Fully Integrated Power Management with Switch Mode Charger

FEATURES

- Seven highly efficient 6-MHz buck converters
  - Two 0.6 to 2.1 V @ 1.5 A (up to 2.0 A with some limitations)
  - Five 0.6 to 2.1 V @ 0.8 A (up to 1.0 A with some limitations)
- 11 General-purpose LDOs
  - Six 1.0 to 3.3 V @ 0.2 A with battery or preregulated supply (One can be used as a vibrator driver.)
  - One 1.0 to 3.3 V @ 50 mA with battery or preregulated supply
  - One low noise 1.0 to 3.3 V @ 50 mA with battery or preregulated supply
  - 3.3 V @ 35 mA USB LDO
  - One LDO for TWL6030 internal use
  - One LDO for internal and external use
- USB OTG module
- Backup battery charger
- 10-bit ADC with 17 input channels
- 13-bit Coulomb counter with four programmable integration periods
- Low power consumption
  - 5 µA in backup mode
  - 20 µA in wait-on mode
  - 110 µA in deep sleep, with two DCDCs active
- RTC with alarm wake-up mechanism
- SIM and MMC card detections
- Two digital PWM outputs
- Thermal monitoring
  - High-temperature warning
  - Thermal shutdown
- Control
  - Configurable power-up and power-down sequences (OTP memory)
  - Three output signals that can be included in the start-up sequence
  - Two I^2C™ interfaces
  - All resources configurable by I^2C
- Clock management

  32-kHz output
- Battery charger 1.5 A
  - Charger for single-cell Li-Ion and Li-Polymer battery packs
  - Switched mode charger with integrated power FET for up to 1.5-A current
  - High-accuracy voltage and current regulation
  - Safety timer and reset control
  - Thermal regulation protection
  - Input/output overvoltage protection
  - Charging indicator LED driver
  - Boost mode operation for USB OTG
  - Compliant with:
    - USB 2.0
    - OTG and EH 2.0
    - YD/T 1591-2006
    - USB battery charging 1.2
    - Japanese battery charging requirements (JEITA)
- Package 7 mm x 7 mm 187-pin nFBGA

APPLICATIONS

- Mobile phones and smart phones
- Gaming handsets
- Portable media players
- Portable navigation systems
- Handheld devices
- Tablets

DESCRIPTION

The TWL6030 device is an integrated power-management integrated circuit (IC) for applications powered by a rechargeable battery. The device provides seven configurable step-down converters with up to 2.0-A capability for memory, processor core, I/O, auxiliary, preregulation for LDOs, etc. The device also contains 11 LDO regulators that can be supplied from a battery or a preregulated supply. Power-up/power-down controller is configurable and can support any power-up/power-down sequences (programmed in OTP memory). The real-time clock (RTC) provides a 32-kHz output buffer, second/minute/hour/day/month/year information, and alarm wake up. The TWL6030 supports 32-kHz clock generation based on a crystal oscillator. The device integrates a switched-mode charger allowing faster battery charge, higher efficiency, and less power dissipation.

The TWL6030 device generates power supplies for OMAP™ 4 processors and operates together with the TWL6040 device, which includes all audio and related detection features. For audio IC parameters, see the TWL6040 datasheet. The TWL6030 is available in an nFBGA package, 7.0 mm x 7.0 mm, with a 0.4-mm ball pitch.

Figure 1 shows the TWL6030 block diagram.

