

# SEMiX 653GB176HDs



SEMiX™ 3s

## Trench IGBT Modules

### SEMiX 653GB176HDs

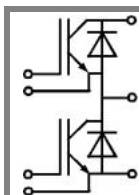
#### Target Data

#### Features

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

#### Typical Applications

- AC inverter drives
- UPS
- Electronic welders



GB

Absolute Maximum Ratings		$T_c = 25\text{ °C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		1700	V
$I_C$	$T_c = 25\text{ (80) °C}$	660 (470)	A
$I_{CRM}$	$T_c = 25\text{ (80) °C}$ , $t_p = 1\text{ ms}$	1320 (940)	A
$V_{GES}$		$\pm 20$	V
$T_{vj}$ ( $T_{stg}$ )	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	°C
$V_{isol}$	AC, 1 min.	4000	V
<b>Inverse diode</b>			
$I_F = -I_C$	$T_c = 25\text{ (80) °C}$	450 (300)	A
$I_{FRM}$	$T_c = 25\text{ (80) °C}$ , $t_p = 1\text{ ms}$	1320 (940)	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 25\text{ °C}$		A

Characteristics		$T_c = 25\text{ °C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 18\text{ mA}$	5,2	5,8	6,4	V
$I_{CES}$	$V_{GE} = 0$ , $V_{CE} = V_{CES}$ , $T_j = 25\text{ (125) °C}$			3,6	mA
$V_{CE(TO)}$	$T_j = 25\text{ (125) °C}$		1 (0,9)	1,2 (1,1)	V
$r_{CE}$	$V_{GE} = 0\text{ V}$ , $T_j = 25\text{ (125) °C}$		2,2 (3,4)	2,8 (4)	mΩ
$V_{CE(sat)}$	$I_C = 450\text{ A}$ , $V_{GE} = 15\text{ V}$ , $T_j = 25\text{ (125) °C}$ , chip level		2 (2,45)	2,45 (2,9)	V
$C_{ies}$	under following conditions		29,7		nF
$C_{oes}$	$V_{GE} = 0$ , $V_{CE} = 25\text{ V}$ , $f = 1\text{ MHz}$		1,7		nF
$C_{res}$			1,3		nF
$L_{CE}$			20		nH
$R_{CC'+EE'}$	resistance, terminal-chip, $T_c = 25\text{ (125) °C}$		0,8 (1,2)		mΩ
$t_{d(on)}/t_r$	$V_{CC} = 1200\text{ V}$ , $I_C = 450\text{ A}$				ns
$t_{d(off)}/t_f$	$V_{GE} = \pm 15\text{ V}$				ns
$E_{on} (E_{off})$	$R_{Gon} = R_{Goff} = 6,8\text{ Ω}$ , $T_j = 125\text{ °C}$		360 (170)		mJ
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_F = 450\text{ A}$ ; $V_{GE} = 0\text{ V}$ ; $T_j = 25\text{ (125) °C}$ , chip level		2 (2,1)	2,2 (2,3)	V
$V_{(TO)}$	$T_j = 25\text{ (125) °C}$		1,1 (0,9)	1,3 (1,1)	V
$r_T$	$T_j = 25\text{ (125) °C}$		2 (2,7)	2 (2,7)	mΩ
$I_{RRM}$	$I_F = 450\text{ A}$ ; $T_j = 25\text{ (125) °C}$				A
$Q_{rr}$	$di/dt = A/\mu s$				μC
$E_{rr}$	$V_{GE} = 0\text{ V}$				mJ
<b>Thermal characteristics</b>					
$R_{th(j-c)}$	per IGBT			0,048	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,12	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module		0,04		K/W
<b>Temperature sensor</b>					
$R_{25}$	$T_c = 25\text{ °C}$		5 ±5%		kΩ
$B_{25/85}$	$R_2 = R_1 \exp[B(1/T_2 - 1/T_1)]$ ; T[K]; B		3420		K
<b>Mechanical data</b>					
$M_s/M_t$	to heatsink (M5) / for terminals (M6)	3/2,5		5 / 5	Nm
w			289		g

