

NMT, TACS, AMPS AUDIO FILTER

FEATURES:

- Low Group Delay Distortion
- On-Chip Uncommitted Amplifier
- Crystal controlled
- Chip Enable Powersave Feature
- Low Power CMOS
- Few External Components Req'd
- "Powersave" mode

APPLICATIONS:

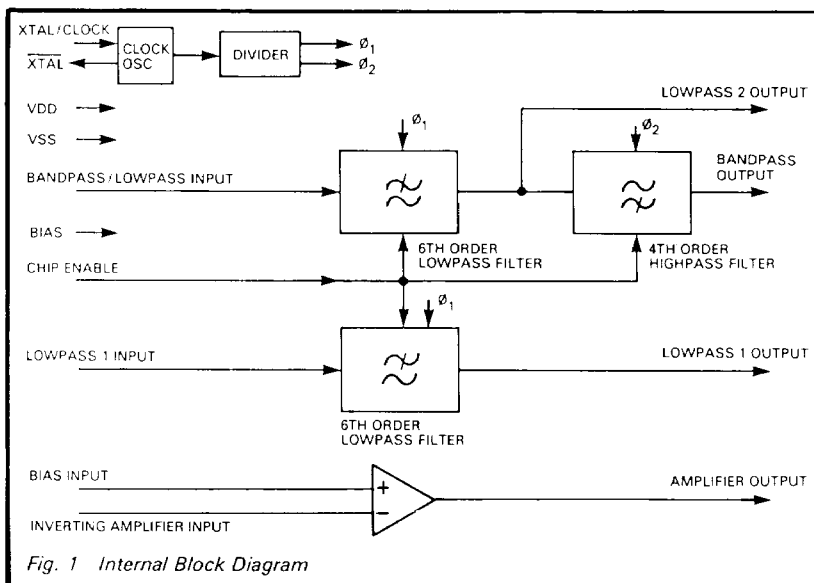
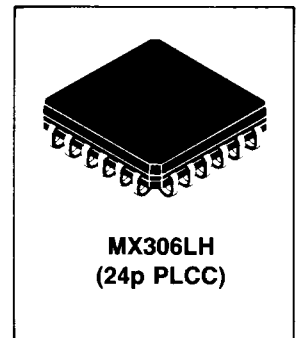
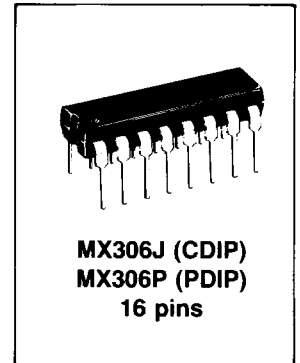
- NMT
- TACS
- AMPS
- General Audio Processing

DESCRIPTION:

The MX306 is a low-power CMOS switched capacitor filter array designed to meet the NMT, TACS, and AMPS audio processing specifications. The device consists of:

- a 3.4 KHz lowpass filter,
- a 300 Hz to 3.4 KHz bandpass filter (lowpass filter and highpass filter in series), and
- an uncommitted amplifier.

The two 6th order lowpass filters provide a low group delay distortion path. The amplifier may be used for any specific application, such as pre-emphasis, de-emphasis, or buffering. An on-chip oscillator uses a 1 MHz crystal and provides all reference clocks for the switched capacitor filters, via a divider chain. Alternatively, an external clock may be used.



MX306 PIN FUNCTION TABLE

PIN		FUNCTION	DESCRIPTION
MX306J MX306P	MX306LH		
1	1	Amp O/P	Uncommitted amplifier output
2	2	V _{ss}	Negative supply voltage
3	6	LP(2) O/P	Buffered output from the lowpass filter (bandpass arrangement)
4	7	Chip Enable	Internally pulled to V _{dd} . A logic "0" applied to this input will disable all filters (powersave mode)
5	8	$\overline{\text{XTAL}}$	1 MHz crystal output. Inverting output of the on-chip oscillator.
6	9	Xtal/Clock	1 MHz crystal input or externally derived clock can be injected into this I/P. Input to the on-chip inverting oscillator.
7	11	LP(1) O/P	Output of separate lowpass filter.
8	12	V _{ss}	Negative supply voltage
9	13	LP(1) I/P	Input of separate lowpass filter.
10	14	V _{ss}	Negative supply voltage
11	17	BP I/P LP(2) I/P	Bandpass/lowpass filter (2) input.
12	18	Bias	V _{dd} /2 Bias pin. Externally decoupled by C ₄ and C ₅ (See Fig. 2, Note 1).
13	20	BP O/P	Bandpass filter output.
14	21	Bias I/P	Connect externally to "Bias" pin.
15	23	Amp I/P	Uncommitted inverting amplifier input.
16	24	V _{dd}	Positive supply voltage

Note: For MX306LH, pin numbers 3,4,5,10,15,16,19, and 22 are not connected.

