

# MN3007

## 1024-STAGE LOW NOISE BBD

### General description

The MN3007 is a 1024-stage long delay low noise BBD that provides a signal delay of up to 51.2msec.

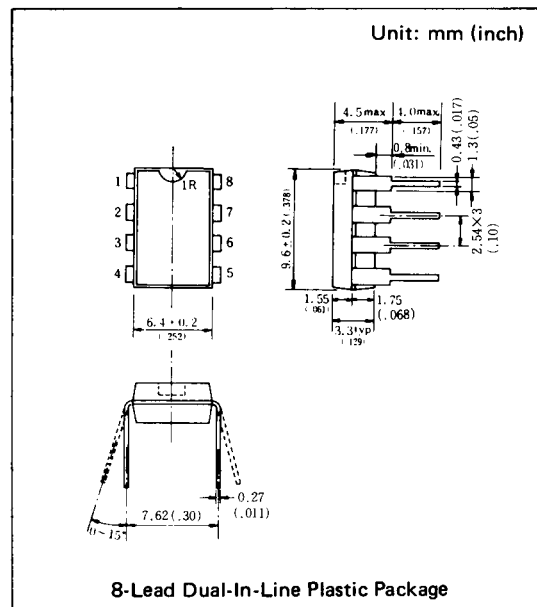
The MN3007 is particularly suitable for use as reverberation effect of electronic musical instrument such as stereo equipment due to its long delay times.

### Features

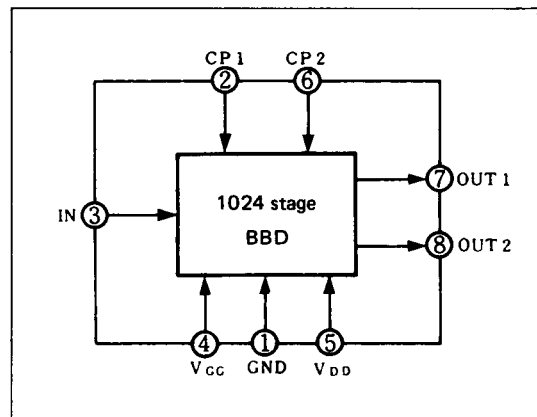
- Variable delay time of audio signal: 5.12 ~ 51.2ms.
- Clock component cancellation capability.
- No insertion loss:  $L_i = 0\text{dB}$  typ.
- Wide dynamic range:  $S/N \approx 80\text{dB}$  typ.
- Wide frequency response:  $f_i \leq 12\text{KHz}$ .
- Low distortion:  $\text{THD} = 0.5\%$  typ. ( $V_i = 0.78\text{Vrms}$ ).
- Clock frequency range: 10 ~ 100KHz.
- P channel silicon gate process.
- 8-Lead Dual-In-Line Plastic Package.

### Applications

- Reverberation effect of echo microphone and stereo equipment.
- Chorus effect in electronic musical instrument.
- 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	$t_D$	5.12~51.2	ms
Total Harmonic Distortion	THD	0.5	%
Signal to Noise Ratio	S/N	80	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

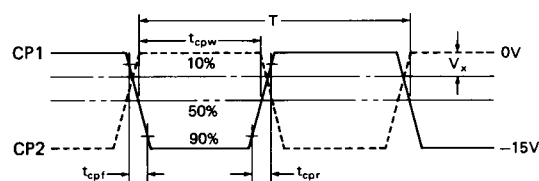
### ■ Operating Conditions (Ta = 25°C)

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	$C_{CP}$				700	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, $V_{DD} = V_{CPL} = -15V$ , $V_{CPH} = 0V$ , $V_{GG} = -14V$ , $R_L = 100k\Omega$ )

