

MN3205

4096-STAGE LOW VOLTAGE OPERATION LOW NOISE BBD

General description

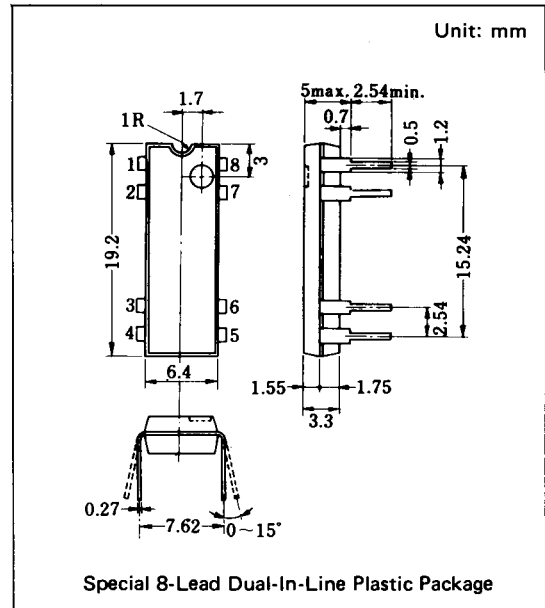
The MN3205 is a 4096-stage low voltage operation ($V_{DD} = 5V$) BBD that provides a signal delay of up to 204.8ms at clock frequency 10KHz and is suitable for use as reverberation effect of audio equipments such as portable stereo and radio cassette recorders which need low voltage and long delay time since S/N is 67dB in spite of many stages.

Features

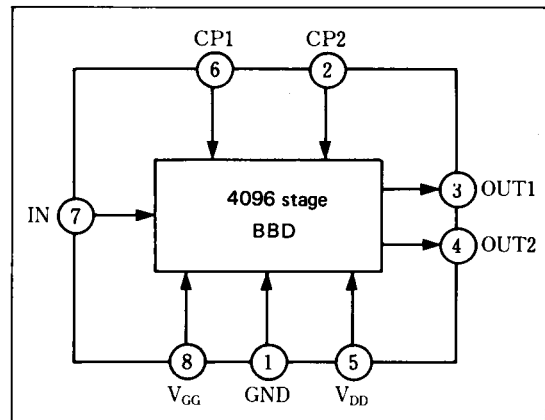
- Variable delay of audio signals: 20.48ms ~ 204.8ms.
- Wide power supply voltage: 4 ~ 9V.
- No insertion loss: $L_i = 0dB$ typ.
- Wide dynamic range: $S/N = 67dB$ typ.
- N channel silicon gate process.
- Special 8-Lead Dual-In-Line Plastic Package.

Applications

- Reverberation and echo effects of audio equipment such as radio cassette recorder, car radio, portable radio, portable stereo, echo microphone and pre-taped musical accompaniment (Karaoke), etc.
- Sound effect of electronic musical instruments.
- Variable or fixed delay of analog signals.
- Telephone time compression and delay line for voice communication system.



Block Diagram



Quick Reference Data

| Item | Symbol | Value | Unit |
|---------------------------|------------------|---------------------------|------|
| Supply Voltage | V_{DD}, V_{GG} | + 5, $\frac{1}{3} V_{DD}$ | V |
| Signal Delay Time | t_D | 20.48~204.8 | ms |
| Total Harmonic Distortion | THD | 0.8 | % |
| Signal to Noise Ratio | S/N | 67 | dB |

■ Absolute Maximum Ratings (Ta = 25°C)

| Item | Symbol | Rating | Unit |
|-------------------------------|--|----------|------|
| Terminal Voltage | V _{DD} , V _{GG} , V _{CP} , V _I | -0.3~+11 | V |
| Output Voltage | V _O | -0.3~+11 | V |
| Operating Ambient Temperature | T _{opr} | -20~+60 | °C |
| Storage Temperature | T _{stg} | -55~+125 | °C |

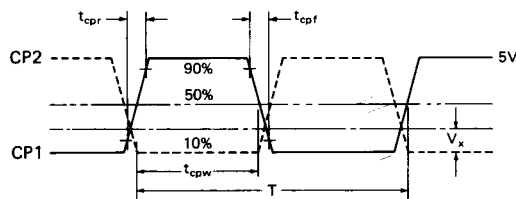
■ Operating Condition (Ta = 25°C)

