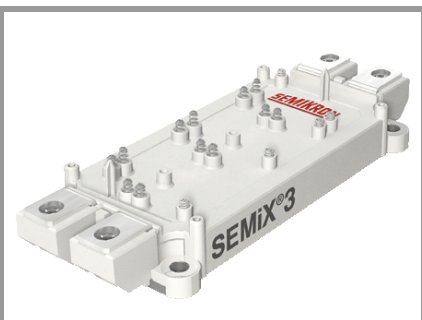


SEMiX653GB176HDs



SEMiX[®]3s

Trench IGBT Modules

SEMiX653GB176HDs

Preliminary Data

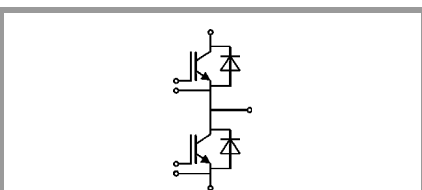
Features

- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- UL recognised file no. E63532

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Remarks

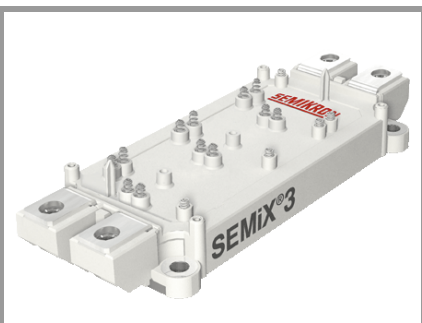


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Absolute Maximum Ratings				
Symbol	Conditions	Values	Unit	
IGBT				
V_{CES}		1700	V	
I_C	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	619	A
		$T_c = 80^\circ\text{C}$	438	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	900	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 1000\text{V}$ $V_{GE} \leq 20\text{V}$ $T_j = 125^\circ\text{C}$ $V_{CES} \leq 1700\text{V}$		10	μs
T_j		-55 ... 150	$^\circ\text{C}$	
Inverse diode				
I_F	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	545	A
		$T_c = 80^\circ\text{C}$	365	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	900	A	
I_{FSM}	$t_p = 10\text{ms}$, half sine wave, $T_j = 25^\circ\text{C}$	2900	A	
T_j		-40 ... 150	$^\circ\text{C}$	
Module				
$I_{t(RMS)}$		600	A	
T_{stg}		-40 ... 125	$^\circ\text{C}$	
V_{isol}	AC sinus 50Hz, $t = 60\text{s}$	4000	V	

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_{Cnom} = 450\text{A}$ $V_{GE} = 15\text{V}$ chipllevel	$T_j = 25^\circ\text{C}$	2	2.45	V
		$T_j = 125^\circ\text{C}$	2.45	2.9	V
V_{CE0}		$T_j = 25^\circ\text{C}$	1	1.2	V
		$T_j = 125^\circ\text{C}$	0.9	1.1	V
r_{CE}	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	2.2	2.8	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	3.4	4.0	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 18\text{mA}$	5.2	5.8	6.4	V
I_{CES}	$V_{GE} = 0\text{V}$ $V_{CE} = 1700\text{V}$	$T_j = 25^\circ\text{C}$	0.1	0.3	mA
		$T_j = 125^\circ\text{C}$			mA
C_{ies}	$V_{CE} = 25\text{V}$		39.6		nF
C_{oes}	$V_{GE} = 0\text{V}$		1.65		nF
C_{res}			1.31		nF
Q_G	$V_{GE} = -8\text{V} \dots +15\text{V}$		4200		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		1.67		Ω
$t_{d(on)}$	$V_{CC} = 1200\text{V}$		290		ns
t_r	$I_{Cnom} = 450\text{A}$ $T_j = 125^\circ\text{C}$		90		ns
E_{on}	$R_{Gon} = 3.6\Omega$		300		mJ
$t_{d(off)}$	$R_{Goff} = 3.6\Omega$		975		ns
t_f			190		ns
E_{off}			180		mJ
$R_{th(j-c)}$	per IGBT			0.054	K/W

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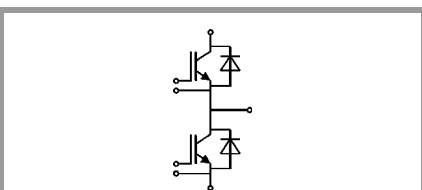
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Typical Applications

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Remarks

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_{Fnom} = 450A$ $V_{GE} = 0V$ chipllevel	$T_j = 25^\circ C$		1.7	1.9	V
		$T_j = 125^\circ C$		1.7	1.9	V
V_{F0}		$T_j = 25^\circ C$	0.9	1.1	1.3	V
		$T_j = 125^\circ C$	0.7	0.9	1.1	V
r_F		$T_j = 25^\circ C$	1.3	1.3	1.3	m Ω
		$T_j = 125^\circ C$	1.8	1.8	1.8	m Ω
I_{RRM}	$I_{Fnom} = 450A$	$T_j = 125^\circ C$		380		A
Q_{rr}	$di/dt_{off} = 4200A/\mu s$	$T_j = 125^\circ C$		130		μC
E_{rr}	$V_{GE} = -15V$ $V_{CC} = 1200V$	$T_j = 125^\circ C$		73		mJ
$R_{th(j-c)D}$	per diode				0.11	K/W
Module						
L_{CE}				20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_C = 25^\circ C$		0.7		m Ω
		$T_C = 125^\circ C$		1		m Ω
$R_{th(c-s)}$	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 Ω)			0,493 $\pm 5\%$		k Ω
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[K]$;			3550 $\pm 2\%$		K



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