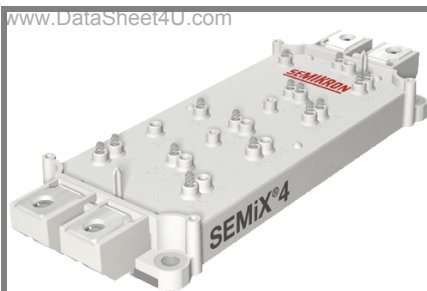


SEMiX 604GB12T4s

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SEMiX® 4s

Trench IGBT Modules

SEMiX 604GB12T4s

Target Data

Features

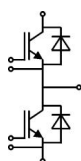
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

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:
 $R_{Gon,main} = 1,0\Omega$,
 $R_{Goff,main} = 1,0\Omega$,
 $R_{G,x} = 2,2\Omega$ each,
 $R_{E,x} = 0,5\Omega$ each



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Absolute Maximum Ratings		T _{case} = 25°C, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V _{CES}	T _j = 25 °C	1200	V	
I _C	T _j = 175 °C	T _c = 25 °C	910	A
		T _c = 80 °C	700	A
I _{CRM}	I _{CRM} =3xI _{Cnom}	1800	A	
V _{GES}		± 20	V	
t _{psc}	V _{CC} = 600 V; V _{GE} ≤ 20 V; T _j = 150 °C V _{CES} < 1200 V	10	µs	
Inverse Diode				
I _F	T _j = 175 °C	T _c = 25 °C	705	A
		T _c = 80 °C	525	A
I _{FRM}	I _{FRM} =3xI _{Fnom}	1800	A	
Module				
I _{t(RMS)}		600	A	
T _{vj}		- 40 ... + 175	°C	
T _{stg}		- 40 ... + 125	°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					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 24\text{ mA}$	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}					$T_j = 25^\circ\text{C}$ 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
$V_{CE(sat)}$	$I_{Cnom} = 600\text{ A}, V_{GE} = 15\text{ V}$				$T_j = 25^\circ\text{C}_{chiplev.}$ V
					$T_j = 150^\circ\text{C}_{chiplev.}$ V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$				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
$t_{d(on)}$	$R_{Gon} = 1,7\ \Omega$				355 ns
t_r					90 ns
E_{on}	$di/dt = 5200\text{ A}/\mu\text{s}$				62 mJ
$t_{d(off)}$					590 ns
t_f	$R_{Goff} = 1,7\ \Omega$				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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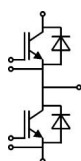
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 $R_{Goff,main}=1,0\Omega$,
 $R_{G,x}=2,2\Omega$ each,
 $R_{E,x}=0,5\Omega$ each

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		0,7		mΩ
	$T_{case} = 25^{\circ}\text{C}$				
	$T_{case} = 125^{\circ}\text{C}$		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.



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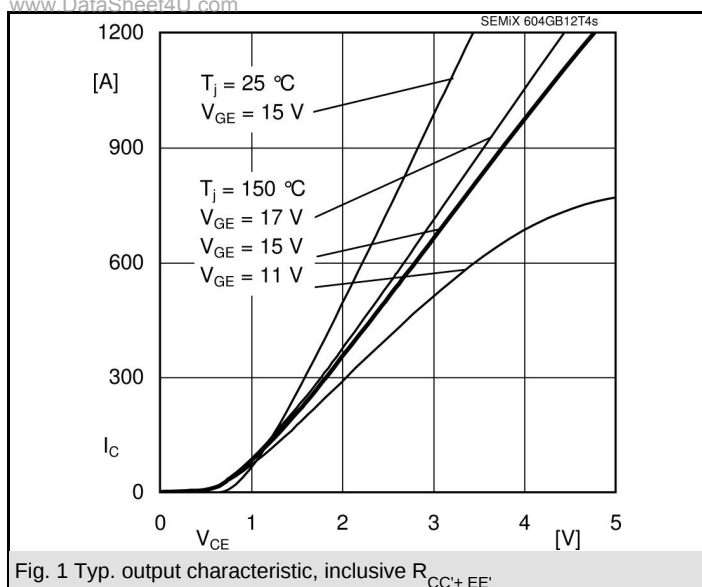


