LM36274 Integrated Backlight Driver With Integrated LCD Bias

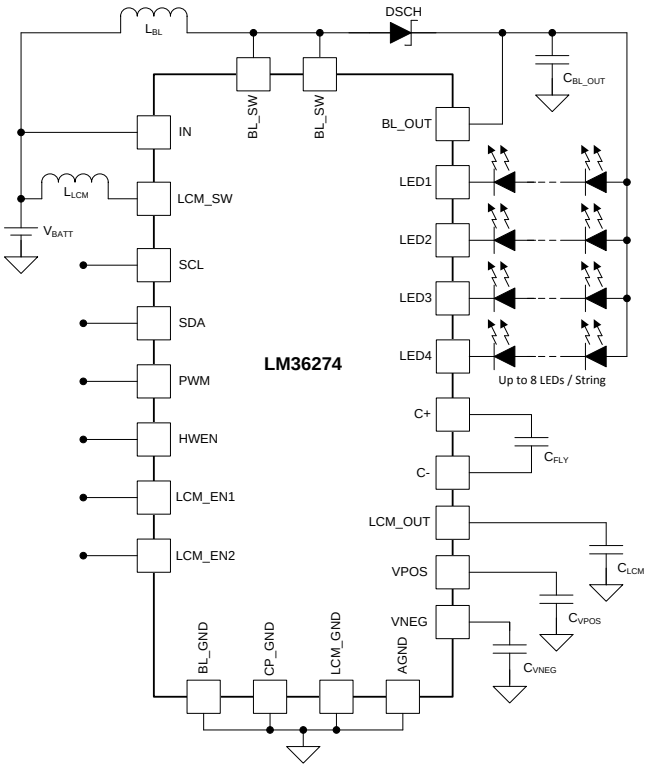
1 Features

- Drives up to Four Parallel White LED Strings (29-V Maximum V_{OUT})
- 11-Bit Exponential and Linear Dimming Control
- PWM and I^2C Brightness Control
- Backlight Operation With 4.7-µH to 15-µH Inductor
- Backlight and LCD Bias Efficiency up to 92%
- Programmable LCD Bias Voltages (±4 V to ±6.5 V With 50-mV resolution) With Up to 80-mA per Output
- 0.2% Matched LED Current From 60 µA to 30 mA
- 1% Accurate LED Current From 60 µA to 30 mA
- 2.7-V to 5-V Input Voltage Range

2 Applications

- LCD Panels With up to 24 LEDs
- Smart Phones
- Tablets and Gaming Tablets
- Home Automation Panels

Simplified Schematic



3 Description

The LM36274 is an integrated four-channel WLED driver and LCD bias supply. The ultra-compact size, high efficiency, high level of integration, and programmability allow the LM36274 to address a variety of applications without the need for hardware changes while minimizing the overall solution area.

The backlight boost provides the power to bias four parallel LED strings with up to 29-V total output voltage. The 11-bit LED current is programmable via the I^2C bus and/or controlled via a logic level PWM input from 60 µA to 30 mA. Each LED string can be independently enabled or disabled to provide zone dimming capabilities. The backlight boost can be operated efficiently with an inductance range from 4.7 µH to 15 µH, allowing for efficiency and solution size optimization.

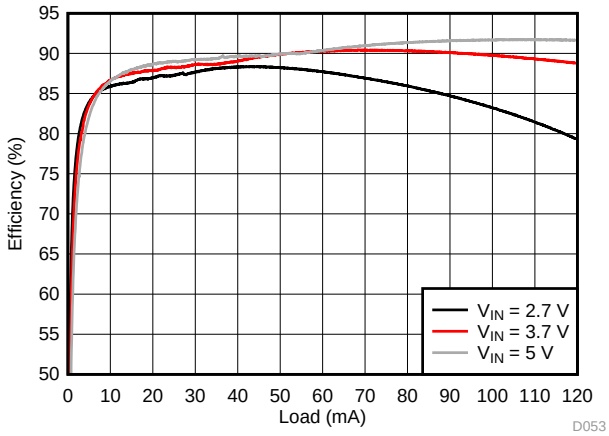
The LCD bias boost provides the power to both a positive LDO and an inverting charge pump. Both positive and negative bias supplies have programmable output voltages of ±4 V to ±6.5 V with 50-mV steps and up to ±80 mA of current capability. An auto-sequencing feature provides a programmed delay from positive to negative bias activation, with additional programmable voltage slew rate control. Two wake-up modes allow both bias outputs to be controlled with a single external signal and stay active while consuming very low quiescent current.

Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (MAX)
LM36274	DSBGA (24)	2.44 mm × 1.67 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Backlight Efficiency, 4P6S



An IMPORTANT NOTICE at the end of this data sheet addresses availability, warranty, changes, use in safety-critical applications, intellectual property matters and other important disclaimers. PRODUCTION DATA.

4 Revision History

Changes from Original (February 2016) to Revision A	Page
• Changed device status from preview to production	1

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5 Device and Documentation Support

5.1 Device Support

5.1.1 Third-Party Products Disclaimer

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5.1.2 Development Support

Power Stage Designer™ tools can be used for the boost calculation: http://www.ti.com/tool/powerstage-designer

5.2 Documentation Support

5.2.1 Related Documentation

For related documentation, see the following:

- *AN-1112 DSBGA Wafer Level Chip Scale Package* (SNVA009)
- *Understanding Boost Power Stages in Switch Mode Power Supplies* http://focus.ti.com/lit/an/slva061/slva061.pdf

5.3 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

TI E2E™ Online Community ***TI's Engineer-to-Engineer (E2E) Community.*** Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support ***TI's Design Support*** Quickly find helpful E2E forums along with design support tools and contact information for technical support.

5.4 Trademarks

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5.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

5.6 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

6 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
LM36274YFFR	ACTIVE	DSBGA	YFF	24	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	LM36274	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

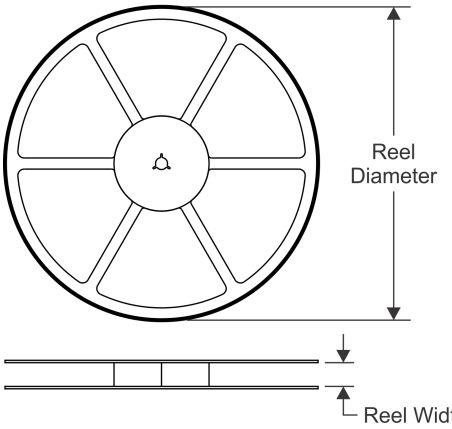
(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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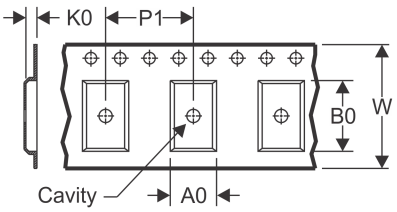
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TAPE AND REEL INFORMATION

