

MN3204

512-STAGE LOW VOLTAGE OPERATION LOW NOISE BBD

General description

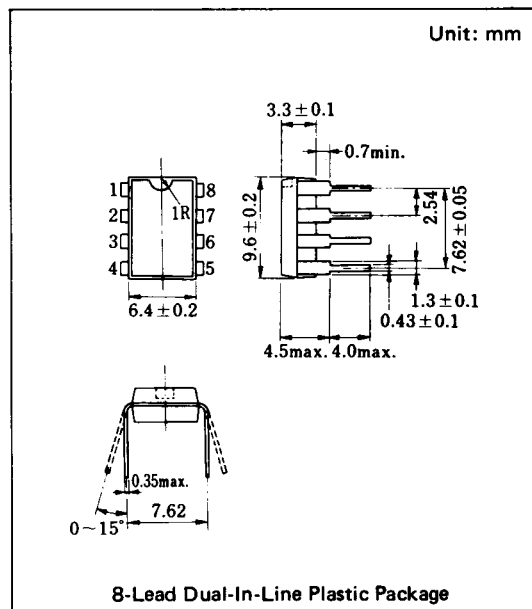
The MN3204 is a 512-stage low voltage operation ($V_{DD} = 5V$) low noise BBD that provides a signal delay of up to 25.6ms and is suitable for use as reverberation effect of low voltage operation audio equipments such as portable stereo and radio cassette recorders.

Features

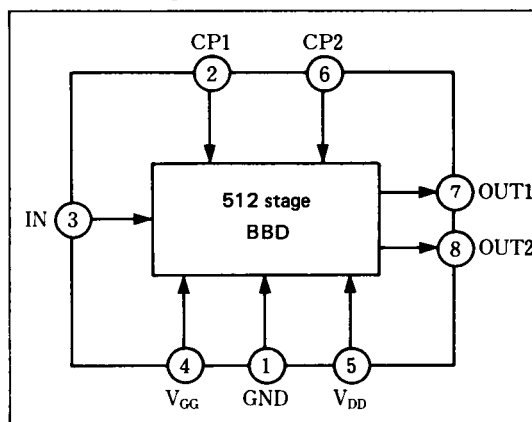
- Variable signal delay of the audio signal: 1.26ms ~ 25.6ms.
- Wide range of source voltage: 4 ~ 10V.
- No insertion loss: $L_i = 0dB$ typ.
- Wide dynamic range: $S/N = 77dB$ typ.
- Low distortion: $THD = 0.4\%$ typ. ($V_i = 0.25V_{rms}$).
- Clock frequency range: 10KHz ~ 200KHz.
- N channel silicon gate process.
- 8-Lead Dual-In-Line Plastic Package.

Applications

- Reverberation and echo effects of audio equipments such as radio cassette recorder, portable radio, portable stereo, echo microphone and pre-taped musical accompaniment (Karaoke), etc.
- Sound 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}	$+5, \frac{1}{18} V_{DD}$	V
Signal Delay Time	t_D	1.28 ~ 25.6	ms
Total Harmonic Distortion	THD	0.4	%
Signal to Noise Ratio	S/N	77	dB

Absolute Maximum Ratings (Ta = 25°C)

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

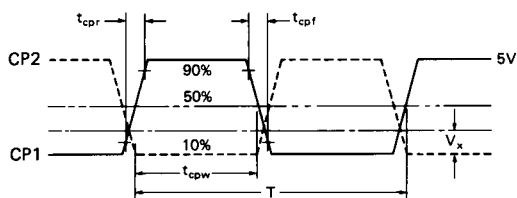
Operating Condition (Ta = 25°C)

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, $V_{DD} = V_{CPH} = 5V$, $V_{CPL} = 0V$, $V_{GG} = 14/15 V_{DD}$, $R_L = 100k\Omega$)

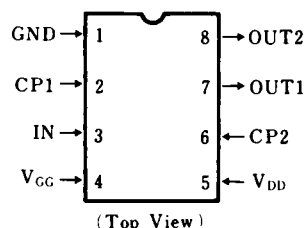
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t_D		1.28		25.6	ms
Input Signal Frequency	f_i	$f_{CP} = 40kHz$, Output -3dB down	12			kHz
Input Signal Swing	V_i	THD=2.5%	0.5			Vrms
Insertion Loss	L_i	$f_{CP}=40kHz$, $f_i=1kHz$	-4	0	4	dB
Total Harmonic Distortion	THD	$f_{CP}=40kHz$, $f_i=1kHz$,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

