



ACT88420
Advanced PMIC with 4 Bucks, 2 LDO,
and Load Bypass Switches

ACT88420 Datasheet Brief

Please refer to the [ACT88420 Product Page](#) for more information. Click [here](#) for a link to request the full datasheet.

BENEFITS and FEATURES

- **Wide Input Voltage Range**
 - $V_{in} = 2.7V$ to $5.5V$
- **Complete Integrated Power Solution**
 - Buck 1: 4A DC/DC Step-Down Regulator with Bypass Function
 - Buck 2: 2A DC/DC Step-Down Regulator
 - Buck 3: 4A DC/DC Step-Down Regulator Optimized for Low Voltage Output
 - Buck 4: 2A DC/DC Step-Down Regulator, can be Configured as 400mA LDO
 - LDO1: 400mA LDO or 1A Load Switch
 - LDO2: 400mA LDO or Load Switch
 - Current Mode Control for Buck1, COT Control for Buck 2, 3, and 4
- **Space Savings**
 - Fully Integrated
 - Works with $0.47\mu H$ Inductor
 - Integrated sequencing
- **Ultra-low Quiescent Current**
- **Excellent Efficiency at Very Light Load**
- **Easy System Level Design**
 - Configurable Sequencing
 - Multiple Wake up Triggers with GPIOs
 - Seamless Sequencing of External Supplies
 - 8 Programmable GPIOs
- **Buck 1 and LDO2 Bypass Mode for 3.3V system level compliance**
- **LDO1 Bypass Mode with Dedicated Input Pin, Support up to 1A Current**
- **Highly Configurable**
 - Regulator Operation Mode can be Configured by 3-Level GPIOs status
 - Configurable Platform ID with Different Power Up Delay Times
 - I²C Interface for Status Reporting and Controllability
 - Programmable Reset and Power Good GPIO's
 - Flexible Sequencing Options
 - Multiple Sleep Modes
 - Configurable Power Cycle and ActiveSafe™ ROM Mode through GPIO
- **I²C Interface – up to 3.4MHz**

APPLICATIONS

- Solid-State Drives (SSD)
- FPGA
- Computer Vision
- Portable Audio / Video

GENERAL DESCRIPTION

The ACT88420 PMIC is an integrated ActiveCiPS™ power management integrated circuit. It powers a wide range of processors, including solid-state drive applications, video processors, FPGA's, peripherals, and microcontrollers. The ACT88420 is highly flexible and can be reconfigured via I²C for multiple applications without the need for PCB changes. The low external component count and high configurability significantly speeds time to market. Examples of configurable options include output voltage, startup time, slew rate, system level sequencing, switching frequency, sleep modes, operating modes etc. ACT88420 is programmed at the factory with a default configuration. These settings can be optimized for a specific design through the I²C interface. The ACT88420 is available in several default configuration. Contact the factory for specific default configurations.

The core of the device includes four DC/DC step down converters using integrated power FETs, two low-drop-out regulators (LDO). Buck1 and two LDOs can be configured as a load switch, Buck 4 can be configured as LDO. Buck1 is a peak current mode, fixed frequency DC-DC step down converter that is optimized for output voltage close to the input voltage. Buck1 switches at either 1.125MHz or 2.25MHz. Buck 2, 3, and 4 use an asynchronous constant on-time, ACOT, control architecture to optimize the load transient response with $0.47\mu H$ inductor and smaller output capacitors. The LDOs only require small ceramic capacitors. All outputs are highly configurable via the I²C interface.

ACT88420 has 8 configurable GPIOs. These GPIOs can be configured for multiple purposes like enable signal for external regulator, interrupt, PWREN, DVS control, ROM control, etc. In addition, some GPIOs support 3 states status that can be used to configure the regulators operation mode, default output voltage, and extra turn on delay times without the need for CMI changes.

The ACT88420 PMIC is available in a 2.693 x 2.693 mm 36 ball WLCSP package.

