

**TA7641BP**  
**TA7641BF**

AM 1 CHIP RADIO

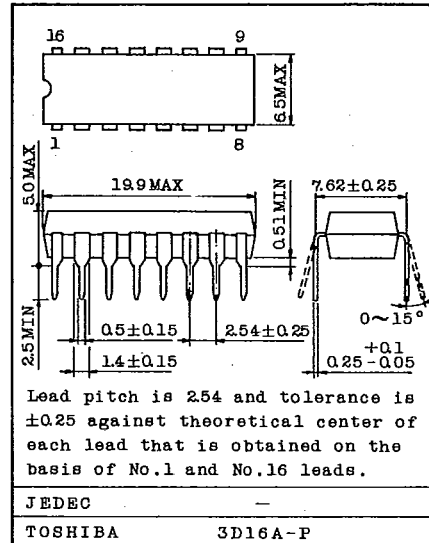
The TA7641BP is designed for the portable AM Radio applications and provides all of the functions from the converter to power amplifier. It is designed to make the quiescent current very small (1.6mA Typ. at  $V_{CC}=3V$ ) by use of the idle current control circuit. So it is capable to design the portable radio set with merit that the battery life is very long.

- . Low Quiescent Current:  $I_{CCQ}=1.6mA$ (Typ.) at  $V_{CC}=3V$
- . Operating Supply Voltage Range:  $V_{CC}=2 \sim 5V$
- . High Power Efficiency
- . Power Output:  $P_O=100mW$ (Typ.) at THD=10%
- . The Item is Different Each Outlines.

TA7641BP; Dual in Line Package..Outline 3D16A-P

TA7641BF; Flat Package.....Outline F16GA1-P

Unit in mm



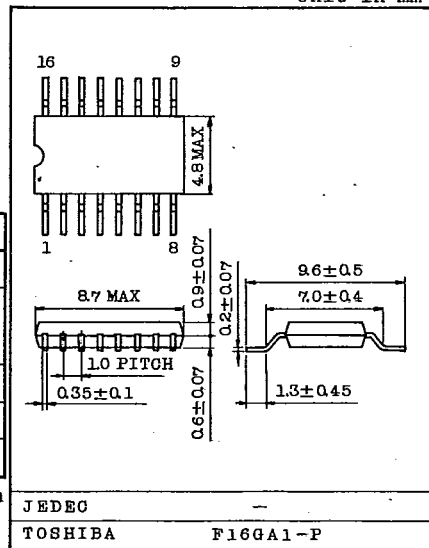
MAXIMUM RATINGS ( $T_a=25^{\circ}C$ )

| CHARACTERISTIC              | SYMBOL             | RATING    | UNIT        |
|-----------------------------|--------------------|-----------|-------------|
| Supply Voltage              | $V_{CC}$           | 6         | V           |
| Power Dissipation<br>(Note) | TA7641BP           | 750       | mW          |
|                             | TA7641BF           | 350       |             |
| Output Current (Peak)       | $I_O(\text{peak})$ | 0.2       | A           |
| Operating Temperature       | $T_{opr}$          | -10 ~ 60  | $^{\circ}C$ |
| Storage Temperature         | $T_{stg}$          | -55 ~ 150 | $^{\circ}C$ |

Note: TA7641BP: Derated above  $T_a=25^{\circ}C$  in the proportion of  $6mW/^{\circ}C$ .

TA7641BF: Derated above  $T_a=25^{\circ}C$  in the proportion of  $2.8mW/^{\circ}C$ .

Unit in mm



TA7641BP

TA7641BF

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## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified,

