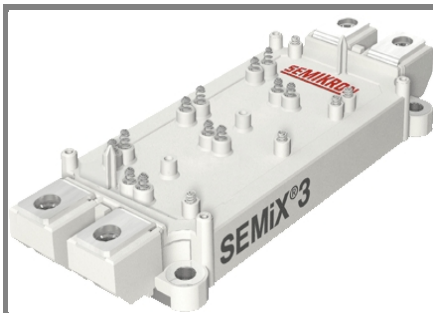


SEMiX 653GB176HDs



SEMiX[®] 3s

Trench IGBT Modules

SEMiX 653GB176HDs

SEMiX 653GAL176HDs

SEMiX 653GAR176HDs

Preliminary Data

Features

- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability
- Released for Sn-Pb and Ni-Au PCB surfaces

Typical Applications

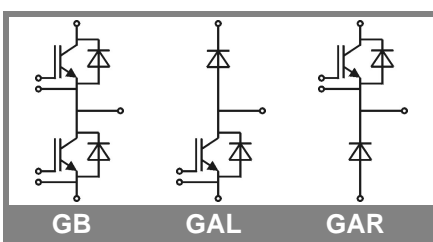
- AC inverter drives
- UPS
- Electronic welders

Remarks

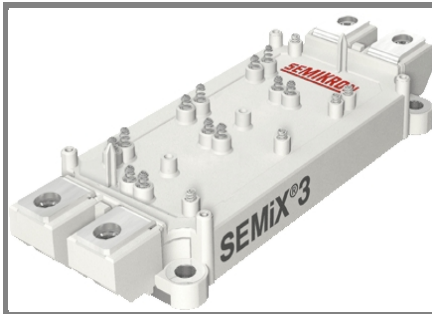
- short circuit capability is tested @ $V_{CC}=1000V$ (all other static parameters are tested @ $V_{CC}=1200V$)

Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25\text{ }^\circ\text{C}$	1700	V	
I_C	$T_j = 150\text{ }^\circ\text{C}$	$T_c = 25\text{ }^\circ\text{C}$	650	A
		$T_c = 80\text{ }^\circ\text{C}$	460	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$, $t_p = 1\text{ ms}$	900	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 600\text{ V}$; $V_{GE} \leq 20\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10	μs	
Inverse Diode				
I_F	$T_j = 150\text{ }^\circ\text{C}$	$T_c = 25\text{ }^\circ\text{C}$	500	A
		$T_c = 80\text{ }^\circ\text{C}$	340	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$, $t_p = 1\text{ ms}$	900	A	
I_{FSM}	$t_p = 10\text{ ms}$; sin.	$T_j = 150\text{ }^\circ\text{C}$	2900	A
Module				
$I_{t(RMS)}$		600	A	
T_{vj}		- 40 ... + 150	$^\circ\text{C}$	
T_{stg}	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 125	$^\circ\text{C}$	
V_{isol}	AC, 1 min.	4000	V	

Characteristics		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 18\text{ mA}$	5,2	5,8	6,4	V
I_{CES}	$V_{GE} = 0\text{ V}$, $V_{CE} = V_{CES}$			0,45	mA
V_{CE0}		$T_j = 25\text{ }^\circ\text{C}$	1	1,2	V
		$T_j = 125\text{ }^\circ\text{C}$	0,9	1,1	V
r_{CE}	$V_{GE} = 0\text{ V}$	$T_j = 25\text{ }^\circ\text{C}$	2,2	2,8	m Ω
		$T_j = 125\text{ }^\circ\text{C}$	3,4	4	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 450\text{ A}$, $V_{GE} = 15\text{ V}$	$T_j = 25\text{ }^\circ\text{C}_{chiplev.}$	2	2,45	V
		$T_j = 125\text{ }^\circ\text{C}_{chiplev.}$	2,45	2,9	V
C_{res}	$V_{CE} = 25$, $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	40		nF
C_{oes}			1,7		nF
C_{res}			1,3		nF
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		48080		nC
$t_{d(on)}$	$R_{Gon} = 3,6\ \Omega$	$V_{CC} = 1200V$ $I_{Cnom} = 450A$ $T_j = 125\text{ }^\circ\text{C}$	290		ns
t_r			90		ns
E_{on}			285		mJ
$t_{d(off)}$	$R_{Goff} = 3,6\ \Omega$		975		ns
t_f			190		ns
E_{off}			170		mJ
$R_{th(j-c)}$	per IGBT			0,05	K/W



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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 450 A; V_{GE} = 0 V$		1,7	2	V
			1,8	2,1	V
V_{F0}			$T_j = 25 ^\circ C$	1,1	V
			$T_j = 125 ^\circ C$	0,9	1,1
r_F			$T_j = 25 ^\circ C$	1,3	mΩ
			$T_j = 125 ^\circ C$	2	2,2
I_{RRM}	$I_{Fnom} = 450 A$		380		A
Q_{rr}	$di/dt = 4200 A/\mu s$				μC
E_{off}	$V_{GE} = -15 V; V_{CC} = 1200 V$				mJ
$R_{th(j-c)D}$	per diode			0,11	K/W
Module					
L_{CE}			20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 ^\circ C$		0,7	mΩ
			$T_{case} = 125 ^\circ C$	1	mΩ
$R_{th(c-s)}$	per module		0,04		K/W
M_s	to heat sink M5		3	5	Nm
M_t	to terminals M6		2,5	5	Nm
w				300	g
Temperature sensor					
R_{100}	$T_c = 100 ^\circ C (R_{25} = 5 k\Omega)$		0,493±5%		kΩ
$B_{100/125}$	$R(T) = R_{100} \exp[B_{100/125} (1/T - 1/T_{100})]$ $T[K]; B$		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.

