

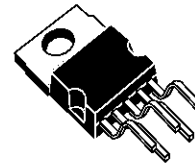
12W AUDIO AMPLIFIER ($V_S = 22V$, $R_L = 4\Omega$)

DESCRIPTION

The TDA2008 is a monolithic class B audio power amplifier in Pentawatt® package designed for driving low impedance loads (down to 3.2Ω). The device provides a high output current capability (up to 3A), very low harmonic and crossover distortion.

In addition, the device offers the following features:

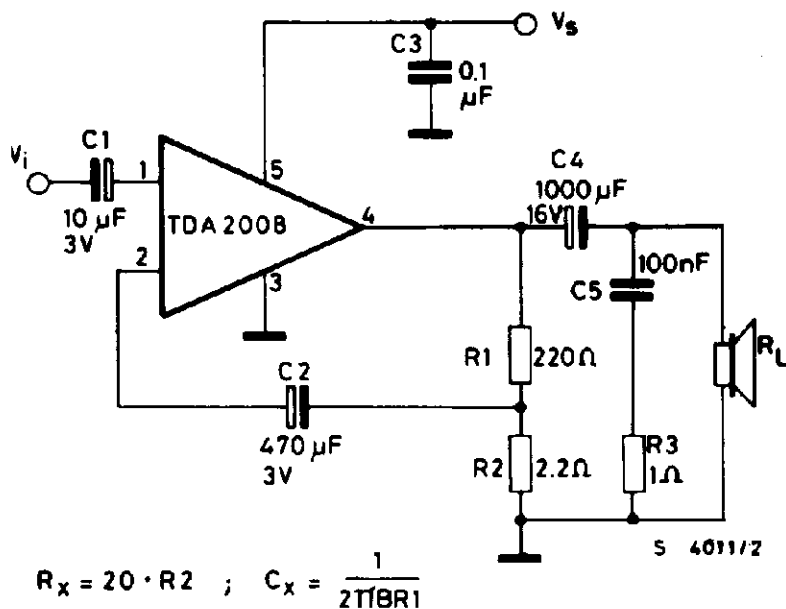
- very low number of external components;
- assembly ease, due to Pentawatt® power package with no electrical insulations requirements;
- space and cost saving;
- high reliability;
- flexibility in use;
- thermal protection.



