B5S162861

20-BIT TWO PORT BUS SWITCH WITH 25Ω SERIES RESISTOR IN OUTPUT

- HIGH SPEED: t_{PD} = 1.25ns (MAX.) at V_{CC} = 4.5V T_A=85°C
- ON RESISTANCE BETWEEN TWO PORT: 25Ω (TYP) at V_{CC} = 5.0V T_A=25°C
- LOW POWER DISSIPATION: I_{CC} = 1uA(MAX.) at T_A=25°C
- COMPATIBLE WITH TTL OUTPUTS: V_{IH}=2V(MIN), V_{IL}=0.8V(MAX)
- POWER DOWN PROTECTION ON INPUTS AND OUTPUTS
- OPERATING VOLTAGE RANGE: V_{CC}(OPR) = 4V to 5.5V
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 16861
- IMPROVED LATCH-UP IMMUNITY
- ESD PERFORMANCE: HBM > 2000V (MIL STD 883 method 3015); MM > 200V

DESCRIPTION

The B5S162861 is an advanced high-speed CMOS 20-BIT TWO PORT BUS SWITCH fabricated with sub-micron silicon gate and double-layer metal wiring C^2MOS tecnology.

It is ideal for 4V to 5.5V V_{CC} operations and ultra-low power and low noise applications, typically notebook and docking station.

Any nG output control governs two 10-bit BUS SWITCHES. Output Enable inputs (nG) tied together gives full 20-bit operations. When nG is LOW, the switches are on. When nG is HIGH, the switches are in high impedance state.

It has ultra high-speed performance at 5V near zero delay with low ON resistance and include 25Ω series resistor to reduce noise resulting from reflections, thus eliminating the need for an external terminating resistor.

All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.


TSSOP

ORDER CODES

PACKAGE	T & R
TSSOP48	B5S162861TTR

PIN CONNECTION

NC	1	48	V_{CC}
1A0	2	47	$\overline{1G}$
1A1	3	46	1B0
1A2	4	45	1B1
1A3	5	44	1B2
1A4	6	43	1B3
1A5	7	42	1B4
1A6	8	41	1B5
1A7	9	40	1B6
1A8	10	39	1B7
1A9	11	38	1B8
GND	12	37	1B9
NC	13	36	V_{CC}
2A0	14	35	$\overline{2G}$
2A1	15	34	2B0
2A2	16	33	2B1
2A3	17	32	2B2
2A4	18	31	2B3
2A5	19	30	2B4
2A6	20	29	2B5
2A7	21	28	2B6
2A8	22	27	2B7
2A9	23	26	2B8
GND	24	25	2B9
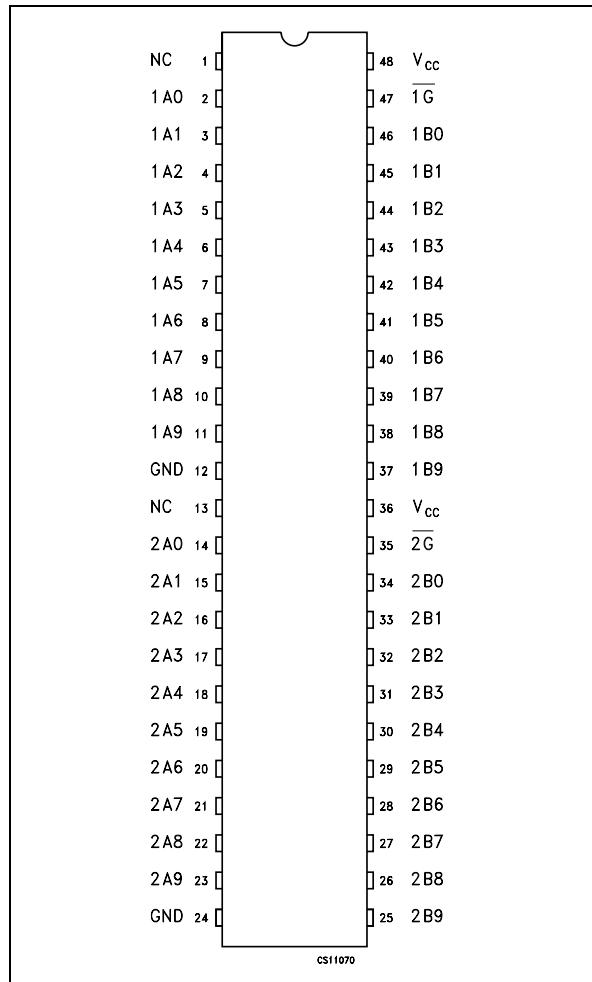
CS11070

