

MN3010

DUAL 512-STAGE LOW NOISE BBD

General description

The MN3010 is a dual 512-stage low noise BBD having a wide dynamic range that provides a signal delay of up to 25.5msec.

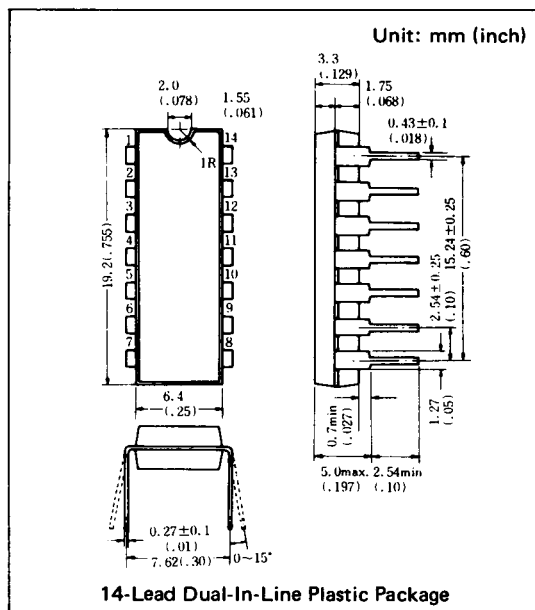
Two 512-stage BBDs are integrated on the same chip which offer uniform characteristics.

Features

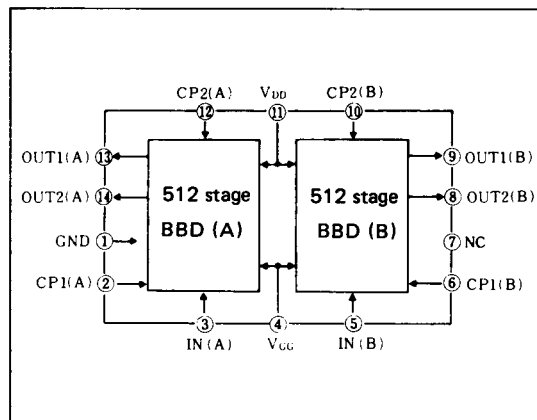
- Variable delay time of audio signals:
 2.56 ~ 25.6ms (512-stage)
 5.12 ~ 51.2ms (512-stage x 2)
- Clock component cancellation capability.
- No insertion loss: $L_i = 0\text{dB typ.}$
- Wide dynamic range: $S/N = 85\text{dB typ.}$
- Wide frequency response: $f_i \leq 12\text{KHz.}$
- Low distortion: $\text{THD} = 0.4\% \text{ typ. (} V_i = 0.78\text{Vrms).}$
- Clock frequency range: $10 \sim 100\text{KHz.}$
- 1024-stage in series connection, and twice as large output in parallel connection.
- P channel silicon gate process.
- 14-Lead Dual-In-Line Plastic Package.

Applications

- Vibrato and/or chorus effects in electronic musical instruments.
- Reverberation effect of electronic musical instruments.
- Variable or fixed delay of analog signals.



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	2.56~51.2	ms
Total Harmonic Distortion	THD	0.4	%
Signal to Noise Ratio	S/N	85	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)

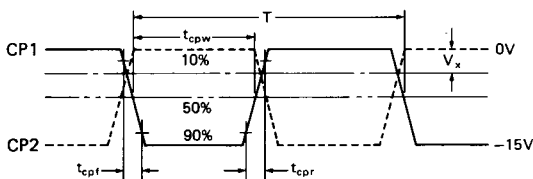
Item	Symbol	Min.	Typ.	Max.	Unit
Drain Supply Voltage	V _{DD}	-14	-15	-16	V
Gate Supply Voltage	V _{GG}		V _{DD} + 1		V
Clock Voltage "H" Level	V _{CPH}	0		-1	V
Clock Voltage "L" Level	V _{CPL}		V _{DD}		V
Clock Input Capacitance	C _{CP}			350	pF
Clock Frequency	f _{CP}	10		100	kHz
Clock Pulse Width *1	t _{cpw}			0.5T*2	
Clock Rise Time *1	t _{opr}			500	ns
Clock Fall Time *1	t _{opf}			500	ns
Clock Cross Point *1	V _x	0		-3	V
Input DC Bias	V _{Bias}	-5		-10	V

