

MN3009

256-STAGE LOW NOISE BBD

General description

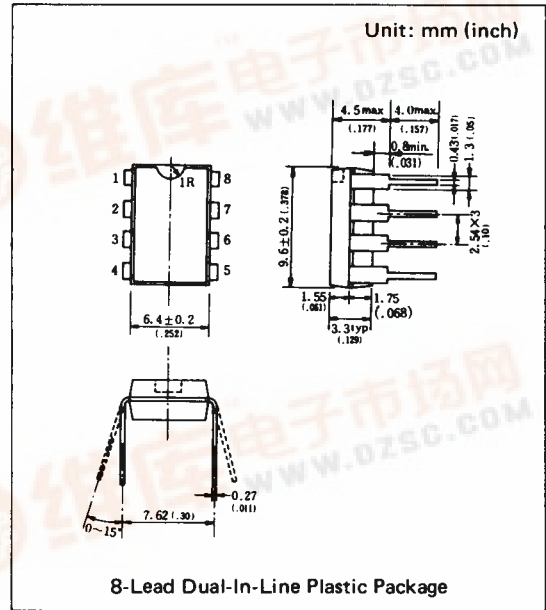
The MN3009 is a 256-stage BBD having a wide dynamic range and low distortion characteristics. The MN3009 provides a signal delay of up to 12.8msec and is particularly suitable as a device for generation of vibrato and/or chorus effects in electronic musical instruments.

Features

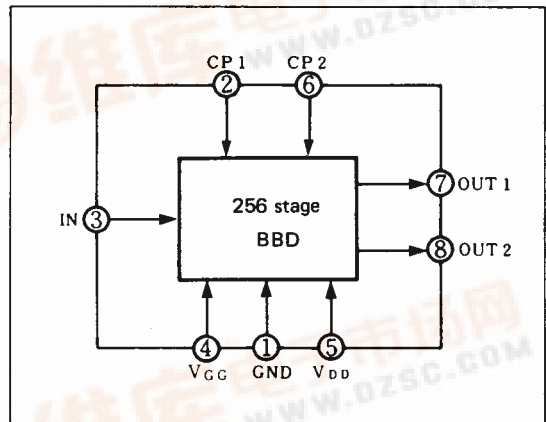
- Variable delay time of audio signals: 0.64 ~ 12.8ms.
- Clock component cancellation capability.
- No insertion loss: $L_i = 0\text{dB}$ typ.
- Wide dynamic range: $S/N = 88\text{dB}$ typ.
- Wide frequency response: $f_i \leq 14\text{KHz}$.
- Low distortion: $\text{THD} = 0.3\%$ typ. ($V_i = 0.78\text{Vrms}$).
- Clock frequency range: 10 ~ 200KHz.
- P channel silicon gate process.
- 8-Lead Dual-In-Line Plastic Package.

Applications

- Vibrato and/or chorus effect in electronic musical instrument.
- Reverberation 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}	$-15, V_{DD} + 1$	V
Signal Delay Time	t_D	0.64~12.8	ms
Total Harmonic Distortion	THD	0.3	%
Signal to Noise Ratio	S/N	88	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	T_{stg}	-55~+125	°C

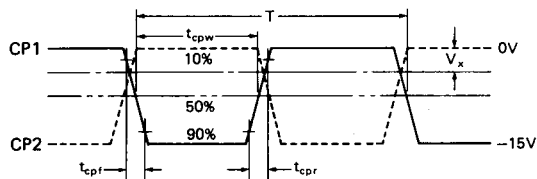
■ Operating Conditions (Ta = 25°C)

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}			200	pF
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 Cross Point *1	V_x	0		-3	V
Input DC Bias	V_{Bias}	-5		-10	V

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

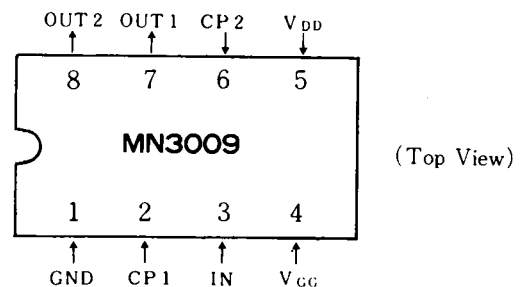
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Signal Delay Time	t_D		0.64		12.8	ms
Input Signal Frequency	f_i	$f_{CP} = 40kHz, V_i = 1.5V_{rms}$ 3dB down (0dB at $f_i = 1kHz$)	12			kHz
Input Signal Swing	V_i	$f_{CP} = 40kHz, f_i = 1kHz, THD = 2.5%$	1.5			Vrms
Insertion Loss	L_i	$f_{CP} = 40kHz, f_i = 1kHz, V_i = 1.7V_{rms}$	-4	0	4	dB
Total Harmonic Distortion	THD	$f_{CP} = 40kHz, f_i = 1kHz, V_i = 0.78V_{rms}$		0.3	2.5	%
Noise	V_{NO}	$f_{CP} = 100kHz$ Weighted by "A" curve			0.2	mVrms
Signal to Noise Ratio	S/N	Maximum output voltage to noise voltage		88		dB

***1 Clock Pulse Waveforms**

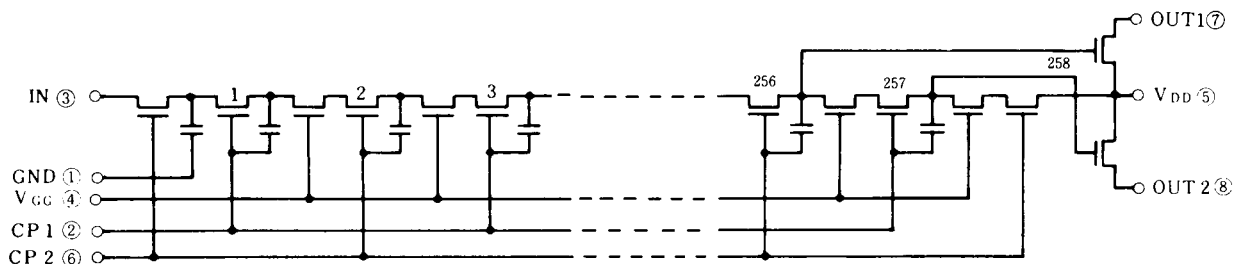


*2 $T = 1/f_{CP}$ (Clock period)

■ Terminal Assignments



■ Circuit Diagram



■ Typical Electrical Characteristic Curves

