

μ A706

5-WATT AUDIO AMPLIFIER

FAIRCHILD LINEAR INTEGRATED CIRCUITS

GENERAL DESCRIPTION — The μ A706 monolithic 5.0 W Audio Amplifier is constructed using the Fairchild Planar* epitaxial process. It is ideally suited as an audio amplifier in automobile radios. Provided with adequate heat sinking, the circuit is optimized to provide 5.5 W (continuous output) into a 4.0 Ω speaker using a single 14 V supply. The circuit operates over the full automobile battery range of 6.0 V to 16 V. The μ A706 incorporates such special features as self-centering bias, direct coupling to the input, low quiescent current, high input impedance and low distortion. Operation as a 5.0 W audio amplifier is achieved with minimal external components.

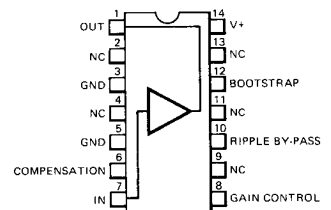
Other applications for the μ A706 are home audio equipment, TV receivers and many industrial applications.

- OUTPUT POWER 5.5 W (14 V — 4 Ω)
- LOW DISTORTION
- LOW QUIESCENT CURRENT
- SELF CENTERING BIAS
- HIGH INPUT IMPEDANCE
- HIGH PEAK OUTPUT CURRENT
- HIGH IMMUNITY TO DAMAGE FROM SHORT-CIRCUITED LOAD†
- PIN-FOR-PIN REPLACEMENT FOR TBA641B

†The device will withstand repetitive short circuits across the speaker load if the absolute maximum junction temperature is not exceeded.

CONNECTION DIAGRAM 14-PIN DIP (TOP VIEW)

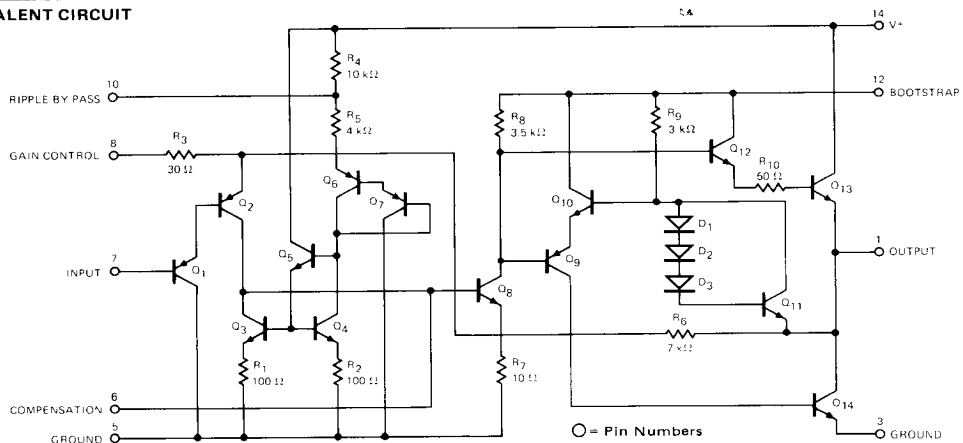
PACKAGE OUTLINES 9H 9J
PACKAGE CODES AP BP



ORDER INFORMATION

TYPE	PART NO.
μ A706AC	μ A706APC
μ A706BC	μ A706BPC

EQUIVALENT CIRCUIT



*Planar is a patented Fairchild process.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (No Signal)	25 V
Supply Voltage	16 V
Input Voltage	-0.5 V to V ⁺
Peak Output Current	2.5 A
Operating Temperature Range	-30°C to +85°C
Storage Temperature	-55°C to +125°C
Maximum Junction Temperature	150°C
Power Dissipation (T _C ≤ 85°C)	5 W
Power Dissipation (T _A ≤ 25°C)	
Package Type AP	1.7 W
Package Type BP	2.3 W
Power Dissipation (T _A ≤ 85°C)	
Package Type AP	0.9 W
Package Type BP	1.2 W

PACKAGE THERMAL RESISTANCE

Thermal Resistance, Junction to Ambient	
Package Type AP	73°C/W
Package Type BP	55°C/W
Thermal Resistance, Junction to Case	
Package Type AP	11°C/W
Package Type BP	12°C/W

$\mu A706C$

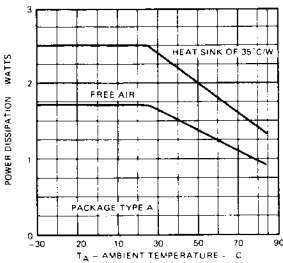
ELECTRICAL CHARACTERISTICS: V_T = 14V, R_L = 4 Ω , T_A = 25°C, θ_{C-A} = 13°C/W, Test Circuit 1, unless otherwise specified