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|-------------------------|------------------|-----------|------|-----------------------|---------------------|------|
| Drain Supply Voltage | V _{DD} | | +4 | +5 | +9 | V |
| Gate Supply Voltage | V _{GG} | | | 14/15 V _{DD} | | V |
| Clock Voltage "H" Level | V _{CPH} | | | V _{DD} | | V |
| Clock Voltage "L" Level | V _{CPL} | | 0 | | +0.5 | V |
| Clock Frequency | f _{CP} | | 10 | | 100 | kHz |
| Clock Pulse Width *1 | t _{CPW} | | | | 0.5T *2 | |
| Clock Rise Time *1 | t _{CPr} | | | | 500 | ns |
| Clock Fall Time *1 | t _{CPf} | | | | 500 | ns |
| Clock Input Capacitance | C _{CP} | | | | 2800 | pF |
| Clock Cross Point *1 | V _X | | 0 | | 0.3V _{CPH} | V |

■ Electrical Characteristics (Ta = 25°C, V_{DD} = V_{CPH} = 5V, V_{CPL} = 0V, V_{GG} = 14/15 V_{DD}, R_L = 100kΩ)

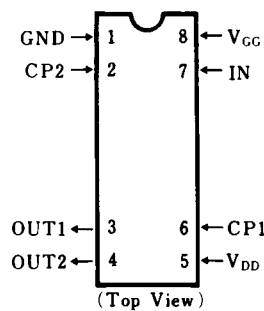
| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---------------------------|-----------------|--|-------|------|-------|-------------------|
| Signal Delay Time | t _D | | 20.48 | | 204.8 | ms |
| Input Signal frequency | f _i | f _{CP} = 40kHz, Output Attenuation ≤ 3dB | 6 | | | kHz |
| Input Signal Swing | V _i | THD=2.5% | 0.36 | | | V _{rms} |
| Insertion Loss | L _i | f _{CP} =40kHz, f _i =1kHz | -4 | 0 | 4 | dB |
| Total Harmonic Distortion | THD | f _{CP} =40kHz, f _i =1kHz, V _i =0.25V _{rms} | | 0.8 | 2.5 | % |
| Output Noise Voltage | V _{no} | f _{CP} = 100kHz, Weighted by "A" curve | | | 0.35 | mV _{rms} |
| Signal to Noise Ratio | S/N | | | 67 | | dB |

*1 Clock Pulse Waveforms

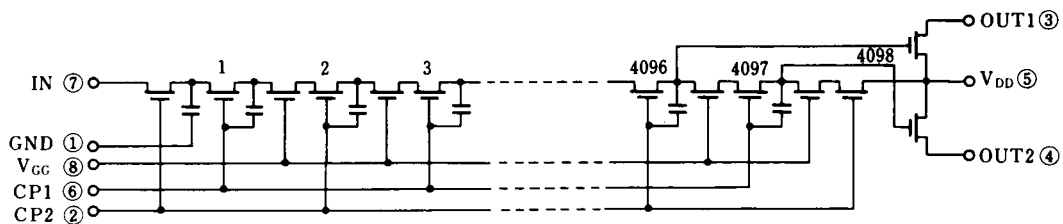


*2 T = 1/f_{CP} (Clock Period)

