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Low Power Spectrum Analyzer
Data Sheet

MSLSA

Description

The MSLSA is a single chip 1/6th octave 6 band spectrum analyzer whose center frequencies are controlled by a single master clock. The center frequencies are set at 1.12246, 1.2599, 1.4142, 1.5874, 1.78179 and 2 (normalized). The sample to corner is 100:1 for the 2 Hz normalized output and 178.16:1 at the 1.122 Hz normalized output. The MSLSA's 1.12246 Hz output is 55.1 kHz (Clock at 5 MHz). Multiple MSLSA can be connected for spectrum analysis by taking the master clock of the high frequency filter and dividing by 2.

The MSLSA includes two uncommitted op amps for adding additional fixed gain for microphone or other low level applications. A digitally programmable gain stage provides 0, 10 or 20 dB of gain. The PD pin selects power down, low power for ultrasonic applications and regular power for operation at 2 MHz center frequency.

The MSLSA is fabricated in 0.6 um CMOS process for low power consumption and operation from 3.0 to 5.5 VDC. The MSLSA is available in a 16-lead SOIC-16 Narrow package.

Features

Selectable Power Modes
Regular Power Consumption: 5 mA at +5V
Low Power Consumption: 2 mA at +5VDC
Powerdown Mode
Operates from 3.0 V to 5.5 VDC
6 Six pole Bandpass filters in one package
Digitally controlled gain stage
Two Uncommitted Op Amps
No Microprocessor Needed

Applications

Real-Time Spectrum Analysis
Audio and Ultrasonic Analysis
Vibration Analysis

Ordering Information

Part Number	Package	Operating Temperature
MSLSAN	SOIC-16N	-40° to +85° C

All packages are 150 mil wide (Narrow SOIC)

Absolute Maximum Ratings

Power Supply Voltage	+6V
Storage Temperature Range	-60° to +150°C
Operating Temperature Range	-40° to +85°C

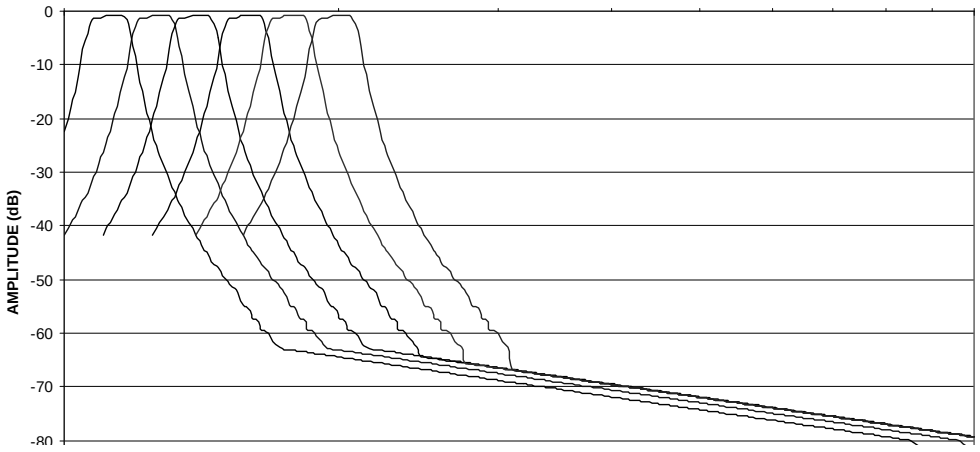

Figure 1: Normalized Frequency Response

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Electrical Characteristics

(VDD = +5.0V, T = 25 C)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
DC Specifications						
Operating Voltage	VDD		3.0	5.0	5.5	V
Supply Current	IDD	PD=0V		2		mA
Output Current	IO	RL = 100 KΩ		1.0		mA
Supply Current	IDD	PD=0.5VDD		5		mA
Output Current	IO	RL = 100 KΩ		1.0		mA
Power Down Current	I_{PD}	PD=VDD		400		µA
AC Specifications						
Output Impedance	Zo			500		Ω
Clock to Corner Ratio	fclk/fcnr	Filter 1		89.08		Hz/Hz
Clock to Corner Ratio	fclk/fcnr	Filter 2		79.36		Hz/Hz
Clock to Corner Ratio	fclk/fcnr	Filter 3		70.62		Hz/Hz
Clock to Corner Ratio	fclk/fcnr	Filter 4		63		Hz/Hz
Clock to Corner Ratio	fclk/fcnr	Filter 5		56.12		Hz/Hz
Clock to Corner Ratio	fclk/fcnr	Filter 6		50		Hz/Hz
Maximum Center Frequency	fcenter	Filter 6 Output		2		MHz
Maximum Center Frequency	fcenter	Filter 6 PD=1/2 VDD		0.1		MHz
Ripple				0.2		dB
Input Offset Voltage	VOS			3.3		mV
40 dB Bandwidth		Normalized Fo	0.76		1.32	
Filter Q	Q			9		
Unity Gain Bandwidth	BW	PD=1/2 VDD		6		MHz

