

# MN3208

## 2048-STAGE LOW VOLTAGE OPERATION LOW NOISE BBD

### General description

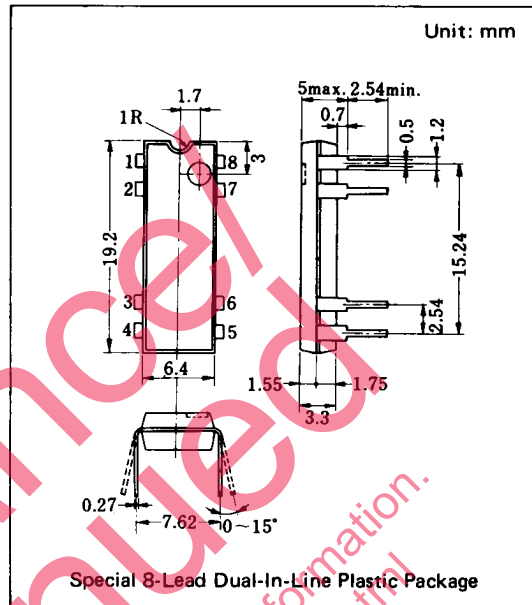
The MN3208 is a 2048-stage low voltage operation ( $V_{DD} = 5V$ ) low noise BBD that provides a signal delay of up to 102.4ms and is suitable as a device for generation of reverberation effect of audio equipment such as stereo equipments.

### Features

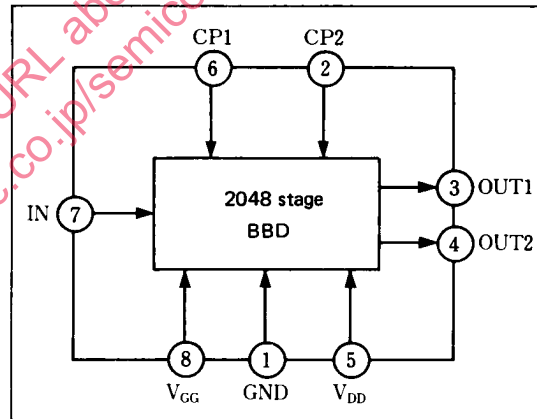
- Variable delay of audio signals: 10.24ms ~ 102.4ms.
- Wide supply voltage: 4 ~ 10V.
- Clock component cancellation capability.
- No insertion loss:  $L_i = 0dB$  typ.
- Wide dynamic range:  $S/N = 71dB$  typ.
- Low distortion:  $THD = 0.5\%$  typ. ( $V_i = 0.25V_{rms}$ )
- N-channel silicon gate process.
- Special 8-lead dual-in-line plastic package.

### Applications

- Reverberation and echo effects 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.
- Telephone time compression and delay line for voice communication system.



### 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	$t_D$	10.24~102.4	ms
Total Harmonic Distortion	THD	0.5	%
Signal to Noise Ratio	S/N	71	dB

■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Ratings	Unit
Terminal Voltage	V <sub>DD</sub> , V <sub>GG</sub> , V <sub>CP</sub> , V <sub>I</sub>	-0.3~+11	V
Output Voltage	V <sub>O</sub>	-0.3~+11	V
Operating Temperature	T <sub>opr</sub>	-20~+60	°C
Storage Temperature	T <sub>stg</sub>	-55~+125	°C

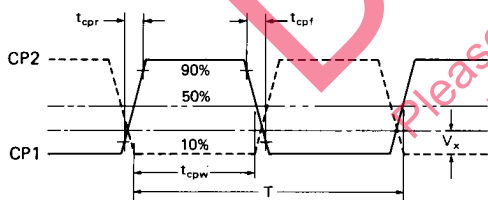
■ Operating Condition (Ta = 25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain Supply Voltage	V <sub>DD</sub>		+4	+5	+10	V
Gate Supply Voltage	V <sub>GG</sub>			$\frac{14}{15} V_{DD}$		V
Clock Voltage "H" Level	V <sub>CPH</sub>			V <sub>DD</sub>		V
Clock Voltage "L" Level	V <sub>CPL</sub>		0		+1	V
Clock Frequency	f <sub>CP</sub>		10		100	kHz
Clock Pulse Width *1	t <sub>CPW</sub>				0.5T *2	
Clock Rise Time *1	t <sub>CPr</sub>				500	ns
Clock Fall Time *1	t <sub>CPf</sub>				500	ns
Clock Input Capacitance	C <sub>CP</sub>				1400	pF
Clock Cross Point *1	V <sub>X</sub>		0		0.3V <sub>CPH</sub>	V

