



MOTOROLA
Semiconductors

BOX 20912 • PHOENIX, ARIZONA 85036

MC1358

TV SOUND IF AMPLIFIER

... a versatile monolithic device incorporating IF limiting, detection, electronic attenuation, audio amplifier, and audio driver capabilities.

- Direct Replacement for the CA3065
- Differential Peak Detector Requiring a Single Tuned Circuit
- Electronic Attenuator Replaces Conventional ac Volume Control – Range > 60 dB
- Excellent AM Rejection @ 4.5 and 5.5 MHz
- High Stability
- Low Harmonic Distortion
- Audio Drive Capability – 6.0 mA p-p
- Minimum Undesirable Output Signal @ Maximum Attenuation

IF AMPLIFIER, LIMITER,
FM DETECTOR, AUDIO DRIVER,
ELECTRONIC ATTENUATOR

MONOLITHIC SILICON
INTEGRATED CIRCUIT

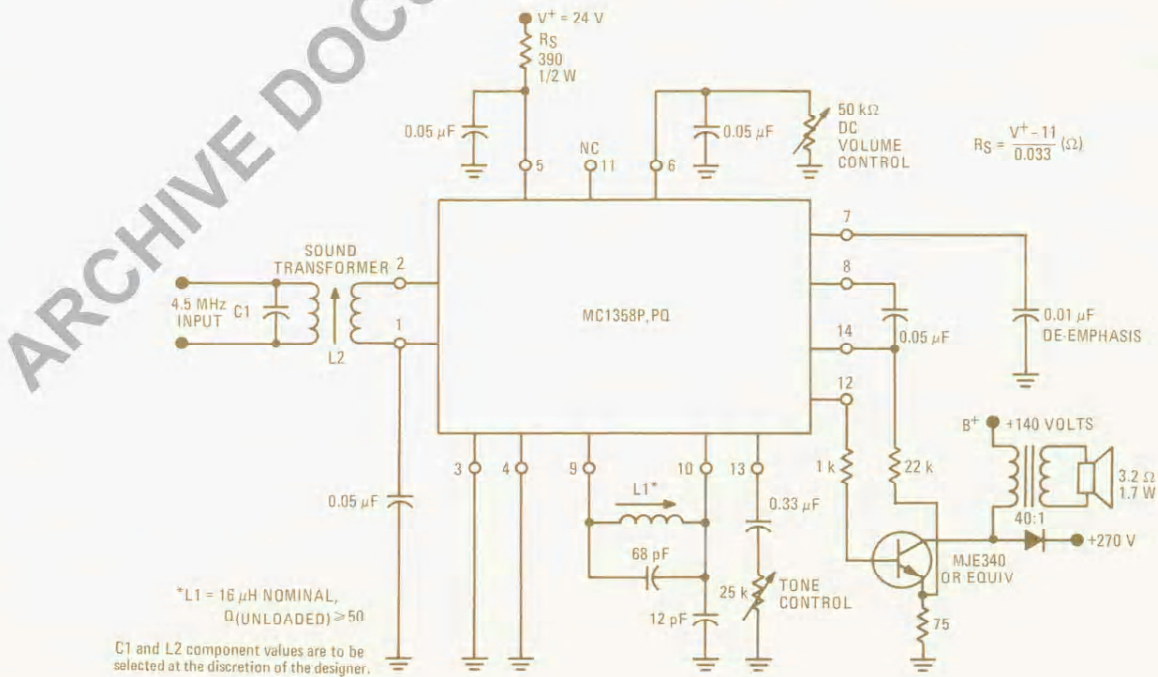
JUNE 1974 – DS 9178

P SUFFIX
PLASTIC PACKAGE
CASE 646
TO-116



PQ SUFFIX
PLASTIC PACKAGE
CASE 647

FIGURE 1 – TYPICAL TV APPLICATION CIRCUIT



MAXIMUM RATINGS ($T_A = +25^{\circ}\text{C}$ unless otherwise noted)

Rating	Value	Unit
Input Signal Voltage (Pins 1 and 2)	± 3.0	Vdc
Power Supply Current	50	mA
Power Dissipation (Package Limitation)		
Plastic Packages	625	mW
Derate above $T_A = +25^{\circ}\text{C}$	5.0	mW/ $^{\circ}\text{C}$
Operating Temperature Range (Ambient)	-20 to +75	$^{\circ}\text{C}$
Storage Temperature Range	-65 to +150	$^{\circ}\text{C}$

Maximum Ratings as defined in MIL-S-19500, Appendix A.