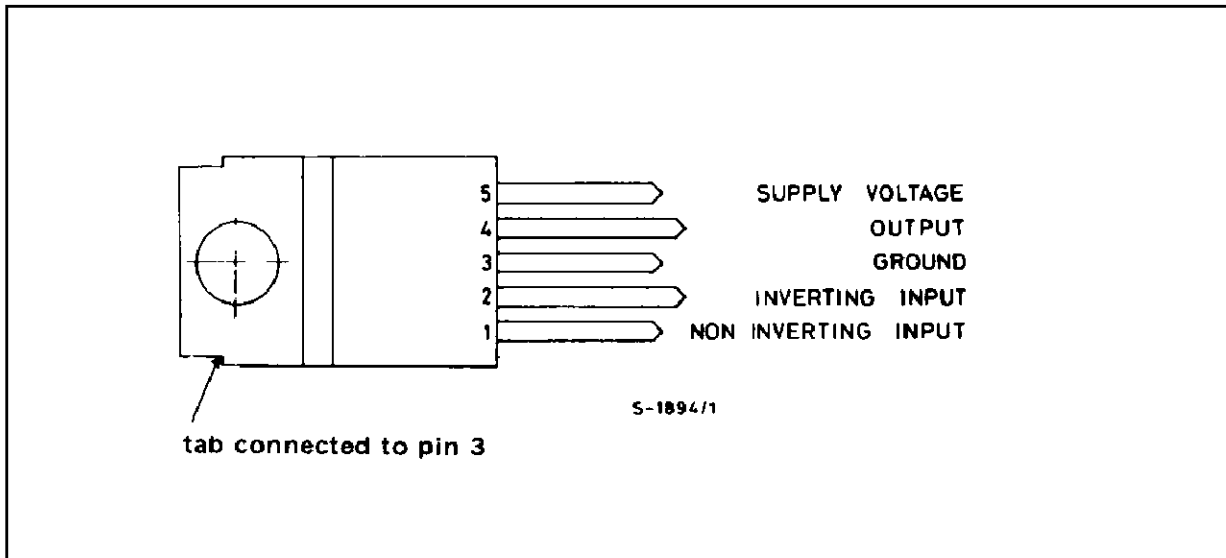
Pentawatt

ORDERING NUMBER : TDA 2008V

TYPICAL APPLICATION CIRCUIT



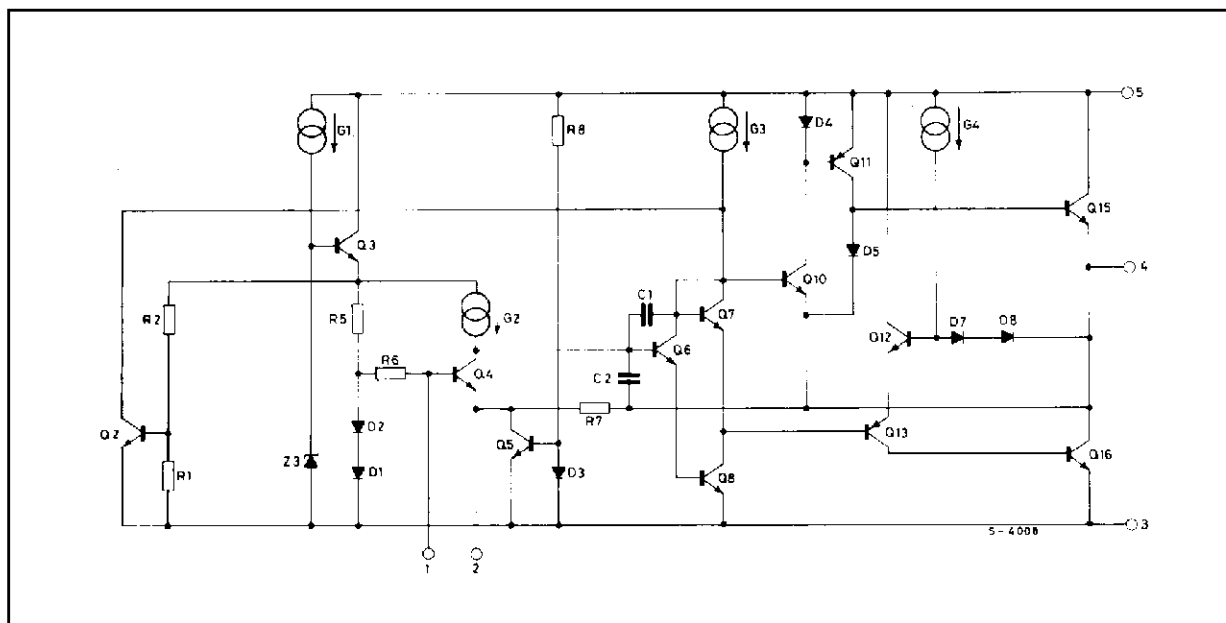
PIN CONNECTION (top view)