*1 T = 1/f_{CP}

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

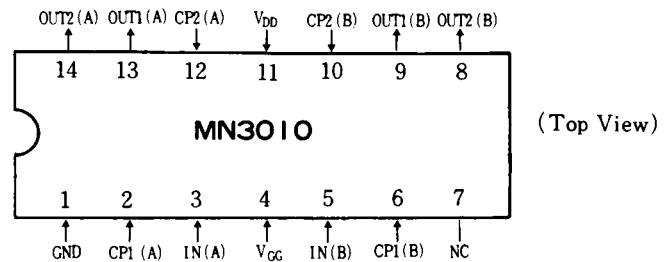
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t _D		2.56		25.6	ms
Input Signal Frequency	f _i	f _{CP} = 40kHz, V _i = 1.8Vrms, 3dB down (0 dB at f _i = 1kHz)	12			kHz
Input Signal Swing	V _i	f _{CP} = 40kHz, f _i = 1 kHz, THD = 2.5%	1.8			Vrms
Insertion Loss	L _i	f _{CP} = 40kHz, f _i = 1 kHz, V _i = 1.8Vrms	-4	0		dB
Total Harmonic Distortion	THD	f _{CP} = 40kHz, f _i = 1 kHz, V _i = 0.78Vrms		0.4		%
Noise Voltage	V _{no}	f _{CP} = 100kHz, weighted by "A" curve			0.21	mVrms
Signal to Noise Ratio	S/N	Maximum output voltage to noise voltage		85		dB

*1 Clock Pulse Waveforms

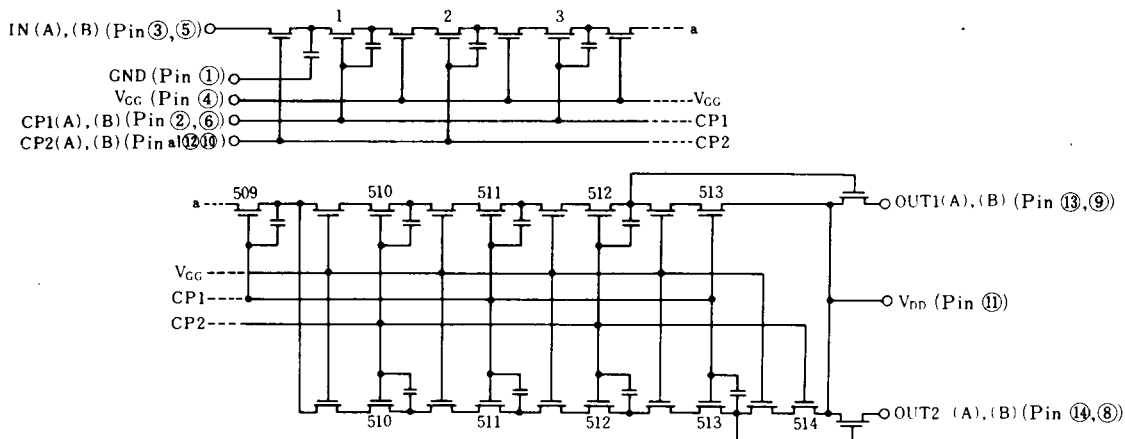


*2 T = 1/f_{CP} (Clock period)

