

SEMiX 151GB12T4s



SEMiX® 1s

Trench IGBT Modules

SEMiX 151GB12T4s

SEMiX 151GAL12T4s

SEMiX 151GAR12T4s

Target Data

Features

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

Typical Applications

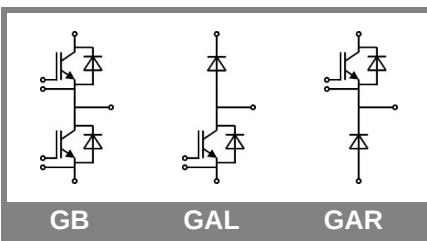
- AC inverter drives
- UPS
- Electronic Welding

Remarks

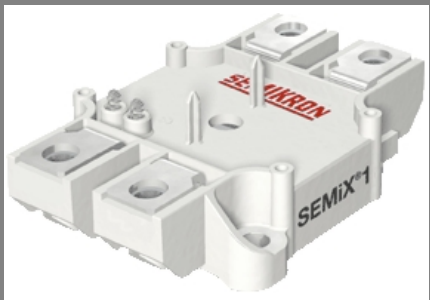
- Case temperature limited to $T_C = 125^\circ\text{C}$ max.
- Product reliability results are valid for $T_J = 150^\circ\text{C}$

Absolute Maximum Ratings			T _{case} = 25°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	230	A
		T _c = 80 °C	180	A
I _{CRM}	I _{CRM} =3xI _{Cnom}		450	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	190	A
		T _c = 80 °C	140	A
I _{FRM}	I _{FRM} =3xI _{Fnom}		450	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°C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 6 mA		5	5,8	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C					mA
V _{CE0}			T _j = 25 °C	0,8	0,9	V
			T _j = 150 °C	0,7	0,8	V
r _{CE}	V _{GE} = 15 V		T _j = 25°C	6,7	7,3	mΩ
			T _j = 150°C	10	10,7	mΩ
V _{CE(sat)}	I _{Cnom} = 150 A, V _{GE} = 15 V		T _j = 25°C _{chiplev.}	1,8	2	V
			T _j = 150°C _{chiplev.}	2,2	2,4	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz		9,3			nF
C _{oes}			0,6			nF
C _{res}			0,5			nF
Q _G	V _{GE} = -8 ... +15V		850			nC
R _{Gint}	T _j = 25 °C		5			Ω
t _{d(on)}	R _{Gon} = Ω		17			ns
t _r						ns
E _{on}	mJ					
t _{d(off)}	R _{Goff} = Ω					ns
t _f			ns			
E _{off}			17			mJ
R _{th(j-c)}	per IGBT		0,19			K/W



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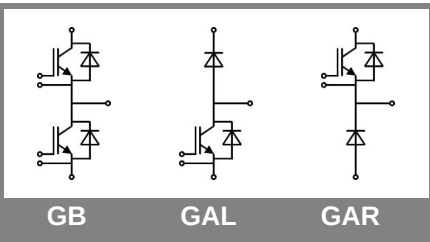
Remarks

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

Characteristics						
Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
V _F = V _{EC}	I _{Fnom} = 150 A; V _{GE} = 0 V	T _j = 25 °C _{chiplev.}		2,15	2,45	V
		T _j = 150 °C _{chiplev.}		2,05	2,4	V
V _{F0}		T _j = 25 °C		1,3	1,5	V
		T _j = 150 °C		0,9	1,1	V
r _F		T _j = 25 °C		5,7	6,3	mΩ
		T _j = 150 °C		7,7	8,7	mΩ
I _{RRM} Q _{rr} E _{rr}	I _{Fnom} = 150 A V _{GE} = -15 V; V _{CC} = 600 V	T _j = 150 °C				A μC mJ
R _{th(j-c)D}	per diode				0,31	K/W
Module						
L _{CE}				16		nH
R _{CC'+EE'}	res., terminal-chip	T _{case} = 25 °C		0,7		mΩ
		T _{case} = 125 °C		1		mΩ
R _{th(c-s)}	per module			0,075		K/W
M _s	to heat sink (M5)		3		5	Nm
M _t	to terminals (M6)		2,5		5	Nm
w					150	g
Temperature sensor						
R ₁₀₀ B _{100/125}	T _c =100°C (R ₂₅ =5 kΩ) R(T)=R ₁₀₀ exp[B _{100/125} (1/T-1/T ₁₀₀)]; T[K]			0,493±5% 3550±2%		kΩ 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.