INPUT EQUIVALENT CIRCUIT

CS11300
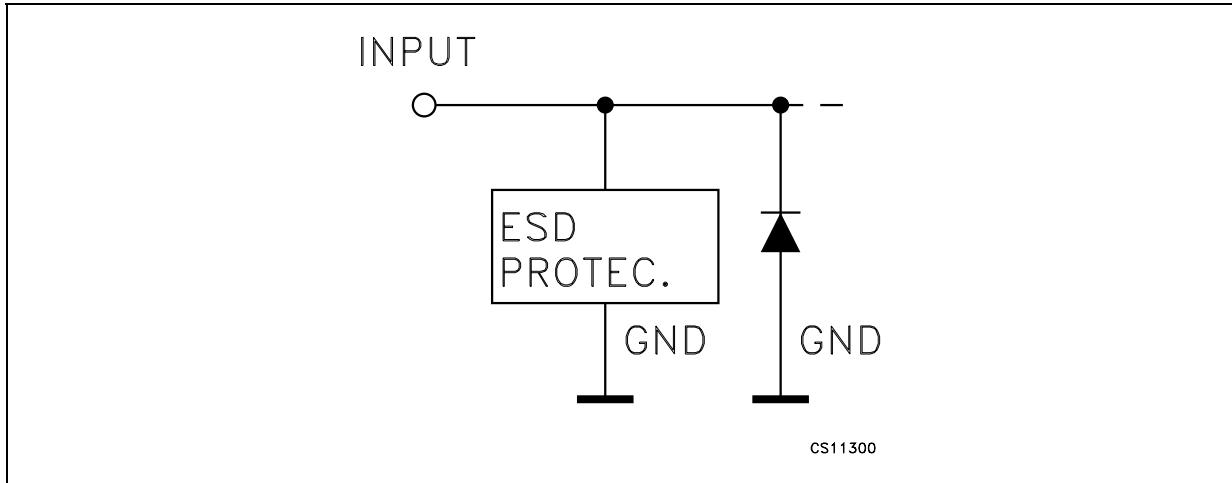
PIN DESCRIPTION

PIN No	SYMBOL	NAME QND FUNCTION
1, 13	NC	Not Connected
2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1A0 to 1A9	Data Inputs
14, 15, 16, 17, 18, 19, 20, 21, 22, 23	2A0 to 2A9	Data Inputs
34, 33, 32, 31, 30, 29, 28, 27, 26, 25	2B0 to 2B9	Data Outputs
46, 45, 44, 43, 42, 41, 40, 39, 38, 37	1B0 to 1B9	Data Outputs
47, 35	$\overline{1G}$, $\overline{2G}$	Bus Enable Input (Active Low)
12, 24	GND	Ground (0V)
36, 48	V_{CC}	Positive Supply Voltage