CHARACTERISTICS	CONDITIONS	MIN	TYP	MAX	UNITS
Total Supply Current	P _{OUT} = 0	10	18	30	mA
Quiescent Current in Output Transistors	P _{OUT} = 0	7	15	27	mA
Input Bias Current			200	950	nA
DC Output Level	R _S = 22 k Ω	6.55	7.0	7.45	V
Voltage Gain, A _V	R _B = 0 Ω	43	46	49	dB
Output Power, P _{OUT}	THD = 10%, f = 1 kHz, A _V = 46 dB	4.5	5.5		W
Total Harmonic Distortion	f = 1 kHz, A _V = 46 dB				
	P _{OUT} = 50 mW		0.3		%
	P _{OUT} = 2.0 W		0.5		%
	P _{OUT} = 4.5 W		3.0		%
Equivalent Input Noise Voltage	R _S = 22 k Ω , B.W. = 10 kHz		3.5		μ V
Total Supply Current	P _{OUT} = 4.5 W		510		mA
Input Impedance	A _V = 46 dB, f = 1 kHz		3.0		M Ω

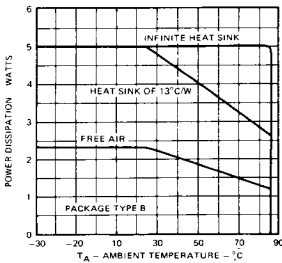
TYPICAL PERFORMANCE CURVES FOR $\mu A706C$

(T_A = 25°C, θ_{C-A} = 13°C/W, Test Circuit 1, A_V = 46 dB)

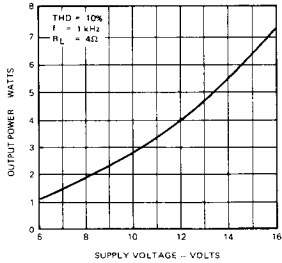
MAXIMUM ALLOWABLE POWER DISSIPATION AS A FUNCTION OF AMBIENT TEMPERATURE (FOR PACKAGE TYPE AP)



MAXIMUM ALLOWABLE POWER DISSIPATION AS A FUNCTION OF AMBIENT TEMPERATURE (FOR PACKAGE TYPE BP)

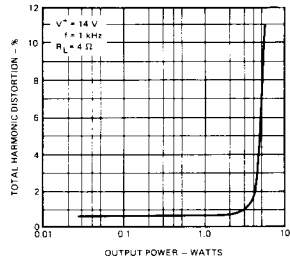


OUTPUT POWER AS A FUNCTION OF SUPPLY VOLTAGE

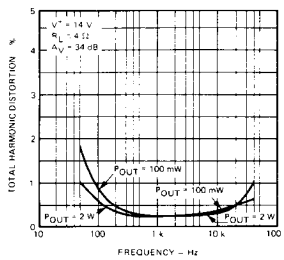


TYPICAL PERFORMANCE CURVES FOR $\mu A706C$ (Cont'd)

