

MN3005

4096-STAGE LONG DELAY BBD

General description

The MN3005 is a world's first 4096-stage long delay BBD, 8 times longer than 512-stage BBD manufactured by using a P-channel low noise silicon gate process.

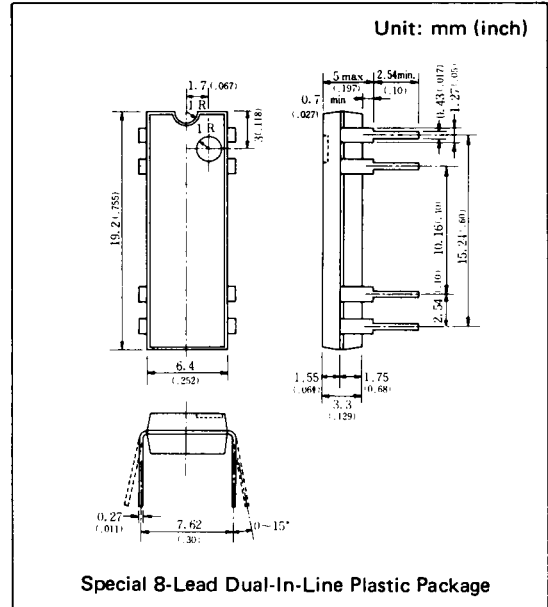
Long signal delay time 205ms can be obtained at clock frequency 10KHz. S/N is 75dB. S/N has been improved by more than 20dB in comparing with 8-connected 512-stage BBD's. The MN3005 is suitably used for reverberation and echo effects in electronic musical instruments such as electronic organ, guitar amplifier and music synthesizer which need long delay time.

Features

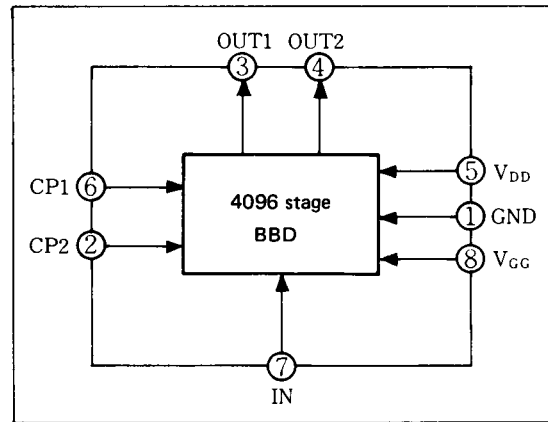
- 1 chip 4096 stage and wide range of variable delay times: 20.48 ~ 204.8ms.
- High S/N in spite of multi-stage and wide dynamic range: S/N \approx 75dB typ.
- No insertion loss since the loss occurring in the signal transfer is corrected by the MOS capacity of input and output. $L_i = 0$ dB.
- High integration and high reliability by using P channel low noise silicon gate process.
- Special 8 lead dual-in-line plastic package.

Applications

- Reverberation and echo effects in echo microphone and stereo equipment.
- Chorus effect in electronic musical instruments.
- Variable or fixed delay of analog signals.
- Telephone time compression and delay line for voice communication systems, etc.



Block Diagram



Quick Reference Data

Item	Symbol	Value	Unit
Supply Voltage	V_{DD}, V_{GG}	-15, $V_{DD} + 1$	V
Signal Delay Time	t_D	20.48~204.8	ms
Total Harmonic Distortion	THD	1	%
Signal to Noise Ratio	S/N	75	dB

■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Terminal Voltage	V _{DD} , V _{GG} , V _{CP} , V _I	-18~+0.3	V
Output Voltage	V _O	-18~+0.3	V
Operating Temperature	T _{opr}	-20~+60	°C
Storage Temperature	T _{stg}	-55~+125	°C