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Block Diagram

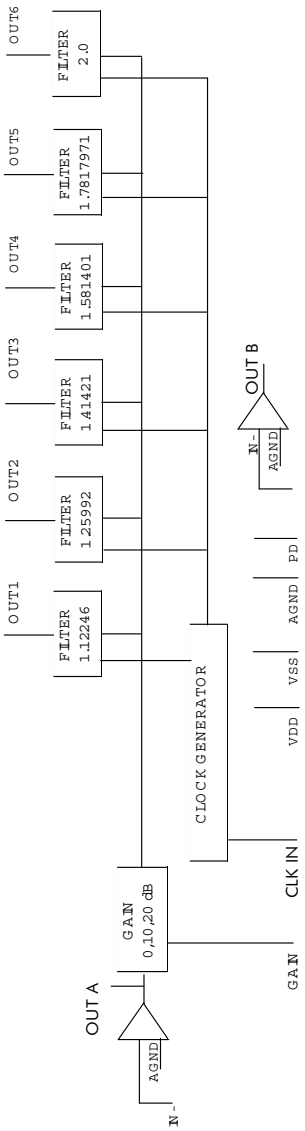

Figure 2: MSLSA BLOCK DIAGRAM

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Pin Description

1. INB Inverting Uncommitted Op Amp Input B
2. OUTA Op Amp Output A
3. INA Inverting Op Amp Input A
4. AGND Connect to 1/2 VDD
5. CLK CMOS Level Selects position of bandpass filter outputs
6. VSS Negative Supply; Tie to 0VDC
7. GAIN Tertiary Control: 0V, 0 dB,
   1/2 VDD 10 dB
   VDD 20 dB
8. PD Power Down; When CMOS high, device is powered down.
   1/2 VDD selects regular power
   VSS selects low power
9. OUT1 1.12X Filter Output
10. OUT2 1.26X Filter Output
11. OUT3 1.41X Filter Output
12. OUT4 1.59X Filter Output
13. OUT5 1.78X Filter Output
14. OUT6 2X Octave Filter Output
15. VDD Positive Supply Typically 5.0 VDC
16. OUTB Uncommitted Op Amp B Output.

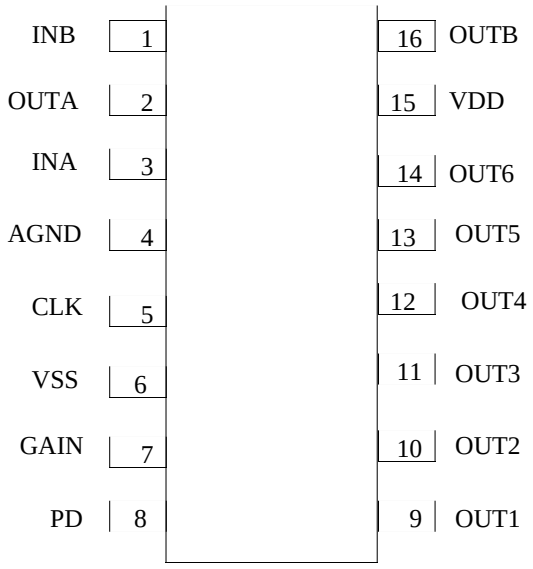

Figure 3: MSLSA Pinout

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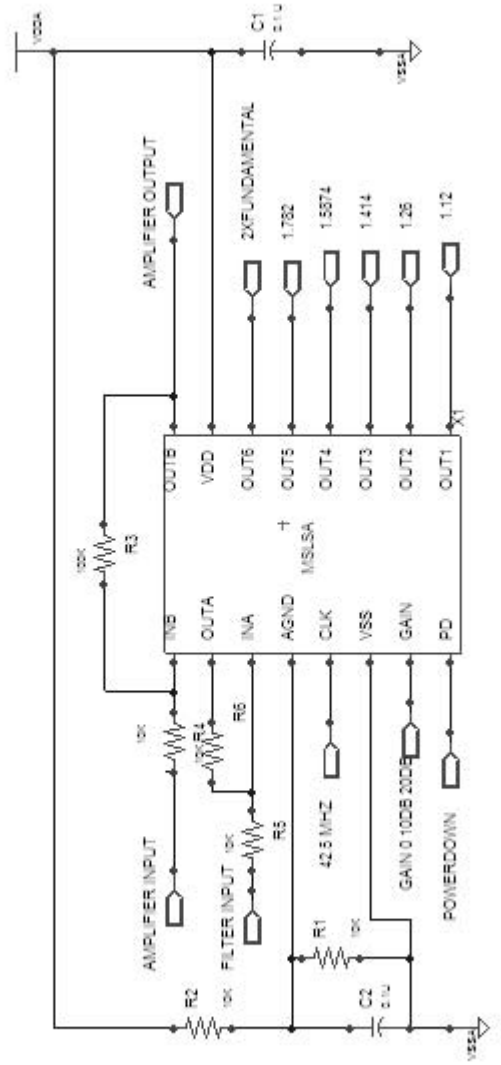