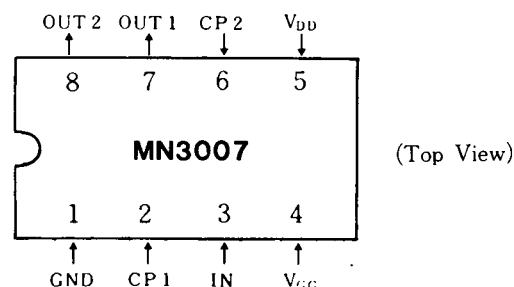
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	$t_D$		5.12		51.2	ms
Input Signal Frequency	$f_i$	$f_{cp} = 40kHz$ , $V_i = 1.5V_{rms}$ , 3dB down (0dB at $f_i = 1kHz$ )	12			kHz
Input Signal Swing	$V_i$	$f_{CP} = 40kHz$ , $f_i = 1kHz$ , THD=2.5%	1.5			Vrms
Insertion Loss	$L_i$	$f_{CP} = 40kHz$ , $f_i = 1kHz$ , $V_i = 1.5V_{rms}$	-4	0	4	dB
Total Harmonic Distortion	THD	$f_{CP} = 40kHz$ , $f_i = 1kHz$ , $V_i = 0.78V_{rms}$		0.5	2.5	%
Noise Voltage	$V_{no}$	$f_{CP} = 100kHz$ Weighted by "A" curve			0.3	mVrms
Signal to Noise Ratio	S/N			80		dB

#### \*1 Clock Pulse Waveforms

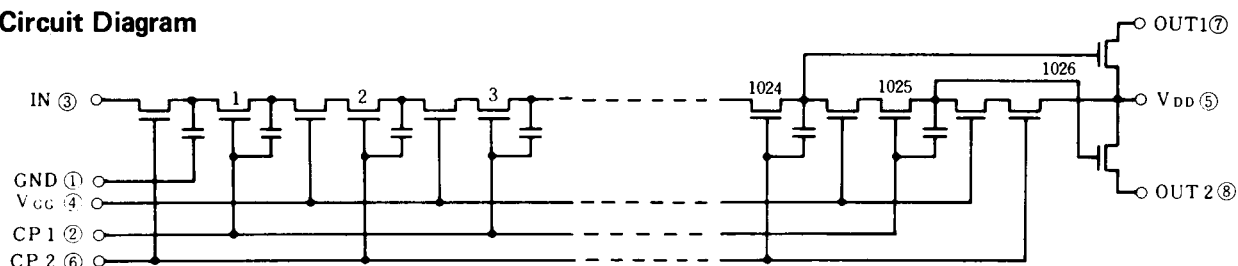


\*2  $T = 1/f_{CP}$  (Clock period)