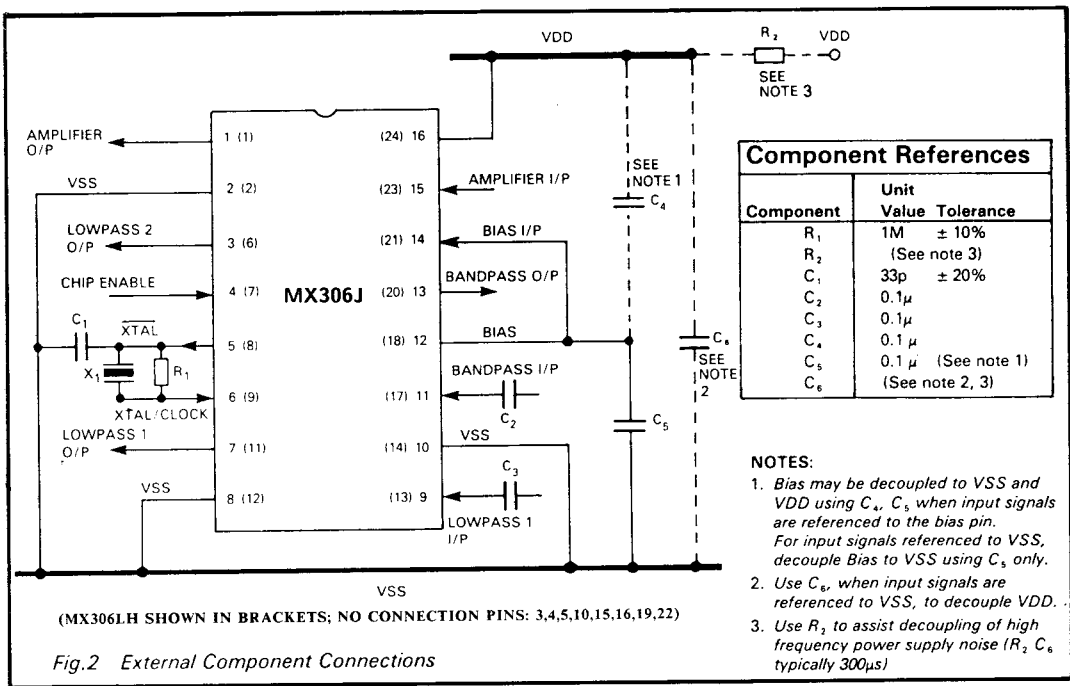


Fig. 2 External Component Connections

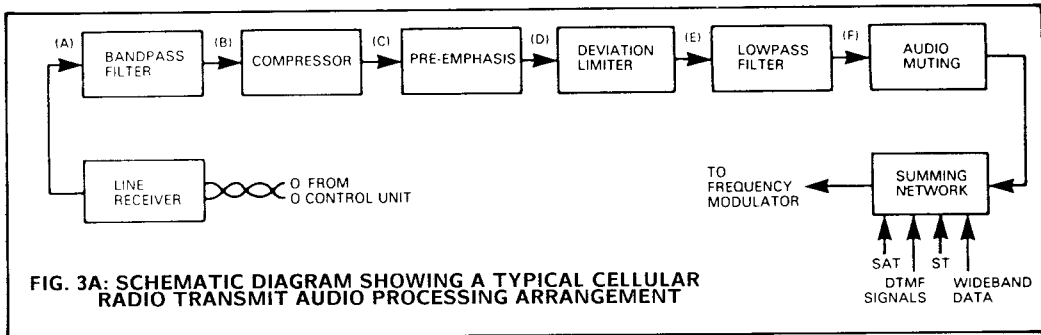


FIG. 3A: SCHEMATIC DIAGRAM SHOWING A TYPICAL CELLULAR RADIO TRANSMIT AUDIO PROCESSING ARRANGEMENT

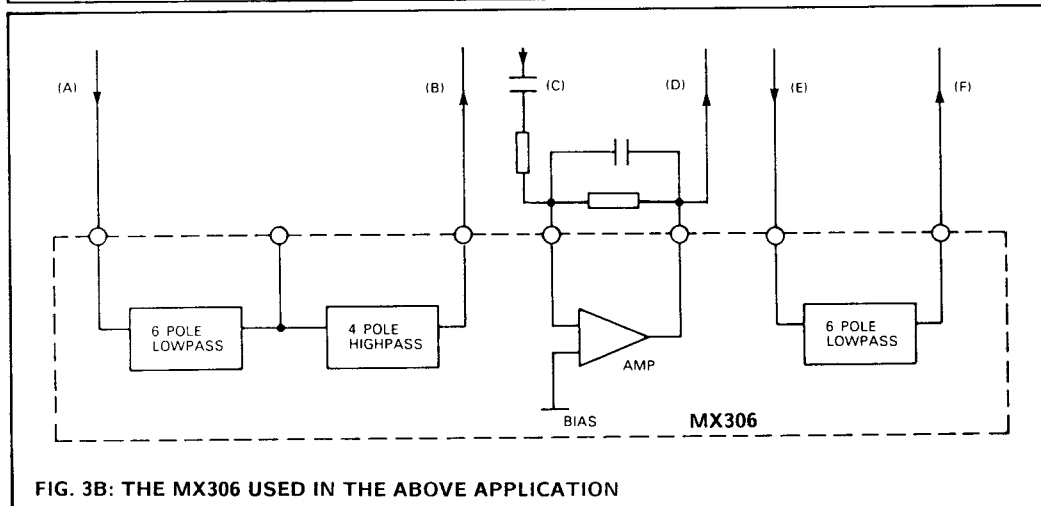


FIG. 3B: THE MX306 USED IN THE ABOVE APPLICATION

MX306 ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Exceeding the maximum rating can result in device damage. Operation of the device outside the operating limits is not implied.

Supply voltage		– 0.3V to 7.0V
Input voltage at any pin (ref VSS = 0V)		– 0.3V to (VDD + 0.3V)
Output sink/source current (total)		20mA
Operating temperature range:	MX306J	–30°C to +85°C
	MX306LH, MX306P	–30°C to +70°C
Storage temperature range:	MX306J	–55°C to +125°C
	MX306LH, MX306P	–40°C to +85°C

Operating Limits

All characteristics measured using the following parameters unless otherwise specified:

VDD = 5V, T_A = 25°C, \varnothing = 1MHz, $\Delta f\varnothing$ = 0, fin = 1kHz.

Characteristics	See Note	Min	Typ	Max	Unit