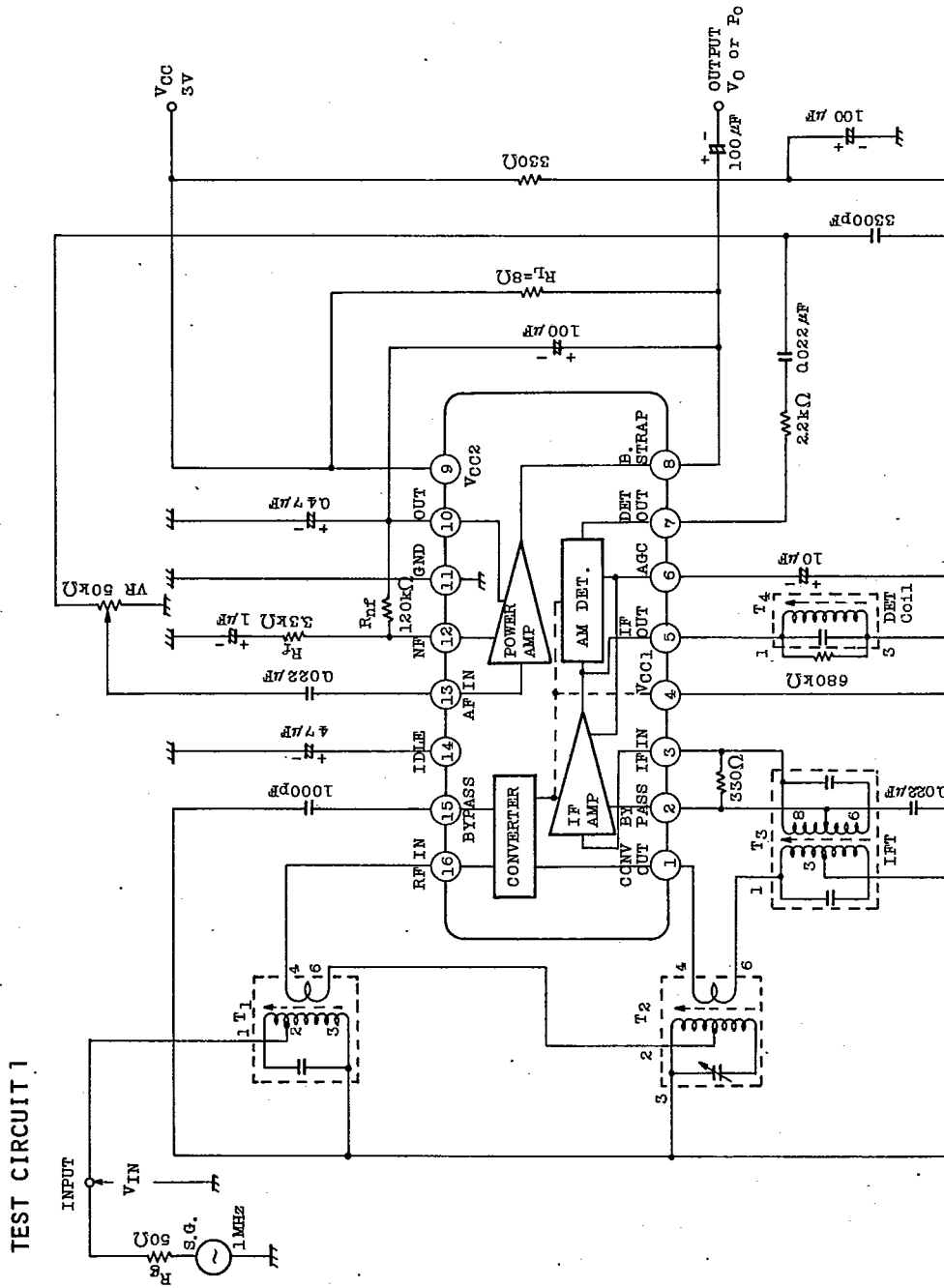
 $V_{CC}=3V$ ,  $f=1MHz$ ,  $f_m=1kHz$ ,  $Mod=30\%$ ,  $R_g=50\Omega$ ,  $R_L=8\Omega$ ,  $T_a=25^\circ C$ )