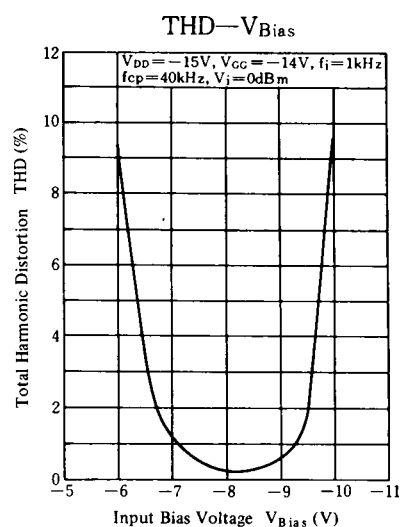
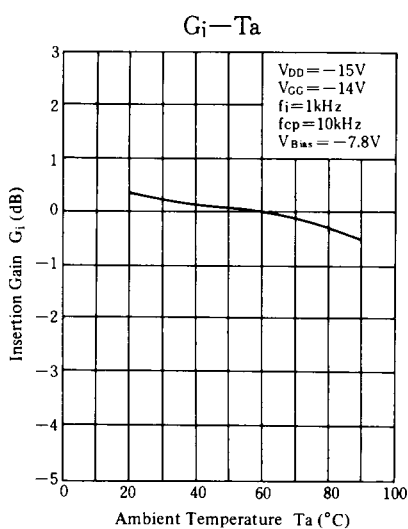
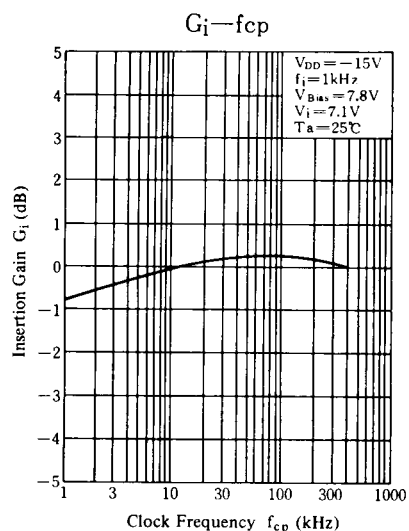
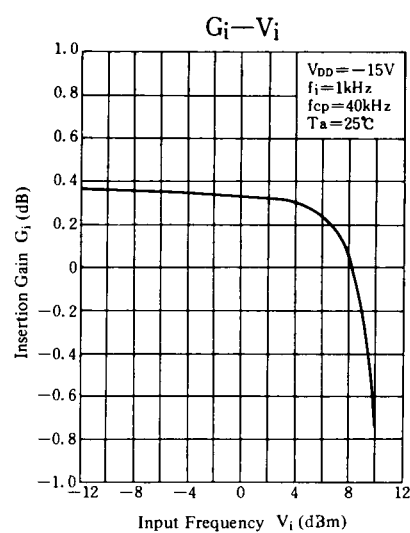
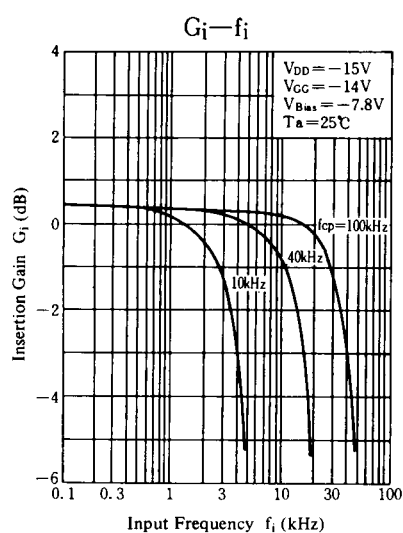
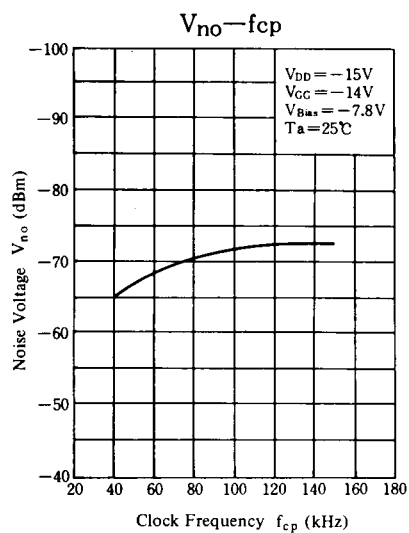
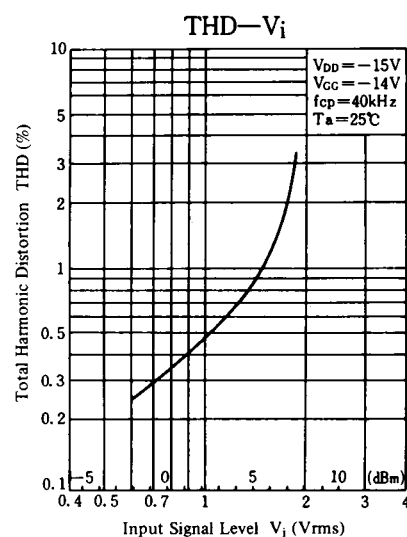
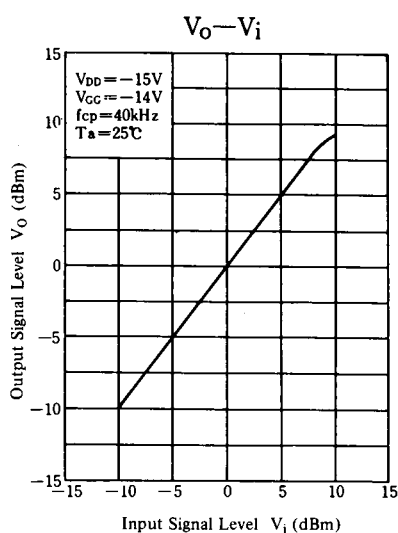
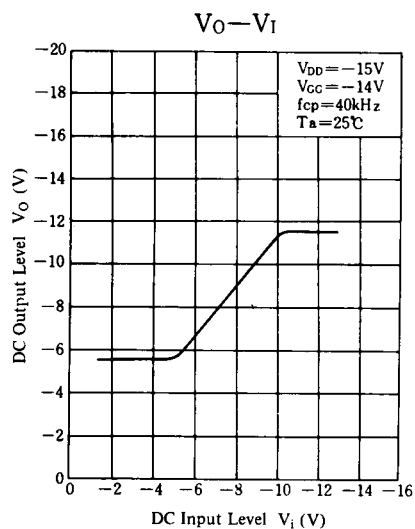
### ■ Terminal Assignments