■ Electrical Characteristics (Ta=25°C, V<sub>DD</sub>=V<sub>CPH</sub>=+5V, V<sub>CPL</sub>=0V, V<sub>GG</sub>= $\frac{14}{15} V_{DD}$ , R<sub>L</sub>=100kΩ)

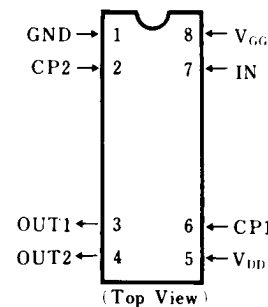
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t <sub>d</sub>		10.24		102.4	ms
Input Signal Frequency	f <sub>i</sub>	f <sub>CP</sub> =40kHz, 3dB down (0dB at f <sub>i</sub> =1kHz)	9			kHz
Input Signal Swing	V <sub>i</sub>	THD=2.5%	0.36			Vrms
Insertion Loss	L <sub>i</sub>	f <sub>CP</sub> =40kHz, f <sub>i</sub> =1kHz	-4	0	4	dB
Total Harmonic Distortion	THD	f <sub>CP</sub> =40kHz, f <sub>i</sub> =1kHz, V <sub>i</sub> =0.25Vrms		0.5	2.5	%
Noise	V <sub>no</sub>	f <sub>CP</sub> =100kHz Weighted by "A" curve			0.3	mVrms
Signal To Noise Ratio	S/N			71		dB

\*1 Clock Pulse Waveforms

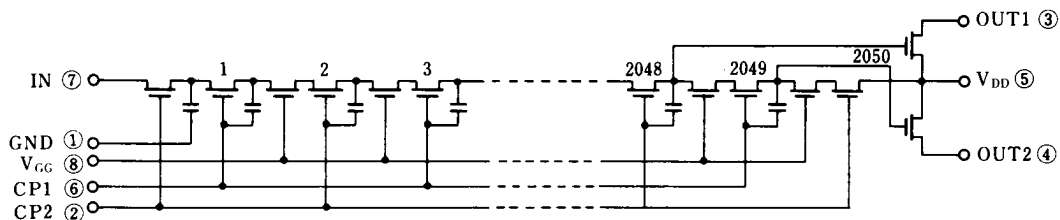


\*2 T = 1/f<sub>CP</sub> (Clock Period)

