

LM324B AND LM2902B NEXT GENERATION QUAD CHANNEL LOW-COST OP AMPS

New Product
Update

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GPAMPS – Product Marketing

Agenda

- Intro to General Purpose Op Amps
- Existing Solution
- LM324B and LM2902B Comparison
- One Pager
- Additional resources
- Questions

General Purpose Amps | Roadmap Overview

Production Sampling
Development Definition

Low voltage (VDD < 6V)

- TLV904x**
350kHz
350kHz, 0.01mA Iq typ
- TLV900x**
1MHz
Q100
1MHz, 1.5mV max Vos, 0.06mA Iq
- TLV905x**
5MHz, 15V/us
5MHz, 15 V/us, 1.6mV max Vos
- TLV906x**
10MHz
Q100
10MHz, 6.5 V/us, 1.6mV max Vos
- INA350x**
85dB CMRR, 100uA
0.6% max gain error, gain from 10-50
- OPAx310**
3MHz
150mA output current, 1μs wakeup

High voltage (VDD > 6V)

- | 40V | | 16V |
|--|---|--|
| Released | | Released |
| OPAx990
40V, 1MHz,
1.5mV, RRIO | TLV930x
40V, 1MHz,
2.5mV, RRO | TLV910x
16V, 1MHz,
1.5mV, RRIO |
| OPAx991
40V, 4.5MHz,
0.75mV, RRIO
Q100 | TLV935x
40V, 3.5MHz,
1.8mV RRO
Q100 | TLV915x
16V, 4.5MHz,
0.75mV, RRIO
Q100 |
| <i>Recent RTMs</i> | | <i>Recent RTM</i> |
| OPAx992
40V, 10.6 MHz,
RRIO | TLV936x
40V, 10.6 MHz,
RRO | TLV916x
16V, 11 MHz,
RRIO |

Standard amps (5V and 36V)

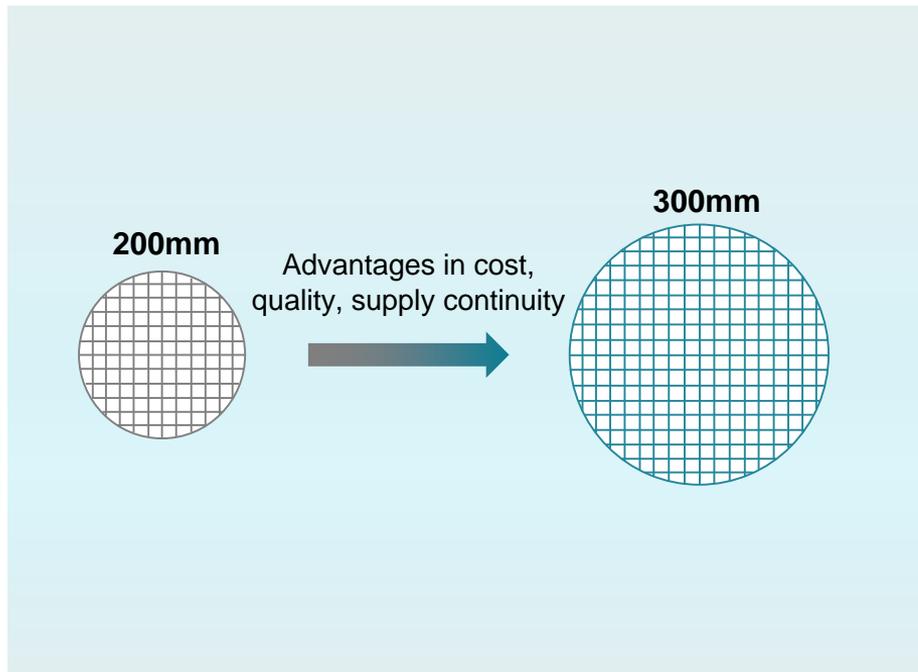
- ### 5V standard amplifiers
- Optimized for 5V systems
- LM321LV**
Single
 - LM358LV**
Dual
 - LM324LV**
Quad
- ### 36V standard amplifiers
- LM358B(A)**
1MHz, Dual
-40 – 85C
 - LM2904B(A)**
1MHz, Dual
-40 – 125C
Q100
 - LM324B**
1MHz, Quad
-40 – 85C
 - LM2902B**
1MHz, Quad
-40 – 125C
Q100
 - TL07xH**
TL08xH
3MHz, -40–125C