Figure 4: MSLSA Application Schematic

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STANDARD PRODUCTS

MSGEQ5A/MSGEQ7	Five Band/Seven Band Graphic Equalizer
MSVHFS1-6	Selectable Very High Frequency LP/BP Filter
MSHFS1-6	Selectable High Frequency LP/BP Filter
MSFS1-6	Selectable Lowpass/Bandpass Filter
MSU1F1-4, MSU2F1	Resistor Programmable Universal Active Filter
MSU1HF1-4, MSU2HF1	High Frequency Resistor Programmable Universal Active Filter
MSELP	Switched Capacitor Elliptic Lowpass Filter with Op Amps
MSNBLP	Switched Capacitor Butterworth Lowpass Filter
MSLE/B/C5L/M	Switched Capacitor General Purpose Lowpass Filter
MS2LFS	Dual Selectable Low Voltage Lowpass/Bandpass Filter
MSLFS	Selectable Low Voltage Lowpass/Bandpass Filter
MSHN1-6	Selectable High Pass/Notch Filter
MSRAAF	Resistor Programmable Active Audio Filter
MSRAHF	Resistor Programmable Active High Frequency Filter
MSDET	Tone Detector
MSEPAF	Electrically Programmable Active Filter
MSCBT	Communications Baseband Transceiver
MSLV14	14 MHz Video Lowpass Filter
MSCPSI	Computer Programmable Sensor Interface
MSSPSI	Smart Programmable Sensor Interface
MSRFIF	Radio Frequency Interface Front End

Mixed Signal Integration
2157-50 O'Toole Avenue
San Jose, California 95131-1332
Phone: (408)-434-6305
Fax: (408)-434-6417

IF YOUR STATE, PROVINCE, OR COUNTRY IS NOT LISTED BELOW, PLEASE CONTACT MSI DIRECTLY.

In Mississippi, Alabama, Georgia
South Carolina, North Carolina, and
Tennessee contact:

AdeptRep
280 Metaire Lane
Madison, Alabama 35758
Telephone: 256-772-1922
Facsimile: 256-772-0323
Toll Free: 1-888-419-2563
Web site: www.adeptrep.com

In Hong Kong and the People's Republic of China contact:

EXER Electronics Hong Kong Ltd.
Room 2007, Building B, South Tower
The Hub Center, Xin Gang Dong Road
Haizhu District
Guangzhou City, #1068,
Guangdong, China
China Telephone: 86-20-8966-2196
Email: kiki@exercorp.com.cn
Website: www.exercorp.com

In Korea contact:

H. B. Corp.
#412, Samwhan HIPEX-A,
240, Pangyoyeok-ro, Bundang-gu,
Seongnam-si, Gyeonggi-do,
13493, Korea
Telephone: (02)3472-3450
Facsimile: (02)3472-3458
Email: hbcorp@hbcorp.co.kr
Web site: www.hbcorp.co.kr

In Singapore, Indonesia and Malaysia contact:

EXER Technologies (S) PTE LTD
7030 Ang Mo Kio Ave 5 #03-61
Northstar @ AMK, Singapore 569880
Telephone: (65)-6-747-9669
Facsimile: (65)-6-749-9669
Email: billy@exercorp.com
Web site: www.exercorp.com

In Israel contact:

Phoenix Technologies Ltd.
3 Gavish St.
Kfar-Saba, 44424
Israel
Telephone: 09-764-4800
Facsimile: 09-764-4801

In the United Kingdom contact

Broadband Technology 2000 Ltd
Victory House
Marino Way
Finchampstead
Berkshire RG40 4RF
United Kingdom
Telephone: +44 (0) 118 932 4600
Facsimile: +44 (0) 118 973 0571
E-mail: sales@bt2000.co.uk
Web site: www.bt2000.co.uk-

:In Germany, Austria and Switzerland

Marbach Elektronik GmbH
Landingstr. 28/30
D-63739 Aschaffenburg
Germany
Telephone: 49 6021 581786 -0
Facsimile: 49 6021 581786 -3
Email: info@marbach-elektronik.de
Web site: www.marbach-elektronik.de

http://www.mix-sig.com

Send us e-mail at "info@mix-sig.com"