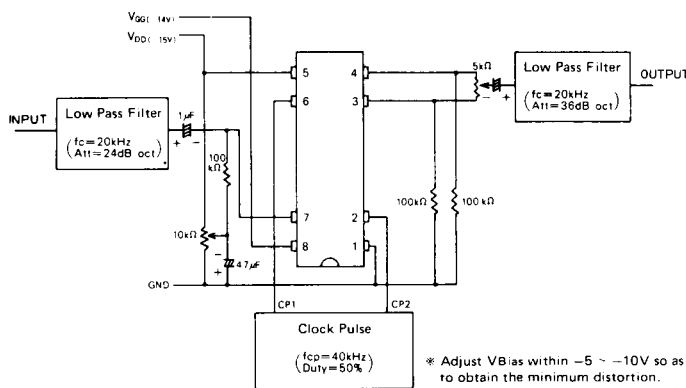
■ Operating Conditions (Ta = 25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain Supply Voltage	V _{DD}		-14	-15	-16	V
Gate Supply Voltage	V _{GG}			V _{DD} + 1		V
Clock Voltage "H" Level	V _{CPH}		0		-1	V
Clock Voltage "L" Level	V _{CPL}			V _{DD}		V
Clock Input Capacitance	C _{CP}				2800	pF
Clock Frequency	f _{CP}		10		100	kHz
Clock Pulse Width *2	t _{cpw}	Test Circuit			0.5T*2	
Clock Rise Time *2	t _{cpr}	Test Circuit			500	ns
Clock Fall Time *2	t _{cpf}	Test Circuit			500	ns
Clock Cross Point	V _x		0		-3	V
Input DC Bias Voltage	V _{Bias}		-5		-10	V

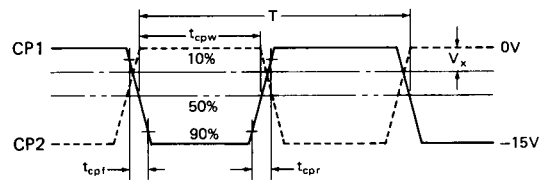
■ Electrical Characteristics (Ta = 25°C, V_{DD} = V_{CPL} = -15V, V_{CPH} = 0V, V_{GG} = -14V, R_L = 100kΩ)

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, V _i = 1.0Vrms, Output Attenuation ≤ 3dB (0dB at f _i = 1kHz)	10			kHz
Input Signal Swing	V _i	f _{cp} = 40kHz, f _i = 1 kHz, THD = 2.5%	1.0			Vrms
Insertion Loss	L _i	f _{cp} = 40kHz, f _i = 1 kHz, V _i = 1.0Vrms	-4	0	4	dB
Total Harmonic Distortion	THD	f _{cp} = 40kHz, f _i = 1 kHz, V _i = 0.78Vrms		1	2.5	%
Noise Voltage	V _{no}	f _{cp} = 100kHz Weighted by "A" curve			0.4	mVrms
Signal to Noise Ratio	S/N			75		dB