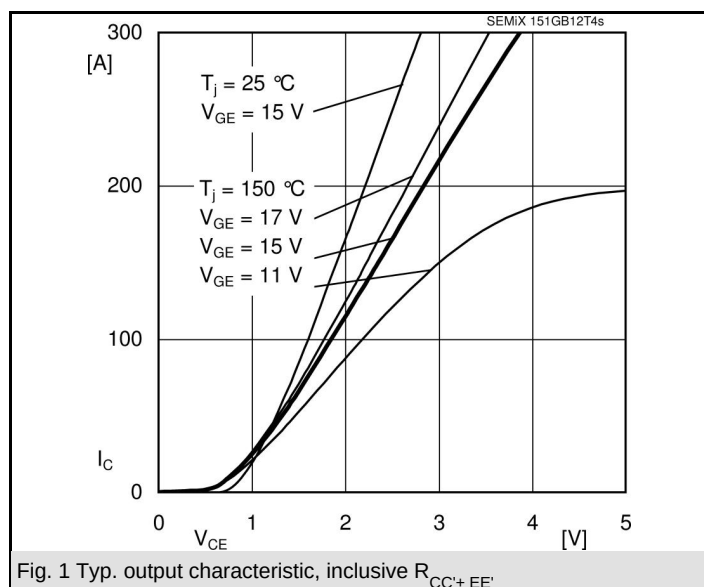


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

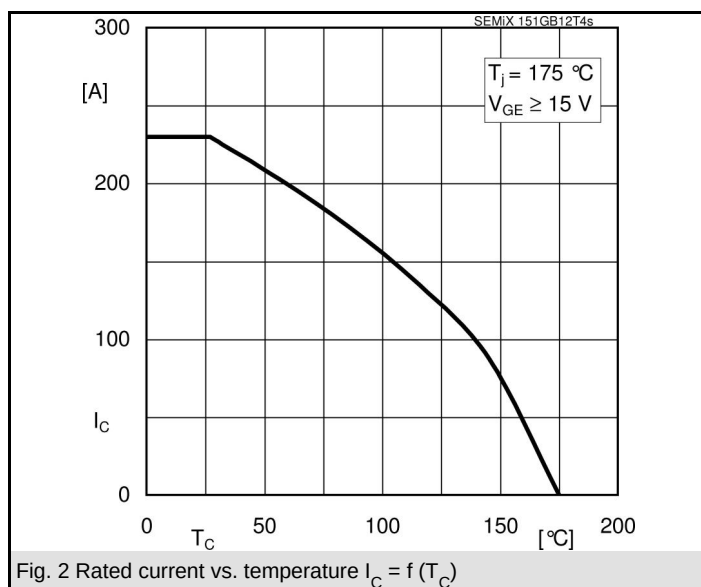


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

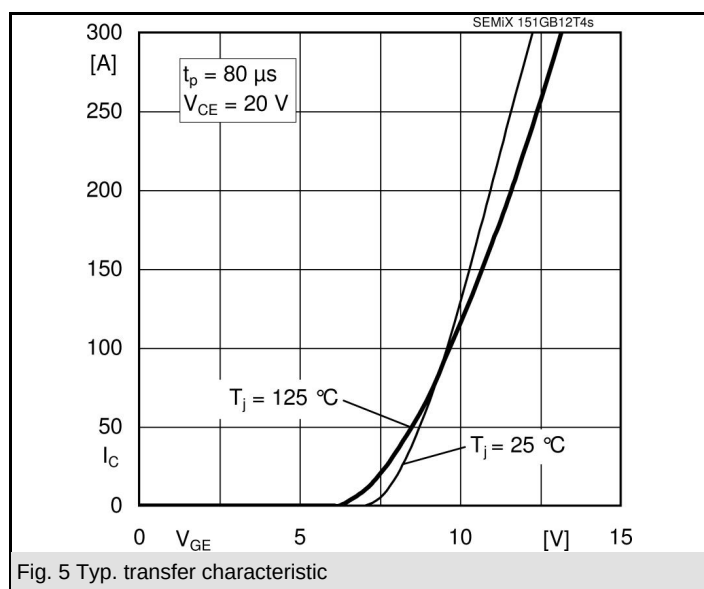