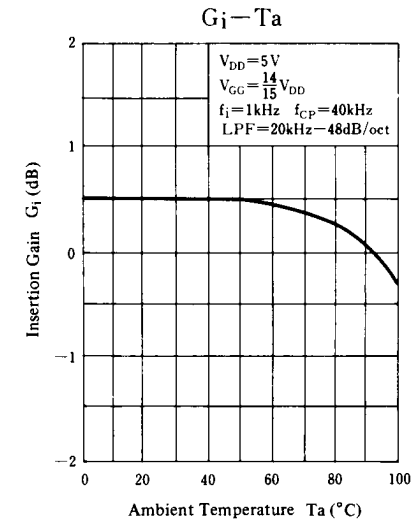
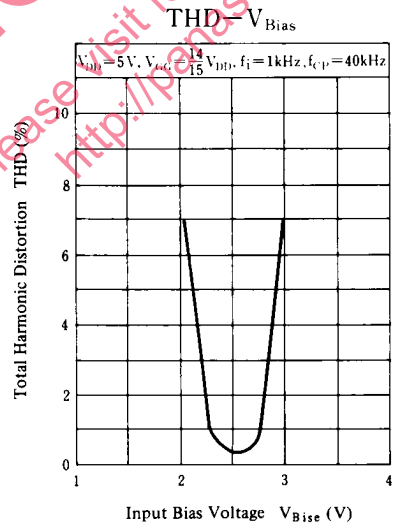
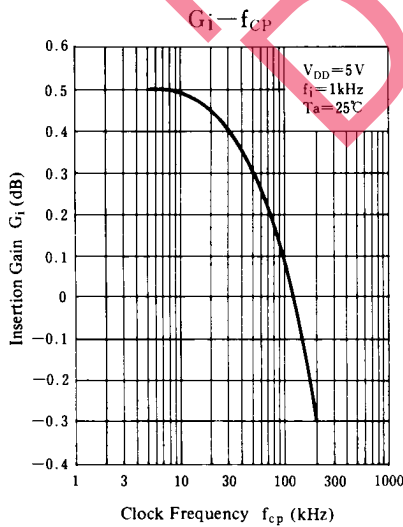
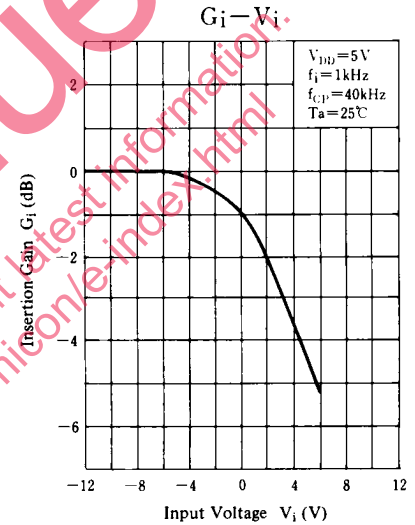
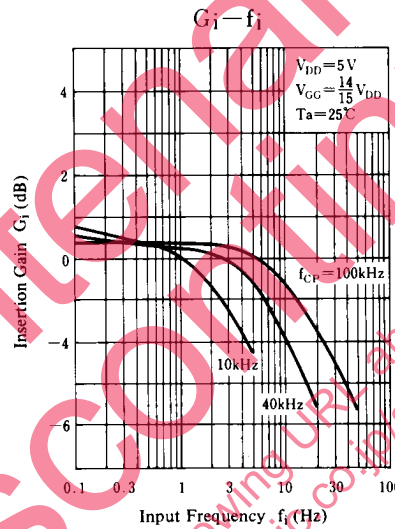
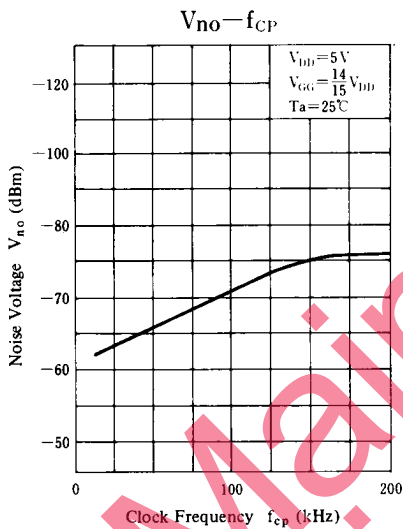
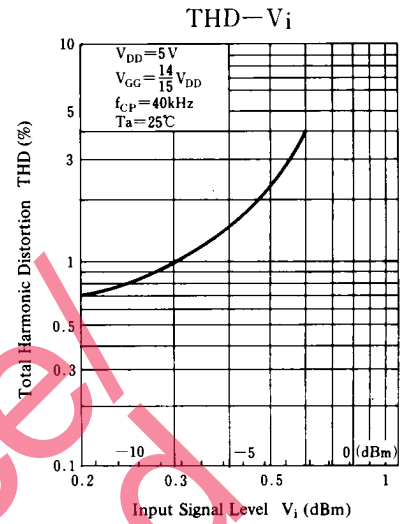
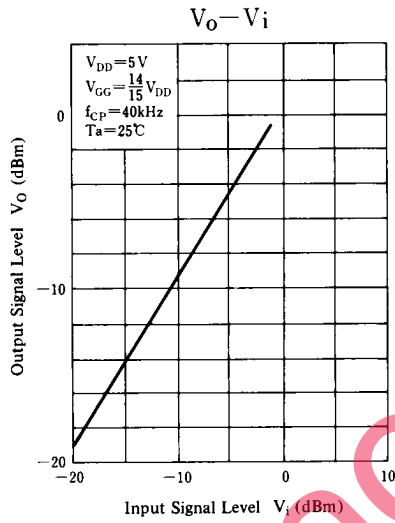
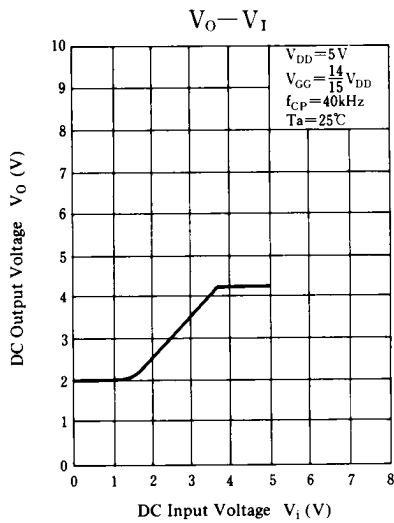
■ Terminal Assignments