Static Characteristics					
Supply voltage		4.5	5	5.5	V
Supply current (Enabled)		—	3.5		mA
Supply current (Disabled)		—	500		μ A
Input impedance (Filters & Amplifier)		100		—	k Ω
Output impedance (Filters)		—	3		k Ω
Output impedance (Amplifier open loop)		—	800		Ω
Output impedance (Amplifier closed loop)		—	6		Ω
Input logic '1'		3.5	—	—	V
Input logic '0'		—	—	1.5	V
Dynamic Characteristics					
Signal input dynamic range LP	1		40		dB
BP	1		40		dB
Cut off frequency (–3dB) LP			3400		Hz
HP			260		Hz
Group Delay (900-2100Hz) LP			30	60	μ s
BP			60		μ s
Noise and Distortion LP	2		45		dB sinad
BP	2		35		dB sinad
Passband ripple (400-3000Hz)				2	dB absolute
Lowpass attenuation f>4kHz	3		10		dB
f>6kHz	3		35		dB
Highpass attenuation f<200Hz	3		15		dB
Insertion loss f = 1kHz			0		dB
Inverting Amplifier					
Gain open loop	3		30		dB
Gain bandwidth product			1		MHz

Note: 1. For 20dB sinad (psophometrically weighted)
 2. –6dBm input (psophometrically weighted)
 3. Relative to 1kHz. 100mV rms input level.