New Package Developments

-  • DDF: SOT23-8 dual
2.9 x 2.8 mm
-  • DSBGA: dual, WCSP
1 x 1 mm
-  • DYY: SOT23-14 quad
4.2 x 3.2mm
-  • RUC: 14-pin quad
2 x 2 mm

Strategic investments in 300-mm wafer capacity

Evolution to larger scale wafers provides advantages of productivity, cost



TI's 300-mm investments:

- **2010:** Ramped RFAB in Richardson, TX as industry's first 300-mm analog wafer fab
- **2014:** Transitioned DMOS6 in Dallas, TX to 300-mm analog technologies
- **2020:** Construction begin on 300-mm factory expansion in Richardson, TX
- **2021:** Acquisition of 300-mm fab in Lehi, UT
- **2022:** Construction to begin on new 300-mm fabs in Sherman, TX

Industry Leading in Tiny Amps

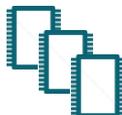
Options for Industrial & Auto



Easy manufacturing for customers



Broad product portfolio



Evolution in size – more functions in smaller spaces

Competitive Edge in Small Packages

World's smallest amplifiers

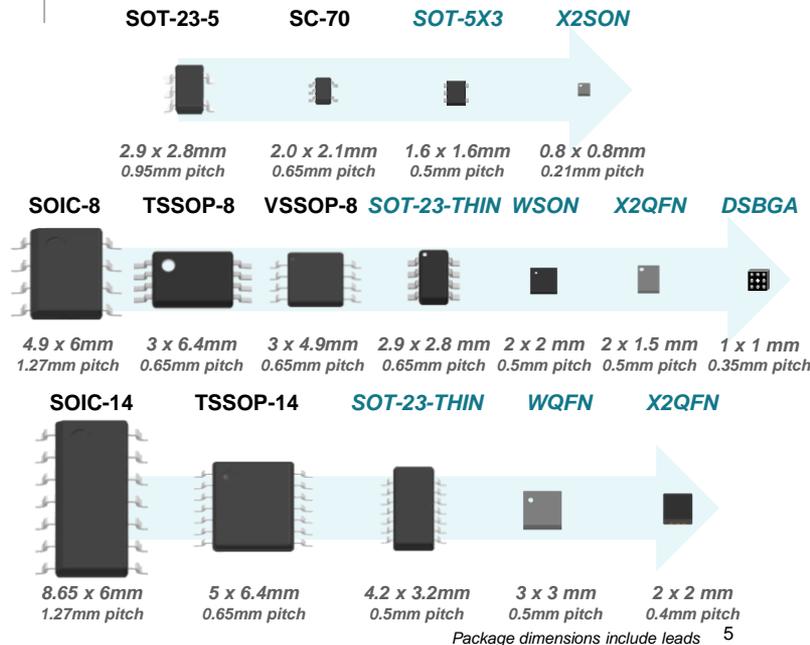
Down to 0.8 x 0.8mm (1ch), 1 x 1mm (2ch), 2 x 2mm (4ch)

Smallest leaded packages

Meets needs of space-constrained and manufacturing-constrained industrial & automotive designs

