MEMsaics™ with nanoPower Technology

LinearDimensions SEMICONDUCTOR

LND056-48
180V, 96 Channel MEMs Driver with DC/DC & Energy Savings Subsystem

GENERAL DESCRIPTION

The LND056-48 is a complete high voltage driver subsystem capable of driving up to 96 muxed output channels from 48 inputs. Each channel is a high precision, uV offset, nulled opamp with a fixed 50V/V gain capable of achieving 0.03% output accuracy.

The LND056-48 also includes all circuitry required to generate three high-voltage rails using a small number of external components. A patents pending high power subsystem makes the LND056-48 the lowest power solution for driving high voltage MEMs, drawing only 47mW of power in a typical application.

Separate LND056-48 channels are dieletrically isolated to minimize crosstalk.

The LND056-48 is packaged in a 6x6mm, 169 bump, 0.4mm pitch BGA package.

APPLICATIONS

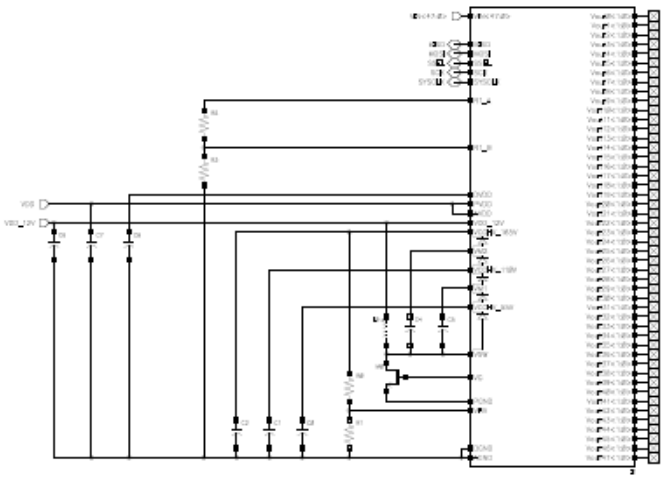
- MEMs micro mirrors
- Transducer control
- Piezo driver
- Microfluidic MEMs pumps
- Print head drivers

TYPICAL APPLICATION

FEATURES

- 96 muxed precision outputs
- 0,2-180V output voltage range
- 48 input channels:
  - 50V/V gain
  - 2:1 mux to each output
  - 0.03% output accuracy
- On board precision opamps:
  - Offset Nullers
  - 47kHz Bandwidth
  - 50mV/us Slew Rate
  - 50uA output current
- Low power subsystem:
  - 47mW typical total power dissipation
- 3-Rail output on board power:
  - PWM boost converter
  - Two voltage doublers
- Crosstalk extremely low due to dieletrically isolated tubs for each channel
- Minimum of external components
- 6x6mm, 169 bump, 0.4mm pitch BGA

TYPICAL APPLICATION CIRCUIT



Electrical Specifications

T_A=25°C to 125°C, V_{DD}=3.0V to 3.6V, typical external component values and full load current range unless otherwise noted. Typical values are characterized at V_{DD}=3.3V and 25°C unless otherwise noted.

Parameter	Test Conditions	Min	Typ	Max	Units
SYSTEM SPECIFICATIONS					
Number of Channels			48		
Mux Ratio			2:1		
DC SPECIFICATIONS					
INITIAL ACCURACY	Post Calibration		50	200	mV
VOLTAGE GAIN			50		V/V
OUTPUT					
Minimum Output Voltage			2		V
Maximum Output Voltage			180		V
Output Current				50	μA
Short-Circuit Current			75		μA
Capacitive Load Drive		0		100	pF
Load Regulation	0 < ILOAD < 100μA		15		μV/μA
POWER SUPPLY					
VDD Supply Range		3.0		3.6	V
VDD_MV Supply Range		10	12	14	V
Total Power Dissipation	V_{OUT}=75V all channels V_{CCHV}=110V all channels	38.8	47.0	74.4	mW
QUIESCENT CURRENT					
Quiescent Current per Channel (VCCHV)	V_{OUT}=75V		6.5	10	μA
Quiescent Current per Channel (VDD)			12	15	μA
Total Current (VDD)			680	850	μA
Total Current (VDDMV)	V_{OUT}=75V all channels V_{CCHV}=110V all channels V_{DDMV}=12V		4.6	7.3	mA
AC SPECIFICATIONS					
FREQUENCY RESPONSE					
Gain Bandwidth Product	C_{LOAD}=10pF		45		kHz
Slew Rate	C_{LOAD}=10pF		0.05		$V/\mu s$
Turn-On Time			5		s
DIGITAL SPECIFICATIONS					
DIGITAL INTERFACE					
DVDD		1.7	1.8	1.9	V
SCK Frequency				40	MHz
SYSCLK Frequency		45	50	55	MHz

PINOUT

Name	Description
MISO	SPI Master Input Slave Output
MOSI	SPI Master Output Slave Input
SSEL	SPI Slave Select
SCK	SPI Clock (20MHz)
SYSSCK	System Clock (50MHz 10% 50duty cycle)
DVDD	Digital Power Supply Positive Input (1.8V)
DGND	Digital Ground
PVDD	Power Supply Positive Power Input for External FET Gate Driver
PGND	Power Ground
VCCHV_165V	High-Voltage Power Supply (165V)
VCCHV_110V	High-Voltage Power Supply (110V)
VCCHV_55V	High-Voltage Power Supply (55V)
VM1	Intermediate High-Voltage Power Supply Booster Node
VM2	Intermediate High-Voltage Power Supply Booster Node
VSW	Boost Converter Switch Node
VG	Boost Converter External FET Gate
VFB	Boost Converter Feedback Voltage
VG	Boost Converter External FET Gate
R1_A	Precision External Resistor - High-Side
R1_B	Precision External Resistor - Low-Side
VIN<47:0>	Channel Input Voltage
VOUT<47:0><1:0>	Channel Output Voltage (Multiplexed to two pins)
AVDD	Analog Power Supply Positive Input (3.3V)
AGND	Analog Ground