| CHARACTERISTIC                  | SYMBOL      | TEST CIRCUIT | TEST CONDITION   | MIN. | TYP. | MAX. | UNIT              |
|---------------------------------|-------------|--------------|--|------|------|------|-------------------|
| Quiescent Current               | $I_{CCQ}$   | 1            | $V_{IN}=0$   | 0.7  | 1.6  | 3.0  | mA                |
| Maximum Sensitivity             | GSM         | .1           | $V_{IN}=20dB\mu V$ , $V_R=Max.$                              | 200  | -    | -    | mV <sub>rms</sub> |
| Output Power                    | $P_o$       | 1            | $V_{IN}=42dB\mu V$ , $V_R=Max.$<br>$R_L=8\Omega$             | 80   | 100  | -    | mW                |
| Maximum Output Power            | $P_{OM}$    | 1            | Power Amp. Only  | -    | 150  | -    | mW                |
| Total Harmonic Distortion       | THD         | 1            | $V_{IN}=42dB\mu V$<br>$V_o=200mV_{rms}$<br>( $V_R=control$ ) | -    | 2    | 6    | %                 |
| Signal to Noise Ratio           | S/N         | 1            | ( $V_R=control$ )  | -    | 44   | -    | dB                |
| Output Noise Voltage            | $V_{NOISE}$ | 1            | $V_{IN}=0$ , $V_R=Max.$                                      | -    | 3.5  | -    | mV <sub>rms</sub> |
| 16 Pin Parallel Input Impedance | $r_{ip} 16$ | 2            | $f=1MHz$   | -    | 500  | -    | k $\Omega$        |
|                                 | $C_{ip} 16$ | 2            |  | -    | 2.5  | -    | pF                |
| 1 Pin Parallel Output Impedance | $r_{op} 1$  | 3            | $f=1MHz$   | -    | 500  | -    | k $\Omega$        |
|                                 | $C_{op} 1$  | 3            |  | -    | 3.9  | -    | pF                |
| 3 Pin Parallel Input Impedance  | $r_{ip} 3$  | 4            | $f=500kHz$   | -    | 60   | -    | k $\Omega$        |
|                                 | $C_{ip} 3$  | 4            |  | -    | 2.2  | -    | pF                |
| 5 Pin Parallel Output Impedance | $r_{op} 5$  | 5            | $f=500kHz$   | -    | 100  | -    | k $\Omega$        |
|                                 | $C_{op} 5$  | 5            |  | -    | 3.0  | -    | pF                |

AUDIO LINEAR IC

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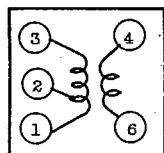
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**COIL DATA**

**T<sub>1</sub> Antenna Coil**

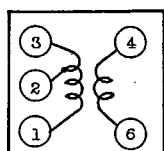


(Bottom View)

| f<br>(kHz) | L(μH) | Q <sub>0</sub> | Turns |     |     |
|------------|-------|----------------|-------|-----|-----|
|            | 1-3   | 1-3            | 1-2   | 2-3 | 4-6 |
| 300        | 600   | 115            | 2     | 130 | 8   |

TOKO  
JA-1302 or Equivalent  
Wire : 0.07mmφUEW

**T<sub>2</sub> OSC Coil**

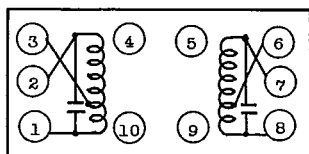


(Bottom View)

| f<br>(kHz) | L(μH) | Q <sub>0</sub> | Turns            |     |                  |
|------------|-------|----------------|------------------|-----|------------------|
|            | 1-3   | 1-3            | 1-2              | 2-3 | 4-6              |
| 796        | 360   | 125            | 92 $\frac{1}{2}$ | 8   | 10 $\frac{1}{2}$ |

SUMIDA  
0187-145-092 or Equivalent  
Wire : 0.08mmφUEW

**T<sub>3</sub> AM IFT**

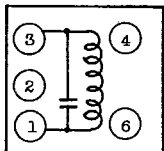


(Bottom View)

| C <sub>0</sub> (pF) | f<br>(kHz) | Q <sub>0</sub> | Turns |     |     |     |
|---------------------|------------|----------------|-------|-----|-----|-----|
|                     |            |                | 1-2   | 1-3 | 2-3 | 6-7 |
| 150                 | 455        | 65             | 80    | 148 | 196 | 32  |

SUMIDA  
48-037-921 or Equivalent  
Wire : 0.08mmφUEW

**T<sub>4</sub> Detector Coil**

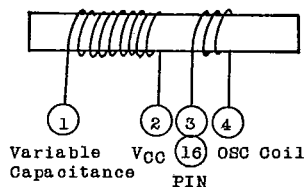


(Bottom View)

| C <sub>0</sub> (pF) | f<br>(kHz) | Q <sub>0</sub> | Turns |
|---------------------|------------|----------------|-------|
|                     |            | 1-3            | 1-3   |
| 180                 | 455        | 65             | 142   |

