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MOTOROLA

MC13060

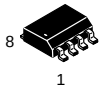
Mini-Watt Audio Output

This device is a rugged and versatile power amplifier in a remarkable plastic power package.

- Supply Voltages from 6.0 Vdc to 35 Vdc
- 2.0 W Output @ 70°C Ambient on PC Board with Good Copper Ground Plane
- Self Protecting Thermal Shutdown
- Easy to Apply, Few Components
- Gain Externally Determined
- Output is Independent of Supply Voltage Over a Wide Range

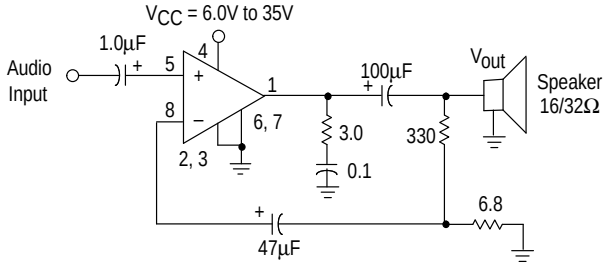
MINI–WATT AUDIO OUTPUT

SEMICONDUCTOR TECHNICAL DATA

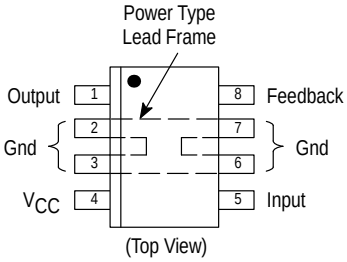


D SUFFIX
PLASTIC PACKAGE
CASE 751
(SOP–8)

Figure 1. Simplified Application



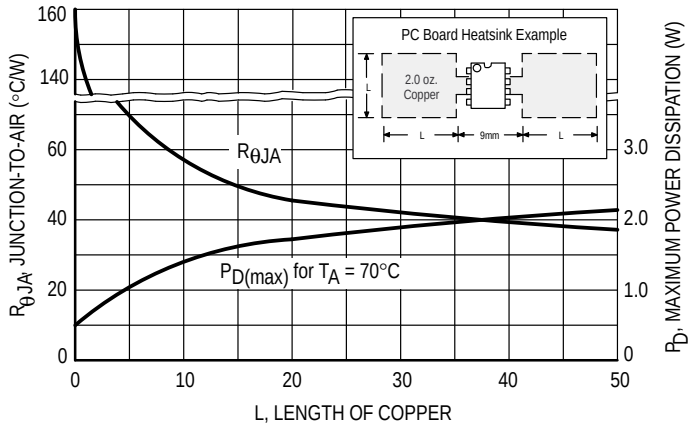
PIN CONNECTIONS



ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC13060D	T_A = – 40 to +85°C	SOP–8

Figure 2. Thermal Resistance & Maximum Power Dissipation versus PC Board Copper



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{CC}	35	V
Audio Input, Pin 5		1.0	V_{pp}
Thermal Resistance, Junction to Air	$R_{\theta JA}$	160	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	25	°C/W
Junction Temperature	T_J	150	°C
Operating Ambient Temperature Range	T_A	–40 to +85	°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C, circuit of Figure 3, unless otherwise noted.)

Characteristics	Symbol	Min	Typ	Max	Unit
AUDIO SECTION					
Power Supply Current, No Signal	I_{CC}	–	13	–	mAdc
Gain	A_o	–	50	–	V/V
Distortion at 62.5 mW Output, 1.0 kHz	THD	–	0.2	1.0	%
Distortion at 900 mW Output, 1.0 kHz	THD	–	0.5	3.0	%
Quiescent Output Voltage, No Signal	$V_{Pin\ 1}$	–	8.4	–	Vdc
Input Bias	$V_{Pin\ 5}$, $V_{Pin\ 8}$	–	0.7	–	Vdc
Input Resistance	R_{in}, Pin 5	–	28	–	kΩ
Output Noise (50 Hz to 15 kHz) Input 50 Ω	V_{out}	–	0.5	4.0	mVrms