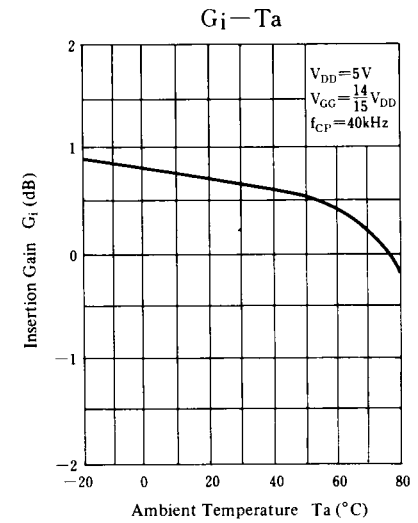
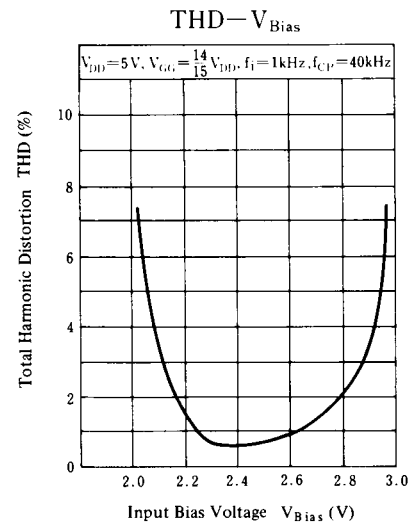
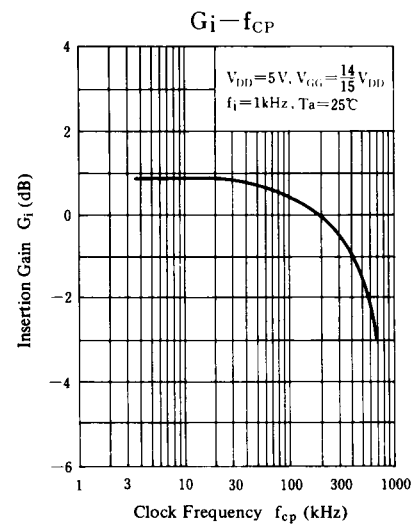
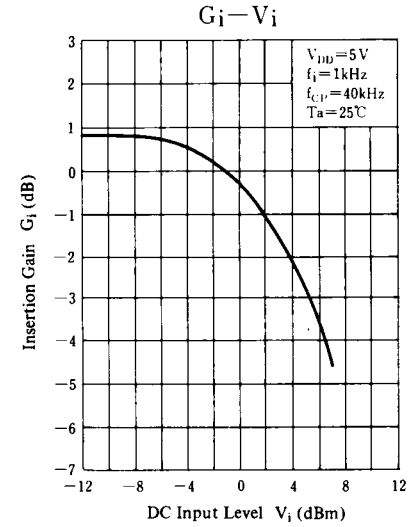
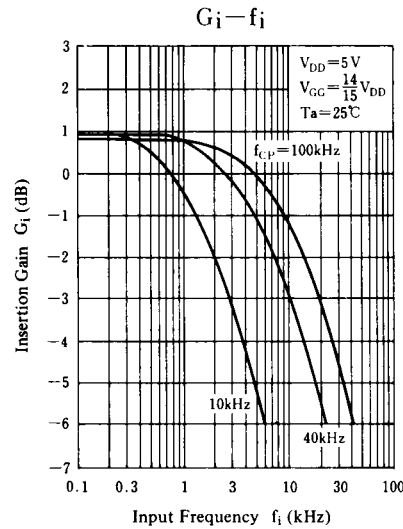
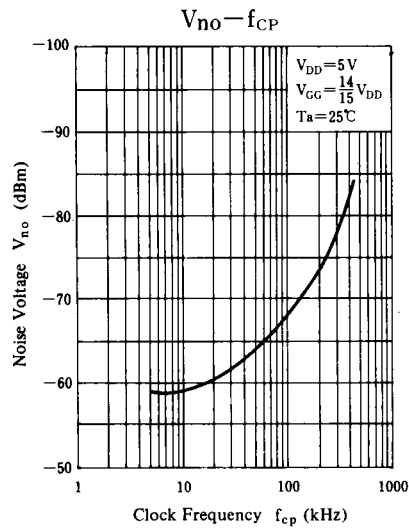
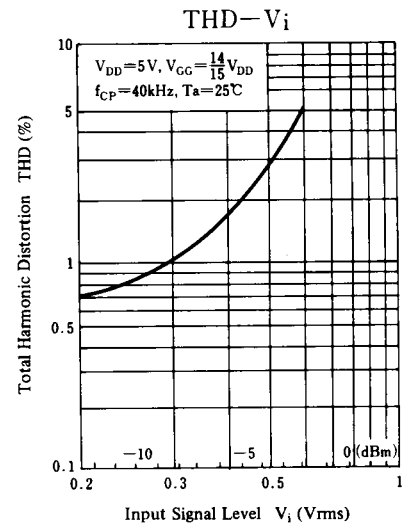
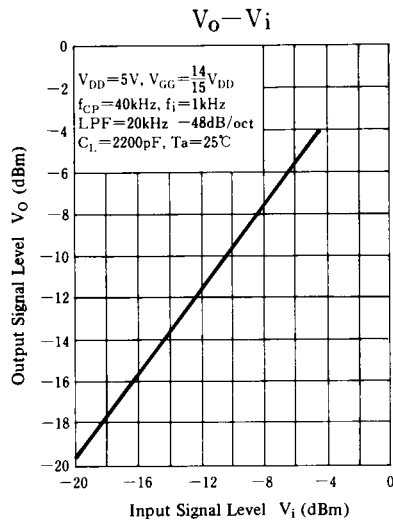
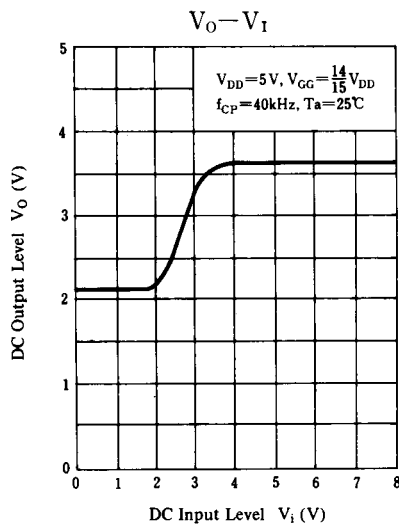
■ Terminal Assignments