ELECTRICAL CHARACTERISTICS ($V^+ = 24\text{ Vdc}$, $T_A = +25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Pin	Min	Typ	Max	Unit
Regulated Voltage	5	10.3	11	12.2	Vdc
DC Supply Current ($V^+ = 9\text{ Vdc}$, $R_S = 0$)	5	10	16	24	mA
Quiescent Output Voltage	12	—	5.1	—	Vdc

DYNAMIC CHARACTERISTICS ($V^+ = 24\text{ Vdc}$, $T_A = +25^{\circ}\text{C}$ unless otherwise noted)

Characteristic	Min	Typ	Max	Unit
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IF AMPLIFIER AND DETECTOR

$f_0 = 4.5\text{ MHz}$, $\Delta f = \pm 25\text{ kHz}$

AM Rejection* ($V_{in} = 10\text{ mV [rms]}$)	40	51	—	dB
Input Limiting Threshold Voltage	—	200	400	$\mu\text{V (rms)}$
Recovered Audio Output Voltage ($V_{in} = 10\text{ mV [rms]}$)	0.5	0.70	—	V(rms)
Output Distortion ($V_{in} = 10\text{ mV [rms]}$)	—	0.4	2.0	%

$f_0 = 5.5\text{ MHz}$, $\Delta f = \pm 50\text{ kHz}$

AM Rejection* ($V_{in} = 10\text{ mV [rms]}$)	40	53	—	dB
Input Limiting Threshold Voltage	—	200	400	$\mu\text{V (rms)}$
Recovered Audio Output Voltage ($V_{in} = 10\text{ mV [rms]}$)	0.5	0.91	—	V(rms)
Output Distortion ($V_{in} = 10\text{ mV [rms]}$)	—	0.9	—	%
Input Impedance Components ($f = 4.5\text{ MHz}$, measurement between pins 1 and 2)				
Parallel Input Resistance	—	17	—	k Ω
Parallel Input Capacitance	—	4.0	—	pF
Output Impedance Components ($f = 4.5\text{ MHz}$, measurement between pin 9 and GND)				
Parallel Output Resistance	—	3.25	—	k Ω
Parallel Output Capacitance	—	3.6	—	pF
Output Resistance, Detector				
Pin 7	—	7.5	—	k Ω
Pin 8	—	250	—	Ω

ATTENUATOR

Volume Reduction Range (See Figure 8) (dc Volume Control = ∞)	60	—	—	dB
Maximum Undesirable Signal (See Note 1) (dc Volume Control = ∞)	—	0.07	1.0	mV

AUDIO AMPLIFIER

Voltage Gain ($V_{in} = 0.1\text{ V (rms)}$, $f = 400\text{ Hz}$)	17.5	20	—	dB
Total Harmonic Distortion ($V_o = 2.0\text{ V (rms)}$, $f = 400\text{ Hz}$)	—	2.0	—	%
Output Voltage (THD = 5%, $f = 400\text{ Hz}$)	2.0	3.0	—	V(rms)
Input Resistance ($f = 400\text{ Hz}$)	—	70	—	k Ω
Output Resistance ($f = 400\text{ Hz}$)	—	270	—	Ω

* 100% FM, 30% AM Modulation.

Note 1. Undesirable signal is measured at pin 8 when volume control is set for minimum output.