Fig. 5 Typ. transfer characteristic

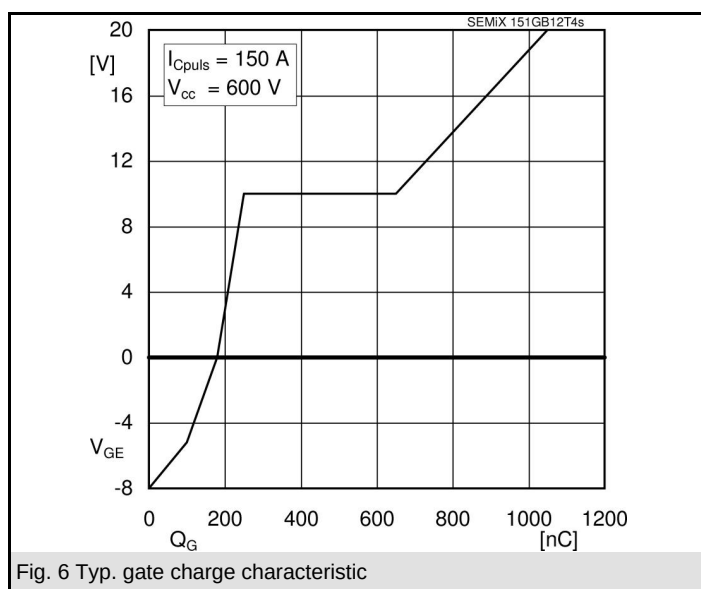
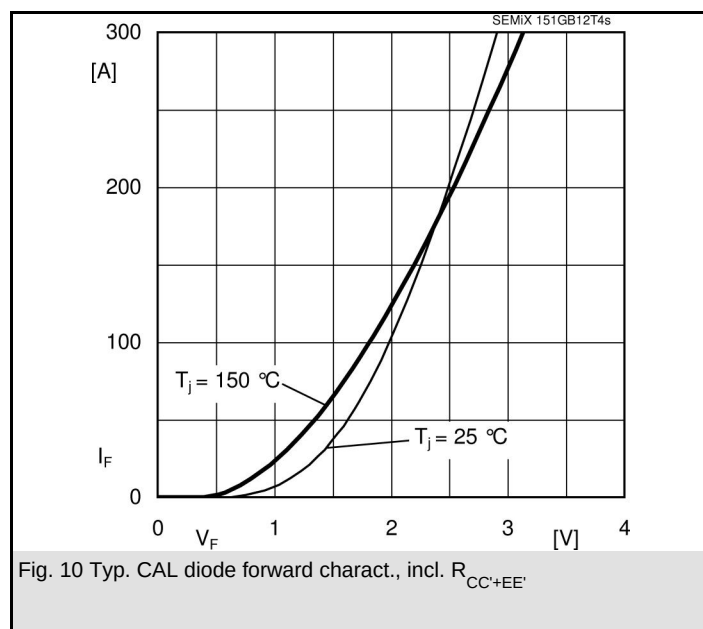
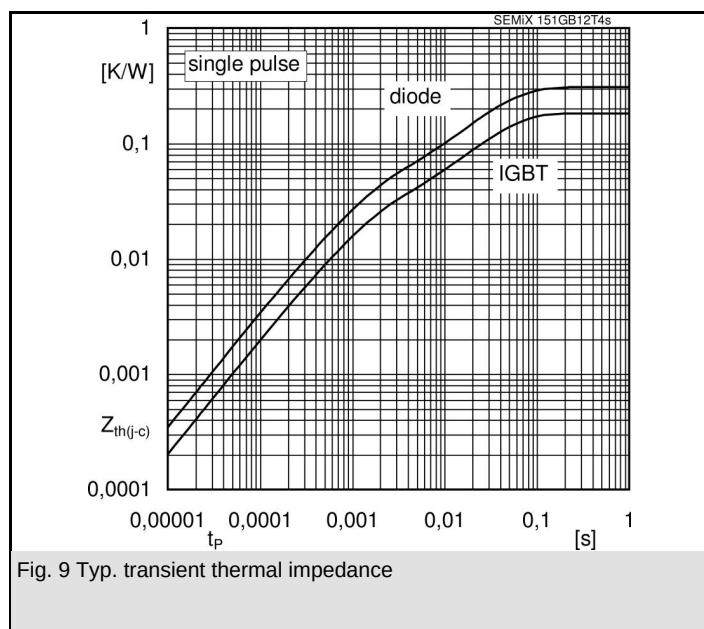


Fig. 6 Typ. gate charge characteristic



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