# BIPOLAR ANALOG INTEGRATED CIRCUIT

# μPC1238V, μPC1238H

T-74-05-01

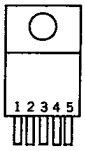
## 10 W AF POWER AMPLIFIER

The μPC1238 is an audio power amplifier designed for median Hi-Fi stereo set and TV set sound power amplifier.
This device can provide 8.4 watts to 8 ohm at 1 % T.H.D. and ±13 V supply voltage.
The μPC1238 incorporates the thermal protection circuit to protect the damage of IC chip against load damping etc.
Since the package is a 5 Pin TO-220 package, it greatly simplifies construction of a power amplifier both in design and assembly.

### FEATURES

- High output power
  - 8.4 W TYP. (at 8 Ω, $V_{CC}$ = ±13 V)
  - 12.5 W TYP. (at 4 Ω, $V_{CC}$ = ±13 V)
- Low T.H.D.
  - 0.012 % TYP. ($P_{out}$ = 2 W, $R_L$ = 8 Ω)
  - 0.02 % TYP. ($P_{out}$ = 2 W, $R_L$ = 4 Ω)
- Low equivalent input noise voltage.
- Available for NFB tone control mode.
- Negligible power ON/OFF noise.
- High density components assembly due to 5 Pin TO-220 package.

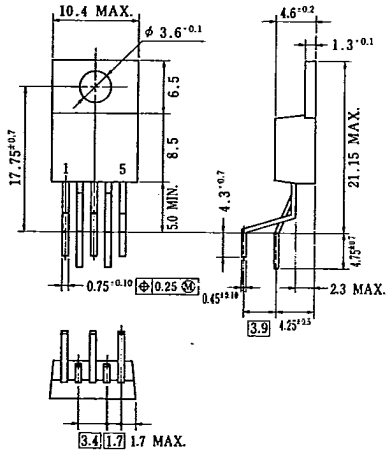
### CONNECTION DIAGRAM




| Pin No. | Electrical Connection |
|---|---|
| 1 | Non inverting input |
| 2 | Inverting input |
| 3 | $-V_{CC}$ |
| 4 | Output |
| 5 | $+V_{CC}$ |

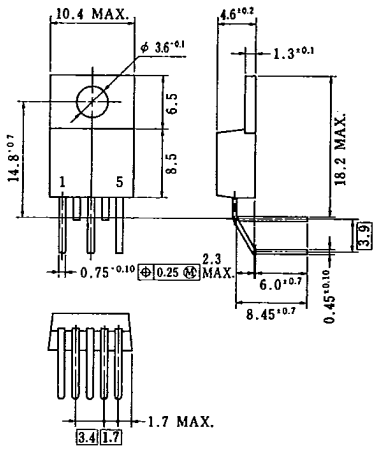
### PACKAGE DIMENSIONS (Unit: mm)

μPC1238V




P5VP-346B2

μPC1238H




P5VP-346B1

T-74-05-01

**ABSOLUTE MAXIMUM RATINGS ($T_a$ = 25 °C)**

| | | | |
|---|---|---|---|
| Supply Voltage (Quiescent) | $V_{CC}$ | ±18 | V |
| Supply Voltage (Operational) | $V_{CC}$ | ±15 | V |
| Circuit Current | $I_{CC(peak)}$ | 4 | A |
| Package Dissipation | $P_D$ | *25 | W |
| Junction Temperature | $T_j$ | 150 | °C |
| Operating Temperature | $T_{opt}$ | −20 to +65 | °C |
| Storage Temperature | $T_{stg}$ | −40 to +150 | °C |
| Thermal Resistance Junction to Case | $R_{th(j-c)}$ | 3.4 | °C/W |

*$T_{tab}$ = 65 °C

**RECOMMENDED OPERATING CONDITIONS ($T_a$ = 25 °C)**

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|
| Operating Supply | $V_{CC}$ | ±6 | ±13 | ±15 | V |
| Terminated Input Resistance | $R_{IN}$ | 47 | 56 | 100 | kΩ |
| Closed Loop Voltage Gain | $A_V$ | 20 | 35 | | dB |
| Load Impedance | $R_L$ | 4 | 8 | | Ω |