TYPICAL APPLICATION DIAGRAM

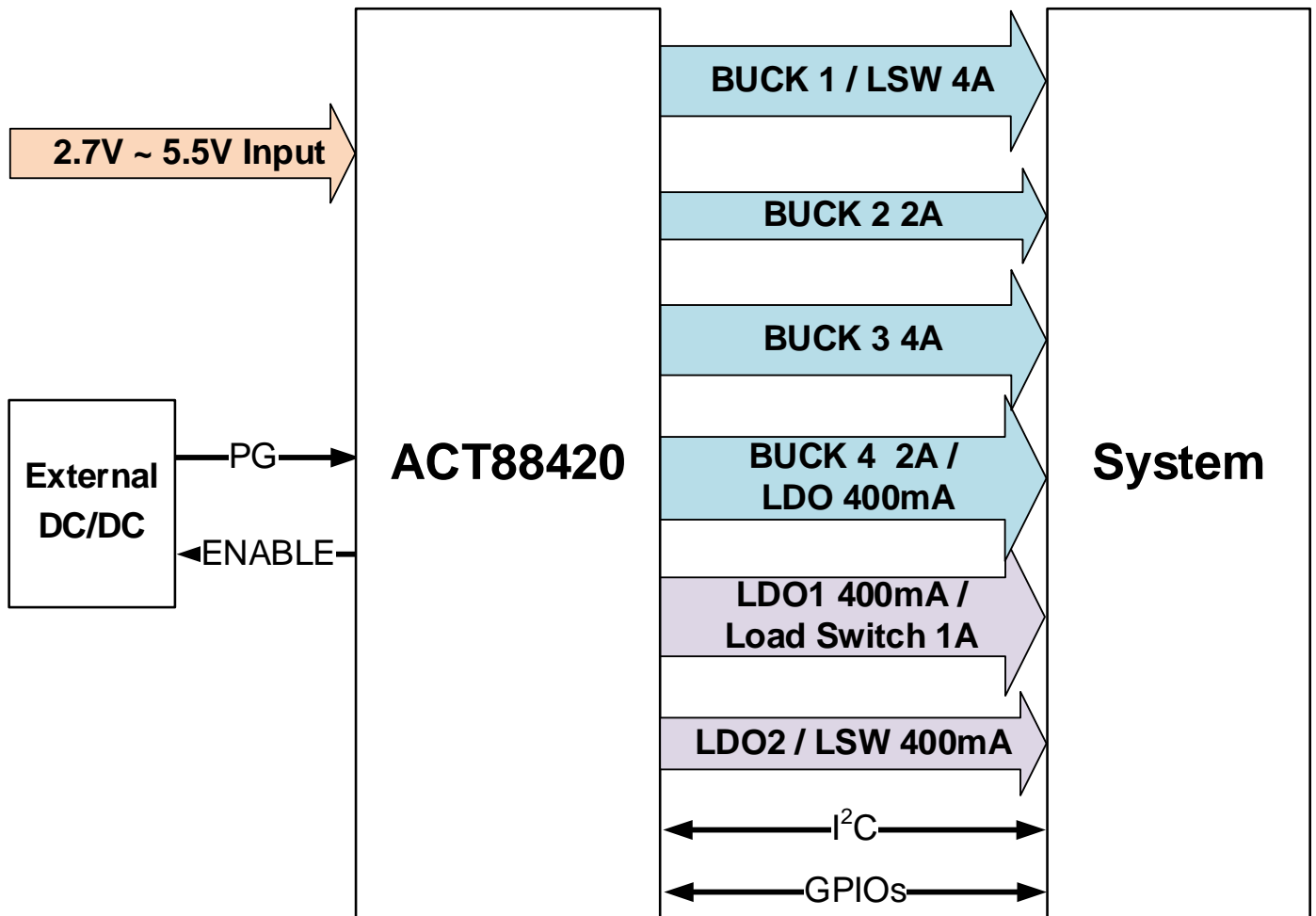


Figure 1: Typical Application Diagram