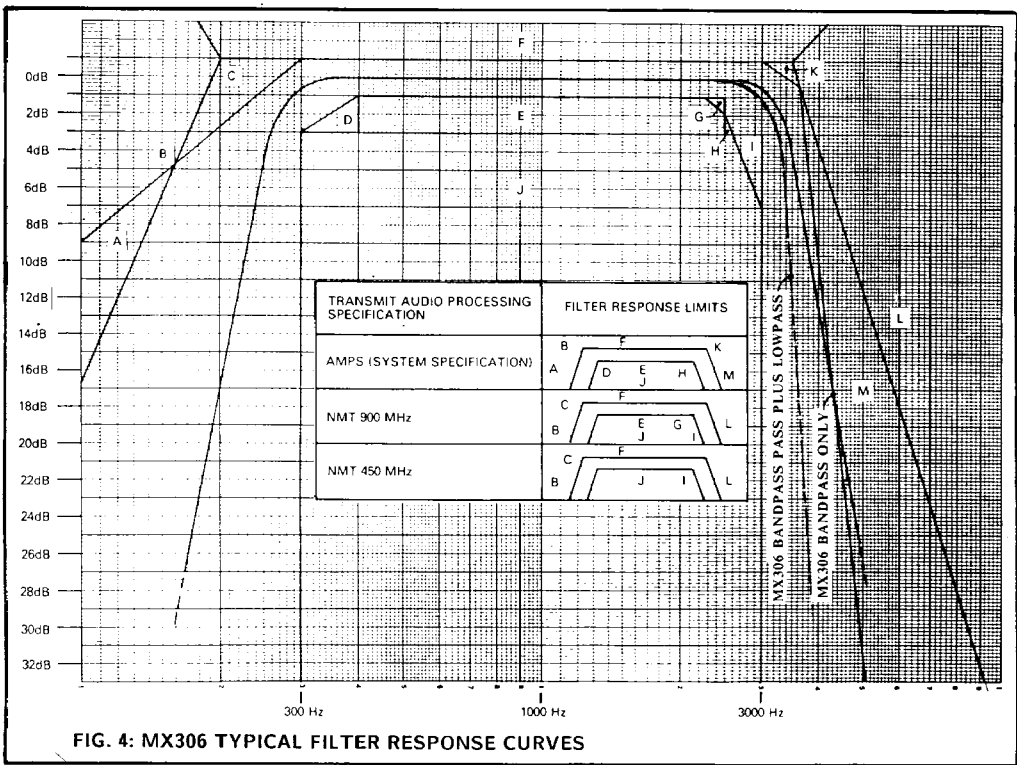


FIG. 4: MX306 TYPICAL FILTER RESPONSE CURVES

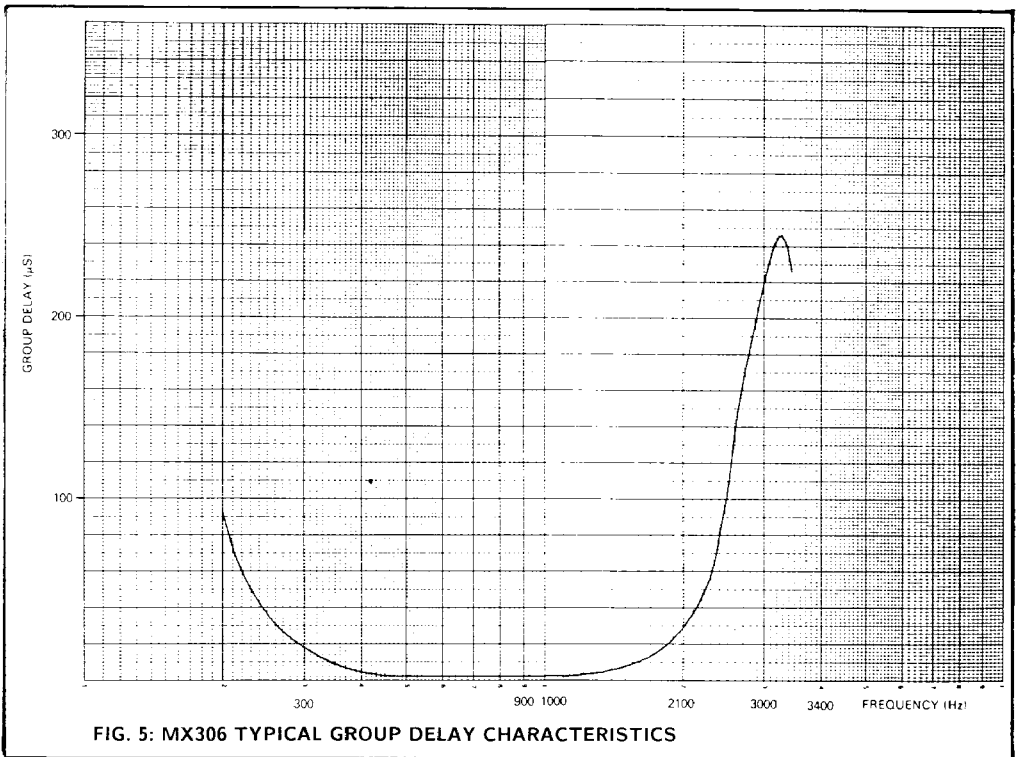


FIG. 5: MX306 TYPICAL GROUP DELAY CHARACTERISTICS