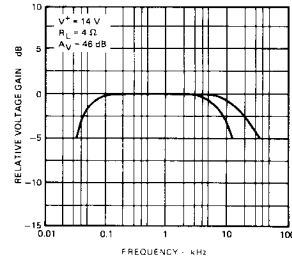
TOTAL HARMONIC DISTORTION AS A FUNCTION OF OUTPUT POWER



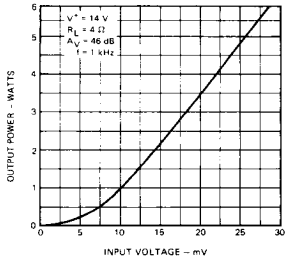
TOTAL HARMONIC DISTORTION AS A FUNCTION OF FREQUENCY



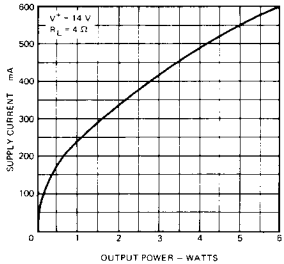
RELATIVE VOLTAGE GAIN AS A FUNCTION OF FREQUENCY



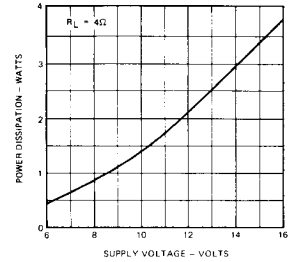
OUTPUT POWER AS A FUNCTION OF INPUT VOLTAGE



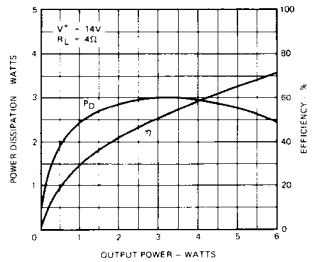
SUPPLY CURRENT AS A FUNCTION OF OUTPUT POWER



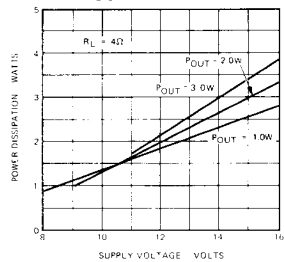
MAXIMUM POWER DISSIPATION BY THE INTEGRATED CIRCUIT AS A FUNCTION OF SUPPLY VOLTAGE



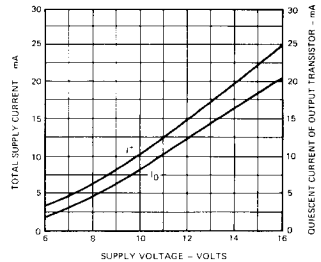
POWER DISSIPATION AND EFFICIENCY AS A FUNCTION OF OUTPUT POWER



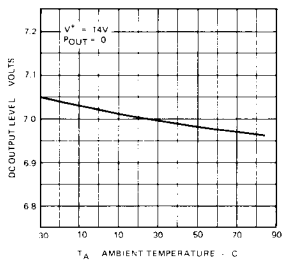
POWER DISSIPATION AS A FUNCTION OF SUPPLY VOLTAGE



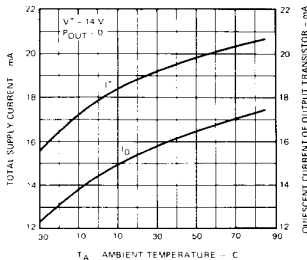
TOTAL SUPPLY CURRENT AND QUIESCENT CURRENT OF OUTPUT TRANSISTOR AS A FUNCTION OF SUPPLY VOLTAGE



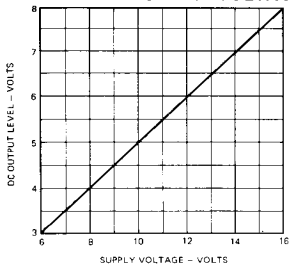
DC OUTPUT LEVEL AS A FUNCTION OF AMBIENT TEMPERATURE



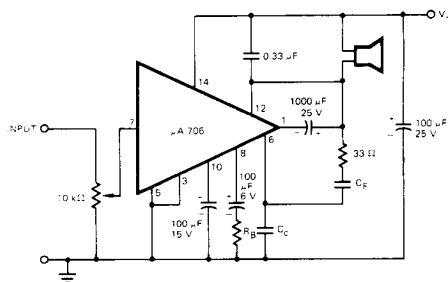
TOTAL SUPPLY CURRENT AND QUIESCENT CURRENT OF OUTPUT TRANSISTOR AS A FUNCTION OF AMBIENT TEMPERATURE



DC OUTPUT LEVEL AS A FUNCTION OF SUPPLY VOLTAGE



5 WATT AUDIO AMPLIFIER WITH MINIMUM COMPONENT COUNT



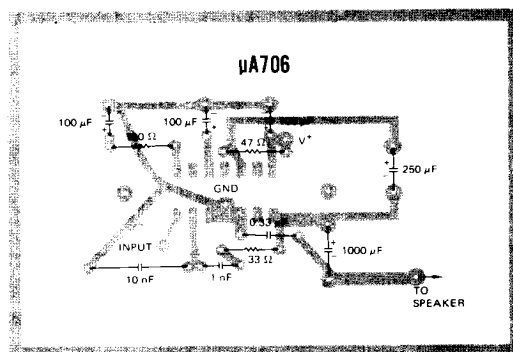
A_V	34 dB		46 dB	
BW	10 kHz	20 kHz	10 kHz	20 kHz
R_B	100 Ω	100 Ω	0 Ω	0 Ω
C_c	10 nF	6.8 nF	2.7 nF	1.5 nF
C_F	1 nF	470 pF	330 pF	150 pF

[illegible]

A_V	34 dB	46 dB
C_S	27 nF	5.6 nF

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A PC BOARD LAYOUT FOR THE 5 WATT AUDIO AMPLIFIER



PHOTOGRAPH OF THE μ A706 IN A TYPICAL APPLICATION

