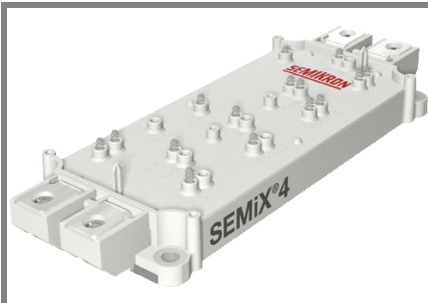


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Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	910	A
		$T_c = 80^\circ\text{C}$	700	A
I_{CRM}	$I_{CRM}=3 \times I_{Cnom}$	1800	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	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	705	A
		$T_c = 80^\circ\text{C}$	525	A
I_{FRM}	$I_{FRM}=3 \times I_{Fnom}$	1800	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			Units	
Symbol	Conditions	min.	typ.	max.	Units	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 24\text{ mA}$	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}			$T_j = 25^\circ\text{C}$	0,8	0,9	V
			$T_j = 150^\circ\text{C}$	0,7	0,8	V
r_{CE}	$V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}$	1,7	1,8	$\text{m}\Omega$
			$T_j = 150^\circ\text{C}$	2,5	2,7	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 600\text{ A}, V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}_{chiplev.}$	1,8	2	V
			$T_j = 150^\circ\text{C}_{chiplev.}$	2,2	2,4	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		37,2		nF
C_{oes}				2,3		nF
C_{res}				2,1		nF
Q_G	$V_{GE} = -8 \dots +15\text{ V}$		3400		nC	
R_{Gint}	$T_j = 25^\circ\text{C}$		1,25		Ω	
$t_{d(on)}$	$R_{Gon} = 1,7\ \Omega$ $di/dt = 5200\text{ A}/\mu\text{s}$ $R_{Goff} = 1,7\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 600\text{ A}$ $T_j = 150^\circ\text{C}$		355		ns
t_r				90		ns
E_{on}				62		mJ
$t_{d(off)}$				590		ns
t_f				112		ns
E_{off}		62		mJ		
$R_{th(j-c)}$	per IGBT			0,049	K/W	

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Typical Applications

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Remarks

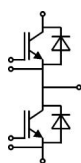
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$$R_{E,x} = 0,5\Omega \text{ each}$$



