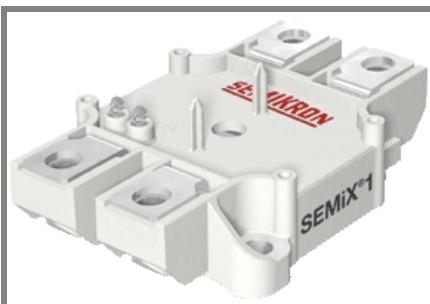


SEMiX 151GB12T4s



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

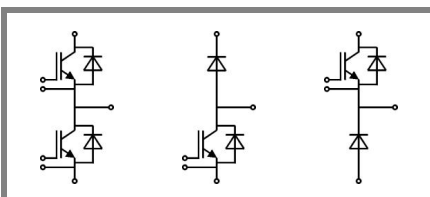
- AC inverter drives
- UPS
- Electronic Welding

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		$T_{case} = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	230	A
		$T_c = 80^\circ\text{C}$	180	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	450	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	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	190	A
		$T_c = 80^\circ\text{C}$	140	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	450	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						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$	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}	$V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}$	6,7	7,3	$\text{m}\Omega$
			$T_j = 150^\circ\text{C}$	10	10,7	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 150\text{ A}, V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}_{chiplev.}$	1,8	2	V
			$T_j = 150^\circ\text{C}_{chiplev.}$	2,2	2,4	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		9,3		nF
C_{oes}				0,6		nF
C_{res}				0,5		nF
Q_G	$V_{GE} = -8 \dots +15\text{ V}$		850		nC	
R_{Gint}	$T_j = 25^\circ\text{C}$		5		Ω	
$t_{d(on)}$	$R_{Gon} = \Omega$	$V_{CC} = V$ $I_{Cnom} = A$ $T_j = 150^\circ\text{C}$				ns
t_r						ns
E_{on}			17		mJ	
$t_{d(off)}$	$R_{Goff} = \Omega$					ns
t_f					ns	
E_{off}			17		mJ	
$R_{th(j-c)}$	per IGBT			0,19	K/W	



GB

GAL

GAR

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Target Data

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- High short circuit capability

Typical Applications

- AC inverter drives
- UPS
- Electronic Welding

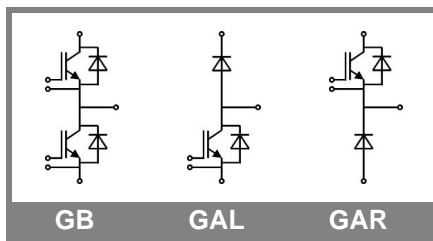
Remarks

- 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					
$V_F = V_{EC}$	$I_{Fnom} = 150\text{ A}; V_{GE} = 0\text{ V}$		2,15	2,45	V
	$T_J = 25^\circ\text{C}_{chiplev.}$				
	$T_J = 150^\circ\text{C}_{chiplev.}$		2,05	2,4	V
V_{F0}			1,3	1,5	V
	$T_J = 25^\circ\text{C}$				
	$T_J = 150^\circ\text{C}$		0,9	1,1	V
r_F			5,7	6,3	mΩ
	$T_J = 25^\circ\text{C}$				
	$T_J = 150^\circ\text{C}$		7,7	8,7	mΩ
I_{RRM}	$I_{Fnom} = 150\text{ A}$				A
Q_{rr}					μC
E_{rr}	$V_{GE} = -15\text{ V}; V_{CC} = 600\text{ V}$		11,3		mJ
$R_{th(j-c)D}$	per diode			0,31	K/W
Module					
L_{CE}			16		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25^\circ\text{C}$	0,7		mΩ
		$T_{case} = 125^\circ\text{C}$	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}	$T_c = 100^\circ\text{C}$ ($R_{25} = 5\text{ k}\Omega$)		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.