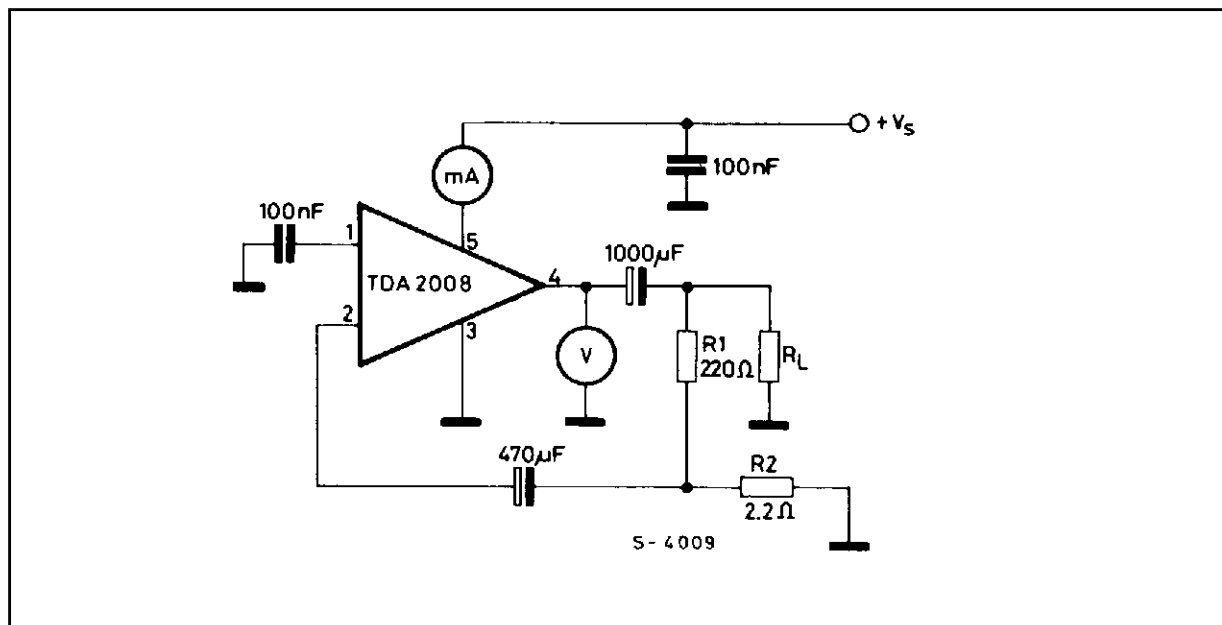
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_s	DC supply voltage	28	V
I_o	Output peak current (repetitive)	3	A
I_o	Output peak current (non repetitive)	4	A
P_{tot}	Power dissipation at $T_{case} = 90^\circ\text{C}$	20	W
T_{stg}, T_j	Storage and junction temperature	- 40 to 150	$^\circ\text{C}$

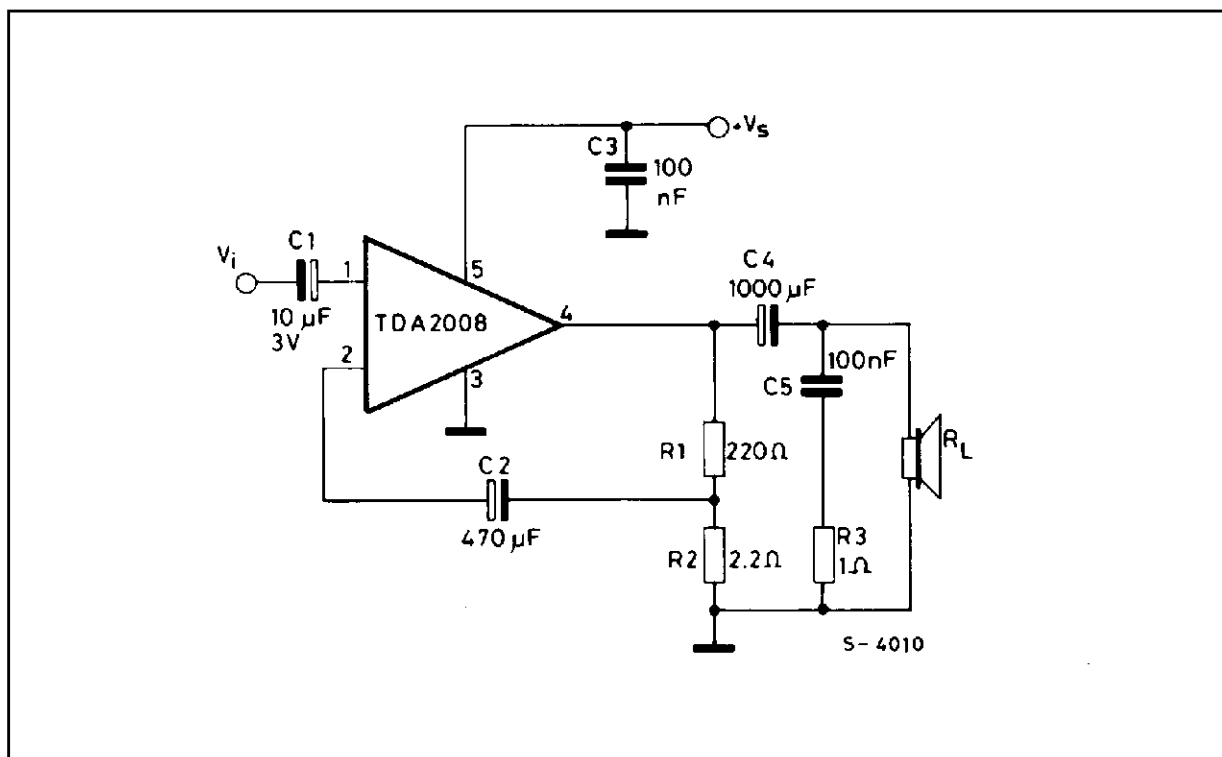
SCHEMATIC DIAGRAM



DC TEST CIRCUIT



AC TEST CIRCUIT



THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th-j-case}$	Thermal resistance junction-case max	3	°C/W

