MN3008

2048-STAGE LOW NOISE BBD

■ General description

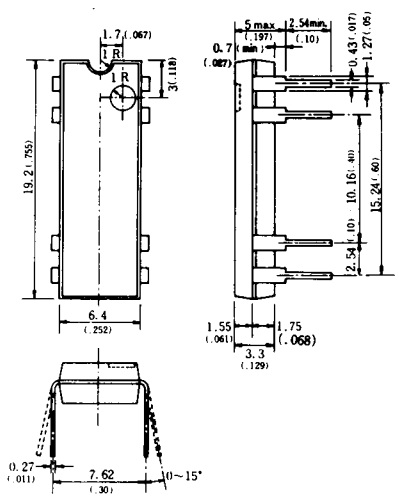
The MN3008 is a 2048-stage long delay low noise BBD that provides a signal delay of up to 102.4msec.

The MN3008 is particularly suitable for use as reverberation effect in electronic musical instruments such as stereo equipment due to its long delay time.

■ Features

- Variable delay time of audio signal: 10.24 ~ 102.4ms.
- Clock component cancellation capability.
- No insertion loss: L_i = 0dB typ.
- Wide dynamic range: S/N = 78dB typ.
- Wide frequency response: $f_i \leqq$ 10KHz.
- Low distortion: THD = 0.5% typ. (V_i = 0.78Vrms).
- Clock frequency range: 10 ~ 100KHz.
- P channel silicon gate process.
- Special 8-Lead Dual-In-Line Plastic Package.

Unit: mm (inch)

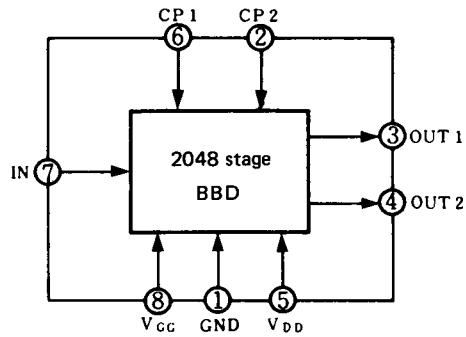


Special 8-Lead Dual-In-Line Plastic Package

■ Applications

- Reverberation effect of echo microphone and stereo equipments.
- Chorus effects 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	10.24~102.4	ms
Total Harmonic Distortion	THD	0.5	%
Signal to Noise Ratio	S/N	78	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	Topr	−20~+60	℃
Storage Temperature	Tstg	−55~+125	℃

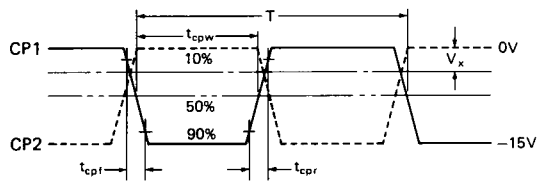
■ Operating Conditions (Ta = 25°C)

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}				1400	pF
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 Cross Point *1	V_X		0		−3	V
Input DC Bias	V_{Bias}		−5		−10	V

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

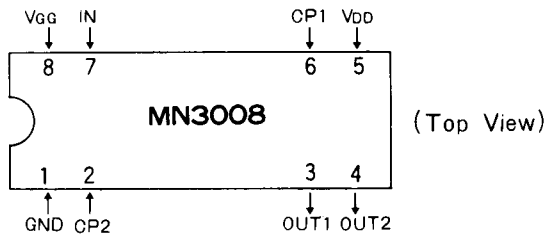
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t_D		10.24		102.4	ms
Input Signal Frequency	f_i	f_{cp} = 40kHz, V_i = 1.7Vrms 3dB down (0dB at f_i = 1kHz)	10			kHz
Input Signal Swing	V_i	f_{CP}=40kHz, f_i = 1 kHz, THD=2:5%	1.2			Vrms
Insertion Loss	L_i	f_{CP}=40kHz, f_i = 1 kHz, V_i =1.2Vrms	−4	0	+4	dB
Total Harmonic Distortion	THD	f_{CP}=40kHz, f_i = 1 kHz, V_i =0.78Vrms		0.5	2.5	%
Noise	V_{no}	f_{cp} = 100kHz, weighted by "A" curve			0.4	mVrms
Signal to Noise Ratio	S/N			78		dB