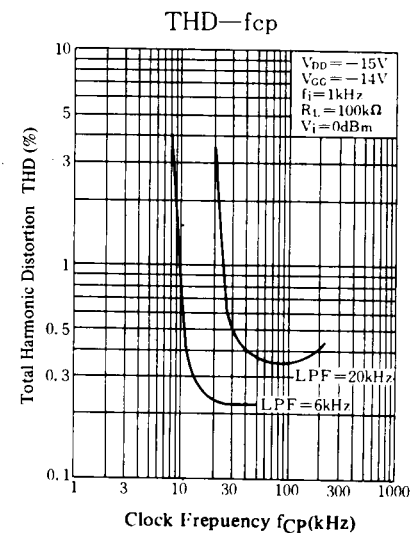
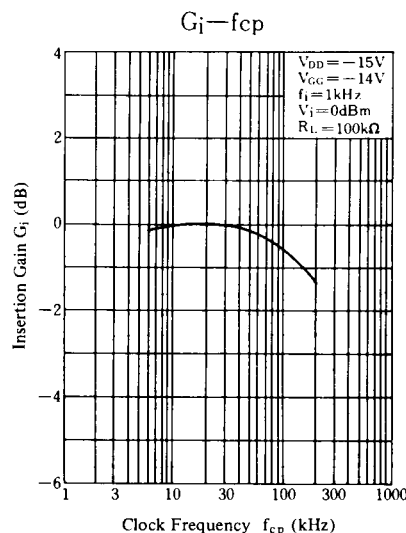
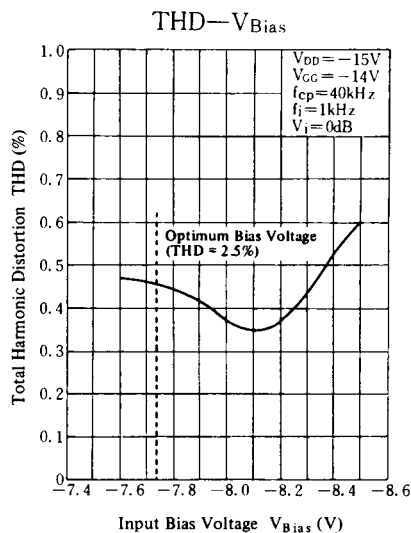
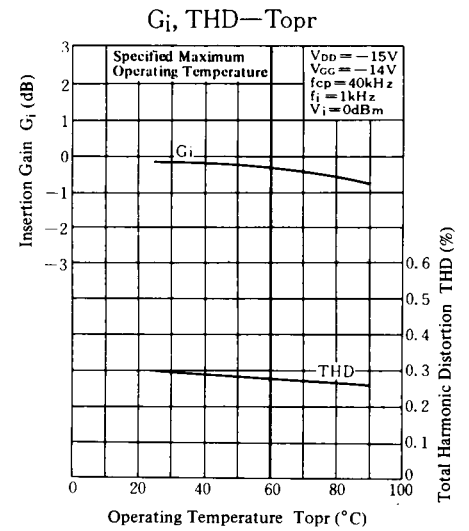
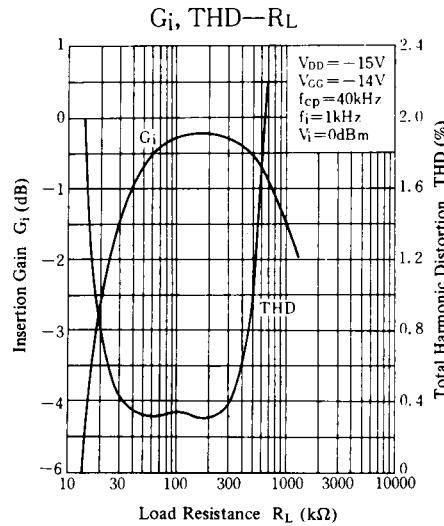
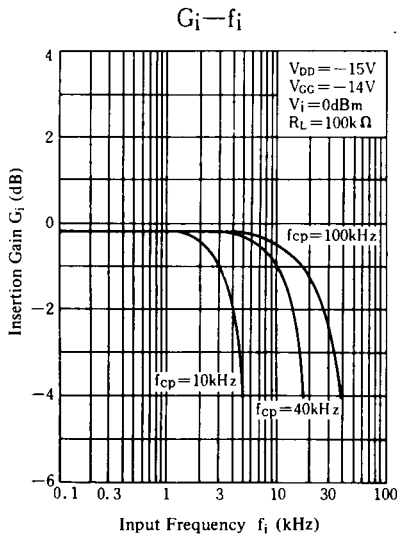
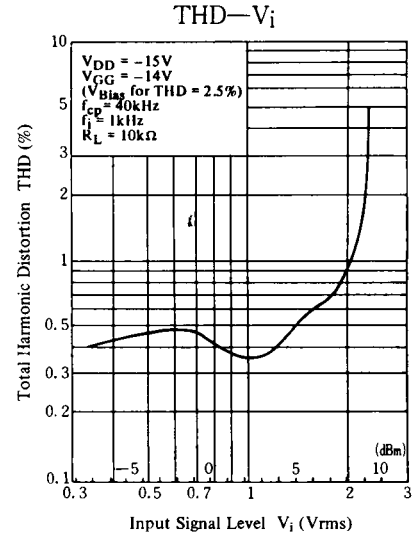
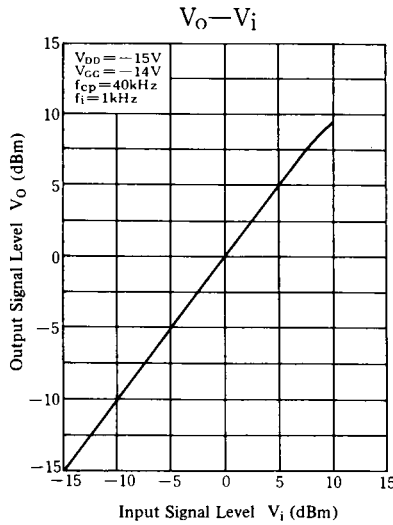
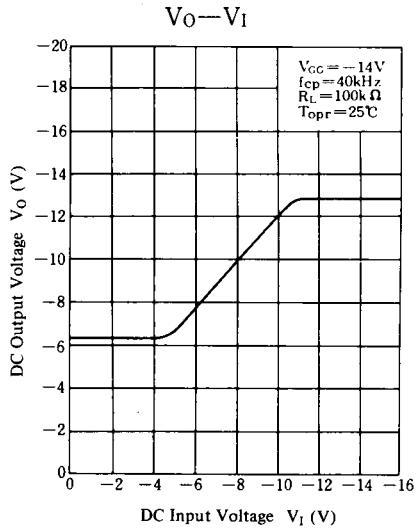
■ Terminal Assignments



