

LM36922H Highly Efficient Dual-String White LED Driver

1 Features

- 1% Matched Current Sinks Across Process, Voltage, Temperature
- 3% Current Sink Accuracy Across Process, Voltage, Temperature
- 11-Bit Dimming Resolution
- Up to 90% Solution Efficiency
- Drives from One to Two Parallel LED Strings at up to 38 V
- PWM Dimming Input
- I²C Programmable
- Selectable 500-kHz and 1-MHz Switching Frequency With Optional –12% shift
- Auto Switch Frequency Mode (250 kHz, 500 kHz, 1 MHz)
- Four Configurable Overvoltage Protection Thresholds (17 V, 24 V, 31 V, 38 V)
- Four Configurable Overcurrent Protection Thresholds (750 mA, 1000 mA, 1250 mA, 1500 mA)
- Thermal Shutdown Protection
- Externally Selectable I²C Address Options via ASEL Input

2 Applications

Power Source for Smart Phone and Tablet Backlighting

3 Description

The LM36922H is an ultra-compact, highly efficient, two -string white-LED driver designed for LCD display backlighting. The device can power up to 12 series LEDs at up to 25 mA per string. An adaptive current regulation method allows for different LED voltages in each string while maintaining current regulation.

The LED current is adjusted via an I²C interface or through a logic level PWM input. The PWM duty cycle is internally sensed and mapped to an 11-bit current thus allowing for a wide range of PWM frequencies and noise-free operation.

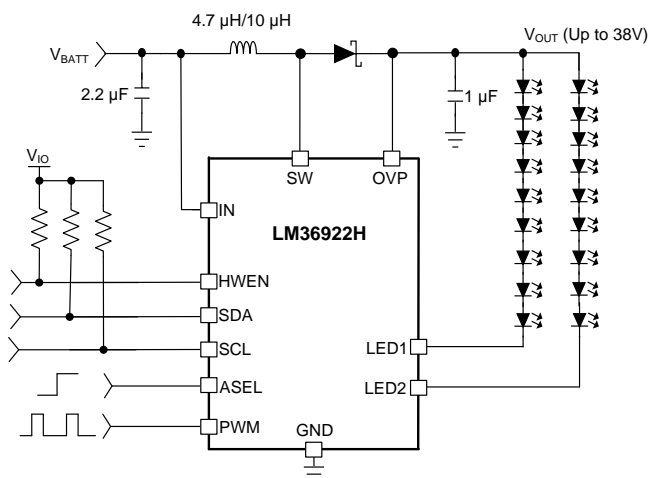
The device operates over the 2.5-V to 5.5-V input voltage range and –40°C to +85°C temperature range.

Device Information⁽¹⁾

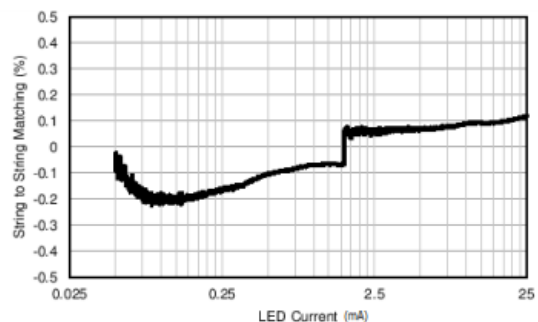
PART NUMBER	PACKAGE	BODY SIZE (MAX)
LM36922H	DSBGA (12)	1.755 mm x 1.355 mm

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

Simplified Schematic



Typical String-to-String Matching vs LED Current



4 Device and Documentation Support

4.1 Device Support

4.1.1 Third-Party Products Disclaimer

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

4.4 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.

4.5 Glossary

[SLYZ022](#) — *TI Glossary*.

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

5 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.

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
LM36922HYFFR	PREVIEW	DSBGA	YFF	12	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	36922H	

(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.

OBSELETE: 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.