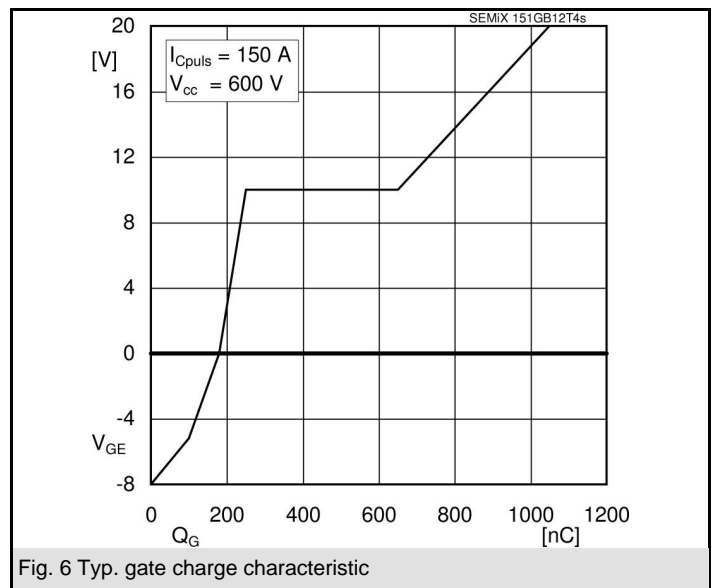
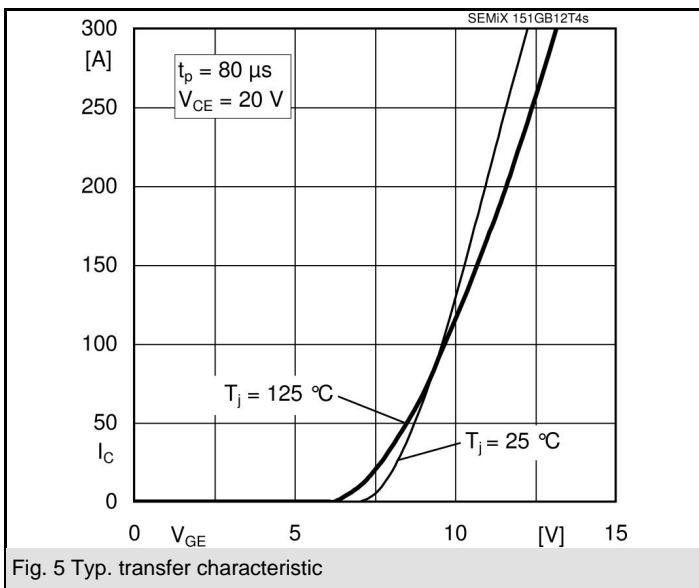
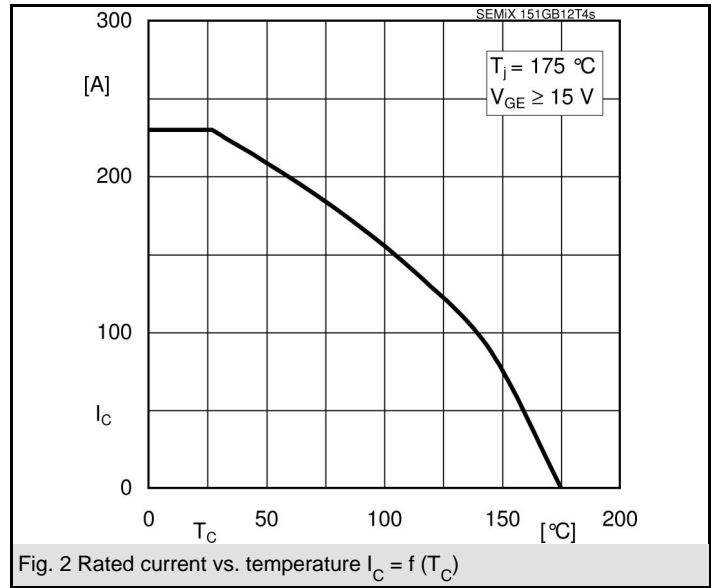
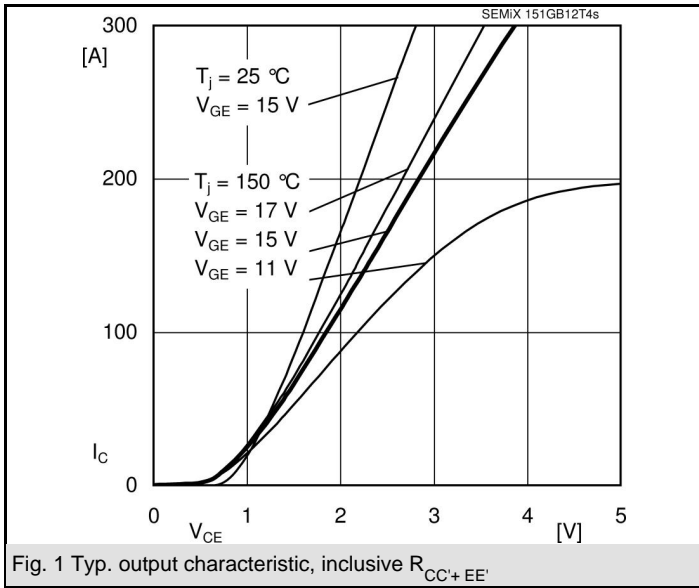
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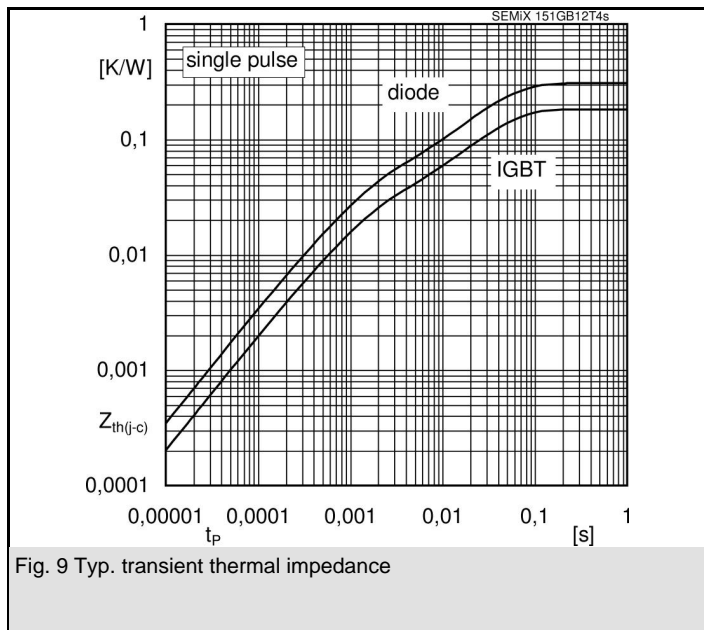