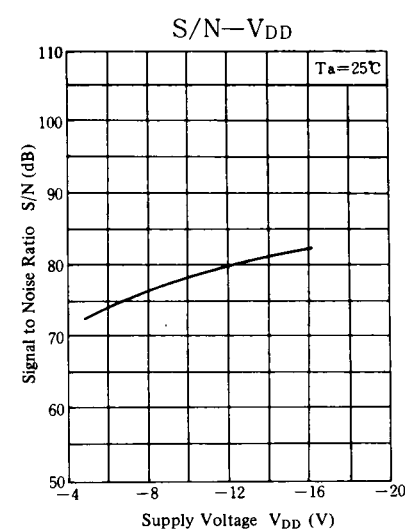
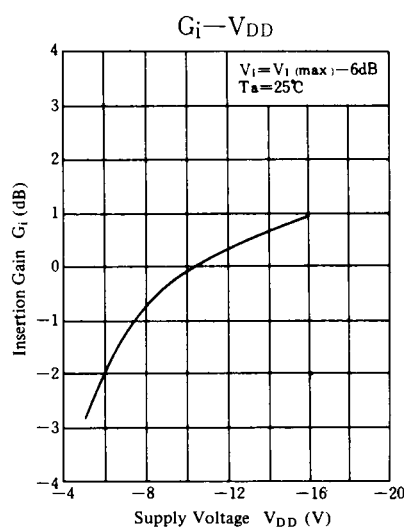
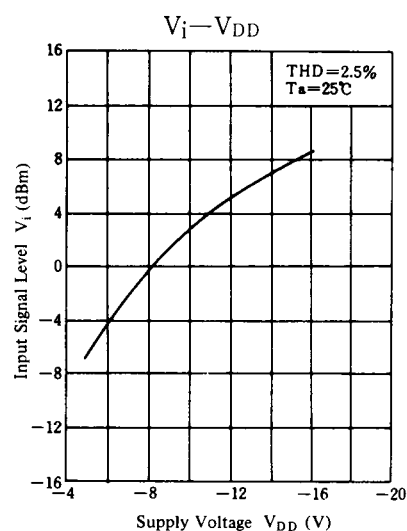
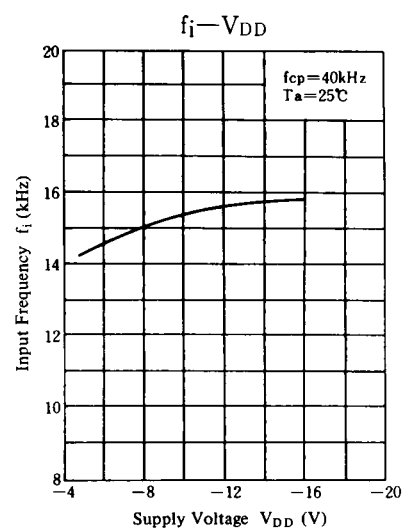
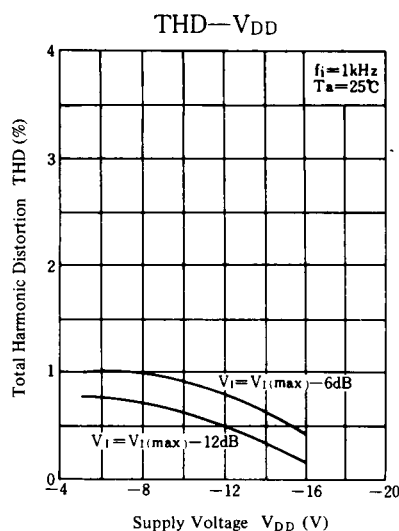
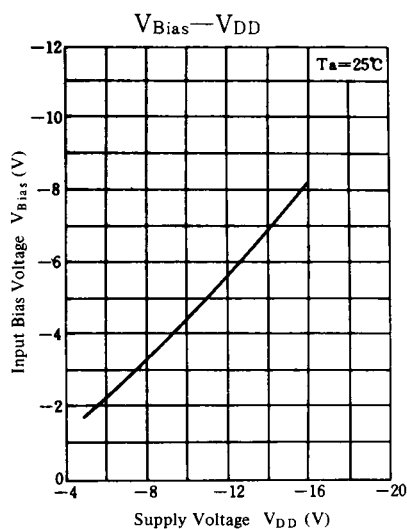
### ■ Circuit Diagram