ELECTRICAL CHARACTERISTICS (Refer to the test circuit, $V_s = 18V$, $T_{amb} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_s	Supply voltage		10		28	V
V_o	Quiescent output voltage (pin 4)			10.5		V
I_d	Quiescent drain current (pin 5)			65	115	mA
P_o	Output power	$d = 10\%$ $f = 1\text{ KHz}$		8		W
		$R_L = 8\Omega$ $R_L = 4\Omega$		10	12	W
$V_i(RMS)$	Input saturation voltage		300			mV
V_i	Input sensitivity	$f = 1\text{ KHz}$ $P_o = 0.5W$ $P_o = 8W$ $P_o = 0.5W$ $P_o = 12W$		20 80 14 70		mV mV mV mV
B	Frequency response (-3 dB)	$P_o = 1W$ $R_L = 4\Omega$	40 to 15,000			Hz
d	Distortion	$f = 1\text{ KHz}$ $P_o = 0.05\text{ to }4W$ $P_o = 0.05\text{ to }6W$		0.12 0.12	1 1	% %
R_i	Input resistance (pin 1)	$f = 1\text{ KHz}$	70	150		K Ω
G_v	Voltage gain (open loop)	$f = 1\text{ KHz}$ $R_L = 8\Omega$		80		dB
G_v	Voltage gain (closed loop)		39.5	40	40.5	dB
e_N	Input noise voltage	BW = 22Hz to 22 KHz		1	5	μV
i_N	Input noise current			60	200	pA
SVR	Supply voltage rejection	$V_{ripple} = 0.5$ $R_g = 10K\Omega$ $R_L = 4\Omega$ $f = 100\text{ Hz}$	30	36		dB

APPLICATION INFORMATION

Figure 1. Typical application circuit

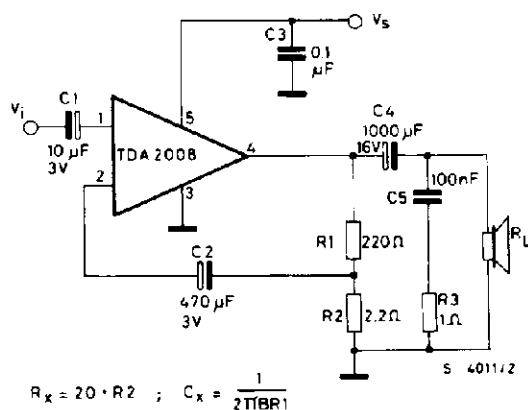


Figure 2. P.C. board and component layout for the circuit of fig. 1 (1:1 scale)

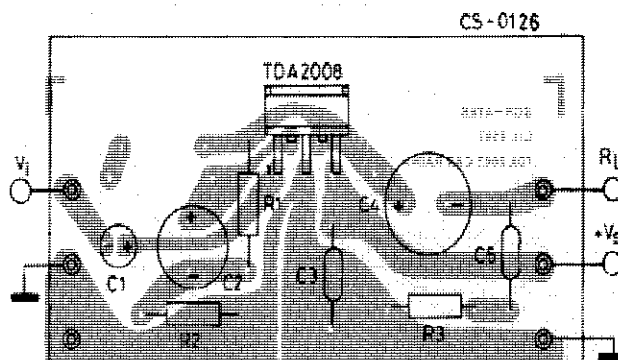


Figure 3. 25W bridge configuration application circuit (°)