Fig. 9 Typ. transient thermal impedance

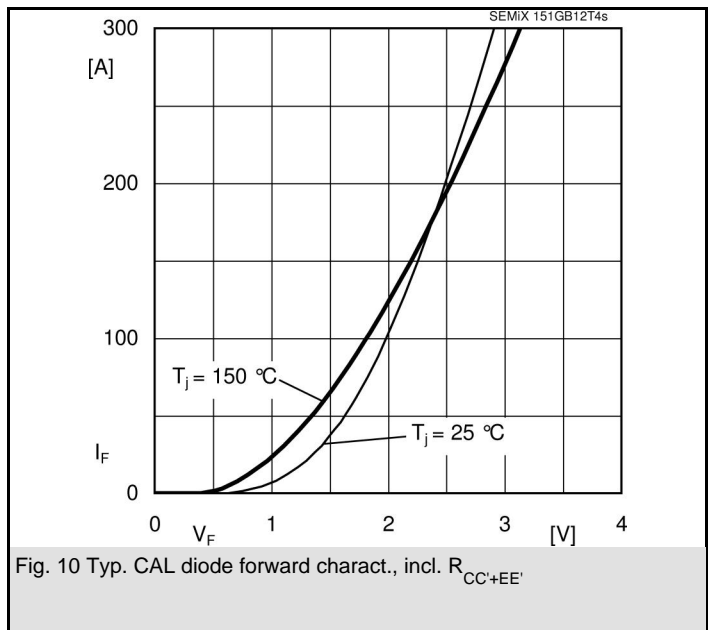


Fig. 10 Typ. CAL diode forward charact., incl. R_{CC+EE}

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