

MN3210

DUAL 512-STAGE LOW VOLTAGE OPERATION LOW NOISE BBD

General description

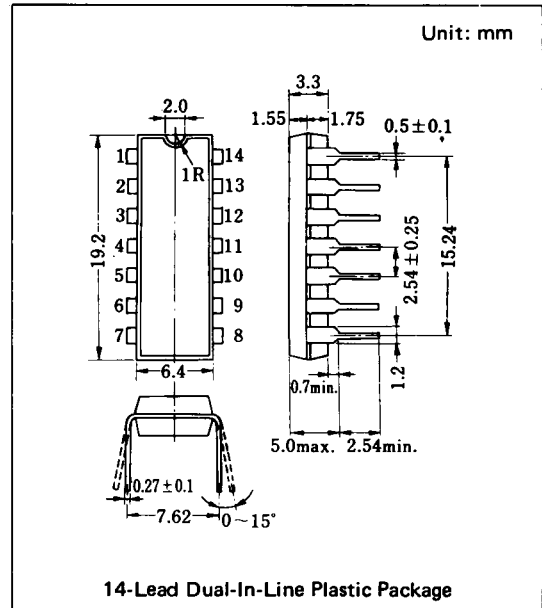
The MN3210 is a dual 512-stage BBD that provides a signal delay of up to 51.2ms and is particularly suitable as a device for generation of reverberation effect of audio equipments such as low voltage operation portable stereo and radio cassette recorders, etc.

Features

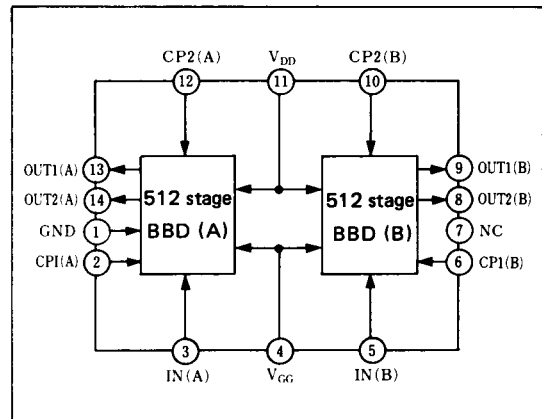
- Variable delay of audio signals:
 1.28ms ~ 25.6ms (512-stage)
 2.56ms ~ 51.2ms (512-stage x 2)
- Wide supply voltage: 4 ~ 10V.
- No insertion loss: $L_i = 0\text{dB typ.}$
- Wide dynamic range: $S/N = 77\text{dB typ.}$
- Low distortion: $\text{THD} = 0.4\% \text{ typ. (} V_i = 0.25\text{Vrms).}$
- Clock frequency range: 10KHz ~ 200 KHz.
- N-channel silicon gate process.
- 14-lead dual-in-line plastic package.

Applications

- Reverberation and echo effect 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 in 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}	+ 5, $\frac{1}{3}V_{DD}$	V
Signal Delay Time	t_D	1.28~25.6, 2.56~51.2	ms
Total Harmonic Distortion	THD	0.4	%
Signal to Noise Ratio	S/N	77	dB

■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Terminal Voltage	$V_{DD}, V_{GG}, V_{CP}, V_i$	-0.3~+11	V
Output Voltage	V_o	-0.3~+11	V
Operating Temperature	T_{opr}	-20~+60	°C
Storage Temperature	T_{stg}	-55~+125	°C

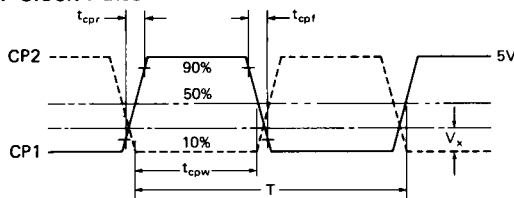
■ Operating Condition (Ta = 25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain Supply Voltage	V_{DD}		+4	+5	+10	V
Gate Supply Voltage	V_{GG}			$\frac{14}{15} V_{DD}$		V
Clock Voltage "H" Level	V_{CPH}			V_{DD}		V
Clock Voltage "L" Level	V_{CPL}		0		+1	V
Clock Frequency	f_{CP}		10		200	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}				350	pF
Clock Cross Point *1	V_X		0		$0.3V_{CPH}$	V