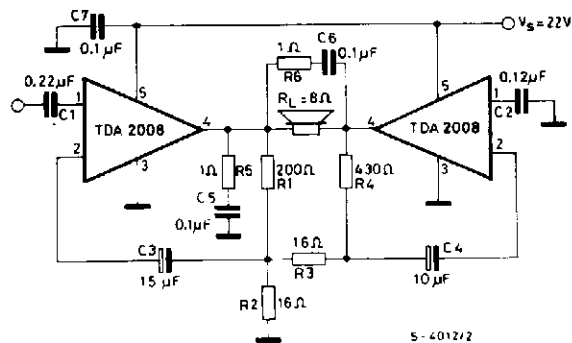
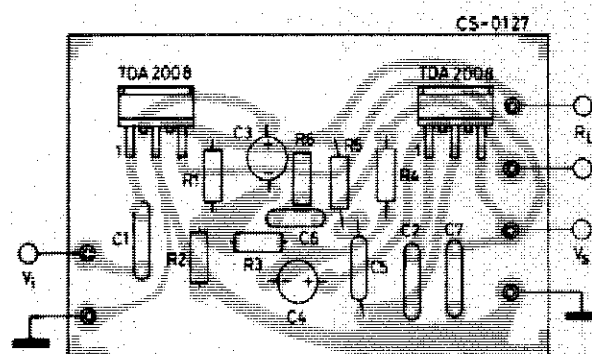


Figure 4. P.C. board and component layout for the circuit of fig. 3 (1:1 scale)



(°) The value of the capacitor C3 and C4 are different to optimize the SVR (Typ. = 40 dB)

Figure 5. Quiescent current vs. supply voltage

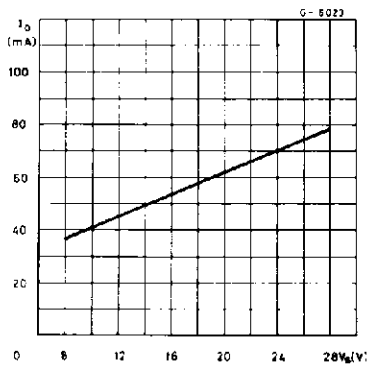


Figure 6. Output voltage vs. supply voltage

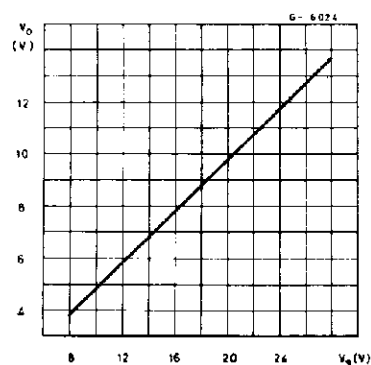


Figure 7. Output power vs. supply voltage

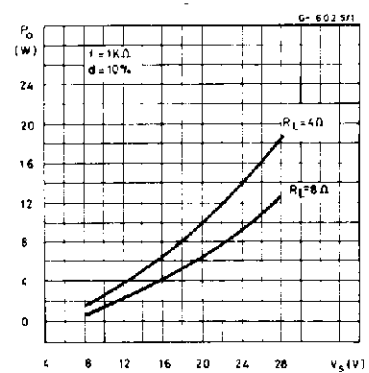


Figure 8. Distortion vs. frequency

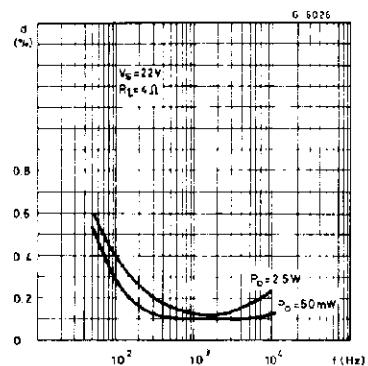


Figure 9. Supply voltage rejection vs. frequency

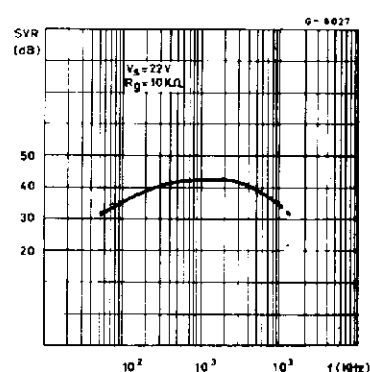
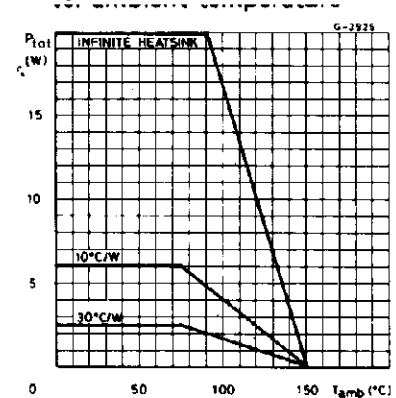


Figure 10. Maximum allowable power dissipation vs. ambient temperature



PRACTICAL CONSIDERATIONS

Printed circuit board

The layout shown in Fig. 2 is recommended. If different layouts are used, the ground points of input 1 and input 2 must be well decoupled from the ground of the output through which a rather high current flows.