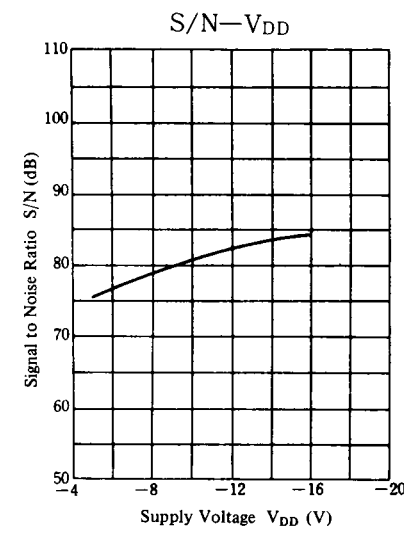
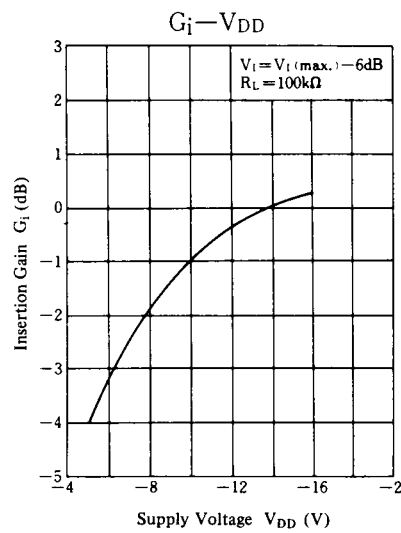
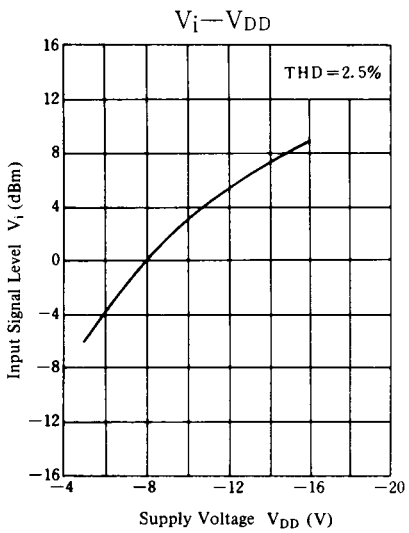
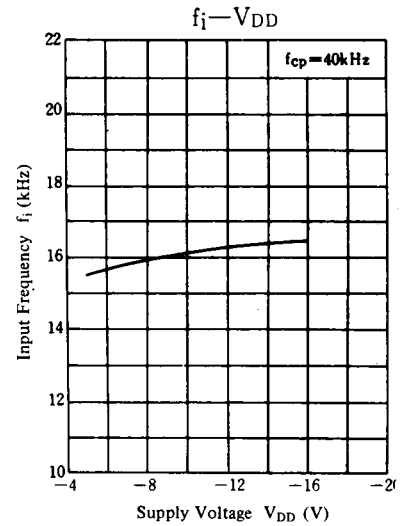
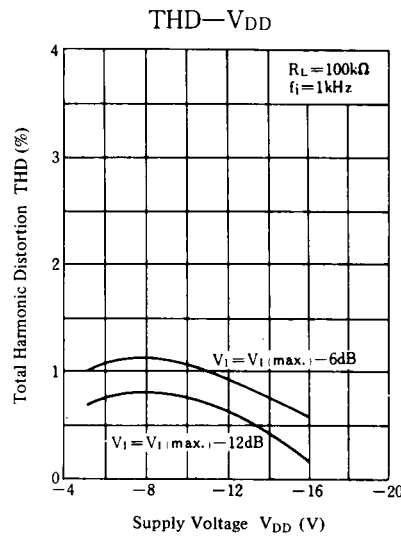
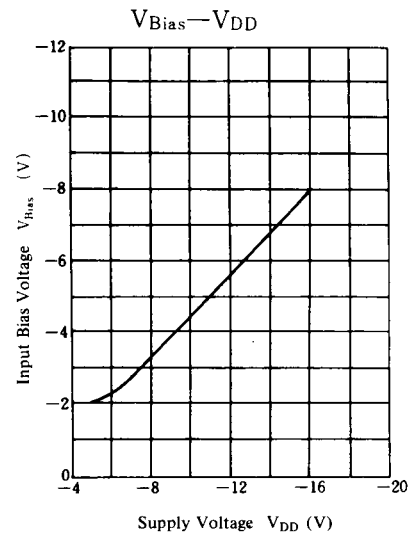
■ Circuit Diagram