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

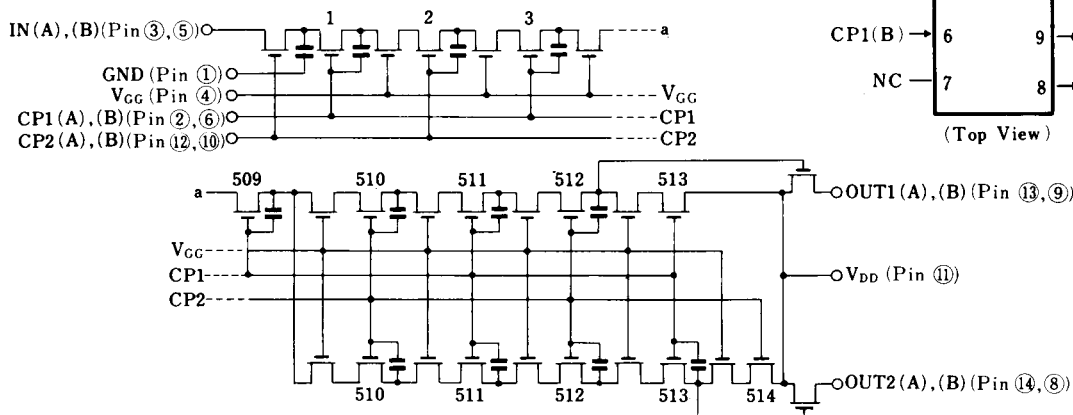
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t_D	512 stage	1.28		25.6	ms
		512 stage x 2	2.56		51.2	ms
Input Signal Frequency	f_i	$f_{CP} = 40kHz, \text{Output Attenuation} \leq 3dB$	12			kHz
Input Signal Swing	V_i	THD=2.5%	0.5			Vrms
Insertion Loss	L_i	$f_{CP}=40kHz, f_i=1kHz$	-4	0	4	dB
Total Harmonic Distortion	THD	$f_{CP}=40kHz, f_i=1kHz, V_i=0.25V_{rms}$		0.4	2.5	%
Noise Voltage	V_{no}	$f_{CP} = 100kHz, \text{Weighted by "A" curve}$			0.14	mVrms
Signal to Noise Ratio	S/N			77		dB

*1 Clock Pulse Waveforms

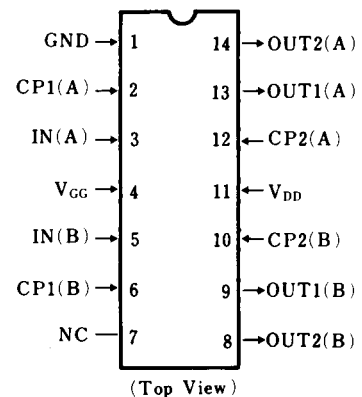


*2 $T = 1/f_{CP}$ (Clock Period)