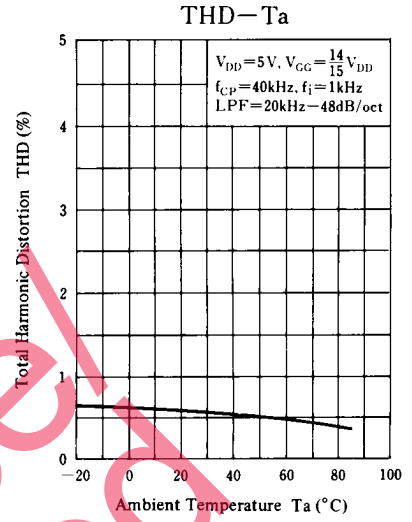
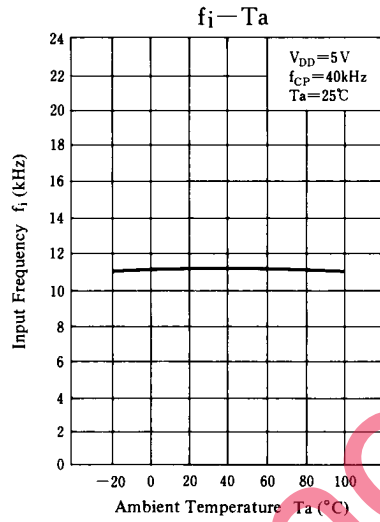
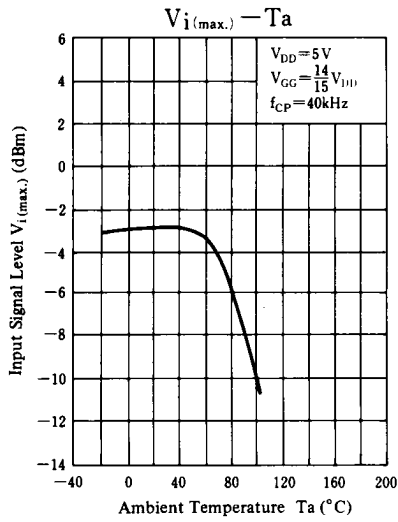