SCHEMATIC DIAGRAM

CS11490

TRUTH TABLE

INPUT		OUTPUT
$\overline{nG}$	1An, 2An	1Bn, 2Bn
L	X	Bus ON
H	X	Z

n: 0 to 9
X: "H" or "L"
Z: High Impedance
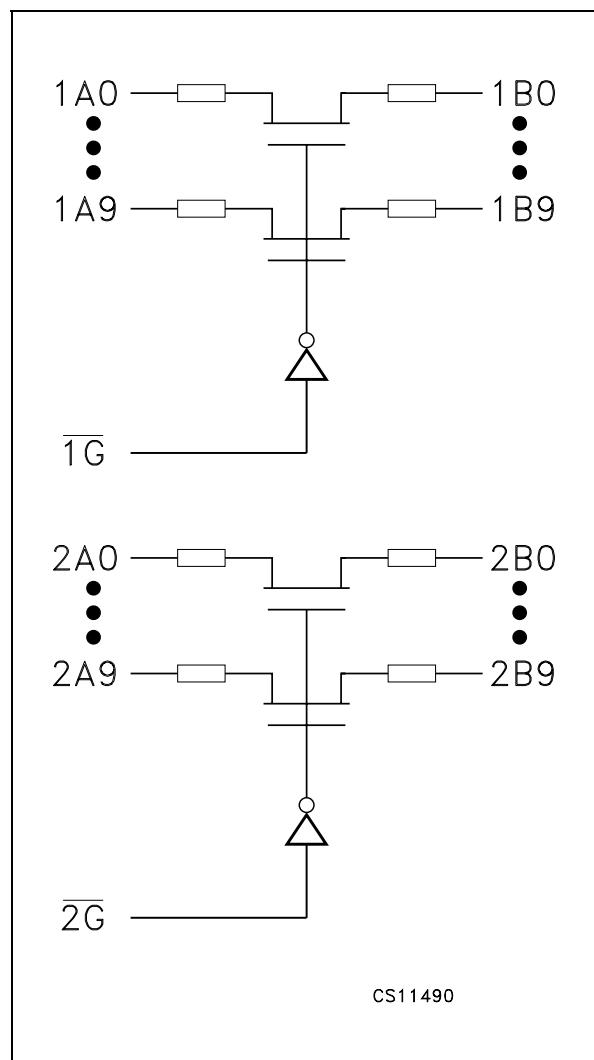
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter[2]	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7.0	V
V_I	DC Switch and Control Pin Voltage	-0.5 to +7.0	V
V_O	DC Output Voltage (V_{CC} = 0V) (note 1)	-0.5 to +7.0	V
V_O	DC Output Voltage ($V_{I/O}$=Gnd)	-0.5 to +7.0	V
I_{IK}	DC Input Diode Current ($V_{I/O}$ < 0V)	- 50	mA
I_{OK}	DC Output Diode Current (note 2)	- 50	mA
I_O	DC Output Current (note 3)	128	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current per Supply Pin	± 100	mA
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Rating are those value beyond which damage to the device may occour. Functional operation under these condition is not implied
1) I_O absolute maximum rating must be observed
2) V_O < GND, V_O > V_{CC}
3) Not more than one output should be tested at one time. Duration of the test should not exceed one second.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	4 to 5.5	V
V_I	Input Voltage	0 to 5.5	V
V_O	Output Voltage (V_{CC} = 0V)	0 to 5.5	V
V_O	Output Voltage	0 to 5.5	V
T_{op}	Operating Temperqture	-55 to 125	°C
dt/dv	Switch Input Rise and Fall Time	0 to DC	ns/V
dt/dv	Control Input Rise and Fall Time (note 1)	0 to 10	ns/V

1) V_{IN} from 0.8V to 2V at V_{CC} = 3.0V

DC SPECIFICATION

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		$T_A = 25\ °C$			-40 to 85 °C		-55 to 125 °C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_{IH}	High Level Input Voltage	4 to 5.5		2			2		2		V
V_{IL}	Low Level Input Voltage	4 to 5.5				0.8		0.8		0.8	V
V_H	Input Hysteresis at Control pin	4.5 to 5.5			150						mV
R_{ON}	Switch ON Resistance	4.5	I_{ON}=64 mA V_I=0V				20	40			Ω
		4.5	I_{ON}=48 mA V_I=0V		28		20	40			
		4.5	I_{ON}=15 mA V_I=2.4V		35		20	48			
		4.0	I_{ON}=15 mA V_I=2.4V				20	48			
I_I	Input Leakage Current	0 to 5.5	V_I = 5.5V or GND			±0.1		±1.0		±2.0	µA
I_{OZ}	High Impedance Leakage Current	4.5 to 5.5	$V_{I/O}$ = 5.5V to GND					±1.0		±2.0	µA
V_{IK}	Clamp Diode Voltage	4.0 to 5.5	I_I = -18mA		-0.7			-1.2		-1.2	V
I_{CC}	Quiescent Supply Current	5.5	V_I = V_{CC} or GND		0.1	1.0		3.0		10.0	µA
I_{CCD}	Supply Current per Control Input per MHz (1)	5.5	$V_{I/O}$ = Open nG=GND; Control Input Toggling 50% Duty Cycle					0.25			mA/ MHz
ΔI_{CC}	I_{CC} incr. per Input	5.5	V_{IC}=V_{CC}-2.1 V					2.5			mA