FUNCTIONAL BLOCK DIAGRAM

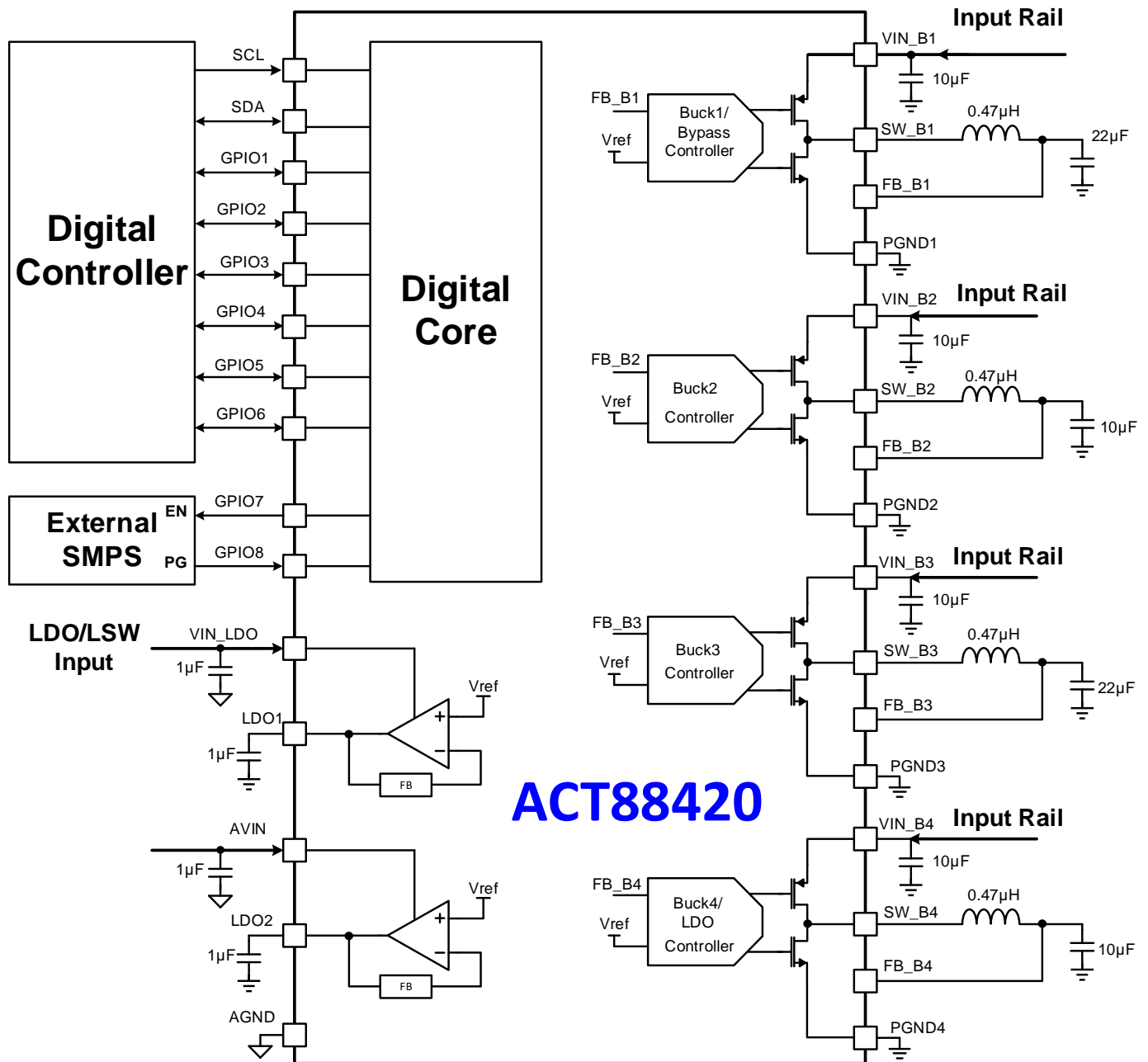
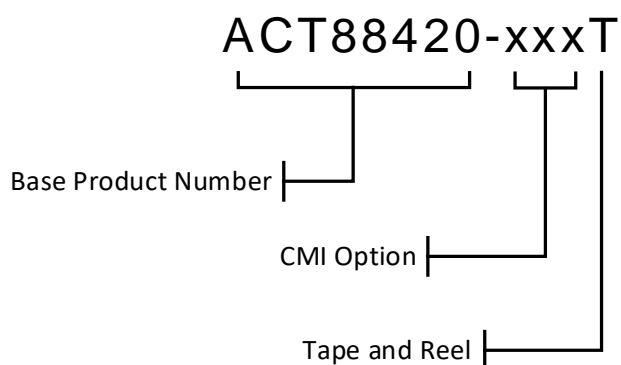