GENERAL DESCRIPTION

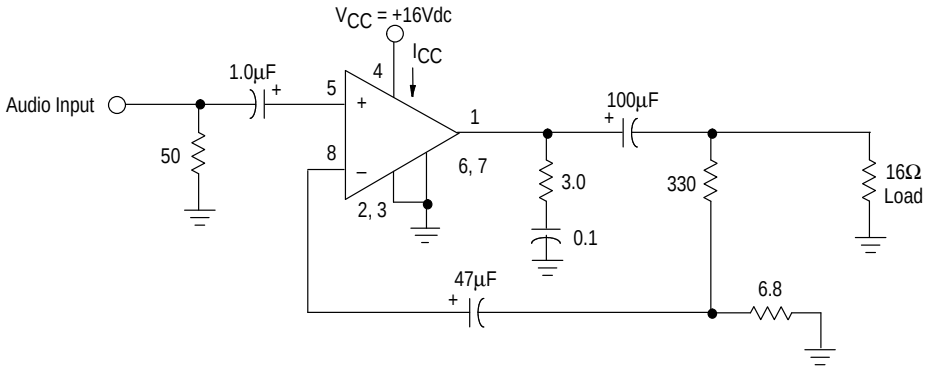
The MC13060 is a quasi–complementary audio power amplifier, mounted in the SOP 8 (power SOIC package). It is well suited to a variety of 1.0 W and 2.0 W applications in radio, TV, intercom, and other speaker driving tasks. It requires the usual external components for high frequency stability and for gain adjustment.

The output signal voltage and the power supply drain current are very linearly related, as shown in Figure 5. Both are quite constant over wide variation of the power supply voltage (above minimum V_{CC} for clipping, of course). The amplifier can best be described as a voltage source with about 1.0 A_{pp} capability. On a good heatsink, it can deliver over 2.0 W at 70°C ambient.

The MC13060 will automatically go into shutdown at a die temperature of about 150°C, effectively protecting itself, even on fairly stiff power supplies. This eliminates the need for decoupling the power supply, which degrades performance and requires extra components.

Input Pins 5 and 8 are internally biased at 0.7 Vdc and should not be driven below ground.

Figure 3. Test Circuit



All Curves Taken in the Test Circuit of Figure 3, Unless Otherwise Noted.