TYPICAL CHARACTERISTICS (continued)

FIGURE 8 - GAIN REDUCTION OF ATTENUATOR

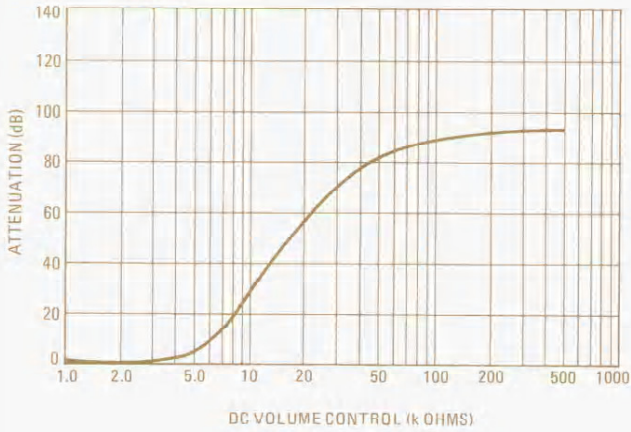


FIGURE 9 - AUDIO AMPLIFIER THD

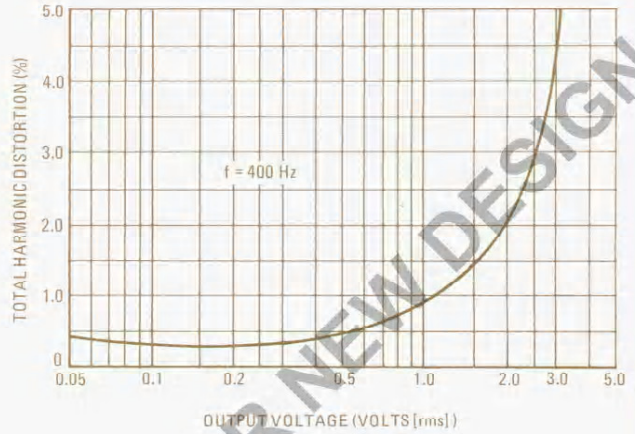


FIGURE 10 - IF FREQUENCY RESPONSE

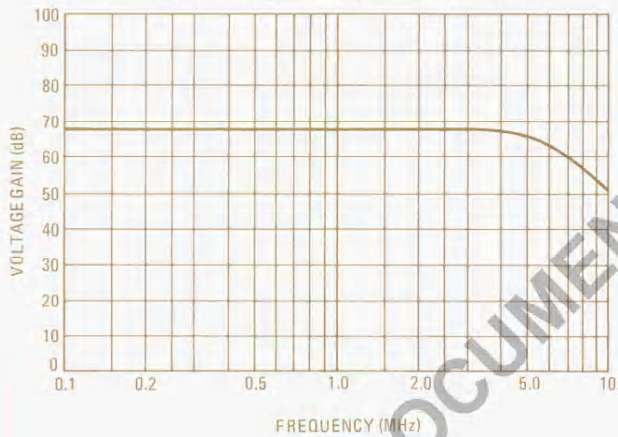


FIGURE 11 - IF FREQUENCY RESPONSE TEST CIRCUIT

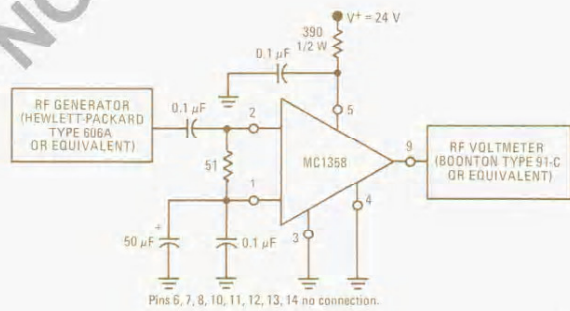


FIGURE 12 - AM REJECTION, DETECTED AUDIO, THD, ATTENUATION TEST CIRCUIT