SUMIDA  
0130-108-016 or Equivalent  
Wire : 0.08mmφUEW

**L<sub>1</sub> Bar Antenna**



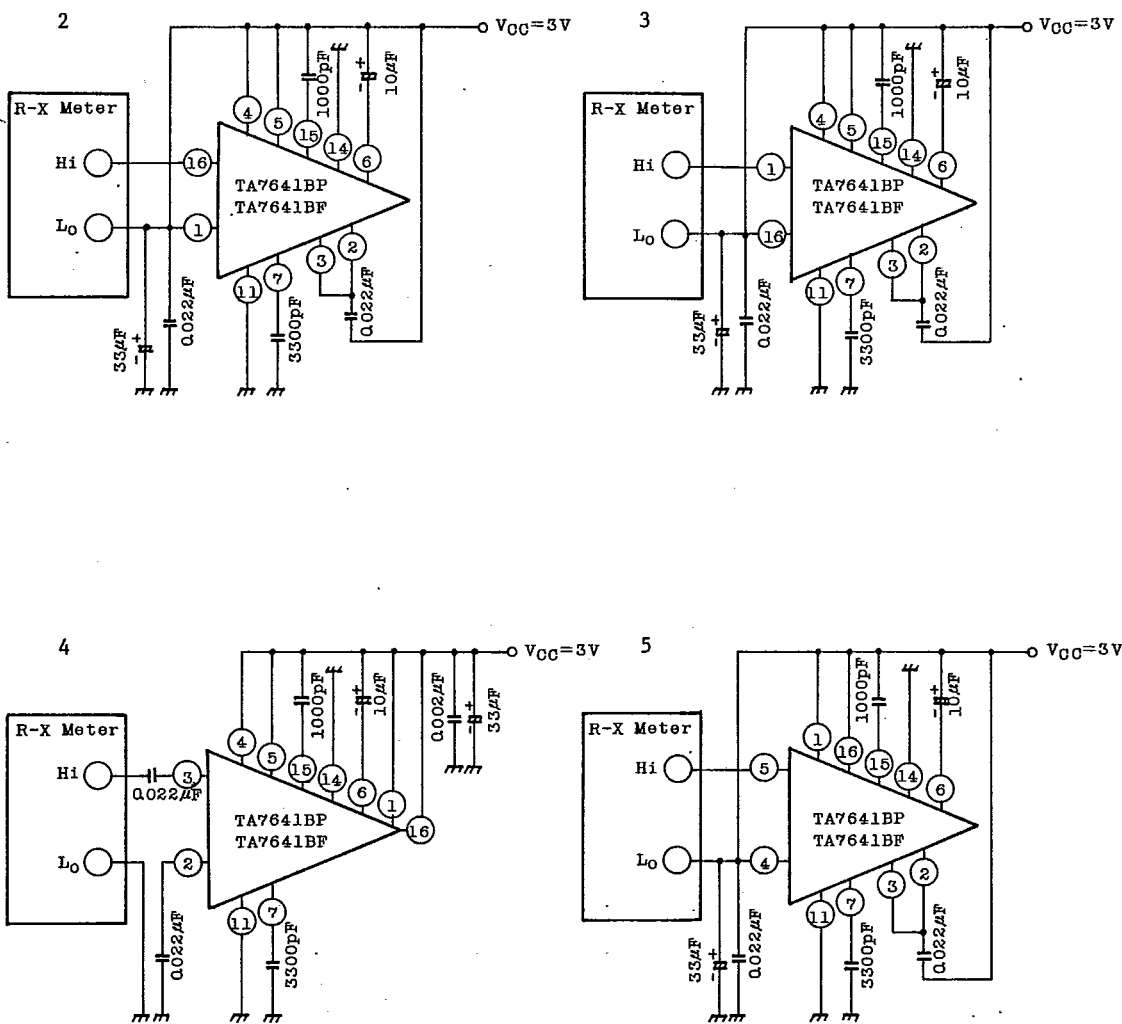
| f<br>(kHz) | L(μH) | Q <sub>0</sub> | Turns |     |
|------------|-------|----------------|-------|-----|
|            | 1-2   | 1-2            | 1-2   | 3-4 |
| 796        | 625   | 200MIN         | 105   | 20  |