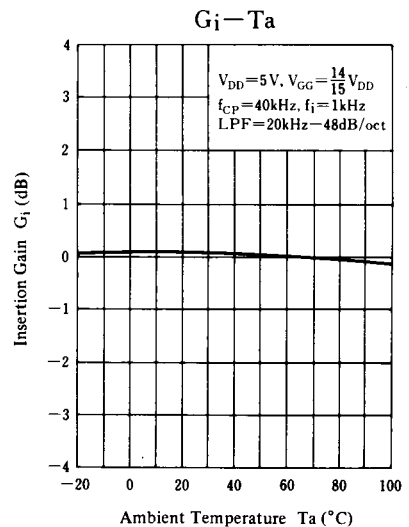
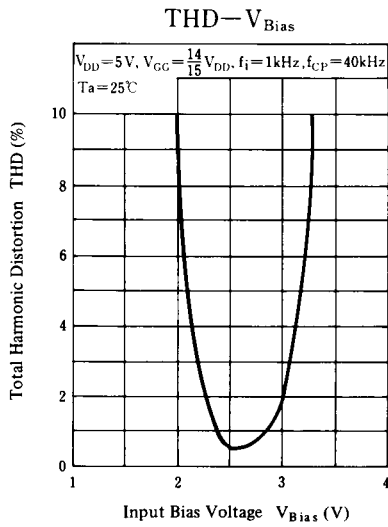
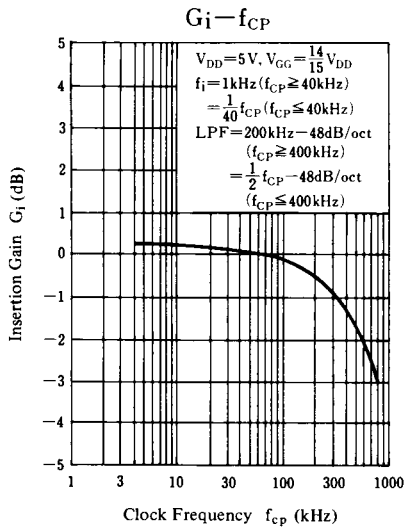
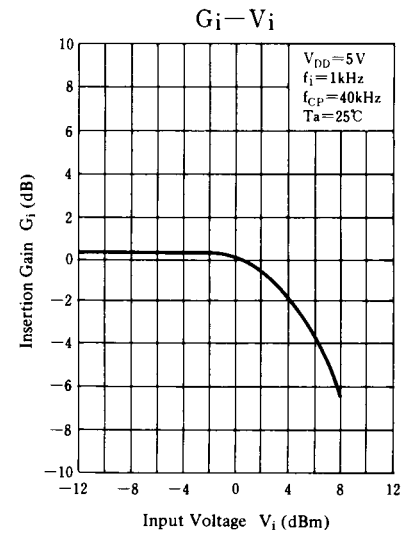
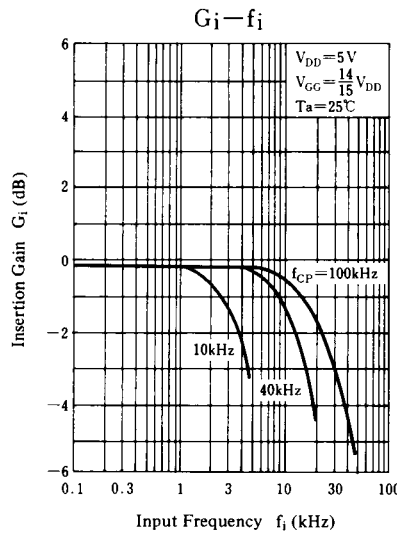
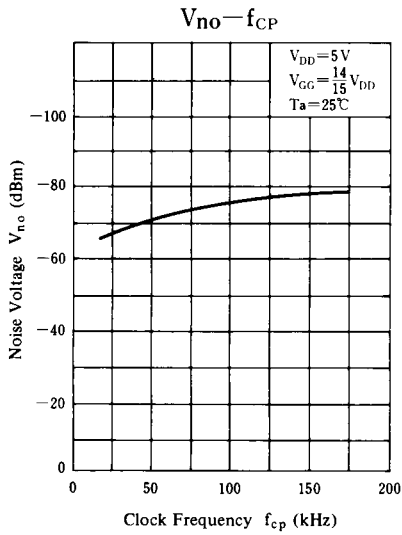
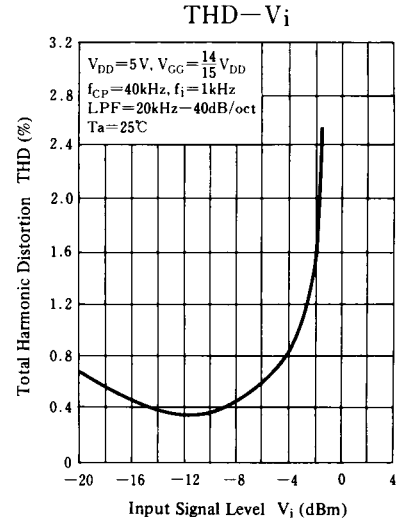
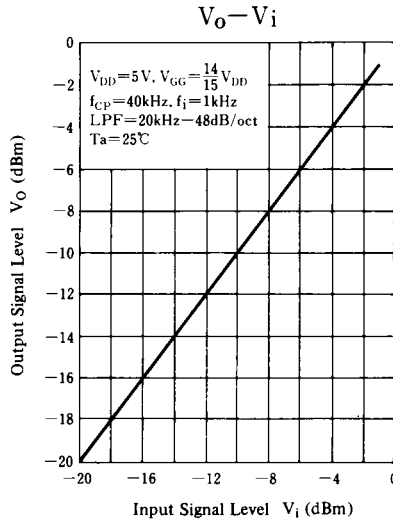
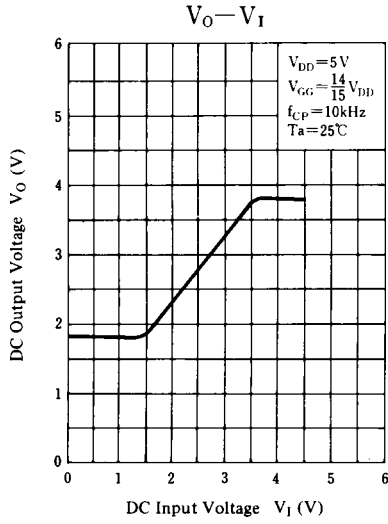
■ Circuit Diagram