■ Circuit Diagram

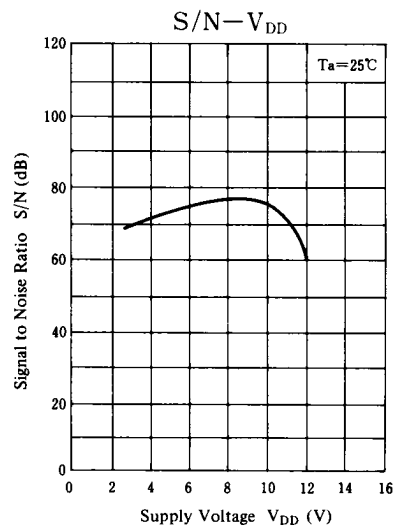
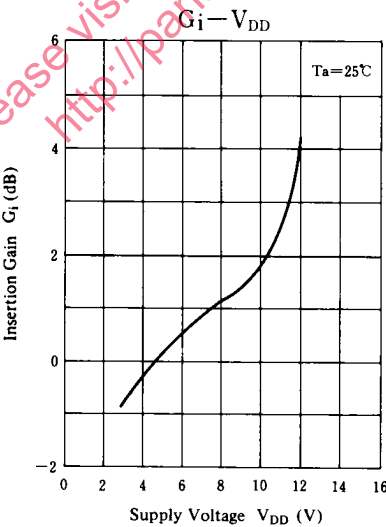
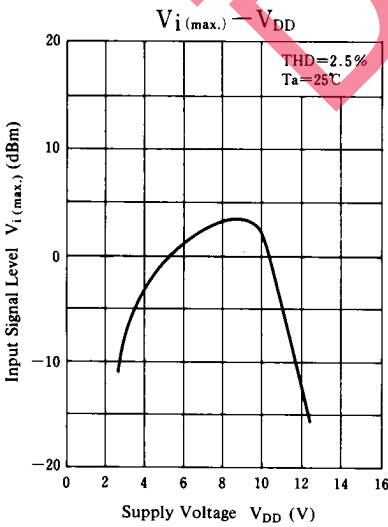
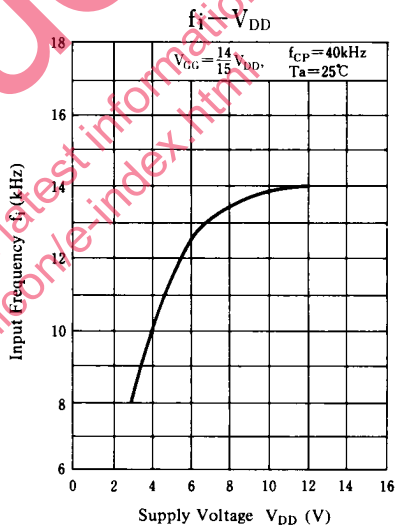
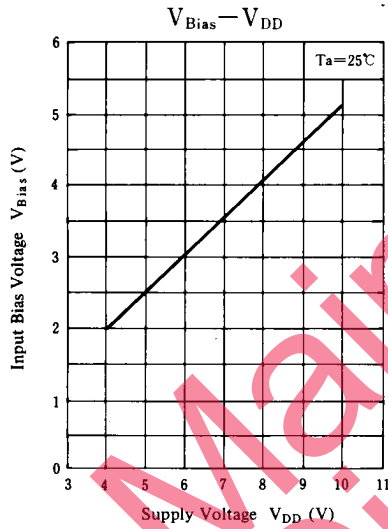


Typical Electrical Characteristic Curves

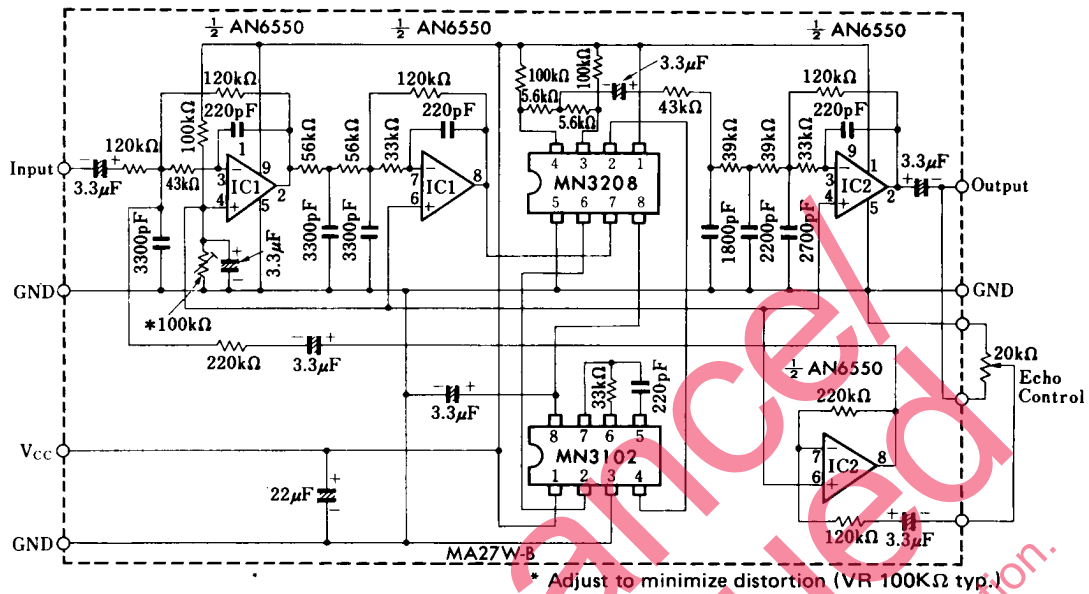




**Supply Voltage Characteristics**



■ Application Circuit



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

Maintenance  
 Discontinued

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