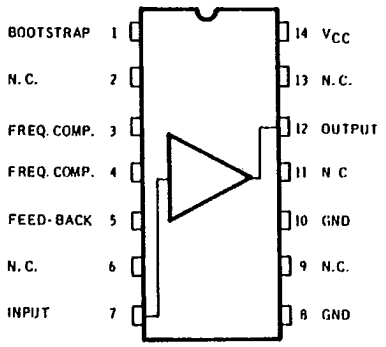
ECG1118

AUDIO AMPLIFIER

T-74-05-01

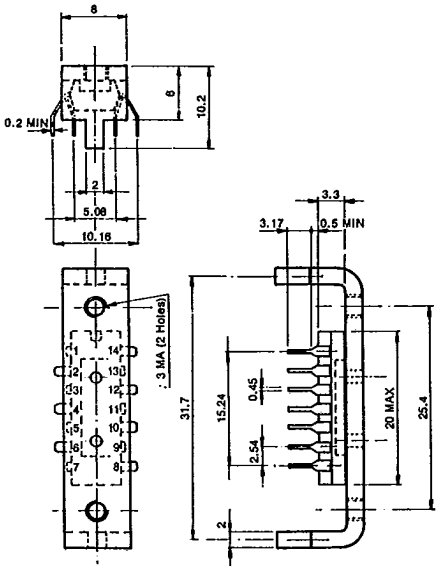
- OUTPUT POWER 3.3 W
- LOW DISTORTION
- LOW QUIESCENT CURRENT
- SELF CENTERING BIAS
- HIGH INPUT IMPEDANCE

CONNECTION DIAGRAM
(top view)



The ECG1118 is a monolithic integrated circuit particularly designed for use in radio receivers, record players and portable TV sets as audio amplifier. The usable range of supply voltage is very wide: from 6 to 16V. Special features of the circuit include low quiescent current, direct coupling of the input and self-centering bias. The circuit requires a minimum number of external components. The package is a special plastic DIP with a shaped heat sink soldered to a copper bar inserted in the plastic. The package has very low thermal resistance. To decrease the thermal resistance further an external heat sink can easily be mounted by means of ordinary hardware.

PHYSICAL DIMENSIONS



Note : all dimensions in mm.

ABSOLUTE MAXIMUM RATINGS

Max Operating Supply Voltage	18 V
Max Supply Voltage (no signal)	22 V
Peak Output Current	1 A
Input Voltage (see note)	-0.5 to +20 V
Storage Temperature	-55°C to +125°C
Operating Temperature	0°C to +70°C
Max Junction Temperature	150°C
Power Dissipation ($T_A \leq 25°C$)	2 W
Power Dissipation ($T_A \leq 70°C$ with ∞ h.s.)	3 W
Thermal Resistance J-A	63°C/W
Thermal Resistance J-C	17°C/W

Note :
For supply voltages less than 20V, the absolute max input voltage is equal to the supply voltage.

OUTPUT POWER AS A FUNCTION OF SUPPLY VOLTAGE AND LOADING CONDITIONS

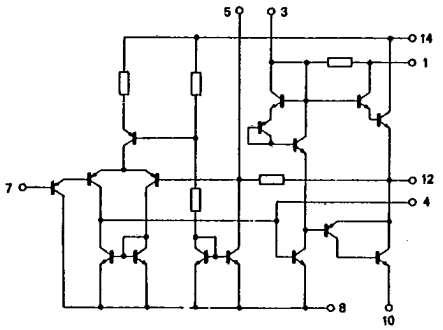
(Typical values at ambient temperature T_A = 25°C)

Pout (W) THD = 2%	Pout (W) THD 10%		V_{CC} (V)	R_L (Ω)	External Heat Sink
	Min.	Typ.			
1.4		1.8	9	4	Not required
0.9		1.15		8	Not required
1.7		2.1	12	8	Not required
2.8	2.5	3.3	15	8	Required
1.6		1.9		16	Not required

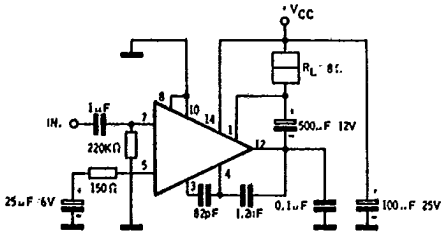
TYPICAL ELECTRICAL CHARACTERISTICS (Ambient temperature T_A = 25°C unless otherwise noted)