Core ; 12mmφ × 53mmφ  
Wire ; USTC-0.1mmφ

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TEST CIRCUIT

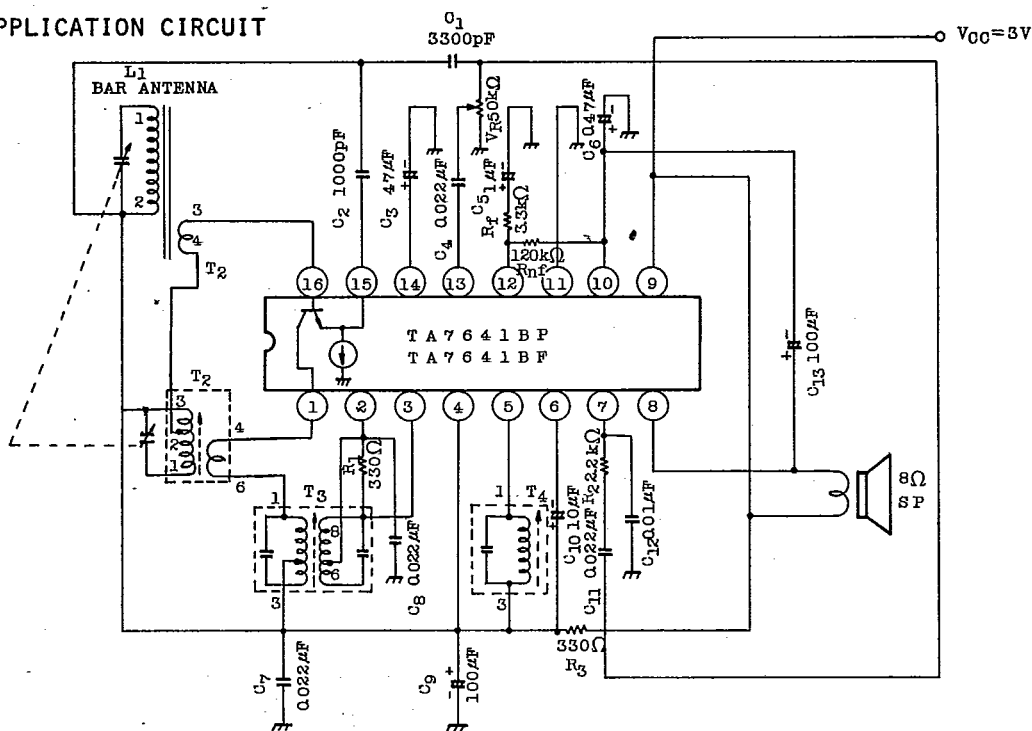


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**APPLICATION CIRCUIT**



**ELECTRICAL CHARACTERISTICS**

(Unless otherwise specified  $T_a=25^\circ\text{C}$ ,  $V_{CC}=3\text{V}$ ,  $f=1\text{MHz}$ ,  $f_m=1\text{kHz}$ ,  $\text{Mod.}=30\%$ ,  $R_L=8\Omega$ )

| CHARACTERISTIC                        | SYMBOL    | TEST CONDITION                                       | TYP. VALUE | UNIT                     |
|---------------------------------------|-----------|--|------------|--------------------------|
| Quiescent Current                     | $I_{CCQ}$ | $E_{IN}=0\text{dB/m}$                                | 1.6        | mA                       |
| Maximum Sensitivity                   | MS        | $P_O=5\text{mW}$                                     | 41         | dB/m                     |
| Quieting Sensitivity                  | QS        | $S/N=20\text{dB}$                                    | 49         | dB/m                     |
| Signal to Noise Ratio                 | S/N       | $E_{IN}=74\text{dB/m}$                               | 44         | dB                       |
| AGC Ratio (Note 1)                    | AGC (FOM) | -10dB Output Reduction<br>(from 100dB/m)             | 50         | dB                       |
| Recovered Output Voltage              | VOD       | $E_{IN}=74\text{dB/m}$ , Measure Pin 7               | 131        | $\text{mV}_{\text{RMS}}$ |
| Power Amplifier Voltage Gain (Note 2) | $G_V$     | $R_{nf}=120\text{k}\Omega$ , $R_f=3.3\text{k}\Omega$ | 26         | dB                       |
| Output Power                          | $P_O$     | THD=10%  | 100        | mW                       |
| Total Harmonic Distortion             | THD       | $E_{IN}=74\text{dB/m}$                               | 2          | %                        |

Note 1. The AGC Ratio is defined as the input electric field intensity ratio between the output voltage at 100dB/m and -10dB output voltage.