*1 Clock Pulse Waveforms



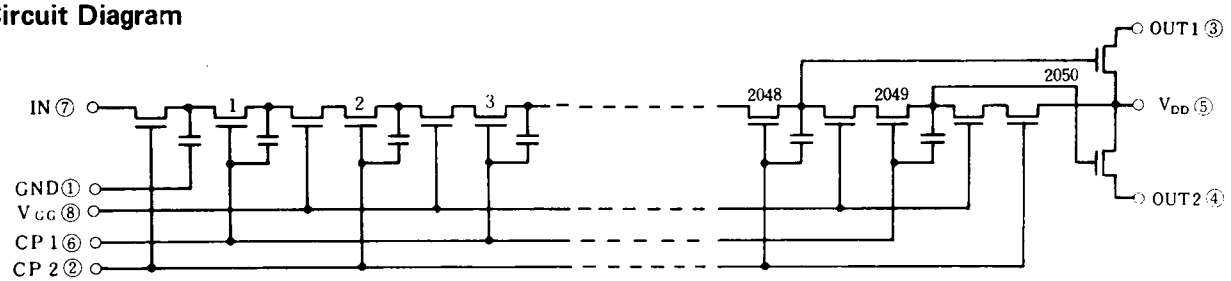
*2 T = $1/f_{CP}$ (Clock period)

■ Terminal Assignments



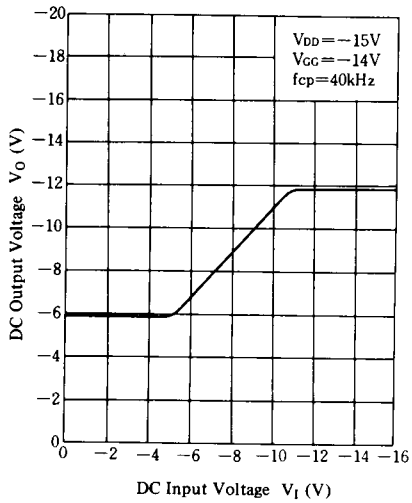
(Top View)