1) This current applies to the control inputs only and represent the current required to switch internal capacitance at the specified frequency. The 1An and 2An inputs generate no significant AC or DC currents as they transition. This parameter is not tested, but is guaranteed by design.

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Condition				Value				Unit
		V_{CC} (V)	C_L (pF)	R_L (Ω)	$t_s = t_r$ (ns)	-40 to 85 °C		-55 to 125 °C		
						Min.	Max.	Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay Time (1) xAn to xBn, xBn to xAn(2)	4.5 to 5.5	50	500	2.5		1.25			ns
t_{PZL} t_{PZH}	Output Enable Time		50	500	2.5	1.5	5.5			ns
t_{PLZ} t_{PHZ}	Output Disable Time		50	500	2.5	1.5	5.5			ns

1) Parameter guaranteed by design
2) X=1,2; n=0..9.

CAPACITANCE CHARACTERISTICS

Symbol	Parameter	Test Condition		Value			Unit
		V_{CC} (V)		$T_A = 25\ °C$			
				Min.	Typ.	Max.	
C_{IN}	Input Capacitance at Control Pin				4		pF
$C_{I/O}$	Input Capacitance at I/O Pin	5.0	$\overline{nG}=V_{CC}$		5.5		pF

TEST CIRCUIT
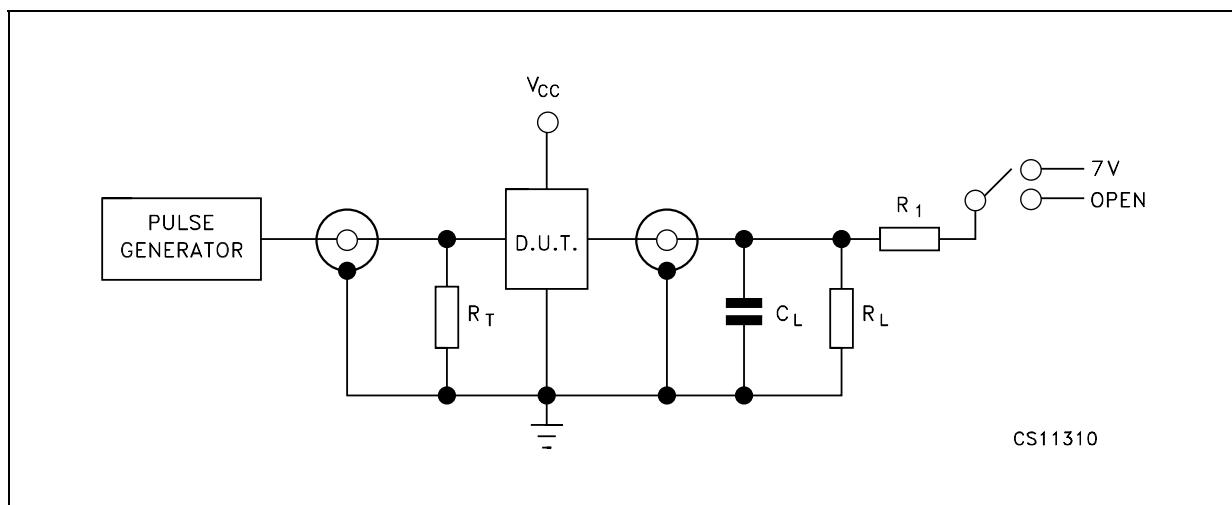
TEST	SWITCH
t_{PLH}, t_{PHL}	Open
t_{PZL}, t_{PLZ}	7V
t_{PZH}, t_{PHZ}	Open