Figure 2: ACT88420 Block Diagram & Application Schematic

ORDERING INFORMATION

PART NUMBER	V _{IN}	V _{OUT1}	V _{OUT2}	V _{OUT3}	V _{OUT4}	V _{LDO1}	V _{LDO2}	7-bit I ² C Address
ACT88420-101T	3.3V	2.5V	1.2V	0.8V	1.2V	LSW (3.3V)	1.8V	0x25h
ACT88420-102T	3.3V	2.5/2.9V	1.2/1.8V	0.83V/ 0.81V	1.1V	LSW (3.3V)	1.8V	0x25h
ACT88420-103T	3.3V	2.5/2.5V	1.2/1.2V	0.80V/ 0.81V	1.8V	LSW (3.3V)	1.8V	0x25h
ACT88420-104T	3.3V	2.5/2.9V	1.2/1.8V	0.8V	0.8V	1.8V	1.8V	0x25h



Note 1: Standard product options are identified in this table. Contact factory for custom options, minimum order quantity required.

Note 2: "xxx" represents the CMI (Code Matrix Index) option. The CMI identifies the IC's default register settings.

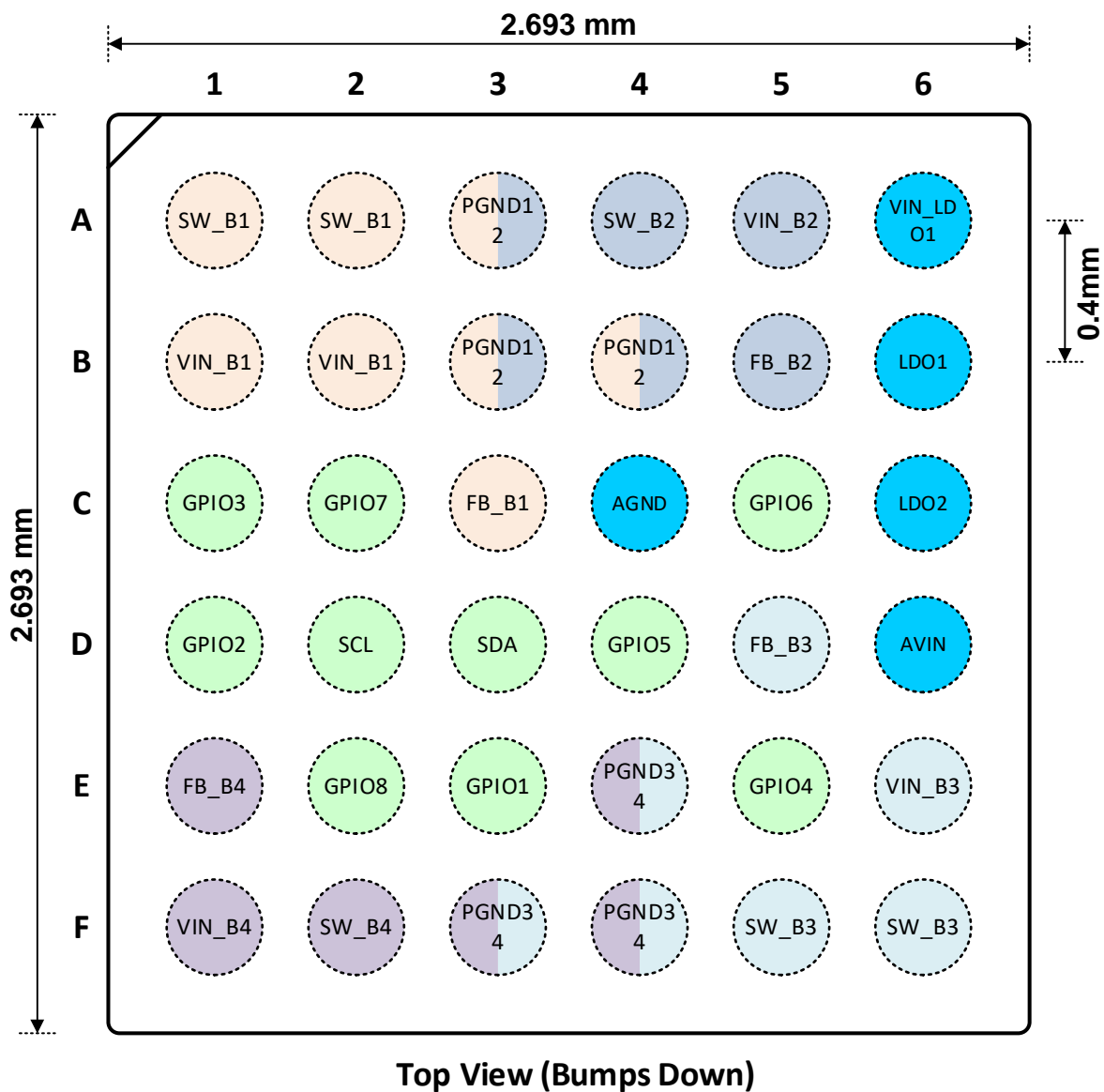
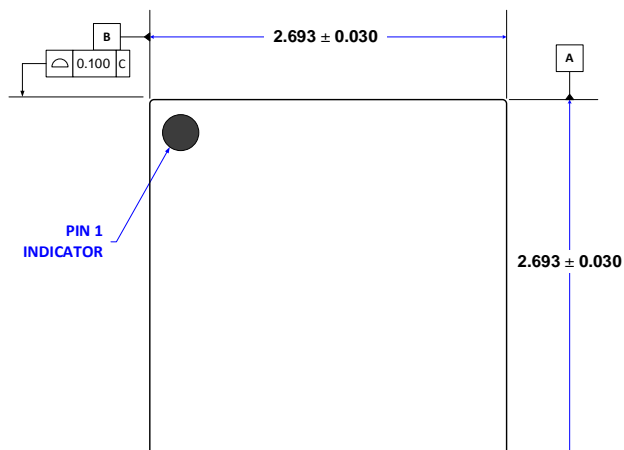