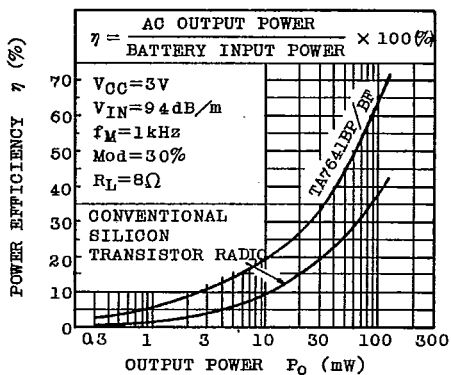
2. The open loop voltage gain of the power amplifier is typical 33dB.

**AUDIO LINEAR IC**

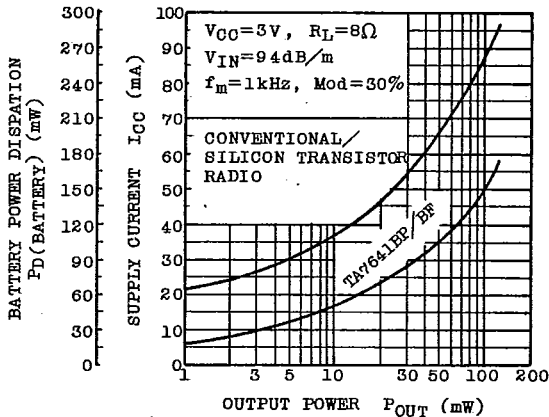
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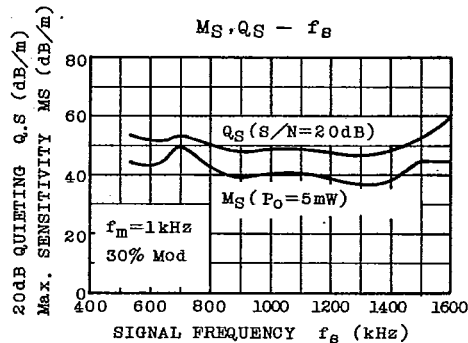
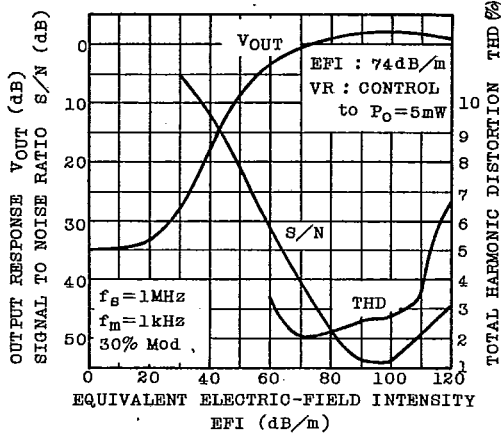
$\eta - P_o$   
CHARACTERISTIC COMPARISON



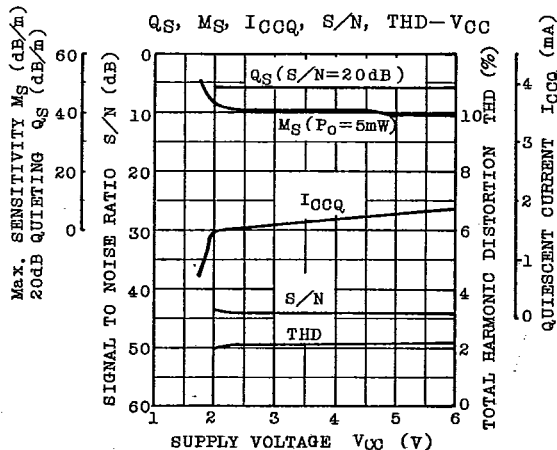
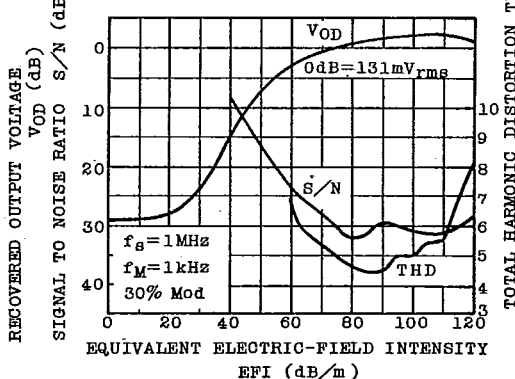
$P_D(\text{BATTERY}), I_{CC} - P_{OUT}$   
CHARACTERISTIC COMPARISON