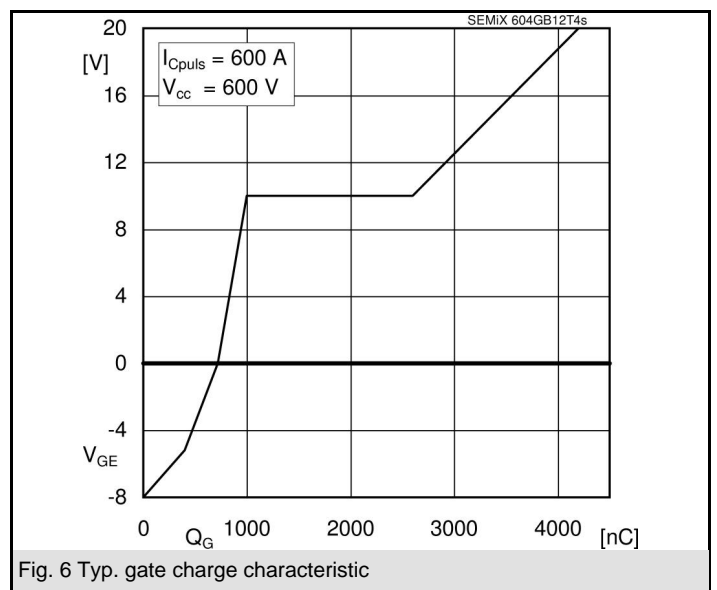
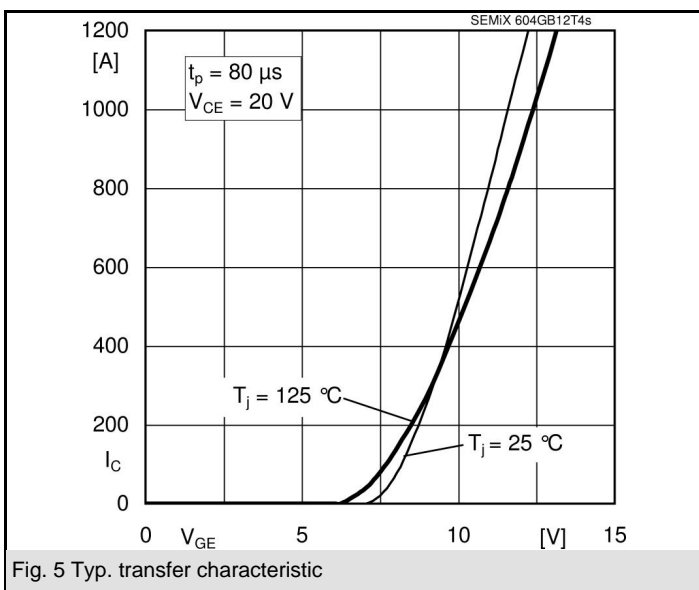
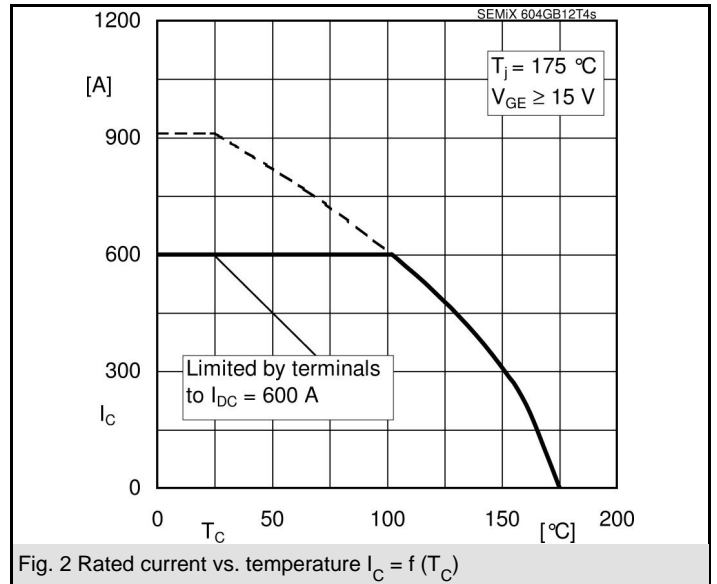
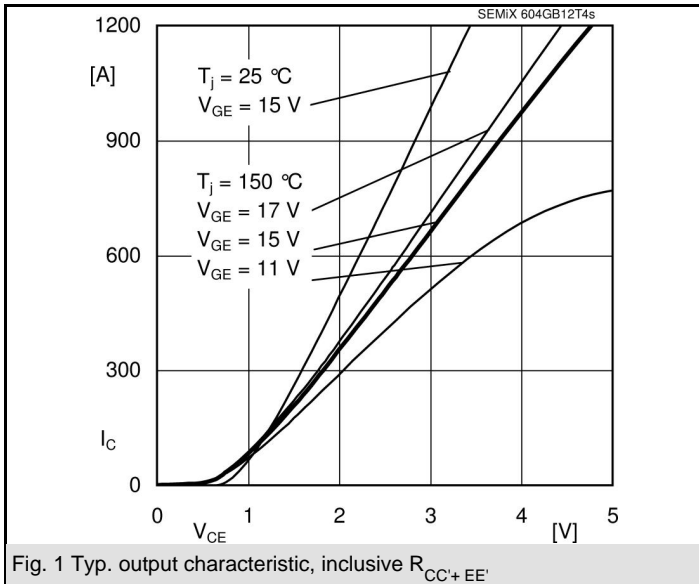
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 600 \text{ A}; V_{GE} = 0 \text{ V}$				
	$T_j = 25^\circ\text{C}_{chiplev.}$		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					
	$T_j = 25^\circ\text{C}$		1,4	1,6	mΩ
	$T_j = 150^\circ\text{C}$		1,9	2,2	mΩ
I_{RRM}	$I_{Fnom} = 600 \text{ A}$		390		A
Q_{rr}	$di/dt = 5200 \text{ A}/\mu\text{s}$		94		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		35		mJ
$R_{th(j-c)D}$	per diode			0,086	K/W
Module					
L_{CE}			22		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		0,03		K/W
M_s	to heat sink (M5)		3	5	Nm
M_t	to terminals (M6)		2,5	5	Nm
w				400	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.