Figure 4. Quiescent Supply Current and Output Voltage versus Supply Voltage

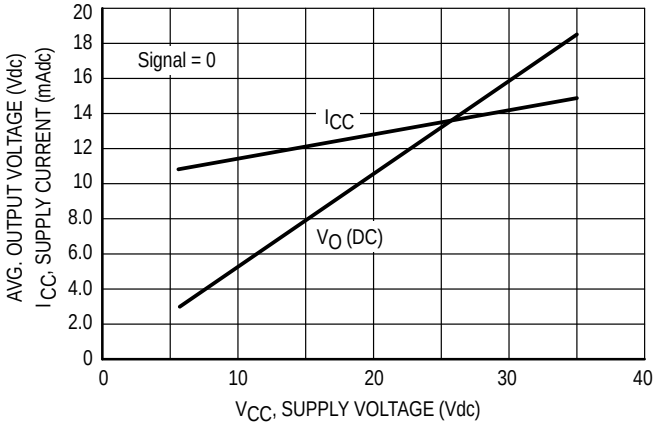


Figure 5. Supply Current versus Output

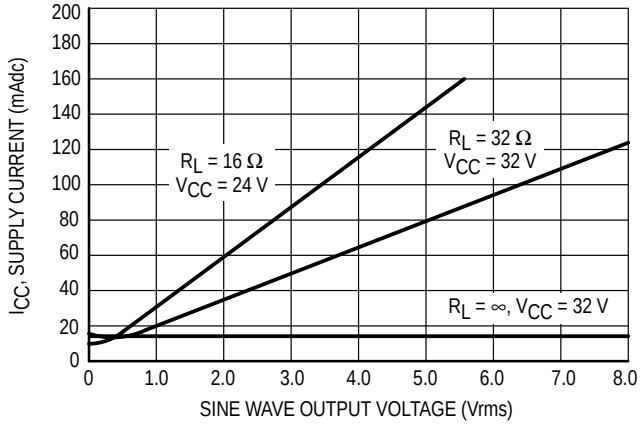


Figure 6. Distortion and Gain versus Frequency

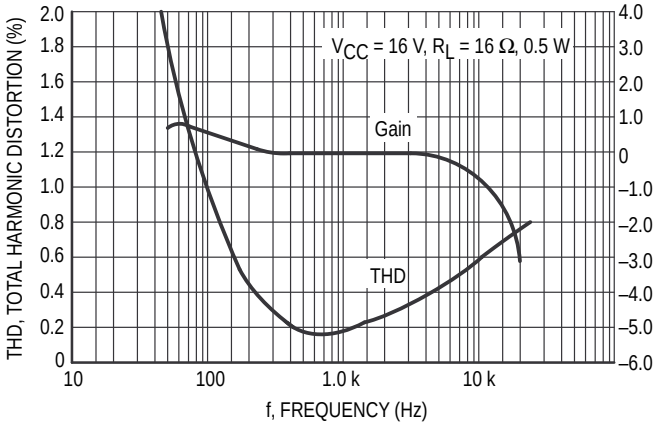


Figure 7. Distortion versus Power Output

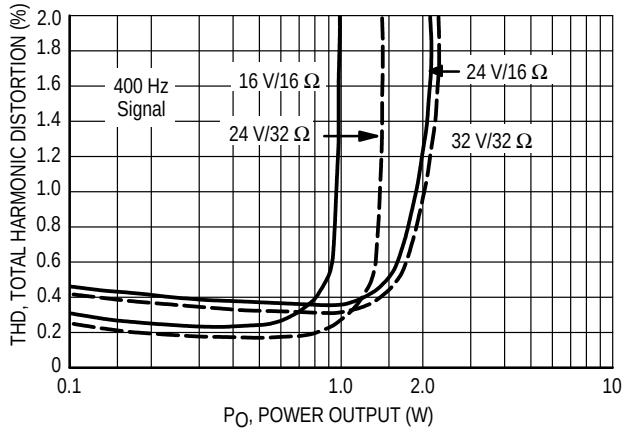


Figure 8. Dissipation versus Output Power

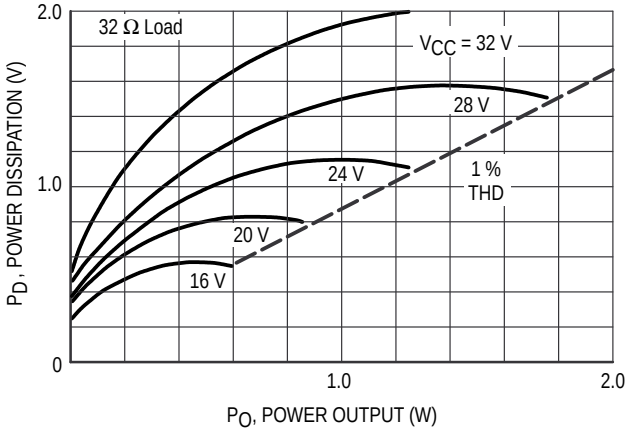


Figure 9. Dissipation versus Output Power