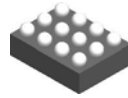
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(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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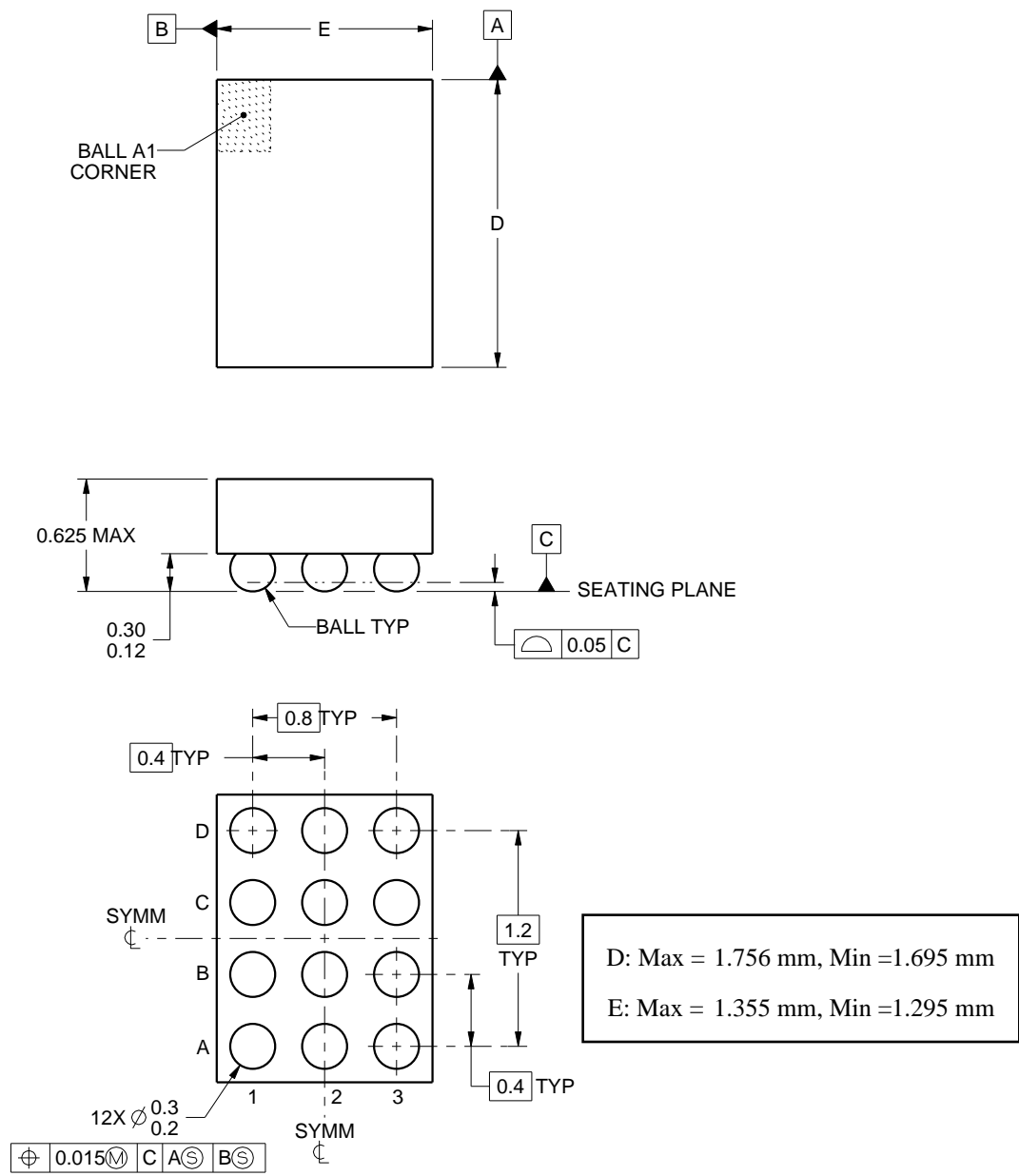
YFF0012



PACKAGE OUTLINE

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



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NOTES:

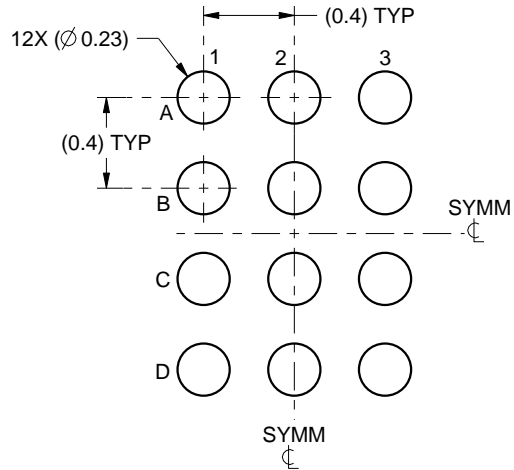
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

EXAMPLE BOARD LAYOUT

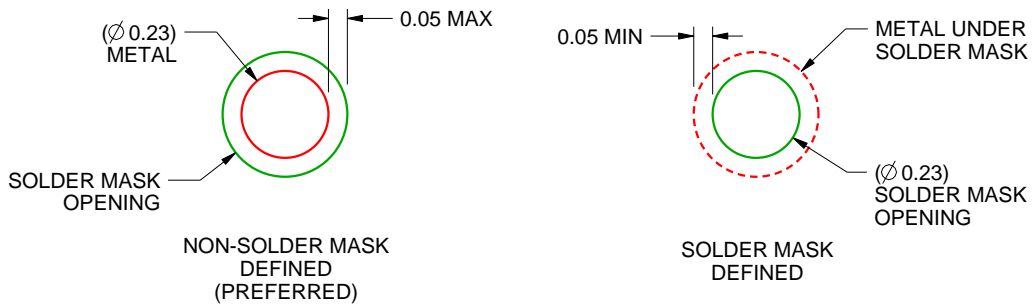
YFF0012

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



LAND PATTERN EXAMPLE
SCALE:30X



SOLDER MASK DETAILS
NOT TO SCALE

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NOTES: (continued)

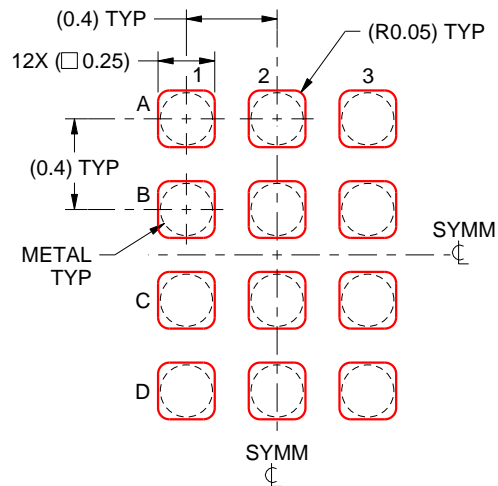
3. Final dimensions may vary due to manufacturing tolerance considerations and also routing constraints. For more information, see Texas Instruments literature number SNVA009 (www.ti.com/lit/snva009).

EXAMPLE STENCIL DESIGN

YFF0012

DSBGA - 0.625 mm max height

DIE SIZE BALL GRID ARRAY



SOLDER PASTE EXAMPLE
BASED ON 0.1 mm THICK STENCIL
SCALE:30X

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NOTES: (continued)

4. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release.

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