*1 Clock Pulse Waveforms

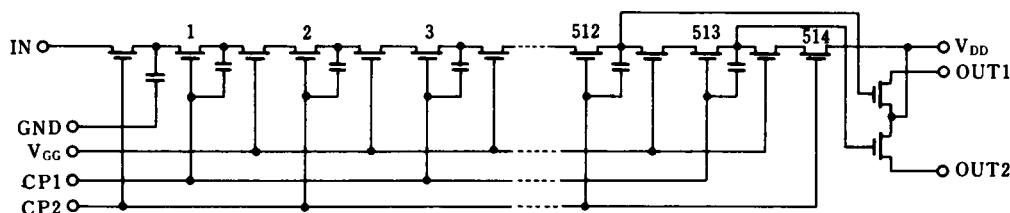


*2 $T = 1/f_{CP}$ (Clock Period)

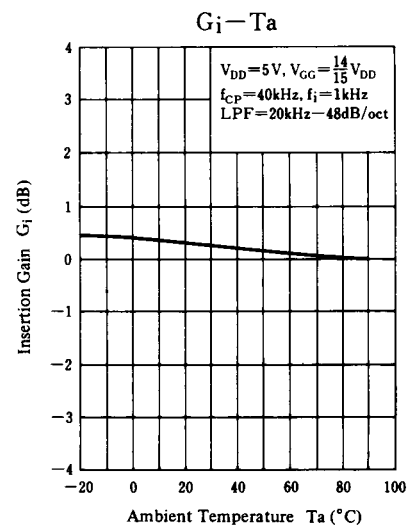
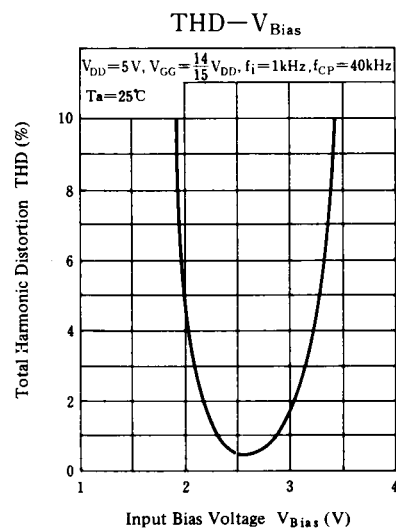
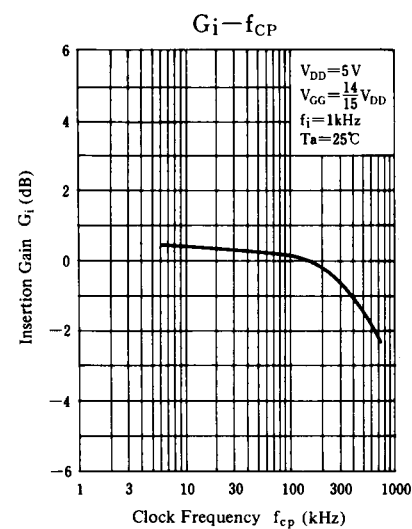
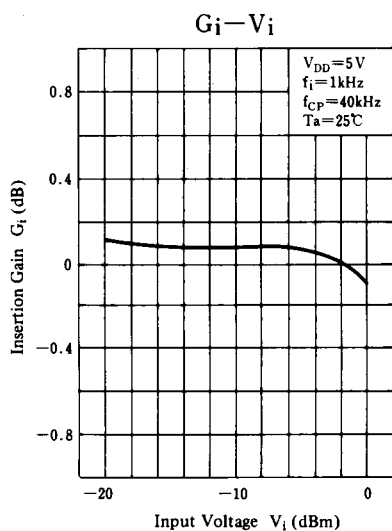