**ELECTRICAL CHARACTERISTICS**

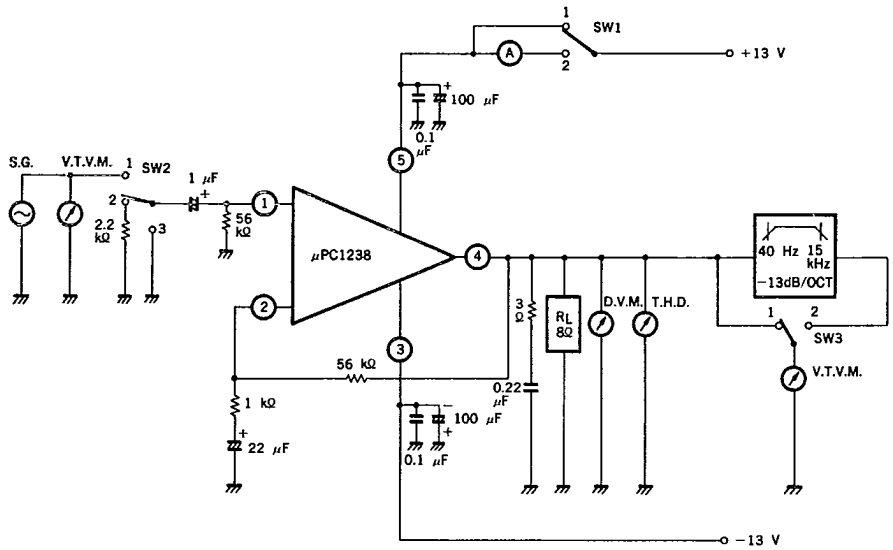
(Refer to the test circuit : $T_a$ = 25 °C, $V_{CC}$ = ±13 V, $A_V$ = 35 dB, $R_G$ = 600 Ω, $R_L$ = 8 Ω)

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Output Offset Voltage | $V_{OFF}$ | −100 | 0 | +100 | mV | No Signal |
| Circuit Current | $I_{CC}$ | 30 | 60 | 130 | mA | No Signal |
| Output Power | $P_O$ | 7 | 8.4 | | W | T.H.D. = 1 %, f = 1 kHz |
| Total Harmonic Distortion | T.H.D. | | 0.2 | 1 | % | f = 40 Hz – 15 kHz<br>$P_O$ = 0.1 –7 W |
| Open Loop Voltage Gain | $A_{vo}$ | | 83 | | dB | $P_O$ = 0.1 W, f = 500 Hz |
| Equivalent Input Noise Voltage | $V_{NI}$ | | 3 | 10 | $\mu V_{r.m.s.}$ | $R_G$ = 2.2 kΩ<br>f = 40 Hz – 15 kHz(–3 dB) |
| Power Band Width | P.B.W. | | 75 | | kHz | $P_O$ = 0.1 W, –3 dB |
| Supply Voltage Rejection Ratio | S.V.R. | 45 | 51 | | dB | f = 100 Hz, $R_G$ = 2.2 kΩ |

5

T-74-05-01

## TEST CIRCUIT & TYPICAL APPLICATIONS



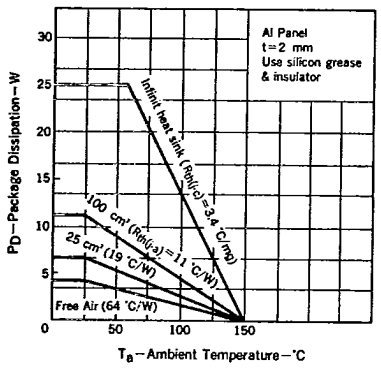

Switch Position

| TEST ITEM | SYMBOL | SW1. | SW2. | SW3. |
|---|---|---|---|---|
| Output Offset Voltage | $V_{OFF}$ | 1 | 3 | 1 |
| Circuit Current | $I_{CC}$ | 2 | 3 | 1 |
| Output Power | $P_O$ | 1 | 1 | 1 |
| Total Harmonic Distortion | T.H.D. | 1 | 1 | 1 |
| Equivalent Input Noise Voltage | $V_{NI}$ | 1 | 2 | 2 |
| Supply Voltage Rejection Ratio | S.V.R. | 1 | 2 | 1 |

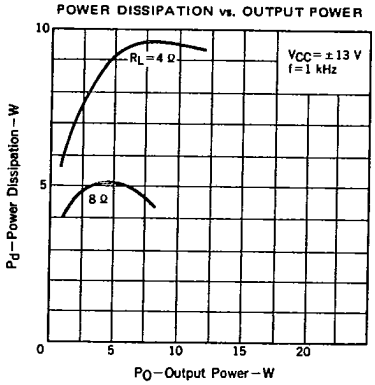
T-74-05-01

## TYPICAL CHARACTERISTICS ($T_a$ = 25 °C)

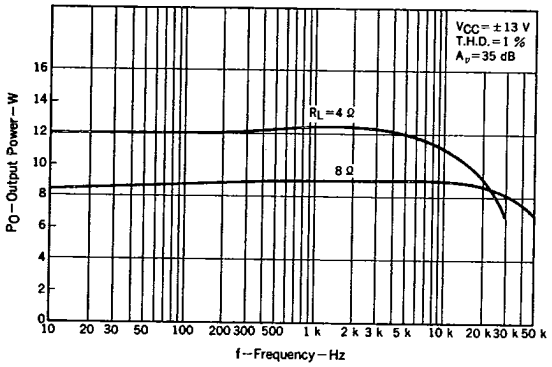
PACKAGE DISSIPATION vs. AMBIENT TEMPERATURE