C_L = 50pF or equivalent (includes jig and probe capacitance)
R_L = R_1 = 500Ω or equivalent
R_T = Z_{OUT} of pulse generator (typically 50Ω)

WAVEFORM 1: PROPAGATION DELAY (f=1MHz; 50% duty cycle)

CS11330
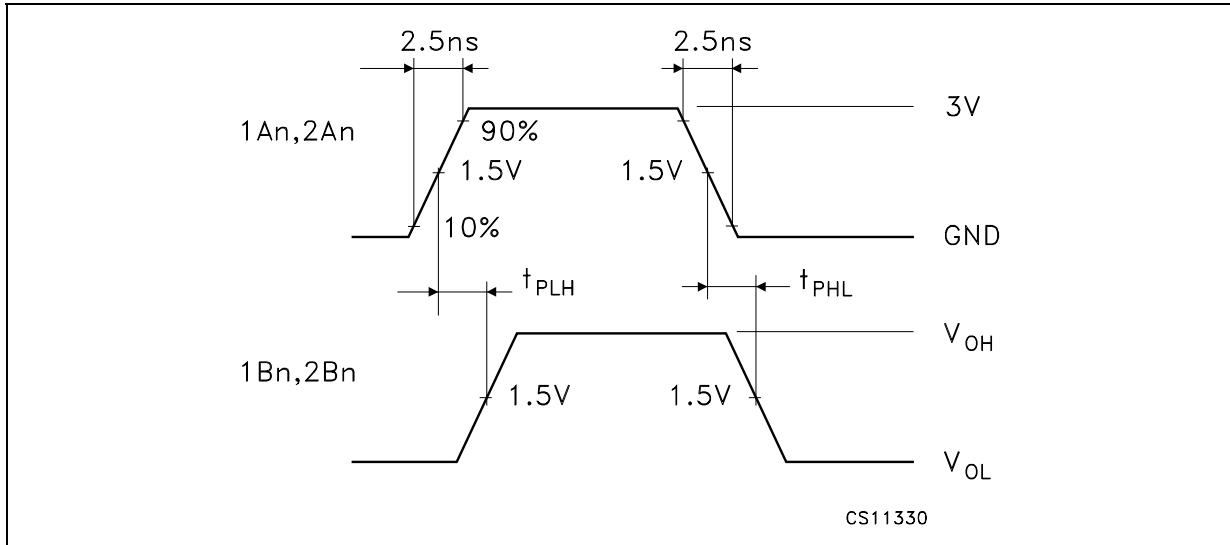
**WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIME** (f=1MHz; 50% duty cycle)