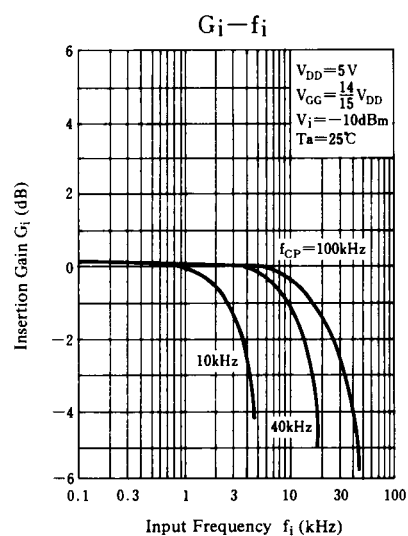
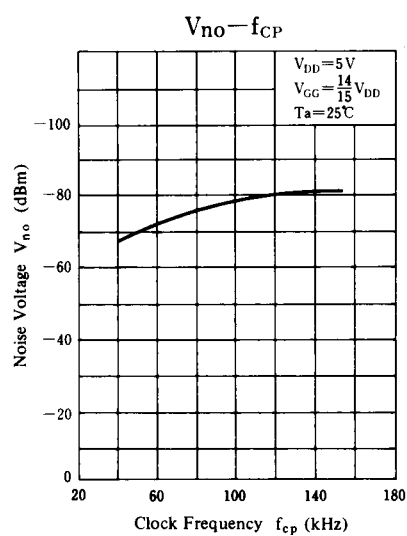
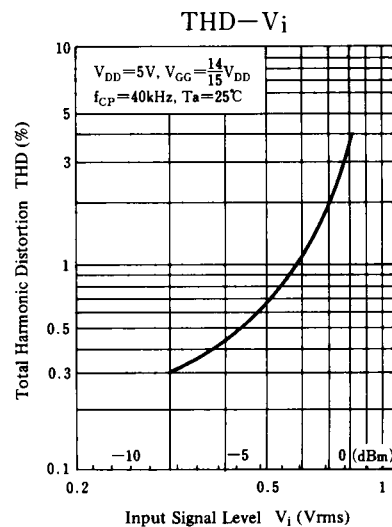
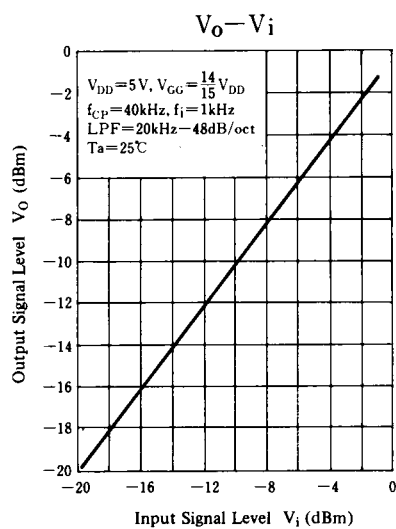
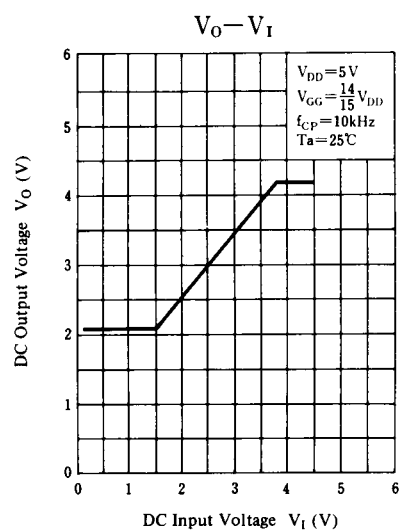
Terminal Assignments