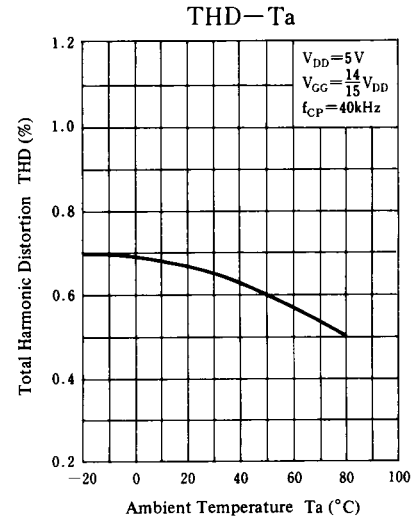
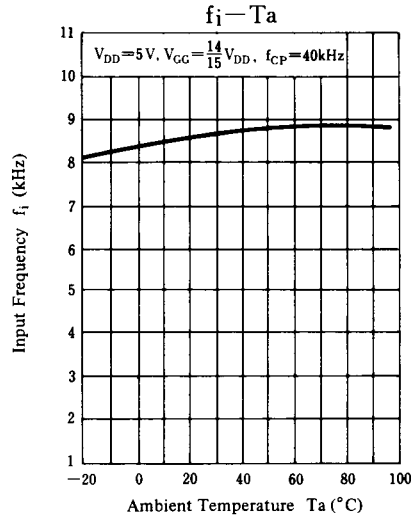
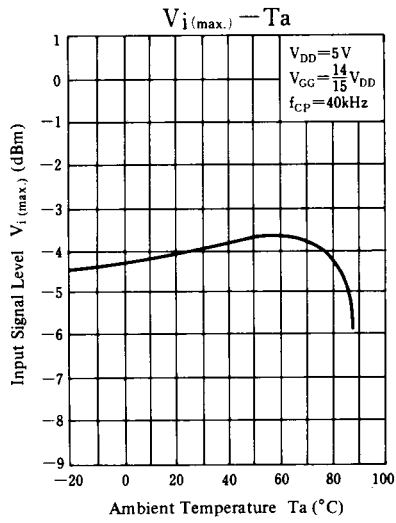