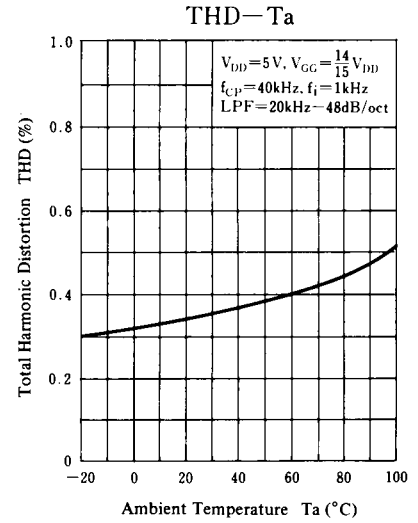
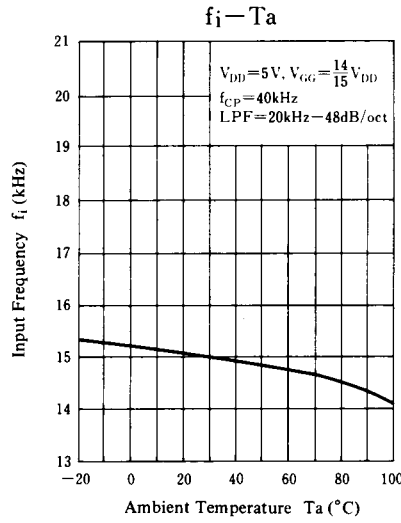
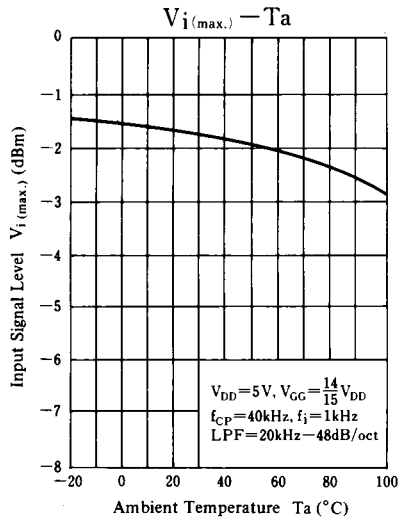