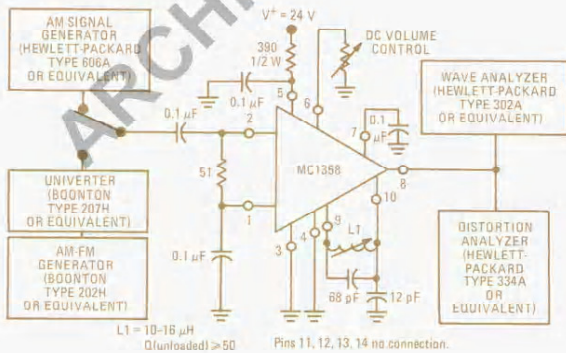


FIGURE 13 - AUDIO VOLTAGE GAIN, AUDIO THD TEST CIRCUIT

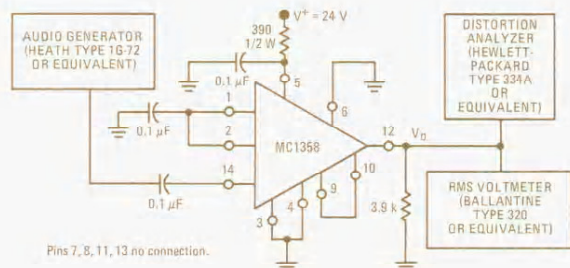


FIGURE 14 - CIRCUIT SCHEMATIC

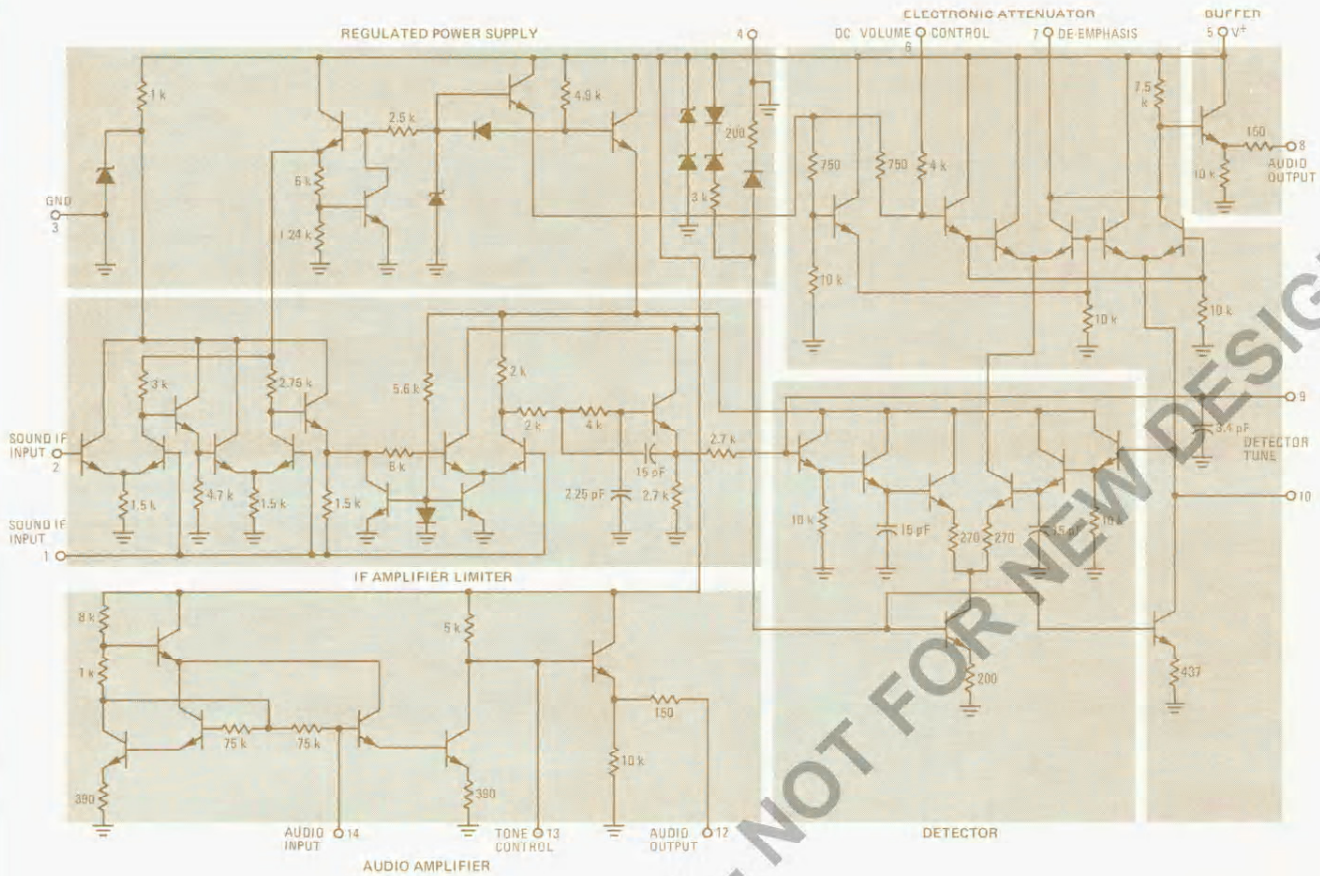
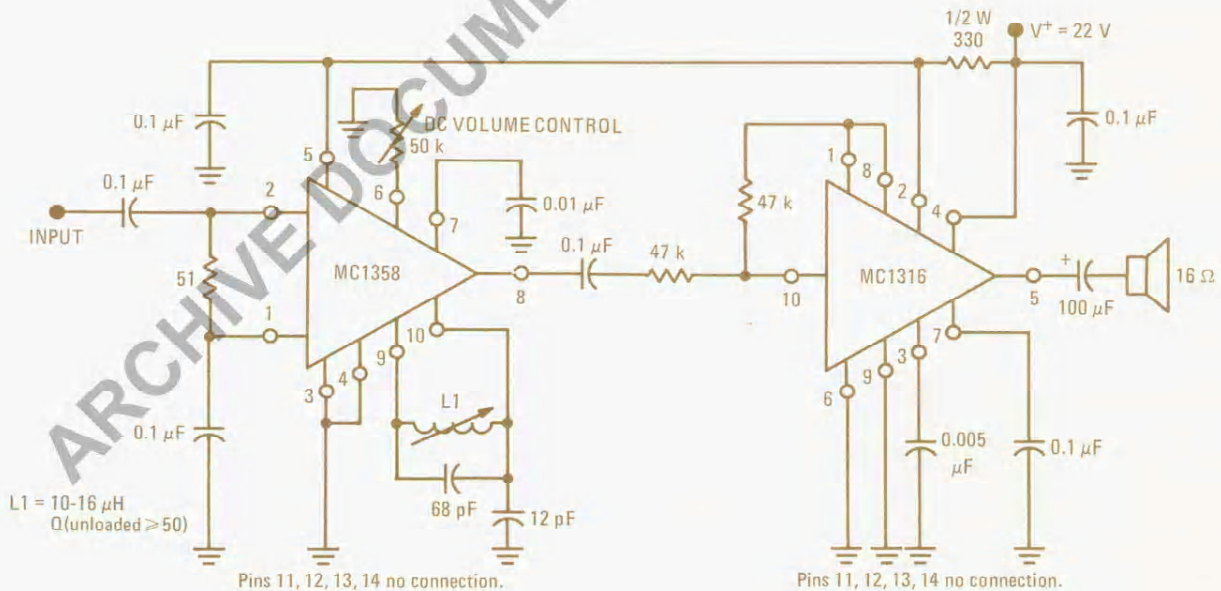


FIGURE 15 - ALTERNATE APPLICATION CIRCUIT



Circuit diagrams utilizing Motorola products are included as a means of illustrating typical semiconductor applications; consequently, complete information sufficient for construction purposes is not necessarily given. The information has been carefully checked and

is believed to be entirely reliable. However, no responsibility is assumed for inaccuracies. Furthermore, such information does not convey to the purchaser of the semiconductor devices described any license under the patent rights of Motorola Inc. or others.

