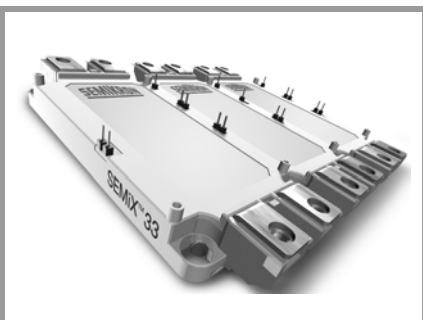


# SEMiX453GD176HDc



SEMiX<sup>®</sup>33c

## Trench IGBT Modules

### SEMiX453GD176HDc

#### Preliminary Data

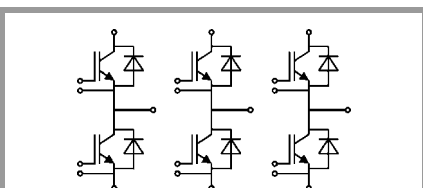
#### Features

- 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

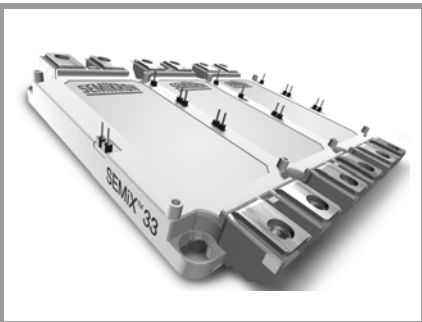


GD

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
<b>IGBT</b>				
$V_{CES}$			1700	V
$I_C$	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	444	A
		$T_c = 80^\circ\text{C}$	315	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$		600	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	$\mu\text{s}$
$T_j$			-55 ... 150	$^\circ\text{C}$
<b>Inverse diode</b>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	545	A
		$T_c = 80^\circ\text{C}$	365	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$		600	A
$I_{FSM}$	$t_p = 10\text{ms}$ , half sine wave, $T_j = 25^\circ\text{C}$		2900	A
$T_j$			-40 ... 150	$^\circ\text{C}$
<b>Module</b>				
$I_{t(RMS)}$			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
<b>IGBT</b>						
$V_{CE(sat)}$	$I_{Cnom} = 300\text{A}$ $V_{GE} = 15\text{V}$ chiplevel	$T_j = 25^\circ\text{C}$		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
$r_{CE}$	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$		3.3	4.2	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$		5.2	6.0	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 12\text{mA}$		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	$\text{mA}$
		$T_j = 125^\circ\text{C}$				$\text{mA}$
$C_{ies}$	$V_{CE} = 25\text{V}$ $V_{GE} = 0\text{V}$	$f = 1\text{MHz}$		26.4		nF
$C_{oes}$		$f = 1\text{MHz}$		1.10		nF
$C_{res}$		$f = 1\text{MHz}$		0.88		nF
$Q_G$	$V_{GE} = -8\text{V} \dots +15\text{V}$			2799		nC
$R_{Gint}$	$T_j = 25^\circ\text{C}$			2.50		$\Omega$
$t_{d(on)}$	$V_{CC} = 1200\text{V}$			335		ns
$t_r$	$I_{Cnom} = 300\text{A}$			70		ns
$E_{on}$	$T_j = 125^\circ\text{C}$			215		mJ
$t_{d(off)}$	$R_{Gon} = 4.3\Omega$			990		ns
	$R_{Goff} = 4.3\Omega$					ns
$t_f$				150		ns
$E_{off}$				125		mJ
$R_{th(j-c)}$	per IGBT				0.071	K/W