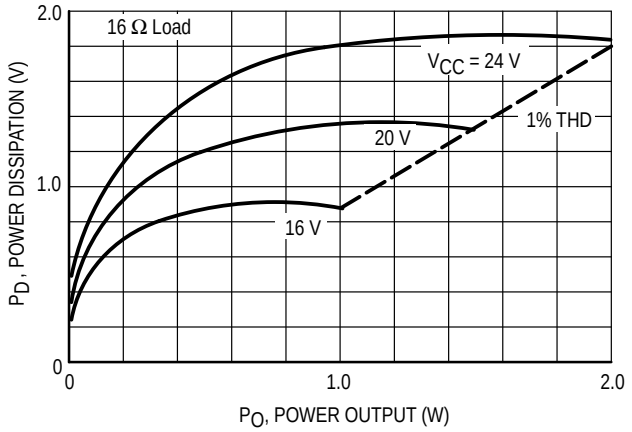
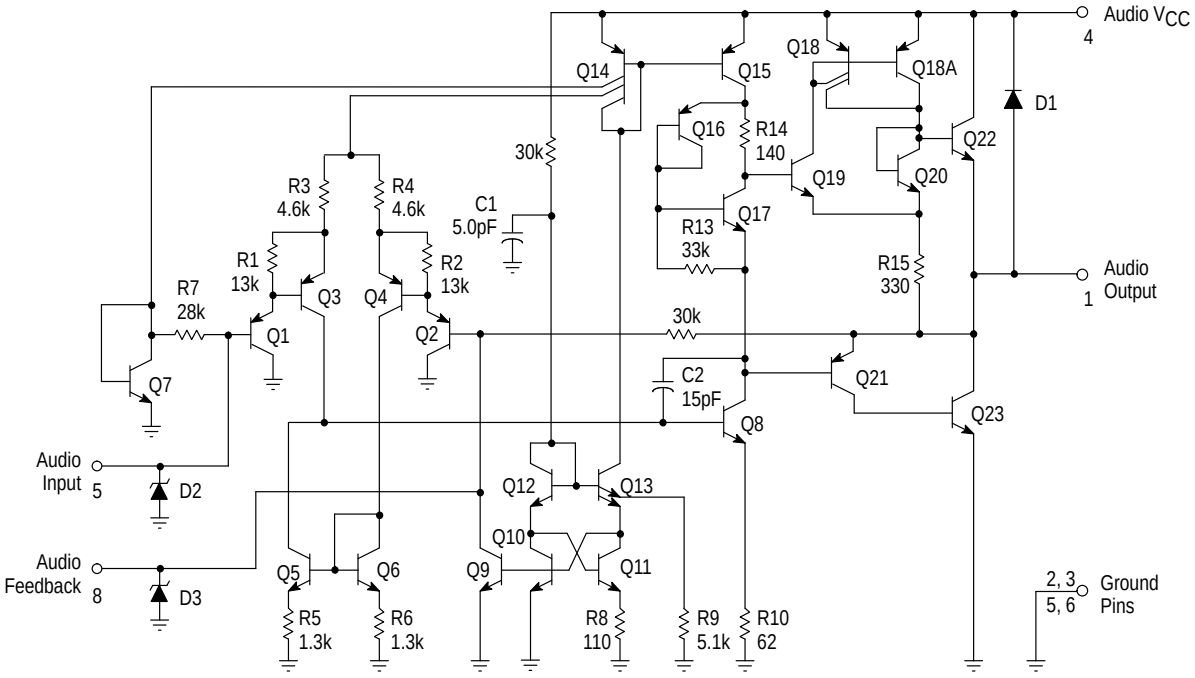
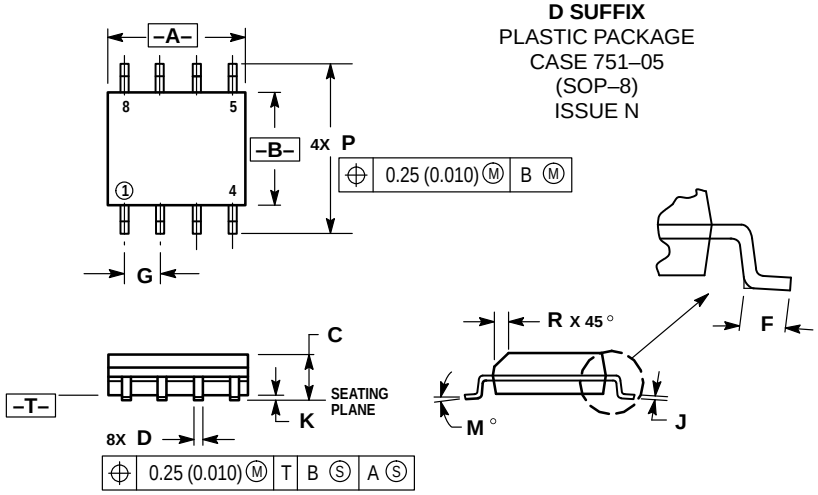


Figure 10. Representative Schematic Diagram



OUTLINE DIMENSIONS

D SUFFIX
PLASTIC PACKAGE
CASE 751–05
(SOP–8)
ISSUE N



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.196
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.18	0.25	0.007	0.009
K	0.10	0.25	0.004	0.009
M	0 °	7 °	0 °	7 °
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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