$V_{OUT}, S/N, THD - E_{FI}$

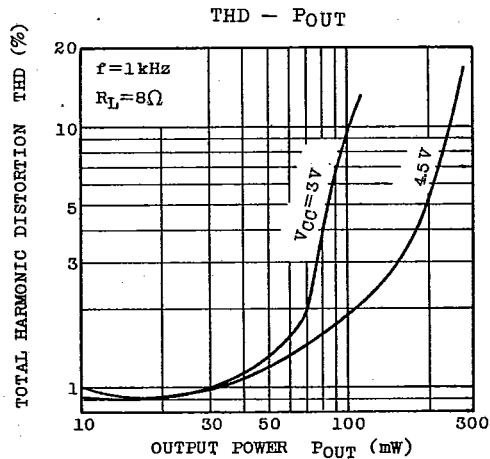
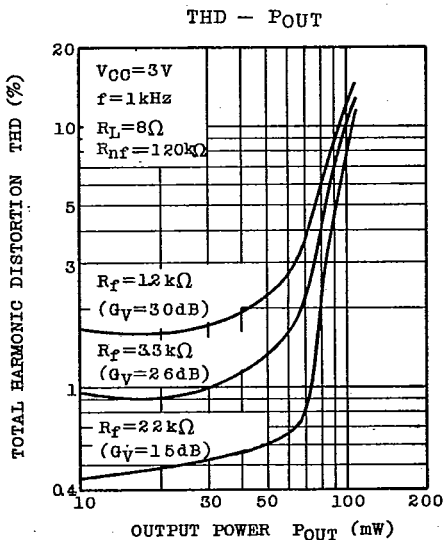
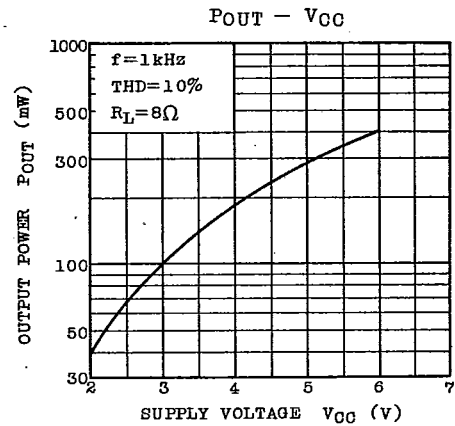
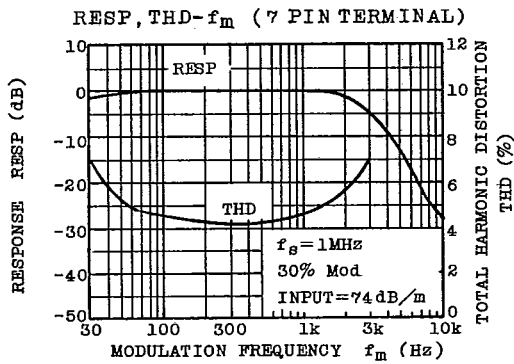
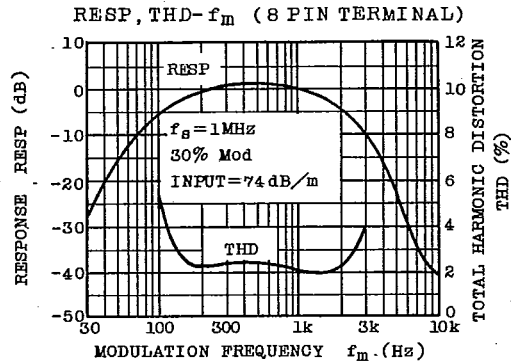
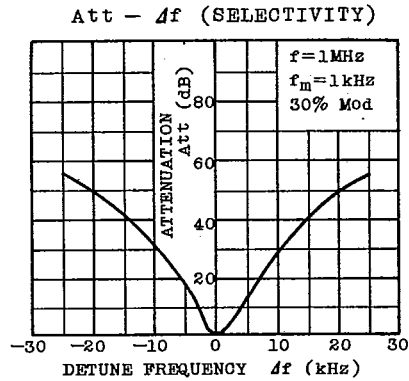


$V_{OD}, S/N, THD - E_{FI}$



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AUDIO LINEAR IC



**1A/641BP**  
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