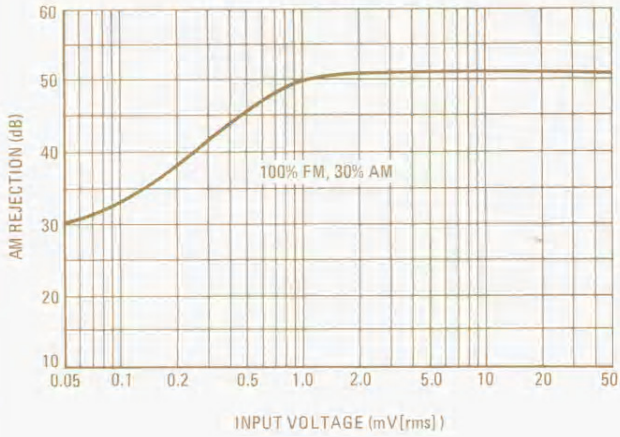


TYPICAL CHARACTERISTICS

($V^+ = 24\text{ V}$, $T_A = +25^\circ\text{C}$ unless otherwise noted)

($f_o = 4.5\text{ MHz}$)

FIGURE 2 – AM REJECTION



($f_o = 5.5\text{ MHz}$)

FIGURE 3 – AM REJECTION

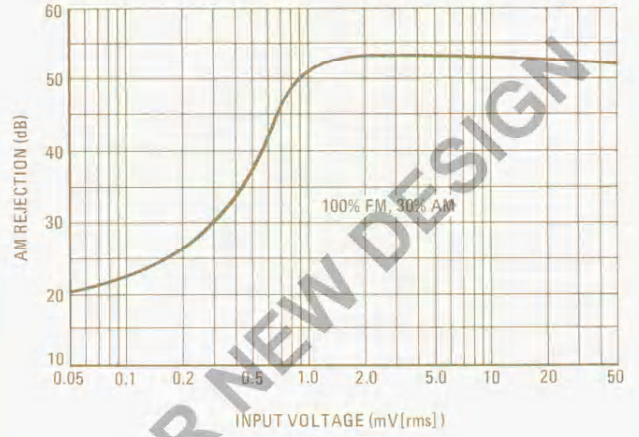


FIGURE 4 – DETECTED AUDIO OUTPUT

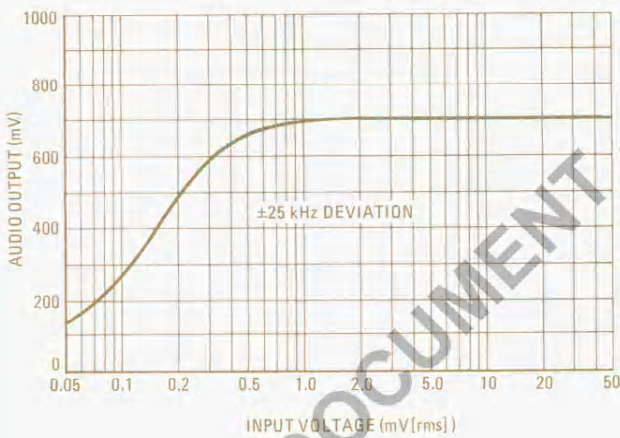