Assembly suggestion

No electrical insulation is needed between the

package and the heat-sink. Pin length should be as short as possible. The soldering temperature must not exceed 260°C for 12 seconds.

Application suggestions

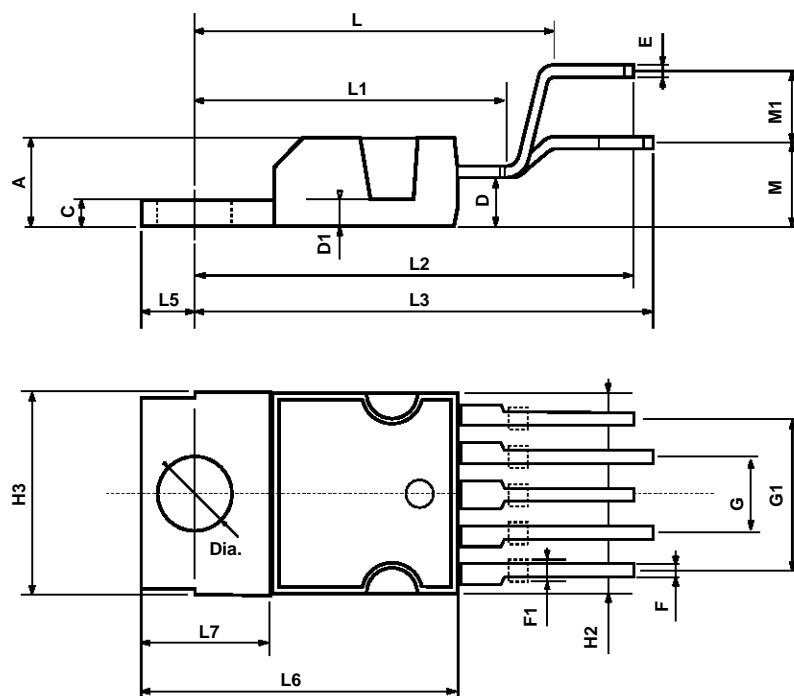
The recommended component values are those shown in the application circuits of Fig. 1. Different values can be used. The following table is intended to aid the car-radio designer.

Component	Recommended value	Purpose	Larger than recommended value	Smaller than recommended value
C1	2.2μF	Input DC decoupling		Noise at switch-on, switch-off
C2	470μF	Ripple rejection.		Degradation of SVR.
C3	0.1μF	Supply by passing.		Danger of oscillation.
C4	1000μF	Output coupling.		Higher low frequency cutoff.
C5	0.1μF	Frequency stability.		Danger of oscillation at high frequencies with inductive loads.
R1	$(G_v - 1) \cdot R_2$	Setting of gain. (*)		Increase of drain current.
R2	2.2Ω	Setting of gain and SVR.	Degradation of SVR.	
R3	1Ω	Frequency stability.	Danger of oscillation at high frequencies with inductive loads.	

(*) The closed loop gain must be higher than 26dB.

PENTAWATT PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			4.8			0.189
C			1.37			0.054
D	2.4		2.8	0.094		0.110
D1	1.2		1.35	0.047		0.053
E	0.35		0.55	0.014		0.022
F	0.8		1.05	0.031		0.041
F1	1		1.4	0.039		0.055
G		3.4		0.126	0.134	0.142
G1		6.8		0.260	0.268	0.276
H2			10.4			0.409
H3	10.05		10.4	0.396		0.409
L		17.85			0.703	
L1		15.75			0.620	
L2		21.4			0.843	
L3		22.5			0.886	
L5	2.6		3	0.102		0.118
L6	15.1		15.8	0.594		0.622
L7	6		6.6	0.236		0.260
M		4.5			0.177	
M1		4			0.157	
Dia	3.65		3.85	0.144		0.152



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