■ Test Circuit

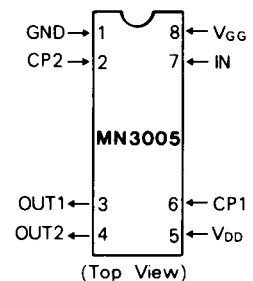


* 1 Clock Pulse Waveforms

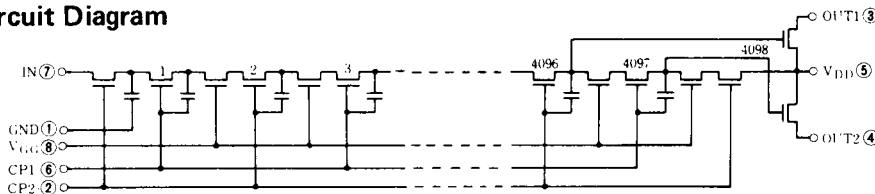


* 2 T = 1/f_{cp}

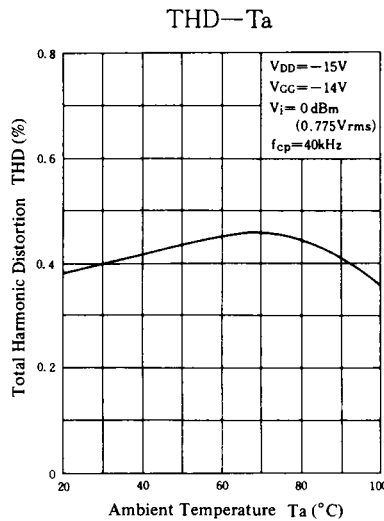
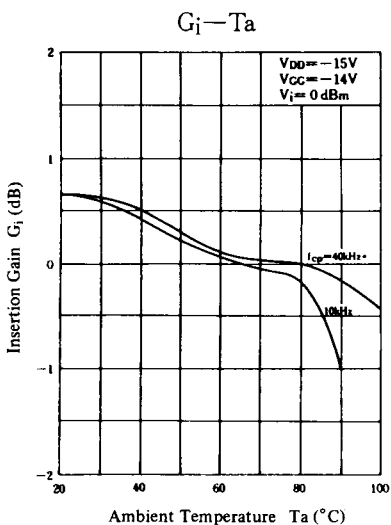
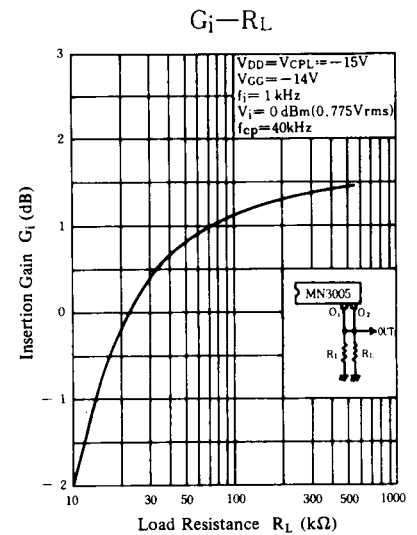
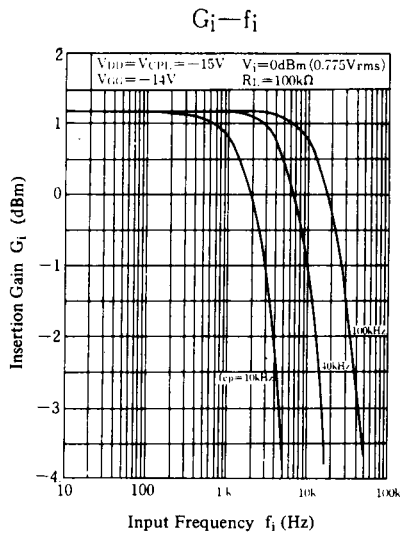
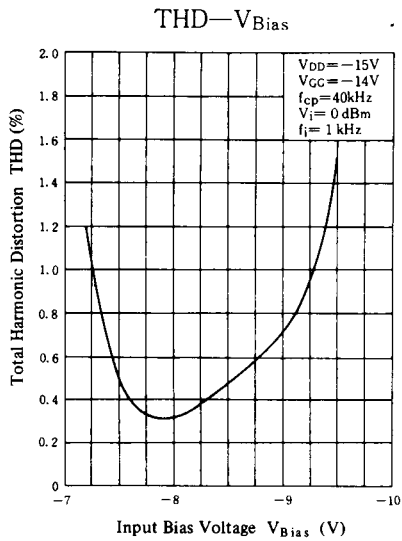
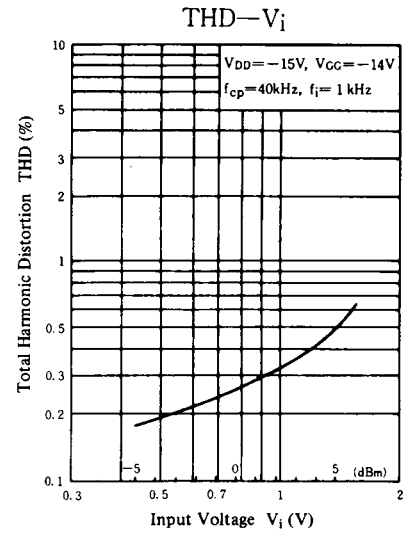
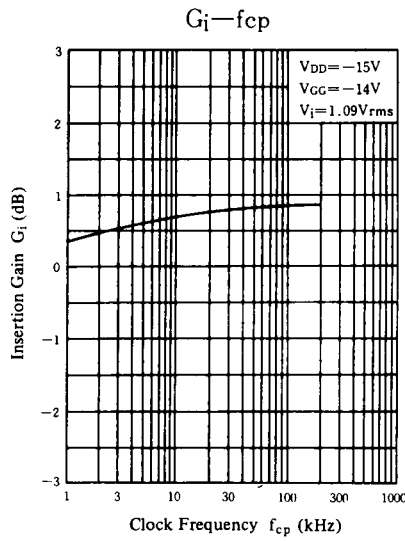
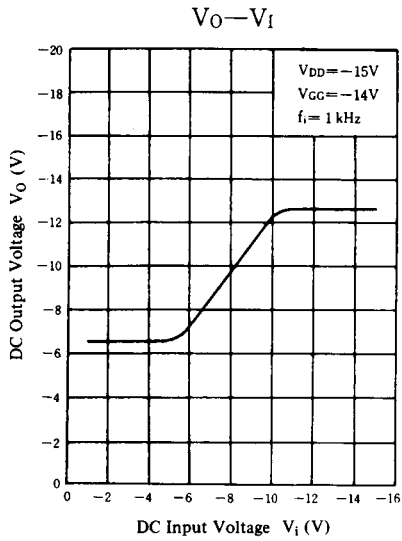
■ Terminal Assignments