FIGURE 5 – DETECTED AUDIO OUTPUT

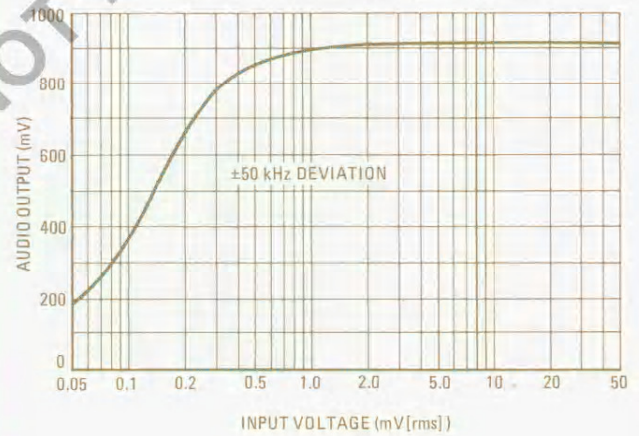


FIGURE 6 – IF AMPLIFIER AND DETECTOR THD

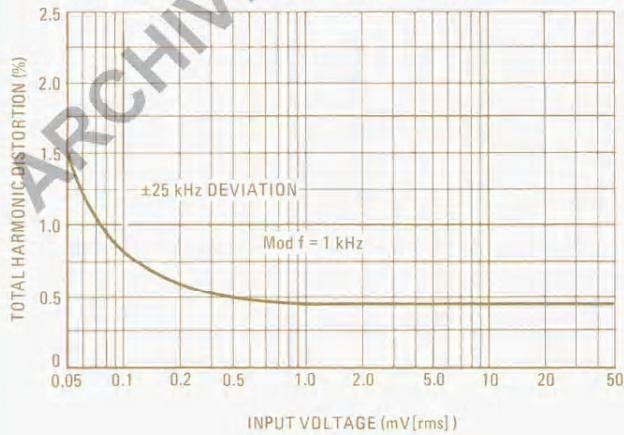


FIGURE 7 – IF AMPLIFIER AND DETECTOR THD

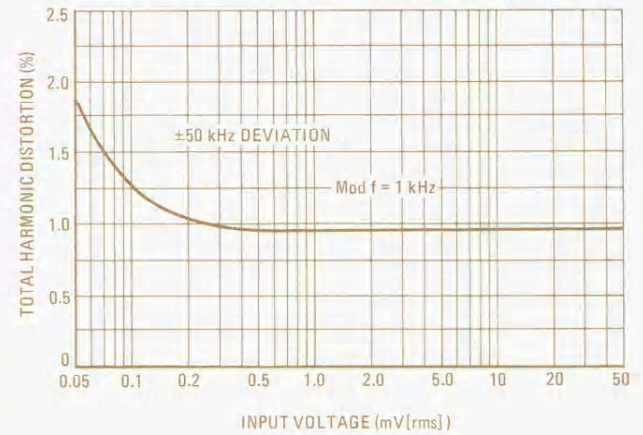
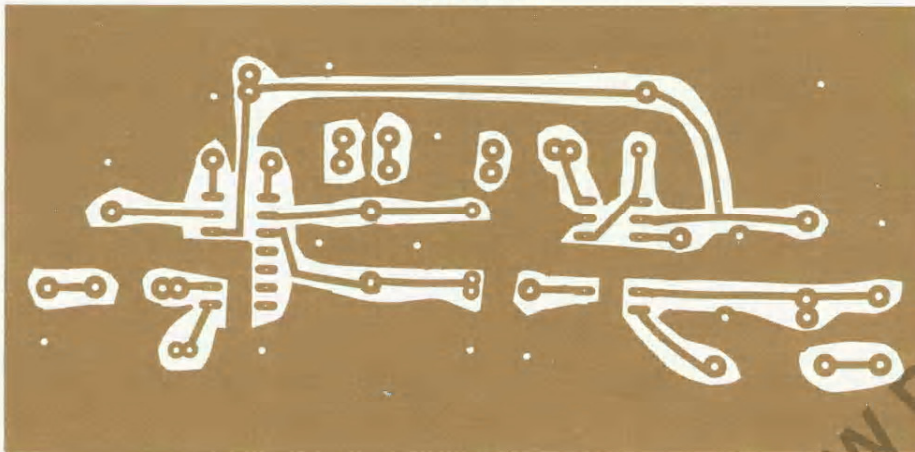
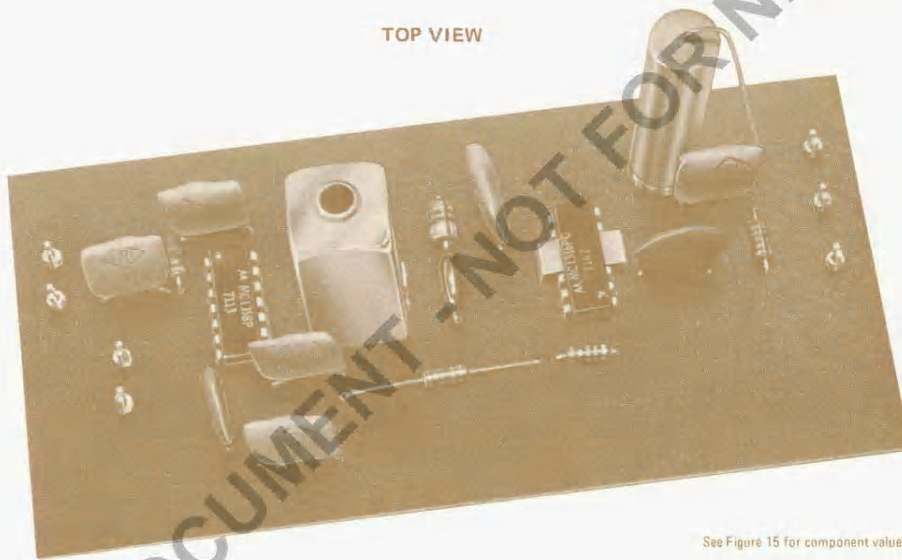