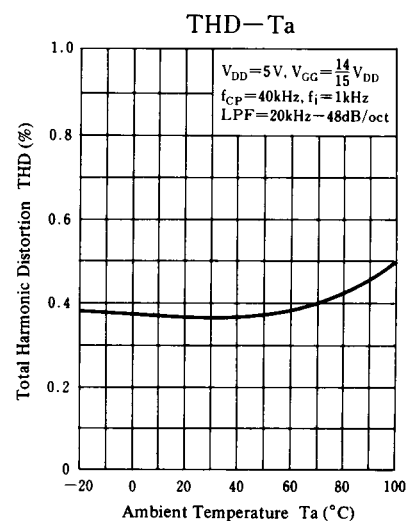
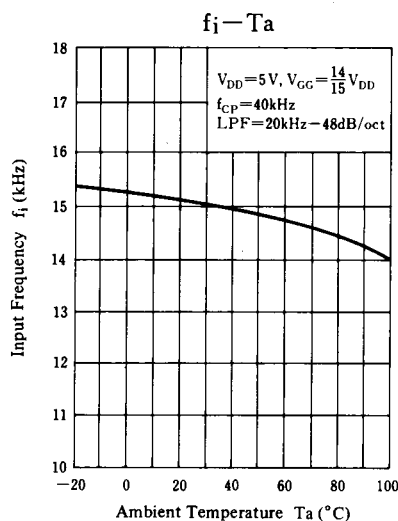
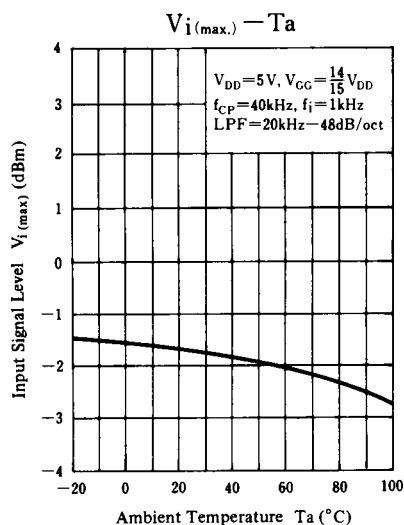


Circuit Diagram

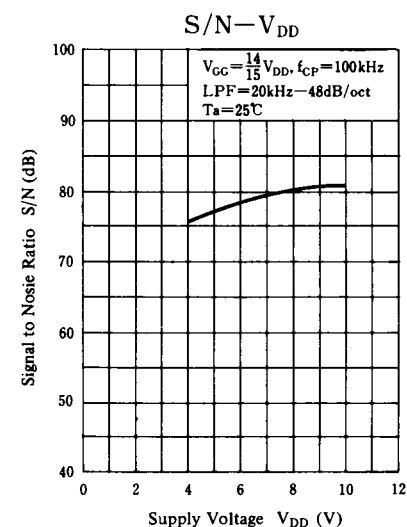
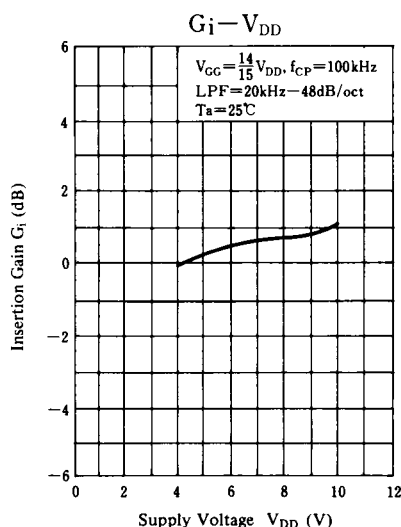
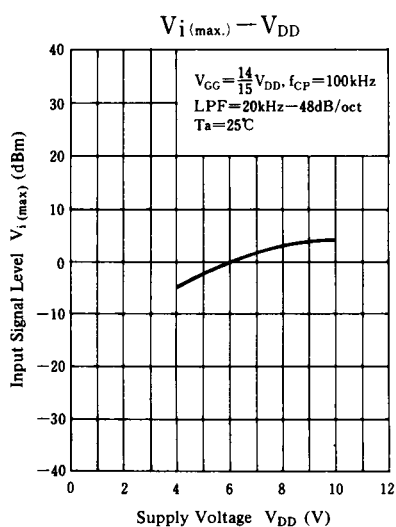
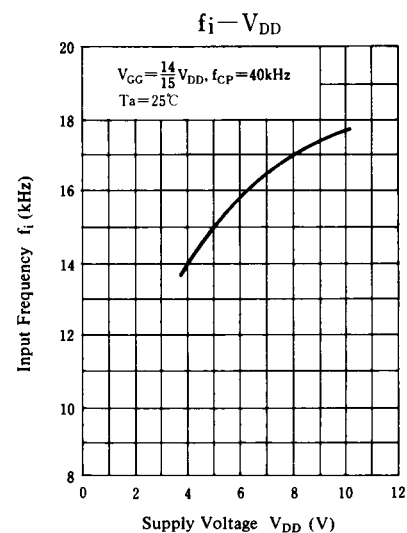
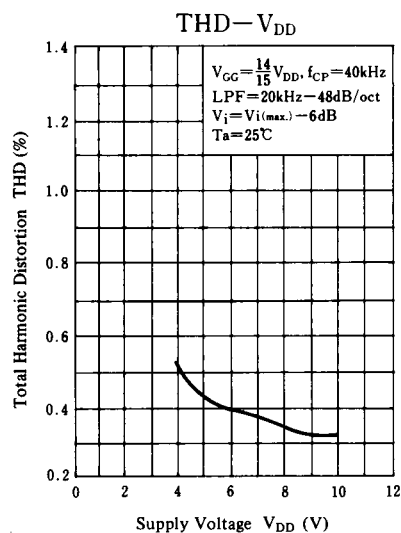
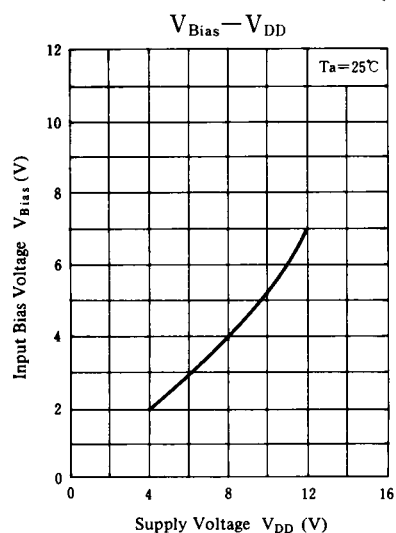