# SEMiX453GD176HDc



SEMiX<sup>®</sup>33c

## Trench IGBT Modules

### SEMiX453GD176HDc

#### Preliminary Data

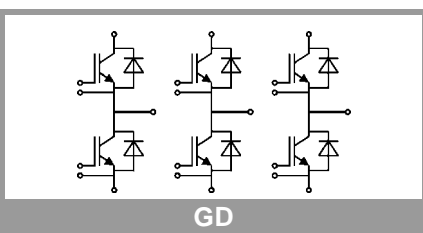
#### Features

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

#### Typical Applications

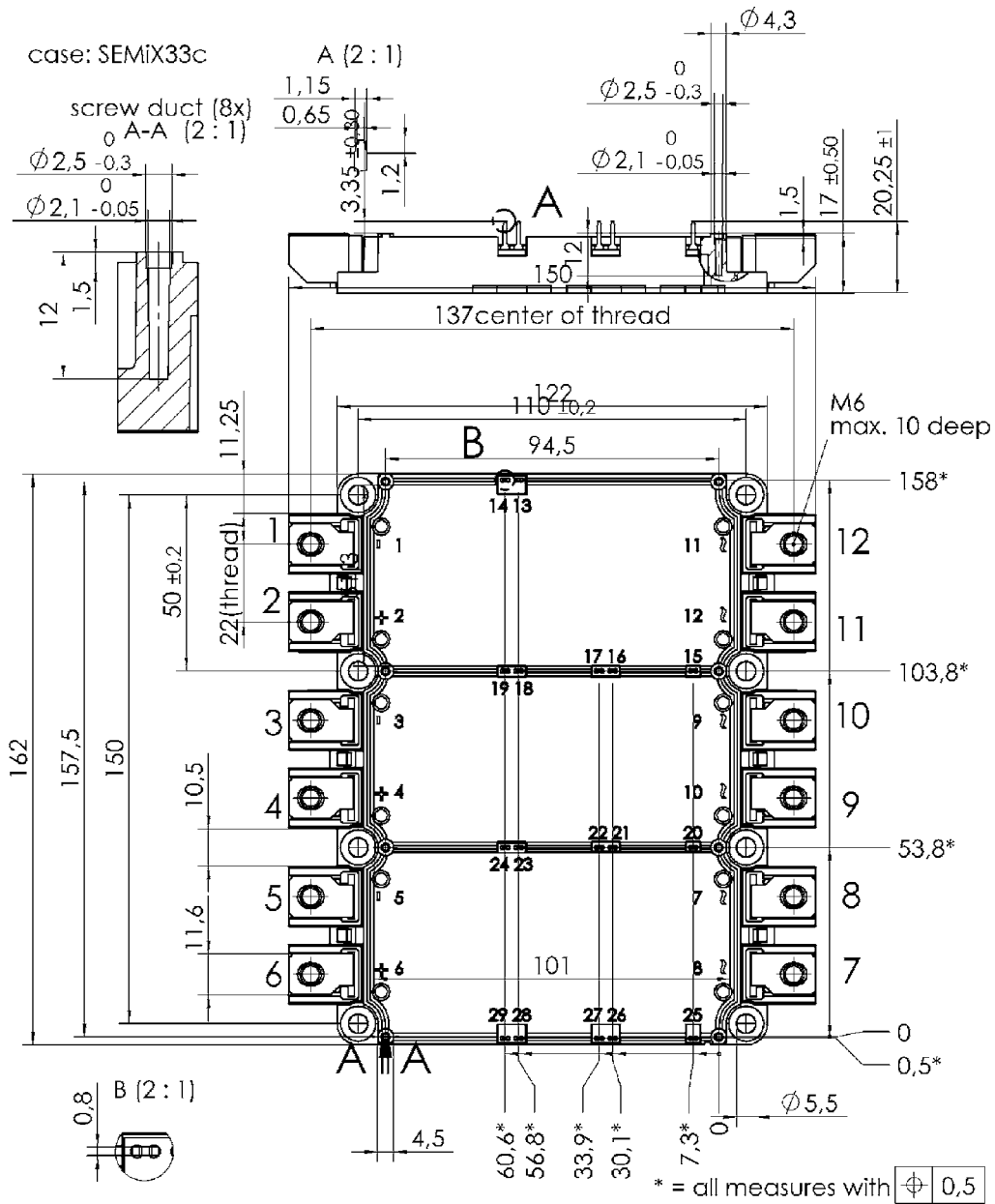
- AC inverter drives
- UPS
- Electronic welders

#### Remarks

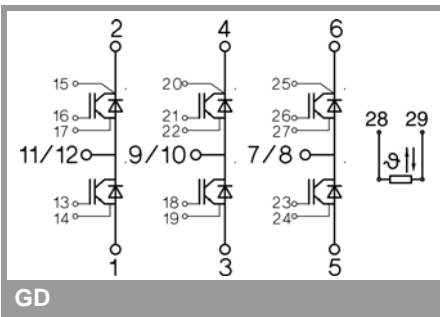


Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>Inverse diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 300A$ $V_{GE} = 0V$ chipllevel	$T_j = 25^\circ C$		1.5	1.7	V
		$T_j = 125^\circ C$		1.4	1.6	V
$V_{F0}$		$T_j = 25^\circ C$	0.9	1.1	1.3	V
		$T_j = 125^\circ C$	0.7	0.9	1.1	V
$r_F$		$T_j = 25^\circ C$	1.3	1.3	1.3	m $\Omega$
		$T_j = 125^\circ C$	1.8	1.8	1.8	m $\Omega$
$I_{RRM}$	$I_{Fnom} = 300A$	$T_j = 125^\circ C$		350		A
$Q_{rr}$	$di/dt_{off} = 4700A/\mu s$	$T_j = 125^\circ C$		115		$\mu C$
$E_{rr}$	$V_{GE} = -15V$ $V_{CC} = 1200V$	$T_j = 125^\circ C$		65		mJ
$R_{th(j-c)D}$	per diode				0.11	K/W
<b>Module</b>						
$L_{CE}$				20		nH
$R_{CC'+EE'}$	res., terminal-chip	$T_C = 25^\circ C$		0.7		m $\Omega$
		$T_C = 125^\circ C$		1		m $\Omega$
$R_{th(c-s)}$	per module			0.014		K/W
$M_s$	to heat sink (M5)		3		5	Nm
$M_t$	to terminals (M6)		2.5		5	Nm
w					900	g
<b>Temperature sensor</b>						
$R_{100}$	$T_c=100^\circ C$ ( $R_{25}=5$ k $\Omega$ )			0,493 $\pm 5\%$		k $\Omega$
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$ ; $T[K]$ ;			3550 $\pm 2\%$		K

# SEMiX453GD176HDc



SEMiX 33c



This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX

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