PARAMETER	CONDITIONS	VALUES		UNIT
		V_{CC} = 12V	V_{CC} = 15V	
Total Current (I_{CC})		3.5	4	mA
Quiescent Current of Output Transistors (I_O)		1.2	1.8	mA
Input Bias Current		75	95	nA
DC Output Voltage	R_S = 220 KΩ	6.3	7.9	V
Open Loop Voltage Gain	R_L = 8Ω	70	72	dB
Total Harmonic Distortion	Test Circuit 1			
	R_L = 8Ω f = 1 KHz Pout = 50mW	0.3	0.3	%
	R_L = 8Ω f = 1 KHz Pout = 1 W	0.2	0.2	%
	Test Circuit 2			
	R_L = 8Ω f = 1 KHz Pout = 50mW	1.5	1.5	%
	R_L = 8Ω f = 1 KHz Pout = 1 W	1	1	%
Supply Current	R_L = 8Ω Pout = 2.1 W	235		mA
	R_L = 8Ω Pout = 3.3 W		300	mA
Feedback Resistance R_f (see electrical diagram)	Pin 5 to 12	7.5	7.5	KΩ
Input impedance	Open loop	0.75	0.75	MΩ

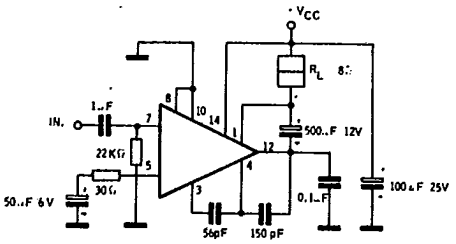
EQUIVALENT CIRCUIT



TEST CIRCUIT 1 (Av = 50)

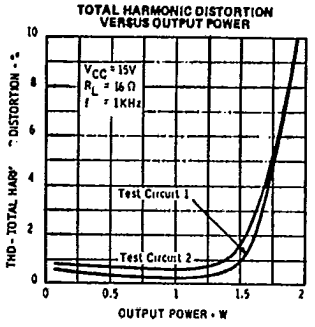


TEST CIRCUIT 2 (Av = 250)



TYPICAL ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

TOTAL HARMONIC DISTORTION VERSUS OUTPUT POWER



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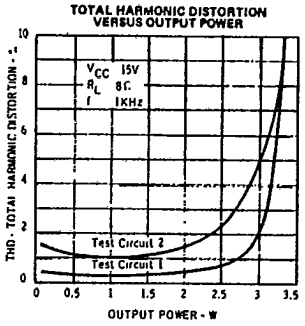
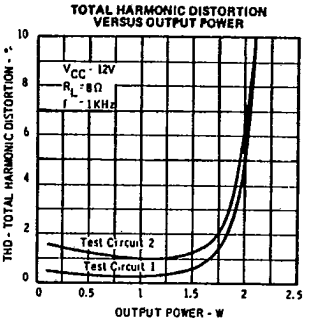
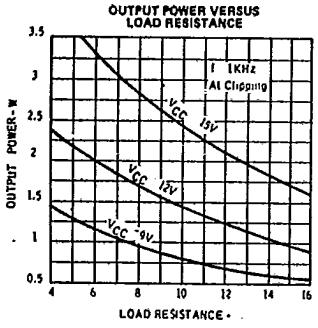