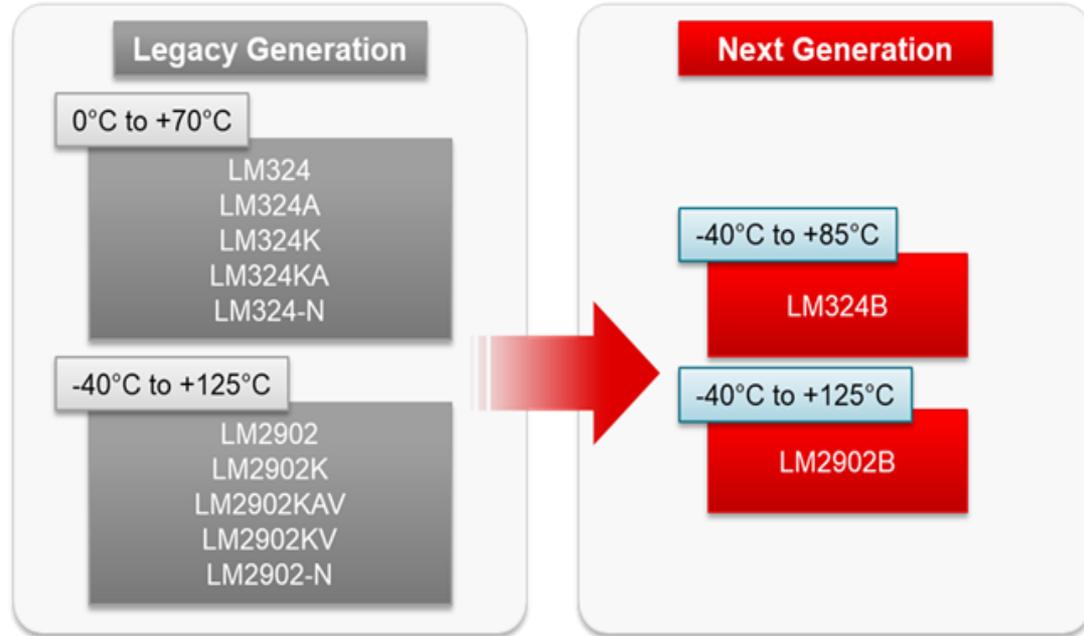
Layout compatible options with industry standard packages

Satisfies second-source requirements for commodity devices



LM324B and LM2902B Comparison

- Improved Performance
 - Wider supply voltage range
 - Wider temperature range
 - Improved V_{OS}
 - Lower Input Bias current
 - Integrated EMI Filters
 - Higher ESD ratings
- Increased Supply
 - Manufactured on 300mm wafers
 - 10x more chips per wafers than previous generation



LM324B | LM2902B

1.2MHz | low offset | Extended Temp Range | 36V Bipolar Amplifier

Improved Features

- Supply voltage 3.0V to 36 V
- Input offset voltage **3.0 mV (Max@ 25°C)**
- Bandwidth **1.2 MHz**
- Input fail-safe **Up to 36 V**
- Robust ESD **2kV (HBM)**
- Circuit topology Bipolar
- Integrated EMI filter
- Available Packages: TSSOP

Better Supply

- Manufactured on 300mm wafers using TI's latest bipolar process technology
- Allows up to 10x the amount of chips per wafer than some of the previous generation devices.

	LM324	LM324B	LM2902	LM2902B
Supply (V)	3V-32V	3V-36V	3V-26V	3V-36V
Temp Range	0 to 70C	-40 to +85C	-40 to +125C	-40 to +125C
V _{OS} (Max)	7mV	3mV	7mV	3mV
I _B (Typ)	20nA	10nA	20nA	10nA
EMI Filters		✓		✓
ESD (HBM)	500V	2kV	500V	2kV

Cost-Optimized

- Innovations in manufacturing allows us to provide better costing compared to the previous-generation products

Sample Today

- LM324BIPWR

Part number ↓↑	Buy	TI.com inventory ↓↑
PLM324BIPWR	<input type="text" value="Enter quantity"/>	11,905
✓ ACTIVE	<input type="button" value="Add to cart"/>	
	Limit: 100	

- LM2902BIPWR

Part number ↓↑	Buy	TI.com inventory ↓↑
PLM2902BIPWR	<input type="text" value="Enter quantity"/>	5,900
✓ ACTIVE	<input type="button" value="Add to cart"/>	
	Limit: 100	

Getting started

You can start evaluating this device leveraging the following:

Content type	Content title	Link to content or more details
Product folder	LM324B and LM2902B	LM324B , LM2902B
Selection tool	Search all TI general-purpose op amps (>1mV offset and <50MHz GBW)	Ti.com/gpamps
Application Note	Application Design Guidelines for LM324/LM358 Devices	Link
Model	LMx24B_LM2902B TINA-TI Reference Design Pspice for TI Model (coming soon)	Link
Design tool	Bill of Materials (BOM) & cross reference tool	bomcross.ti.com

Visit www.ti.com/npu

For more information on the New Product Update series, calendar and archived recordings



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