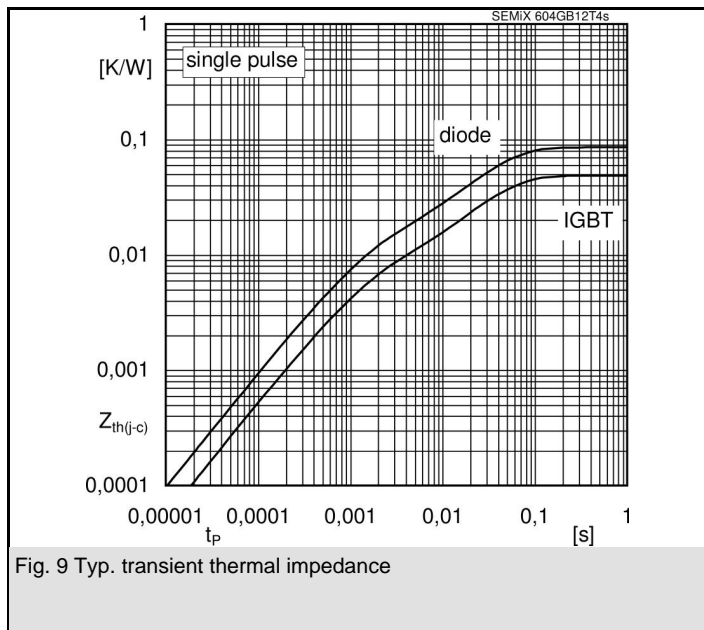


Fig. 9 Typ. transient thermal impedance

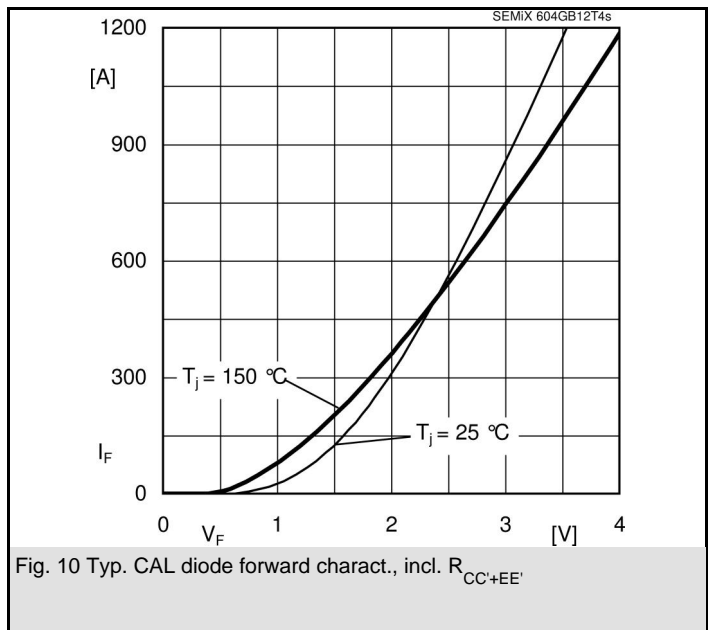
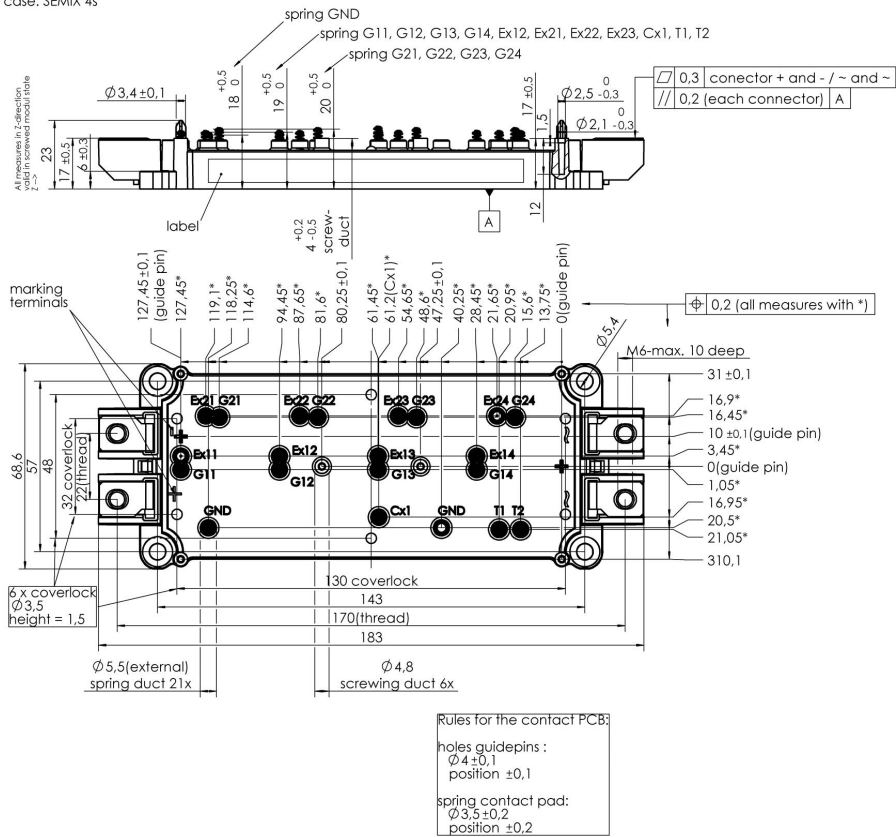


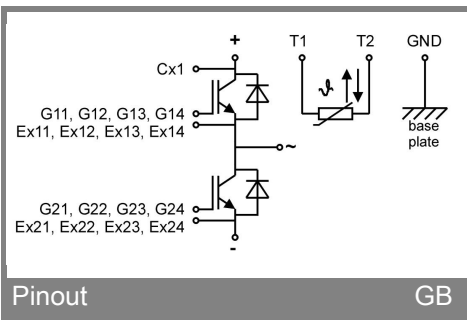
Fig. 10 Typ. CAL diode forward charact., incl. R_{CC+EE}

SEMiX 604GB12T4s

case: SEMiX 4s



Case SEMiX 4s



Pinout

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