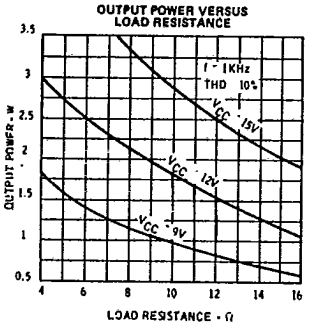
TOTAL HARMONIC DISTORTION VERSUS OUTPUT POWER



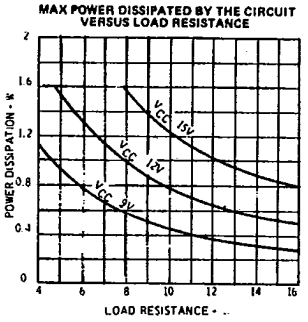
OUTPUT POWER VERSUS LOAD RESISTANCE



OUTPUT POWER VERSUS LOAD RESISTANCE



MAX POWER DISSIPATED BY THE CIRCUIT VERSUS LOAD RESISTANCE



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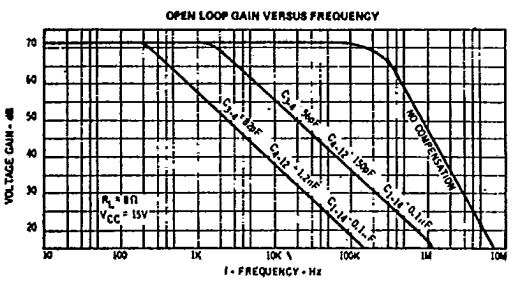
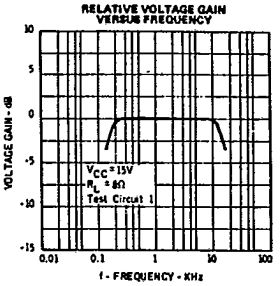
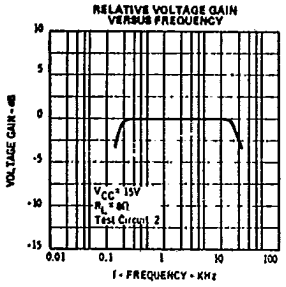
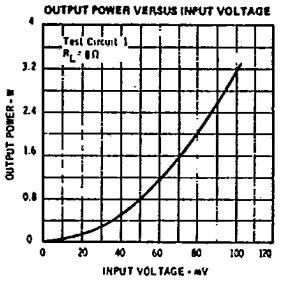
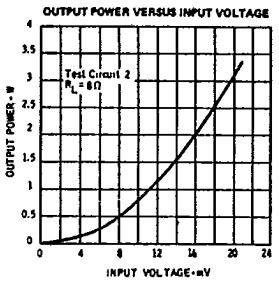
TYPICAL ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

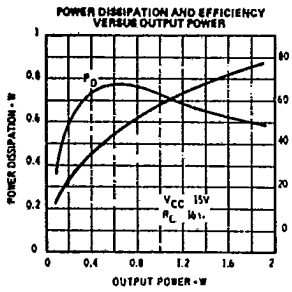


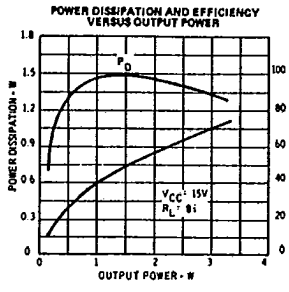


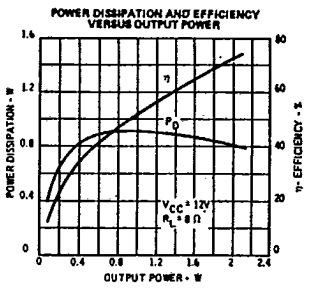




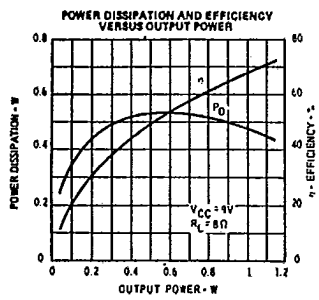


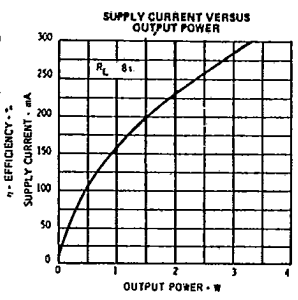


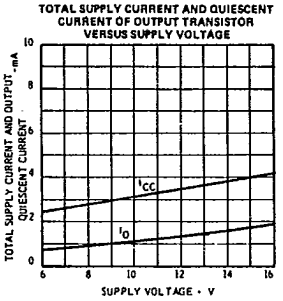


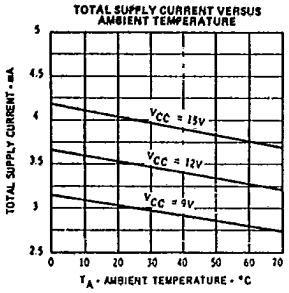


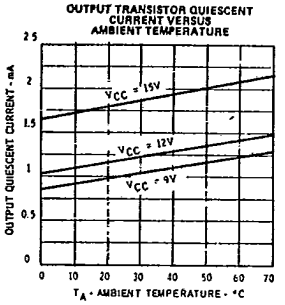
TYPICAL ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

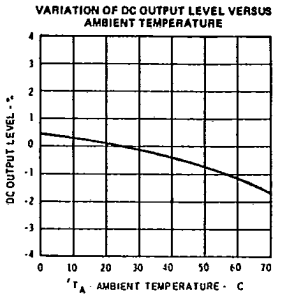












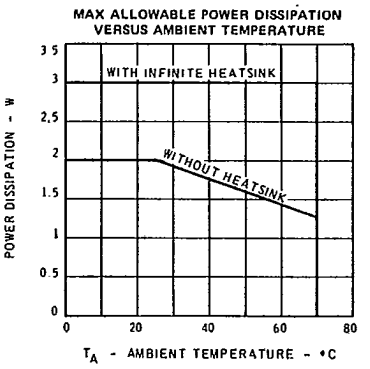
HEAT-SINKING WITH EXTERNAL BAR

Power dissipation can be achieved by means of an additional external heat sink fixed with two screws or by soldering the pins of the external bar to suitable copper areas on the p.c. board.