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

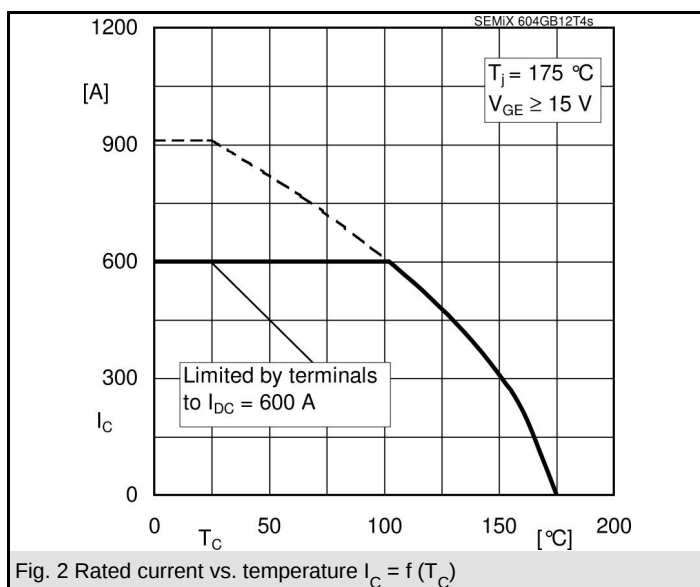


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

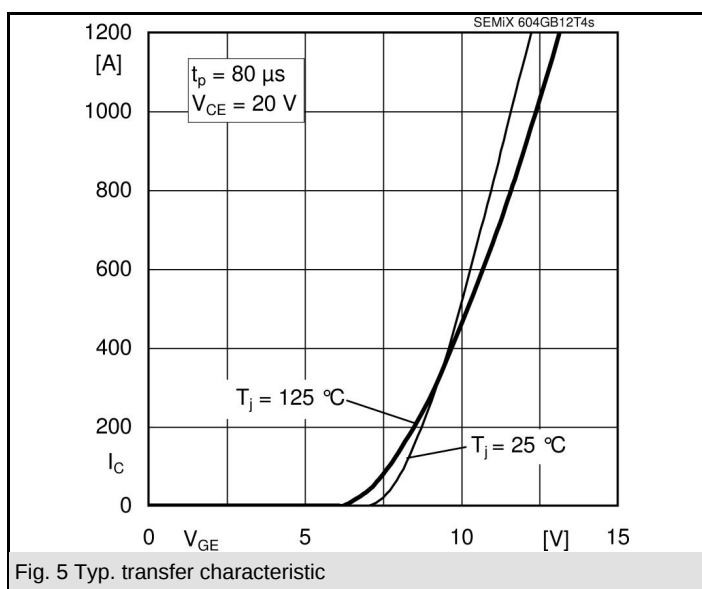


Fig. 5 Typ. transfer characteristic

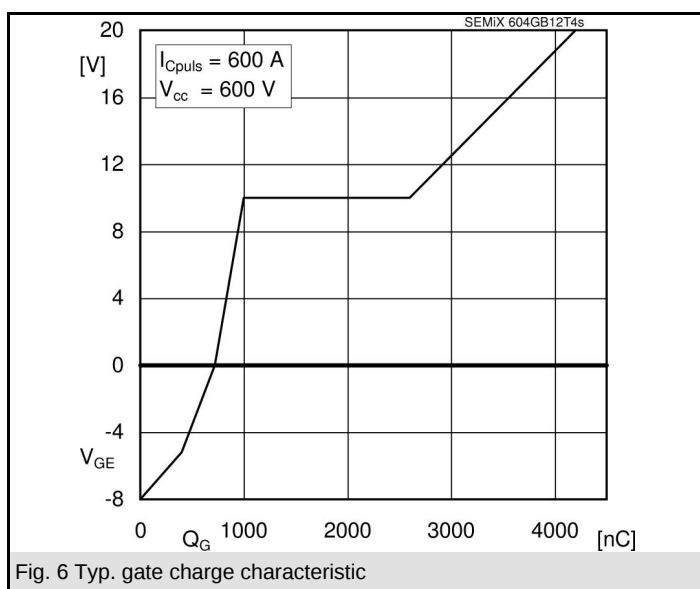


Fig. 6 Typ. gate charge characteristic