■ Circuit Diagram

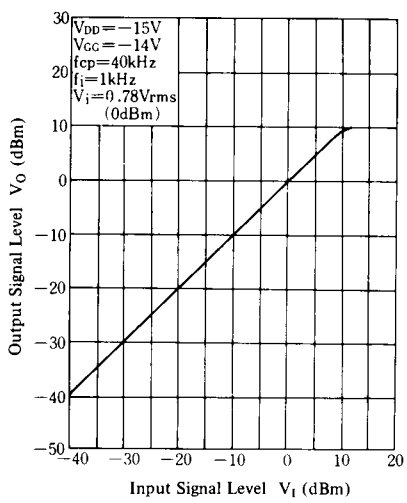


■ Typical Electrical Characteristic Curves

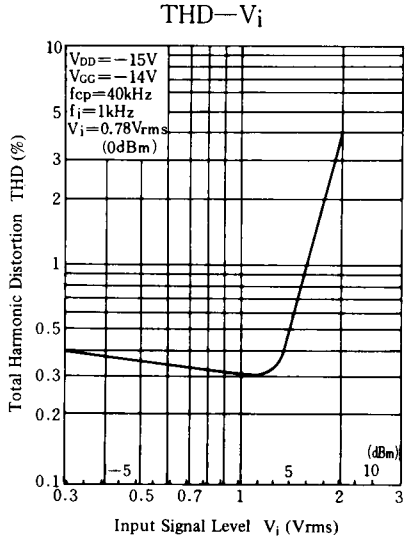
V_O—V_I



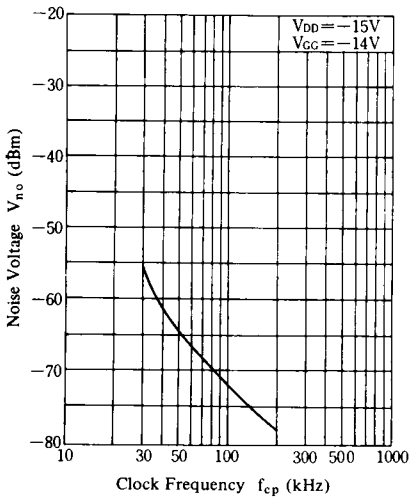
V_O—V_i



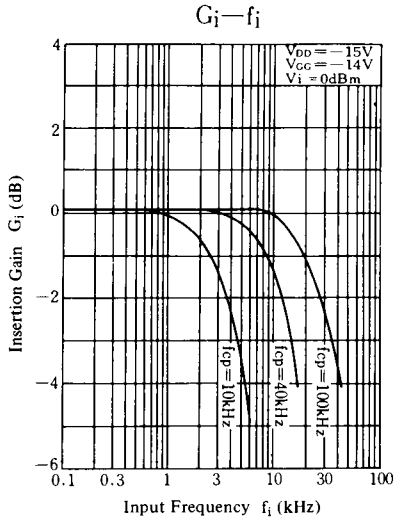
THD—V_i



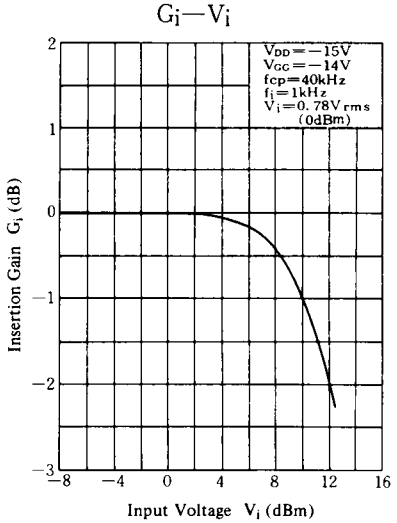
V_{no}—fcp



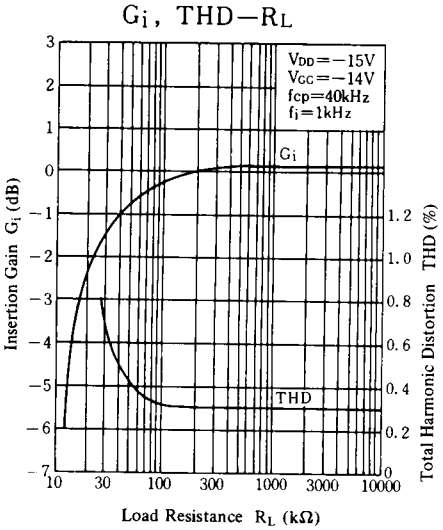
G_i—f_i



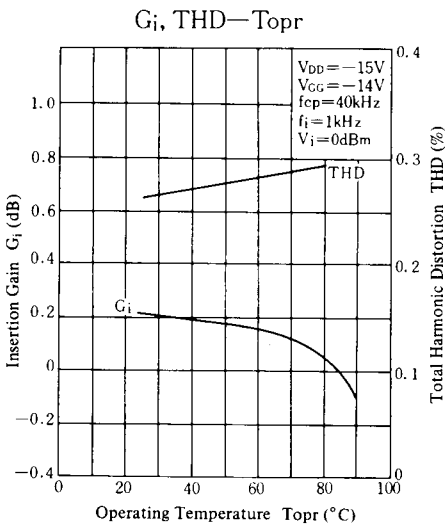
G_i—V_i



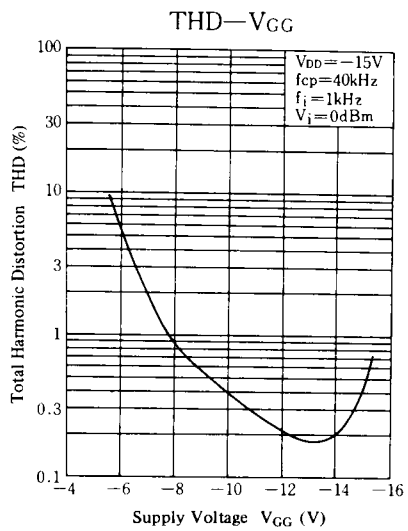
G_i, THD—R_L



G_i, THD—Topr

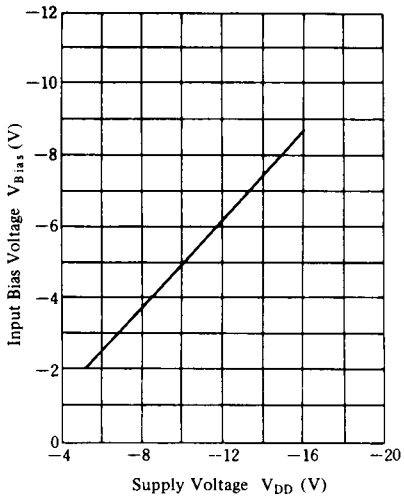