Figure 3: ACT88420 Pin Configuration – Top View (bumps down) – WLCSP- 36

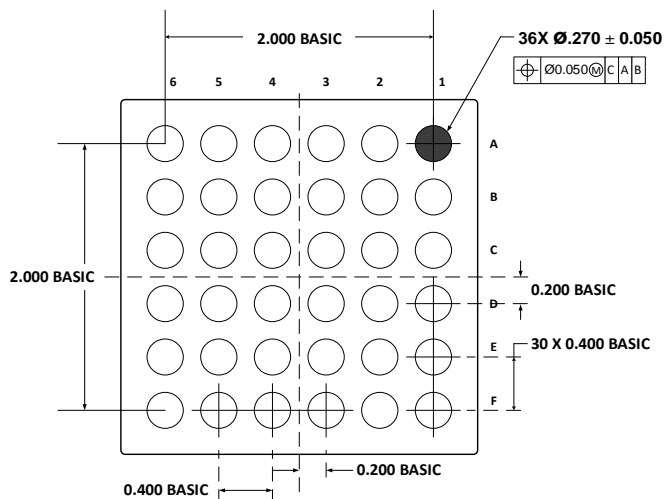
PIN DESCRIPTIONS

Ball (CSP)	NAME	DESCRIPTION
A3, B3, B4	PGND12	Dedicated Power Ground for Buck1 and Buck2 Regulator.
E4, F3, F4	PGND34	Dedicated Power Ground for Buck3 and Buck4 Regulators
A1, A2	SW_B1	Switch Pin for Buck 1 Regulator.
B1, B2	VIN_B1	Dedicated VIN power input for Buck 1 Regulator.
C3	FB_B1	Feedback for Buck 1 Regulator. Connect to the Buck 1 output capacitor.
A4	SW_B2	Switch Pin for Buck 2 Regulator.
A5	VIN_B2	Dedicated VIN power input for Buck 2 Regulator.
B5	FB_B2	Feedback for Buck 2 Regulator. Connect to the Buck 2 output capacitor.
F5, F6	SW_B3	Switch Pin for Buck 3 Regulator.
E6	VIN_B3	Dedicated VIN power input for Buck 3 Regulator.
D5	FB_B3	Feedback for Buck 3 Regulator. Connect to the Buck 3 output capacitor.
F2	SW_B4	Switch Pin for Buck 4 Regulator.
F1	VIN_B4	Dedicated VIN power input for Buck 4 Regulator.
E1	FB_B4	Feedback for Buck 4 Regulator. Connect to the Buck 4 output capacitor.
B6	LDO1	Output for LDO1 Regulator (Leave unconnected if LDO is not used and disabled).
A6	VIN_LDO1	Dedicated VIN power input for LDO Regulator.
C6	LDO2	Output for LDO2 Regulator (Leave unconnected if LDO is not used and disabled).
D2	SCL	I ² C Clock Input.
D3	SDA	I ² C Data Input and Output.
C4	AGND	Analog Ground. Kelvin connects to the other ground pins on the IC.
E3	GPIO1	Configurable general-purpose input/open drain output.
D1	GPIO2	Configurable general-purpose input/open drain output.
C1	GPIO3	Configurable general-purpose input/open drain output.
E5	GPIO4	Configurable general-purpose input/open drain output.
D4	GPIO5	Configurable general-purpose input/open drain output.
C5	GPIO6	Configurable general-purpose input/open drain output.
C2	GPIO7	Configurable general-purpose input/open drain output.
E2	GPIO8	Configurable general-purpose input/open drain output.
D6	AVIN	Analog Input supply and power input for LDO2. This is also the pin that is monitored for VIN OV and UV.