FIGURE 16 - MC1358/MC1316 PRINTED CIRCUIT BOARD

COPPER SIDE

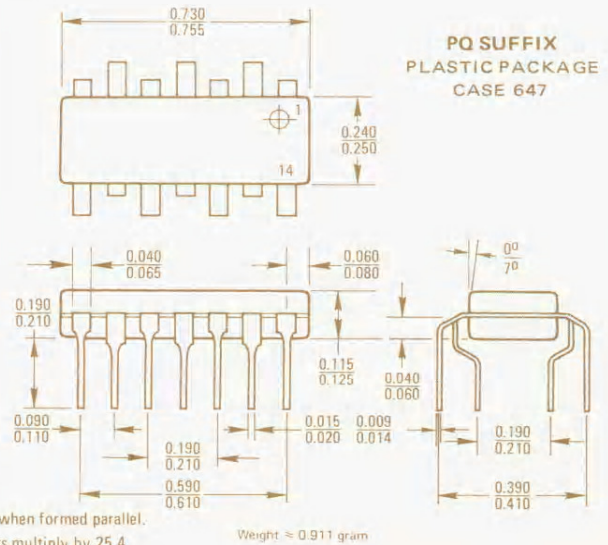
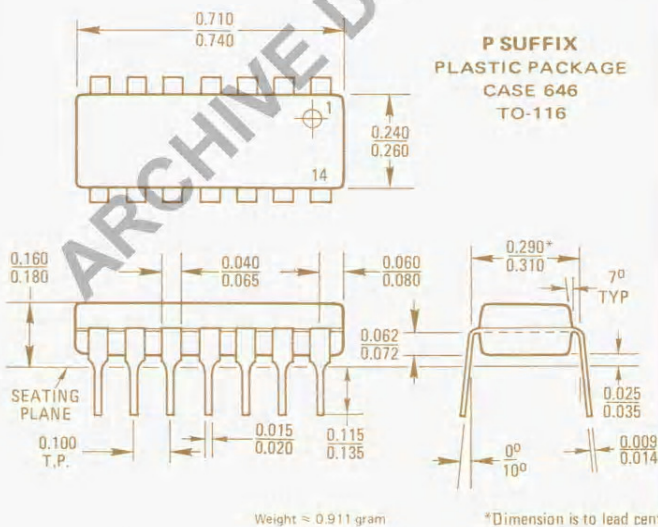


TOP VIEW



See Figure 15 for component values.

OUTLINE DIMENSIONS



*Dimension is to lead centerline when formed parallel.
To convert inches to millimeters multiply by 25.4

All JEDEC dimensions and notes apply.



MOTOROLA Semiconductor Products Inc.

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