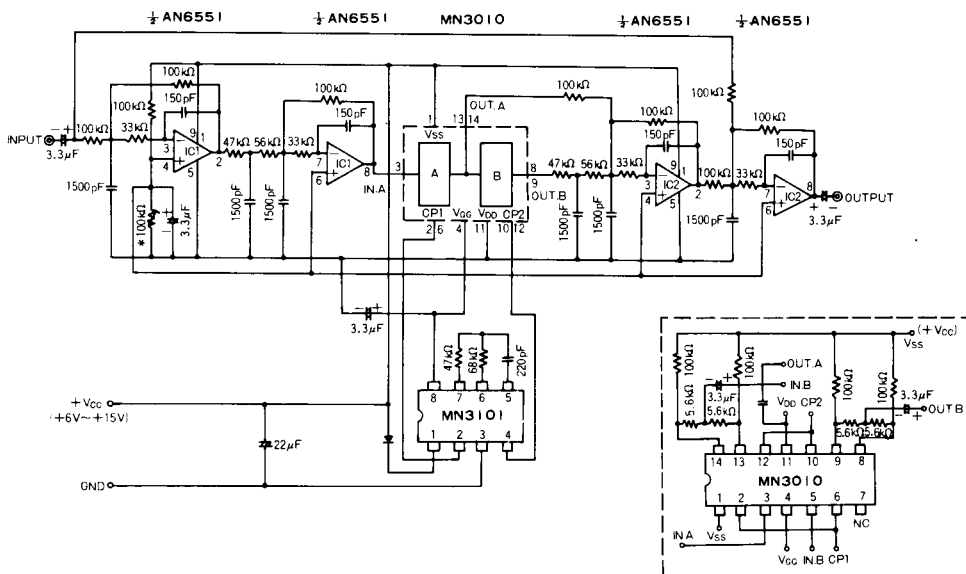
■ Typical Electrical Characteristic Curves



Supply Voltage Characteristics



Application Circuit



Chorus Effect Generation Circuit (Incorporating Clock Generator)