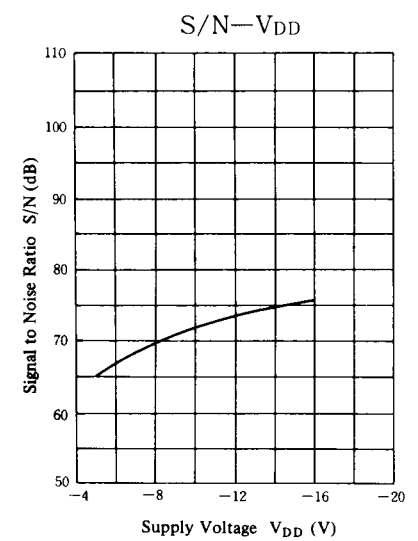
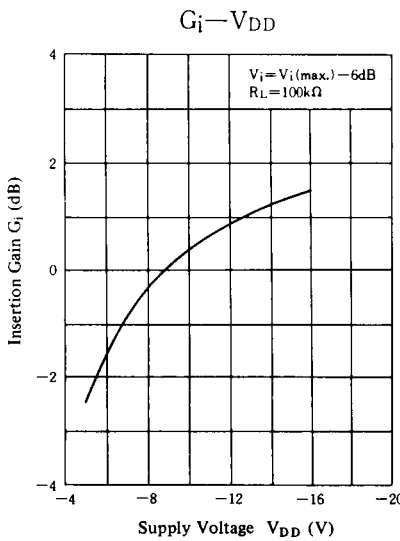
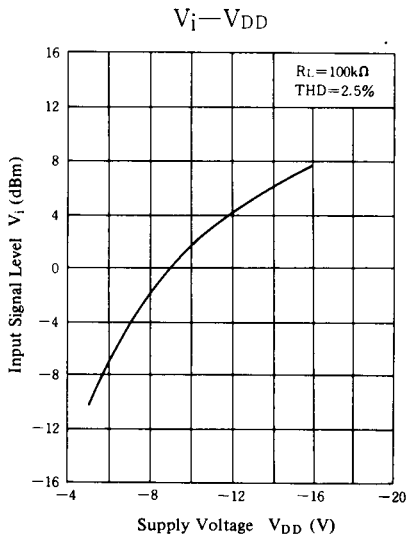
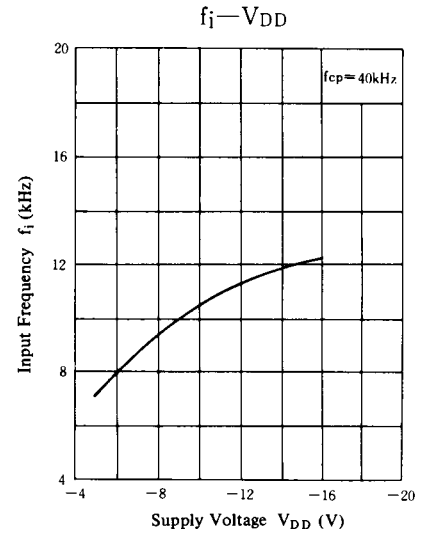
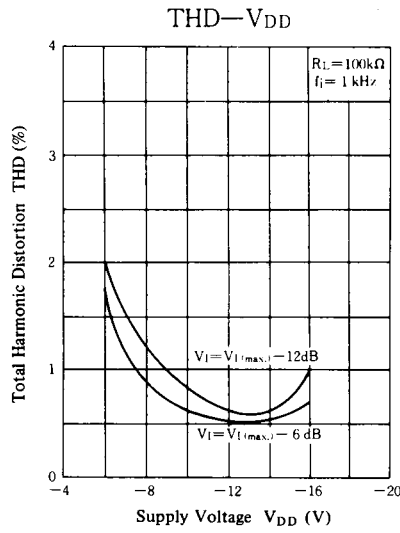
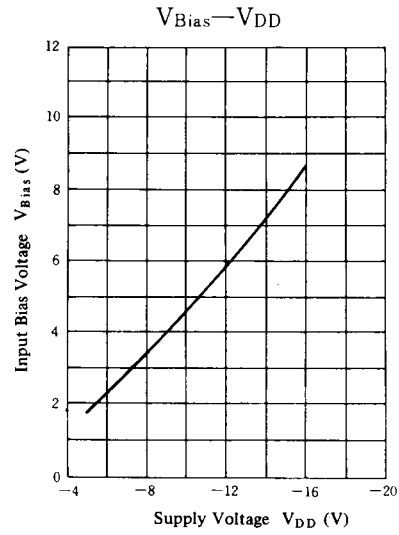
■ Circuit Diagram