A. In the former case, the thermal resistance case-ambient $Rth_{c\text{-}a}$ of the added heat-sink can be calculated as follows :

$$Rth_{c\text{-}a} = \frac{(T_{jmax} - T_a) - P_{dmax}\, Rth_{j\text{-}c}}{P_{dmax}}$$

where :
T_{jmax} = Max Junction temperature
T_a = Ambient temperature
P_{dmax} = Max power dissipation
$Rth_{j\text{-}c}$ = Thermal resistance junction-case



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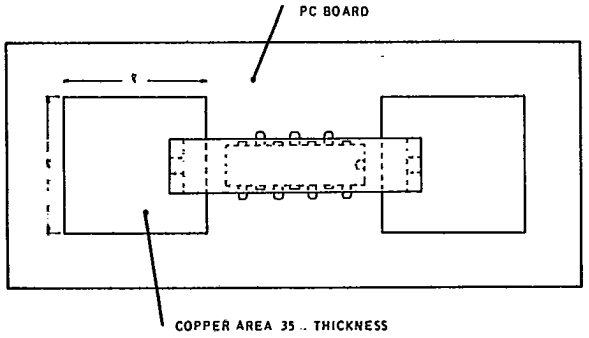
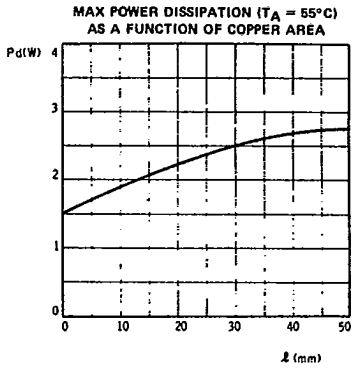
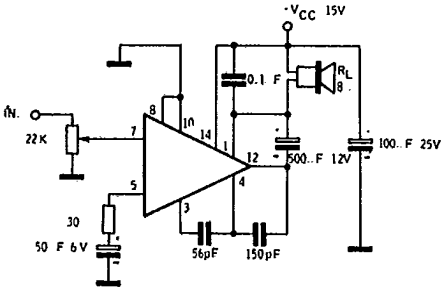
B. If copper areas on the p.c. board are used the diagrams enclosed give the maximum power dissipation as a function of copper area, with copper thickness 35μ and ambient temperature 55°C.





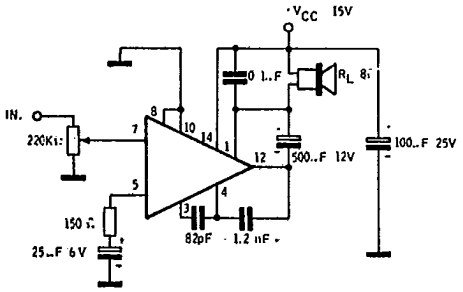
APPLICATION AS AUDIO AMPLIFIER FOR RADIO



ELECTRICAL CHARACTERISTICS

Supply Voltage			15V
Load Resistance			8
Voltage Gain			48 dB
Sensitivity	\ Po 50mW f 1KHz		2.5 mV
	/ Po 3.3W f 1KHz		21 mV
Frequency Response	-3 dB		50 Hz to 15 KHz
Total Current	\ Po 0		4 mA
	/ Po 3.3W		300 mA
Max Output Power	THD 10% f 1KHz		3.3W
Distortion	Po 50mW to 2W f 1KHz		1.5%
Efficiency	Po 3.3W		75%
Input Noise Voltage	R_s 22K BW 15KHz		4 μV
DC Output Voltage	R_s 0 to 20 K		7.9 V
Supply Voltage Rejection (referred to the input)			54 dB

APPLICATION AS AUDIO AMPLIFIER FOR RECORD-PLAYER



ELECTRICAL CHARACTERISTICS

Supply Voltage			15V
Load Resistance			8 ..
Voltage Gain			34 dB
Sensitivity	\ Po 50mW f 1KHz		12.6 mV
	/ Po 3.3W f 1KHz		105 mV
Frequency Response	-3 dB		50 Hz to 15 KHz
Total Current	\ Po 0		4 mA
	/ Po 3.3W		300 mA
Max Output Power	THD 10% f 1KHz		3.3 W
Distortion	Po 50mW to 2W f 1KHz		0.5%
Efficiency	Po 3.3W		75%
Input Noise Voltage	R_s 220K BW 15 KHz		13 μV
DC Output Voltage	R_s 0 to 20 K		7.9 V
Supply Voltage Rejection (referred to the input)			40 dB