THD—V_{GG}

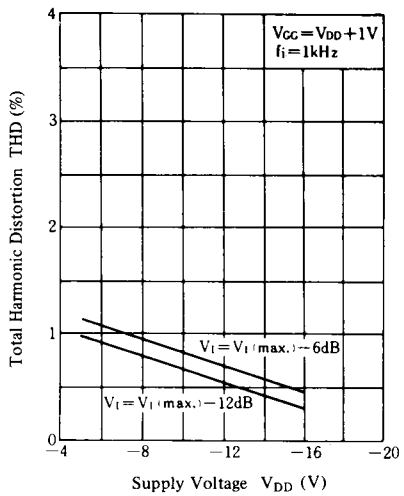


■ Supply Voltage Characteristics

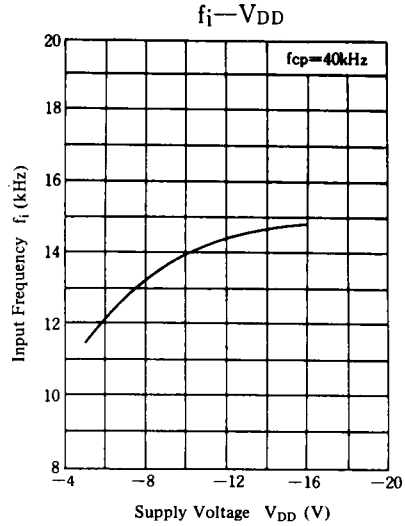
V_{Bias}—V_{DD}



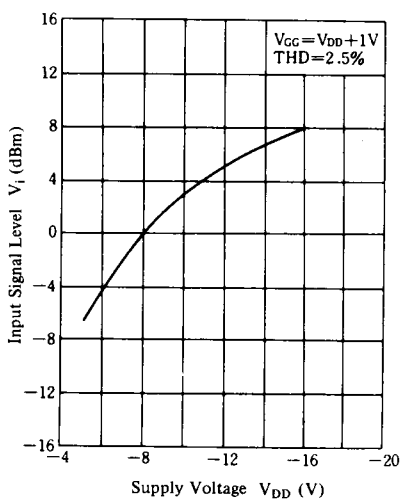
THD—V_{DD}



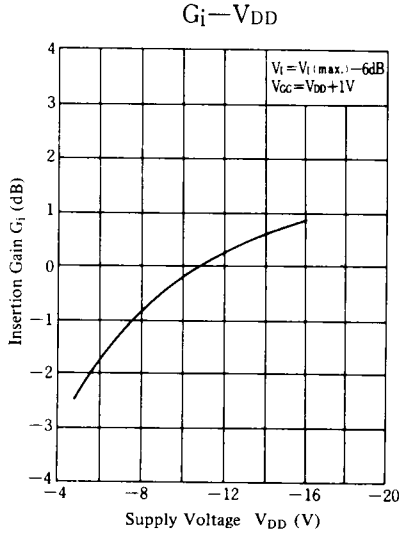
f_i—V_{DD}



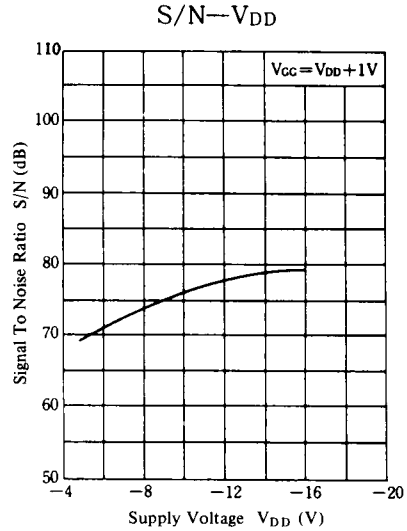
V_i—V_{DD}



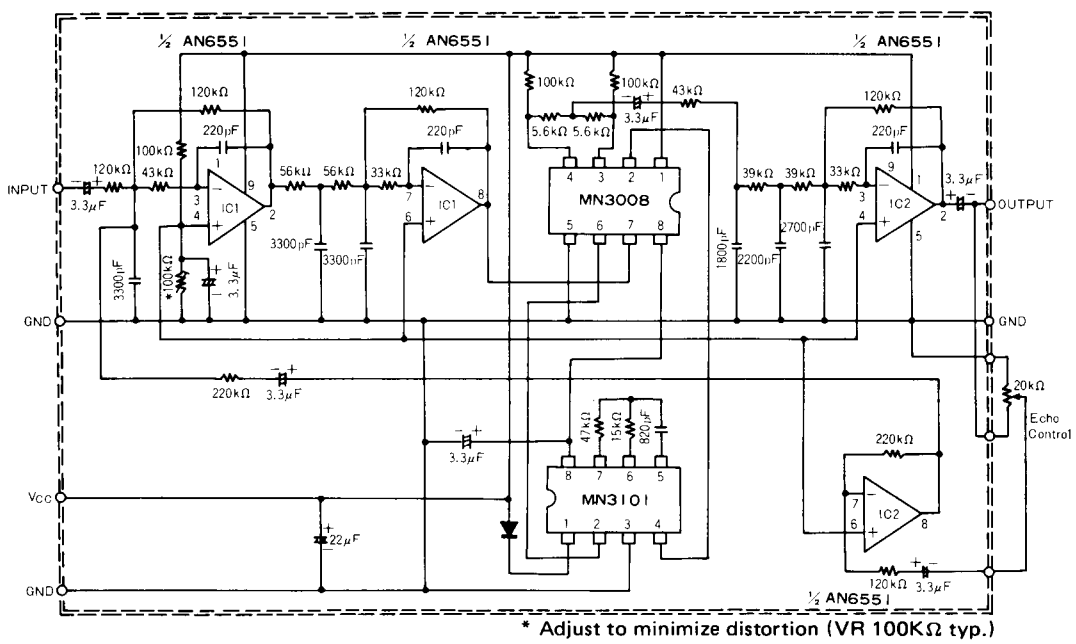
G_i—V_{DD}



S/N—V_{DD}



■ Application Circuit



* Adjust to minimize distortion (VR 100KΩ typ.)

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