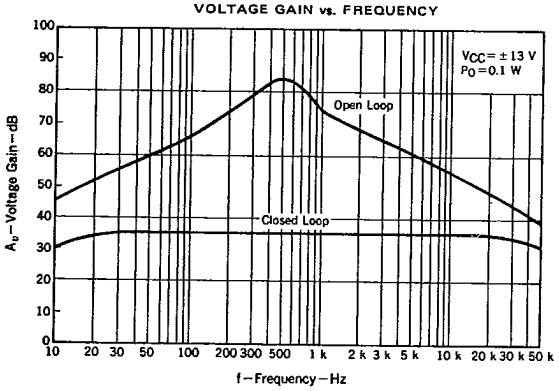

POWER DISSIPATION vs. OUTPUT POWER




OUTPUT POWER vs. FREQUENCY




VOLTAGE GAIN vs. FREQUENCY

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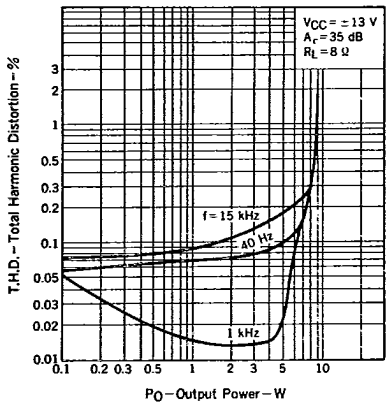
TOTAL HARMONIC DISTORTION vs. OUTPUT POWER

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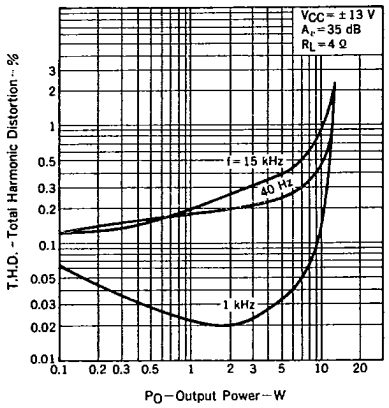


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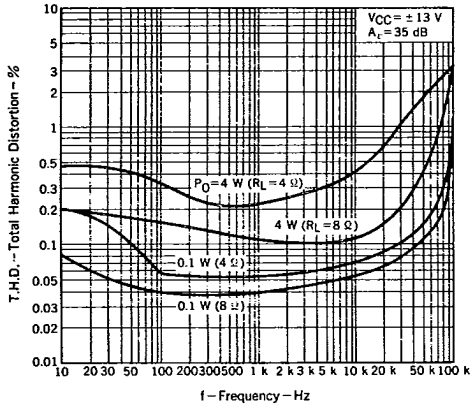
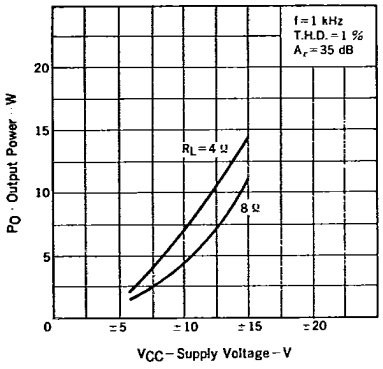
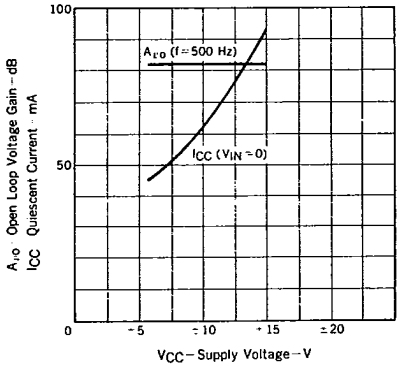


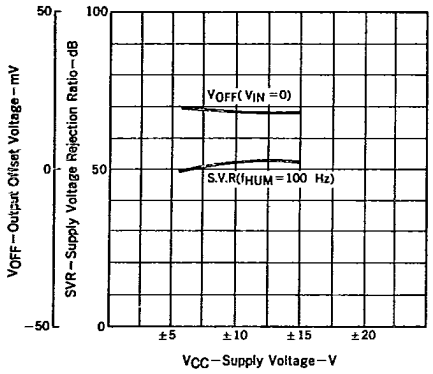

OUTPUT POWER vs. SUPPLY VOLTAGE




OPEN LOOP VOLTAGE GAIN, CIRCUIT CURRENT vs. SUPPLY VOLTAGE



OUTPUT OFFSET VOLTAGE, SUPPLY VOLTAGE REJECTION RATIO vs. SUPPLY VOLTAGE




5