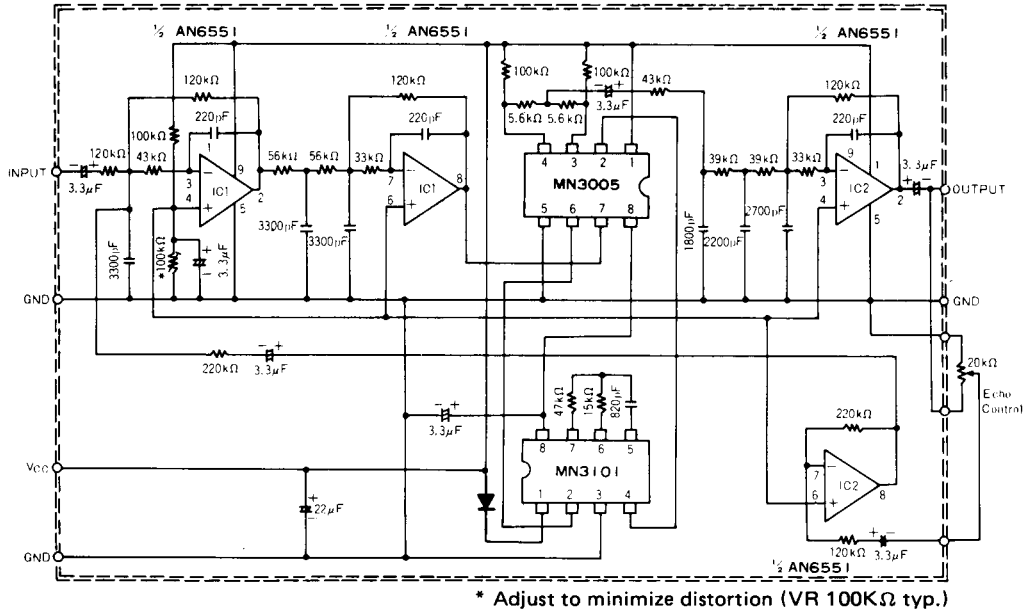
Typical Electrical Characteristic Curves



Supply Voltage Characteristics



■ Application Circuit



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

■ Pattern Drawing of the Printed Circuit Board (Real size)

