

## TPS62770 Multi-Rail DC/DC Converter For Wearable Applications

### 1 Features

- VIN Range 2.5 V to 5.5 V
- 360 nA Iq Step-down Converter
  - 8 Selectable Output Voltages
  - 300 mA Output Current
  - Output Discharge Function
- Slow Rate Controlled Load Switch with Discharge Function
- Dual Mode Boost Converter
  - Load Disconnect
  - Constant Output Voltage Adjustable up to 15 V ( $V_{FB}$  0.8 V) / 12 V Fixed
  - LED Current Driver with PWM to Current Conversion (max  $V_{FB}$  Voltage 200 mV @ D = 100%)
- Tiny 16pin 1.65 x 1.65mm WCSP package 0.4mm pitch

### 2 Applications

- Power Solution for Wearable Electronics

### 3 Description

The TPS62770 is a tiny power solution for wearable applications including a 360nA ultra low Iq step down converter, a slew rate controlled load switch and a dual mode boost converter. The output voltage of the step down converter can be selected with three VSEL pins between 1.0 V, 1.05 V, 1.1 V, 1.2 V, 1.8 V, 1.9 V, 2.0 V and 3.0 V. The output voltage can be changed during operation. In shutdown mode, the output of the step down converter is pulled to GND. The integrated load switch is internally connected to the output of the step down converter and features slew rate control during turn on phase. Once turned off, its output is connected to GND.

The dual mode boost converter can generate a constant output voltage up to 15 V, such as PMOLED supply; or, a constant output current, such as LED back light supply. The output voltage can be adjusted up to 15 V with external resistors, or set to fixed 12 V by connecting the FB pin to VIN. The device features an internal over voltage protection of 17.7 V in case the FB node is left open or tight to GND. It includes an internal rectifier and load disconnect function. When used as constant output current driver, the device offers a PWM to analog converter to scale down the reference voltage according to the duty cycle of the PWM signal.

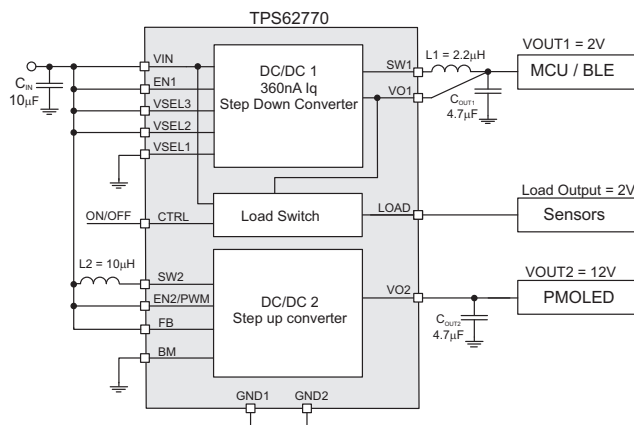
The device is available in a small 16pin 0.4mm pitch WCSP package.

#### Device Information<sup>(1)</sup>

PART NUMBER	PACKAGE	BODY SIZE (NOM)
TPS62770	DSBGA	1.65mm x 1.65mm

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

#### Simplified Schematic



## 4 Device and Documentation Support

### 4.1 Trademarks

All trademarks are the property of their respective owners.

### 4.2 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### 4.3 Glossary

[SLYZ022](#) — *TI Glossary*.

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

**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
TPS62770YFPR	PREVIEW	DSBGA	YFP	16	3000	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	XS62770	
TPS62770YFPT	PREVIEW	DSBGA	YFP	16	250	Green (RoHS & no Sb/Br)	SNAGCU	Level-1-260C-UNLIM	-40 to 85	XS62770	

(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.

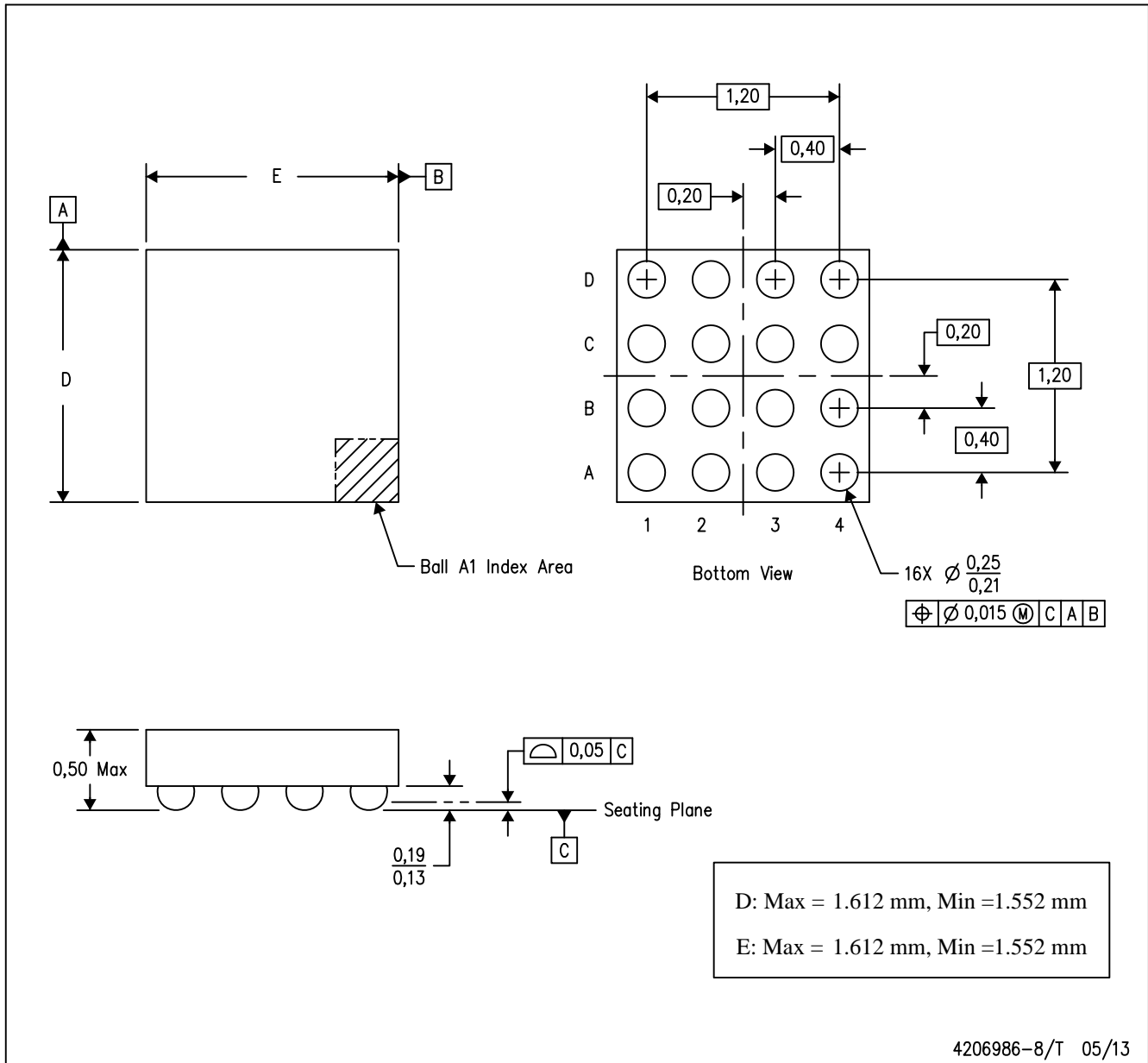
(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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YFP (S-XBGA-N16)

DIE-SIZE BALL GRID ARRAY



- 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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