REEL DIMENSIONS

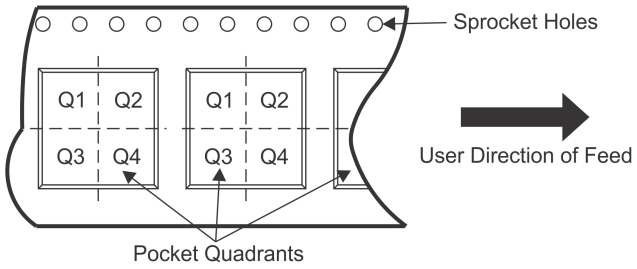


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

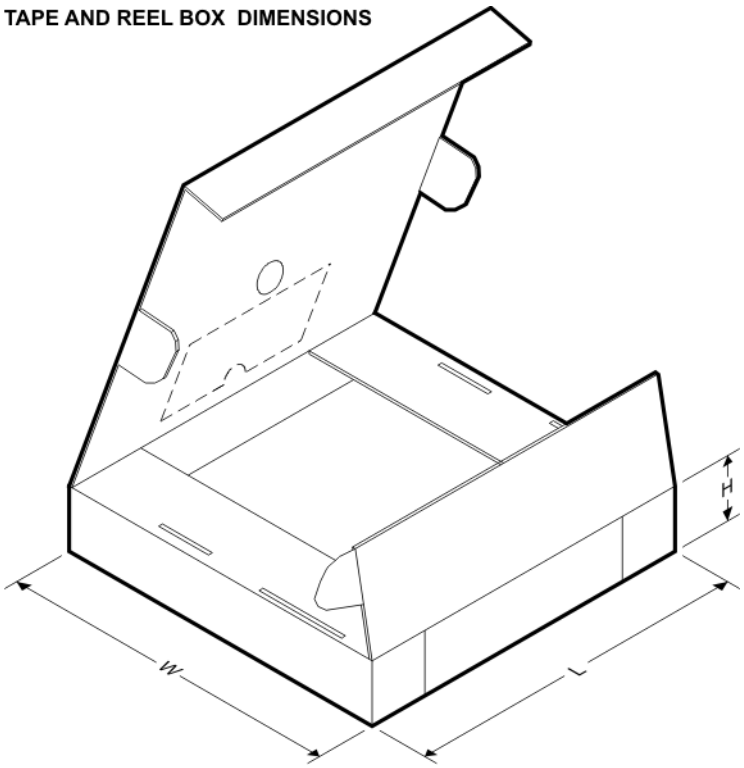
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
LM36274YFFR	DSBGA	YFF	24	3000	180.0	8.4	1.72	2.51	0.69	4.0	8.0	Q1

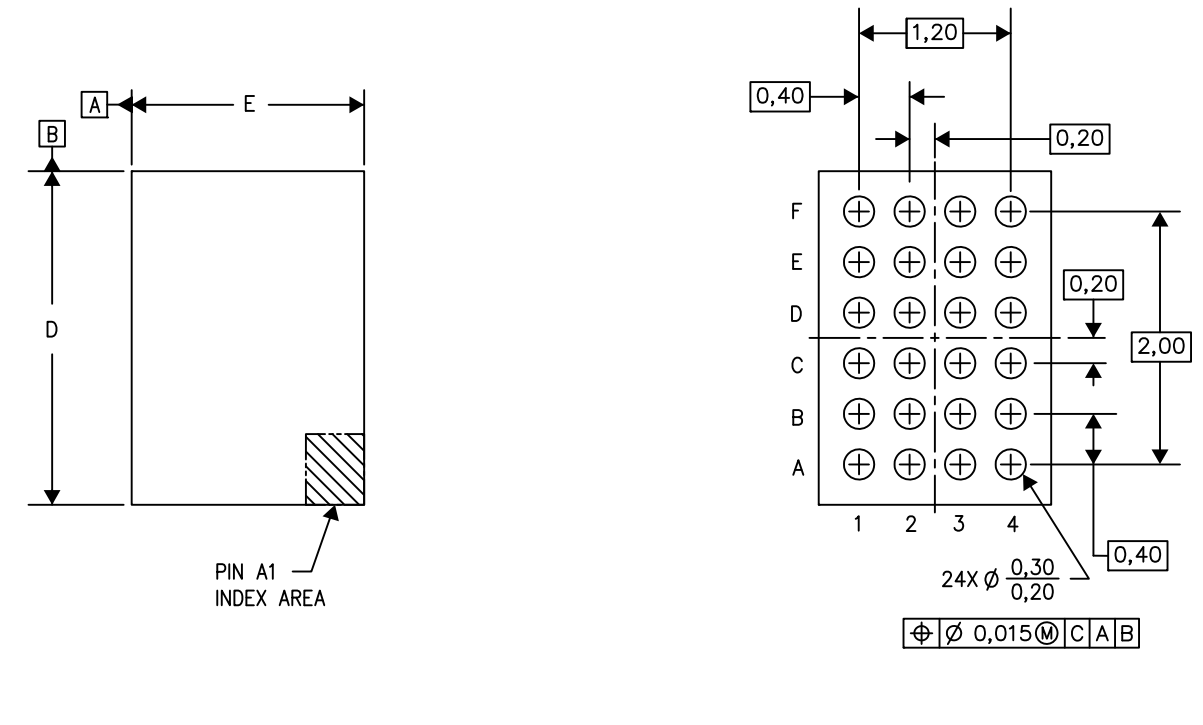
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LM36274YFFR	DSBGA	YFF	24	3000	182.0	182.0	20.0

YFF (R–XBGA–N24) DIE–SIZE BALL GRID ARRAY



D: Max = 2.44 mm, Min = 2.38 mm

E: Max = 1.671 mm, Min = 1.61 mm

4207625–29/AO 12/13

NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. NanoFree™ package configuration.

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