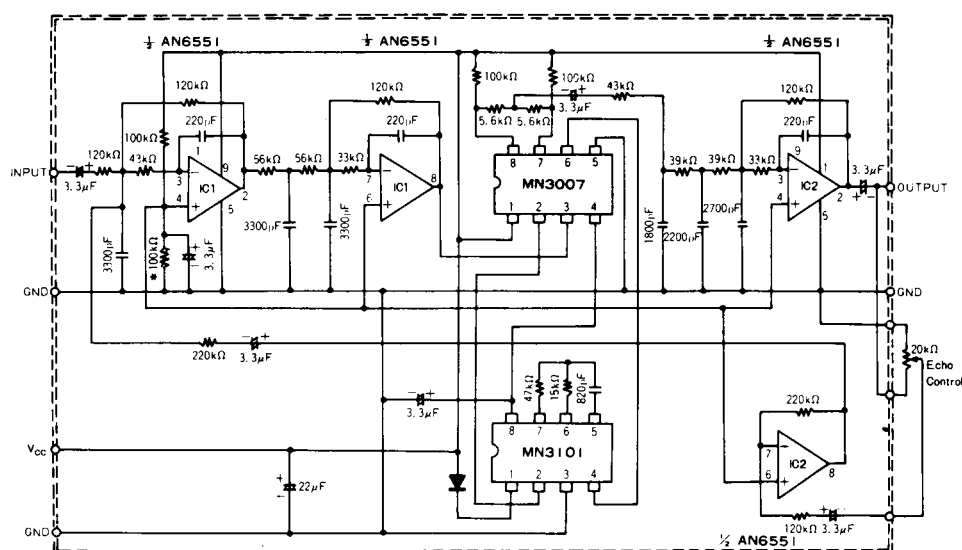
■ Typical Electrical Characteristic Curves



# Supply Voltage Characteristics



# Application Circuit



\* Adjust to minimize distortion (VR 100K typ.)

Echo Effect Generation Circuit (Signal Delay Over 10msec.)