■ Typical Electrical Characteristic Curves

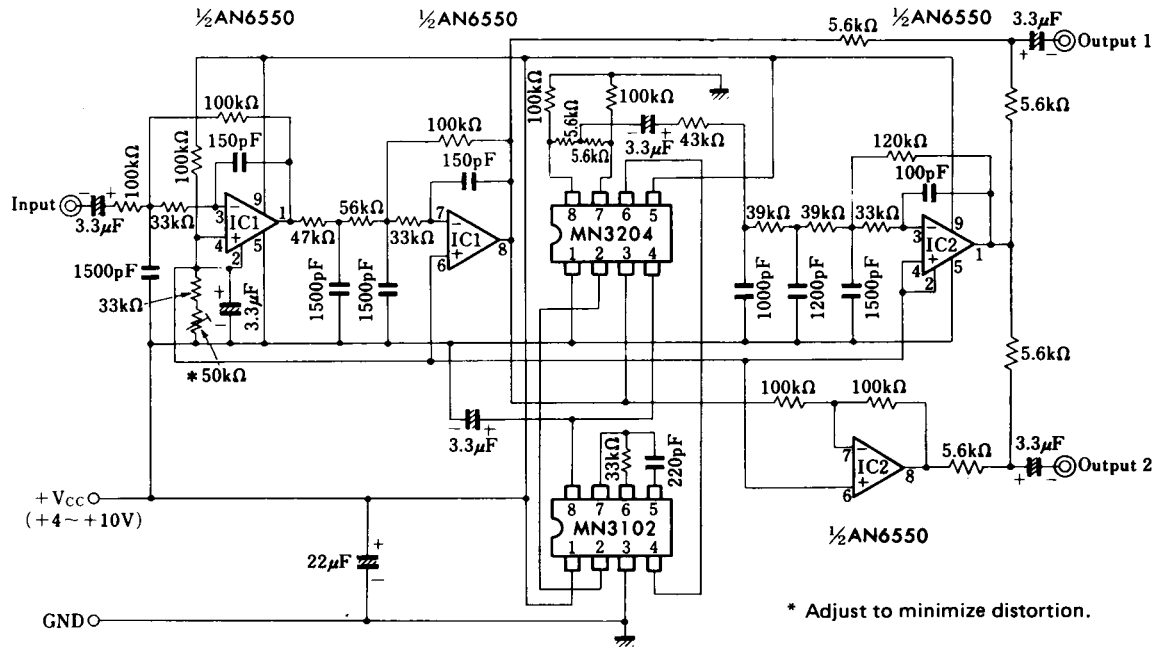




Supply Voltage Characteristics



■ Application Circuit



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