CS11320
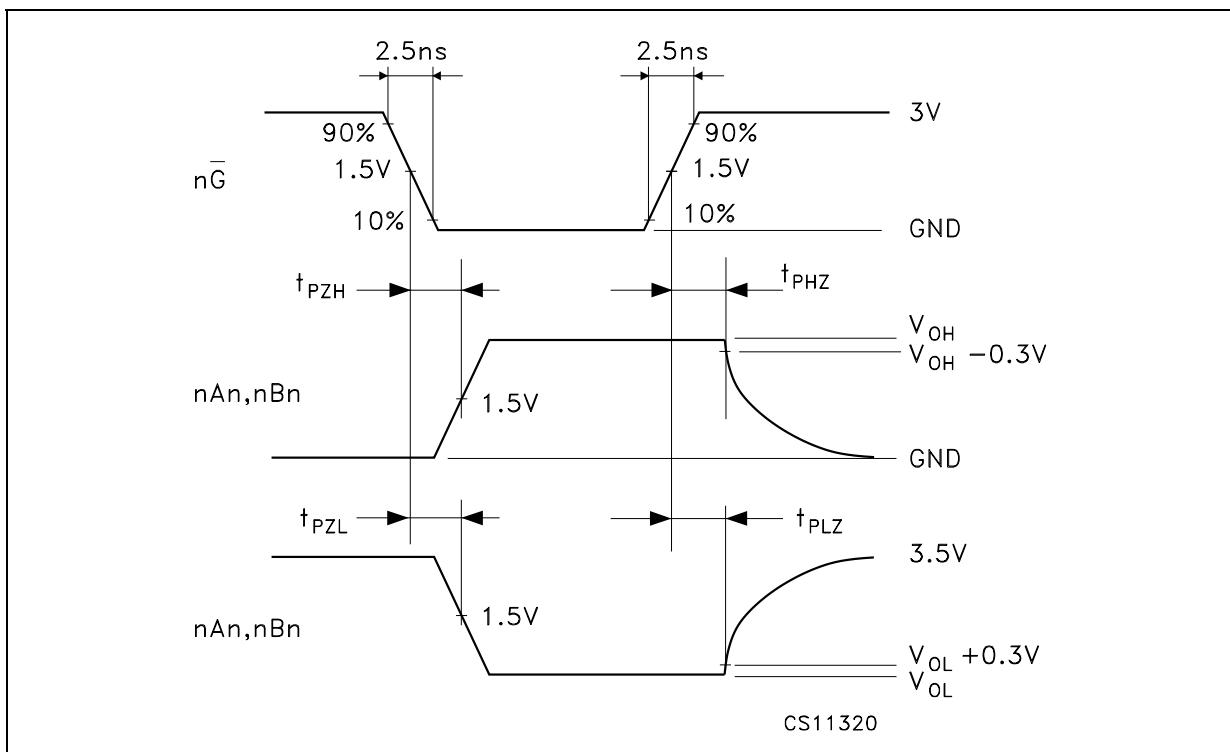
TSSOP48 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	**TYP**	**MAX.**	**MIN.**	**TYP.**	**MAX.**
A			1.2			0.047
A1	0.05		0.15	0.002		0.006
A2		0.9			0.035	
b	0.17		0.27	0.0067		0.011
c	0.09		0.20	0.0035		0.0079
D	12.4		12.6	0.488		0.496
E		8.1 BSC			0.318 BSC	
E1	6.0		6.2	0.236		0.244
e		0.5 BSC			0.0197 BSC	
K	0˚		8˚	0˚		8˚
L	0.50		0.75	0.020		0.030

PIN 1 IDENTIFICATION
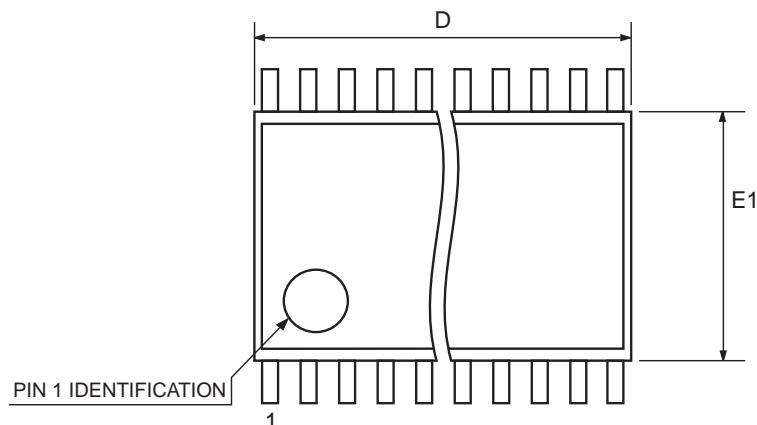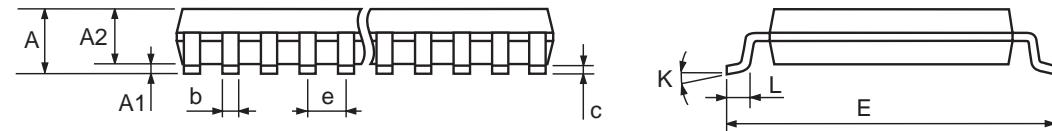
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Tape & Reel TSSOP48 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	**TYP**	**MAX.**	**MIN.**	**TYP.**	**MAX.**
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			30.4			1.197
Ao	8.7		8.9	0.343		0.350
Bo	13.1		13.3	0.516		0.524
Ko	1.5		1.7	0.059		0.067
Po	3.9		4.1	0.153		0.161
P	11.9		12.1	0.468		0.476

Note: Drawing not in scale