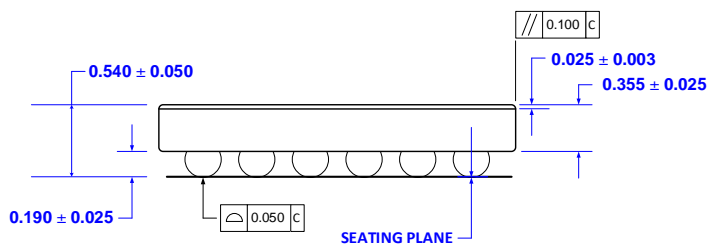
PACKAGE OUTLINE AND DIMENSIONS



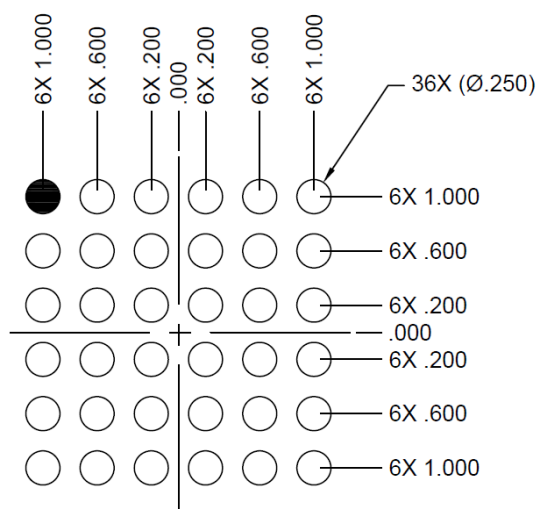
TOP VIEW (BUMPS DOWN)



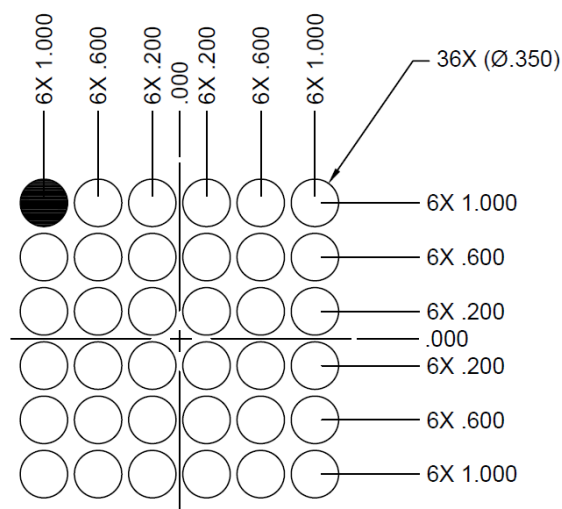
BOTTOM VIEW (BUMPS UP)



SIDE VIEW



RECOMMENDED PCB METAL TOP VIEW



RECOMMENDED SOLDERMASK TOP VIEW

Product Compliance

This part complies with RoHS directive 2011/65/EU as amended by (EU) 2015/863.

This part also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- SVHC Free
- PFOS Free
- Antimony Free
- TBBP-A (C15H12Br4O2) Free



Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

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