■ Terminal Assignments

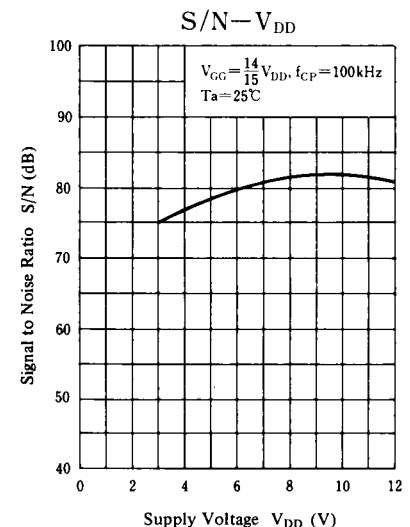
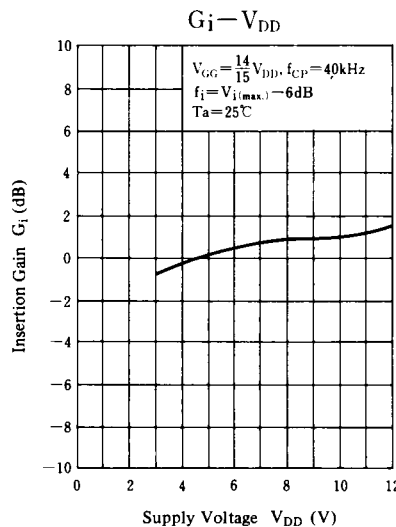
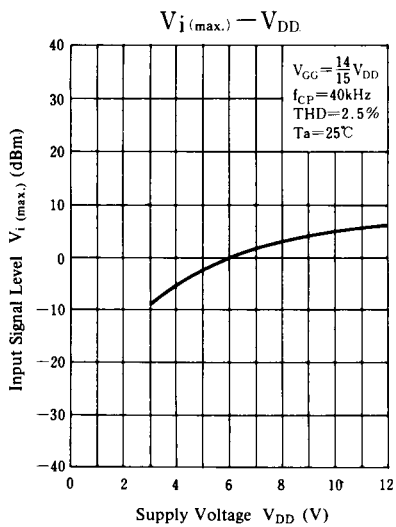
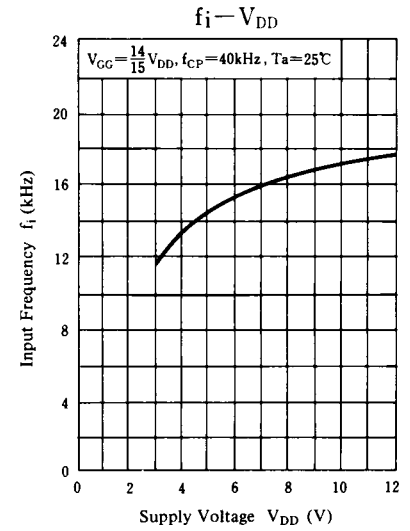
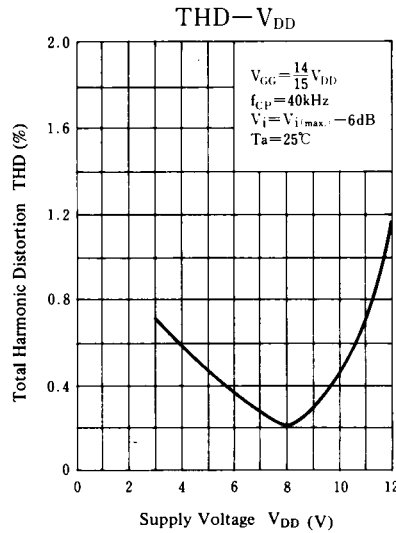
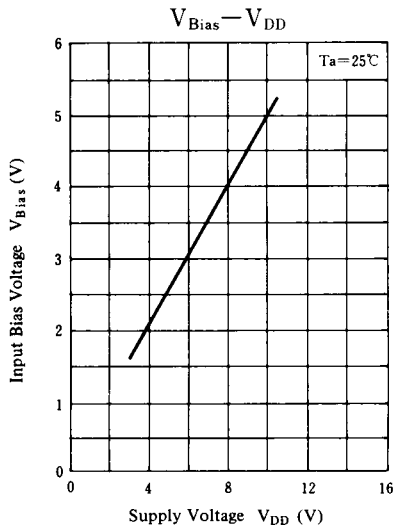


Typical Electrical Characteristic Curves

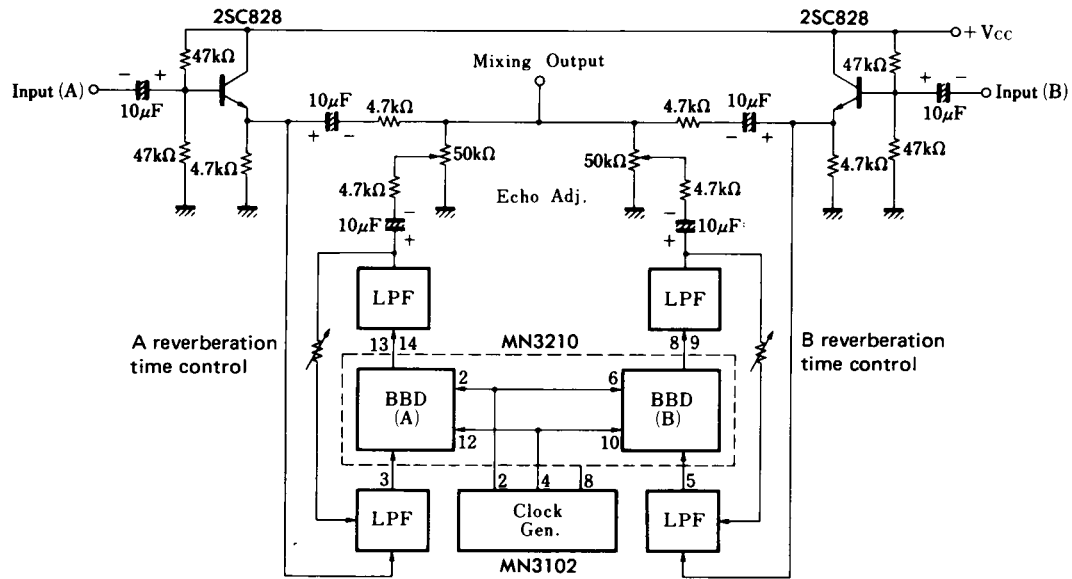




Supply Voltage Characteristics



■ Application Circuit



Duet Circuit