■ Circuit Diagram

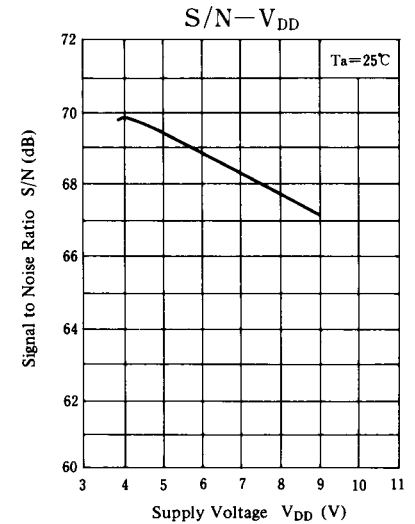
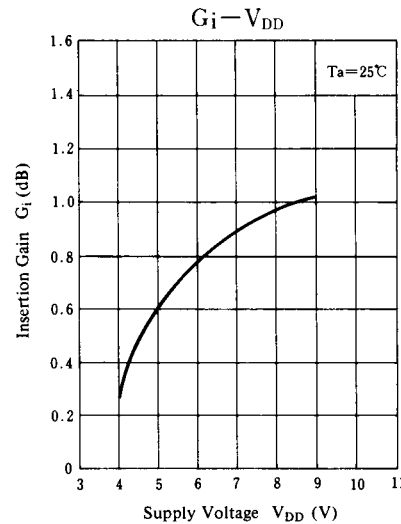
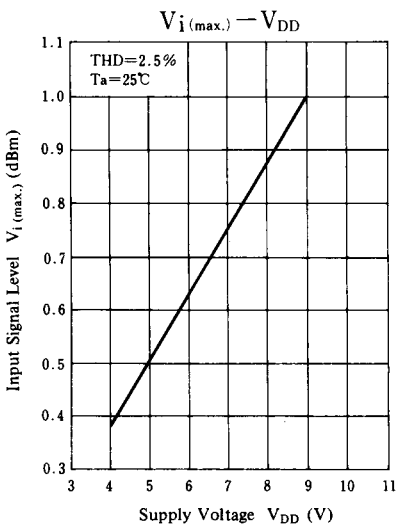
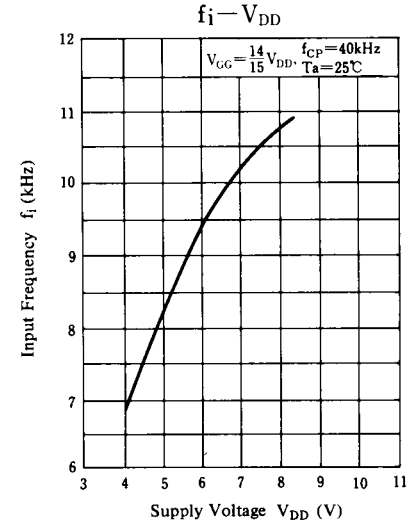
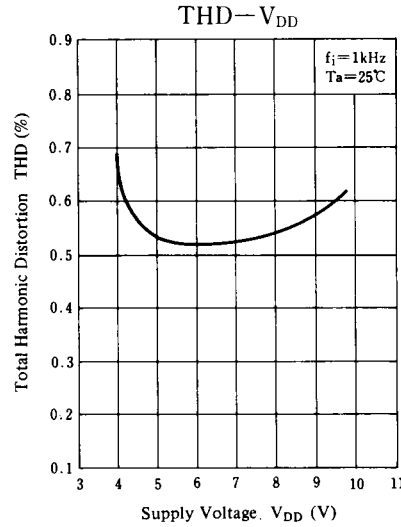
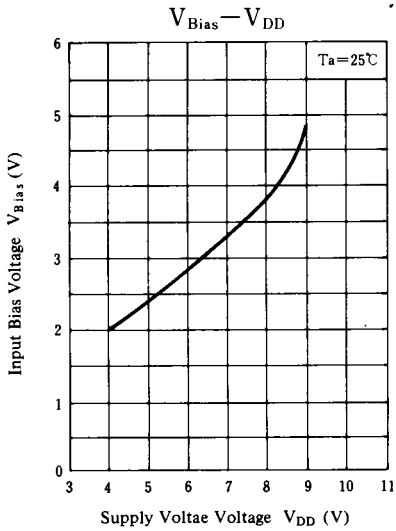


Typical Electrical Characteristic Curves

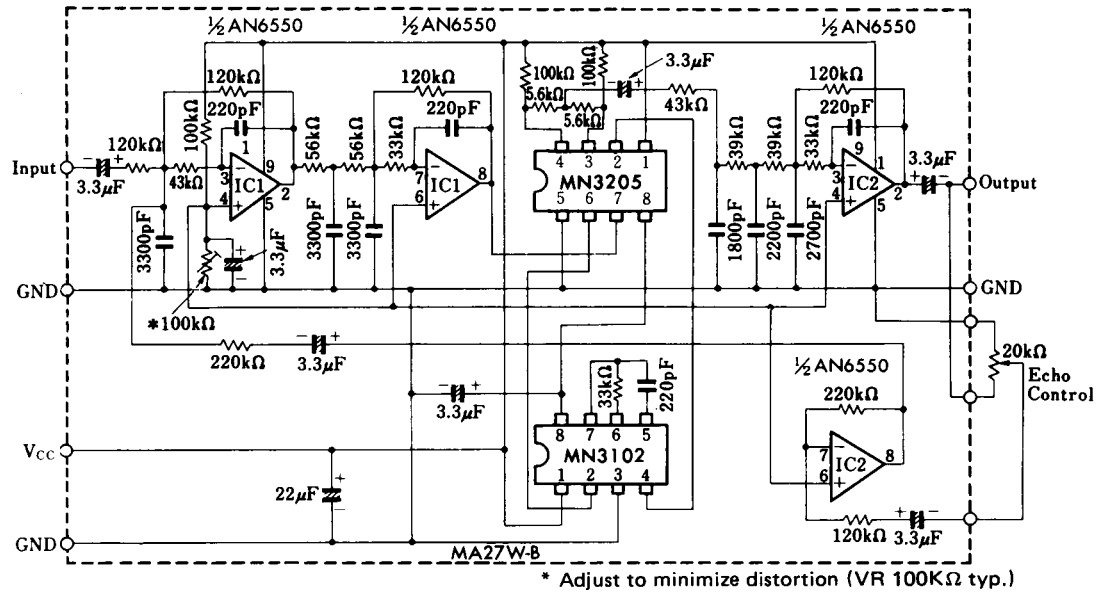




Supply Voltage Characteristics



■ Application Circuit



Reverberation Effect Generation Circuit (Signal Delay Over 100msec.)