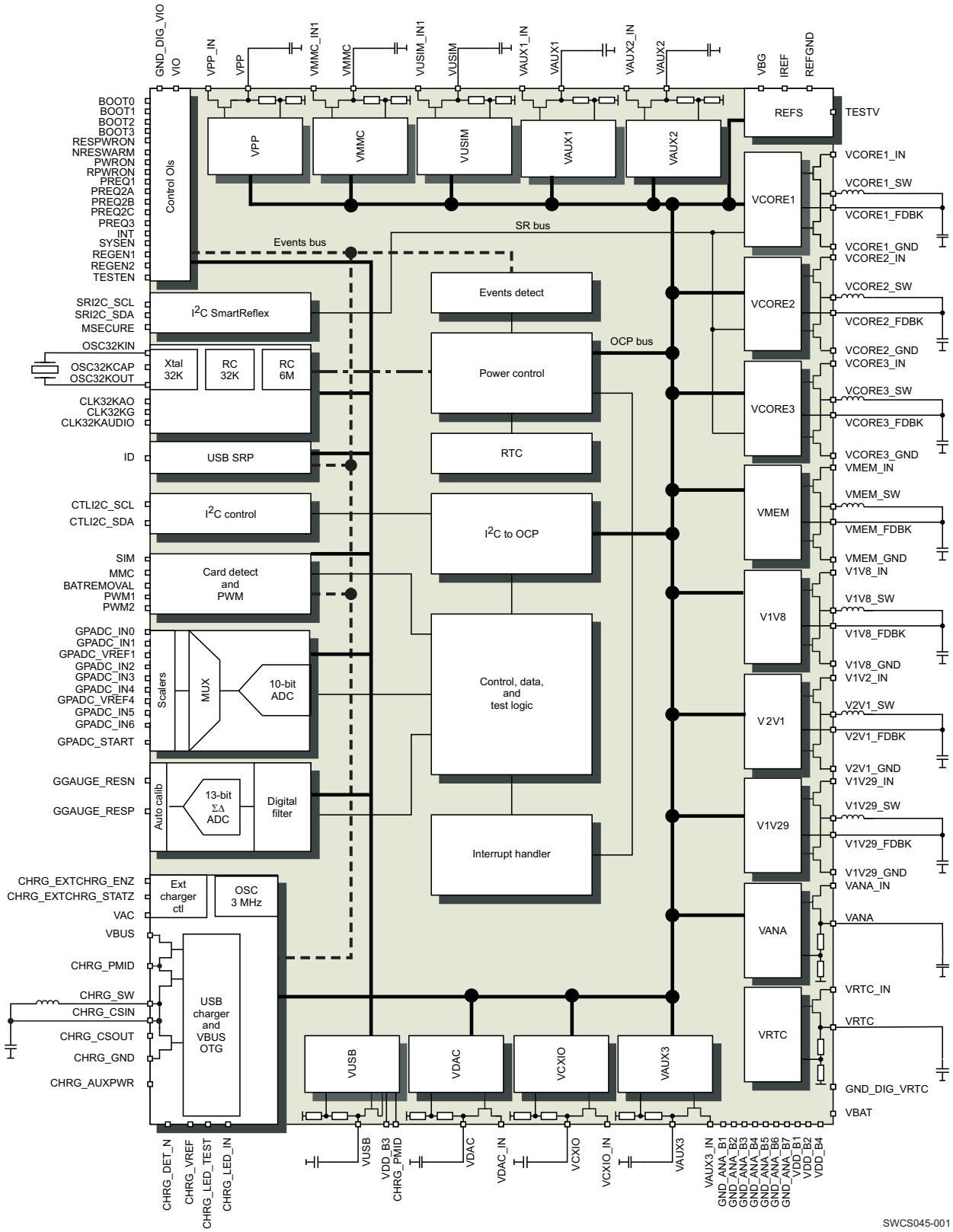


Figure 1. TWL6030 Block Diagram

For the complete TWL6030 data sheet, contact your TI sales representative. The document is internally available for download on ESP under the corresponding TWL6030 product folders and can be shared with customers.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TWL6030B107CMR	ACTIVE	FCBGA	CMR	187	260	Green (RoHS & no Sb/Br)	Call TI	Level-3-260C-168 HR	-40 to 85	6030B107	Samples
TWL6030B107CMRR	ACTIVE	FCBGA	CMR	187	2500	Green (RoHS & no Sb/Br)	Call TI	Level-3-260C-168 HR	-40 to 85	6030B107	Samples
TWL6030B1A0CMR	ACTIVE	FCBGA	CMR	187	260	TBD	Call TI	Call TI		6030B1A0	Samples
TWL6030B1A0CMRR	ACTIVE	FCBGA	CMR	187	2500	Green (RoHS & no Sb/Br)	Call TI	Level-3-260C-168 HR		6030B1A0	Samples
TWL6030B1A4CMR	ACTIVE	FCBGA	CMR	187	260	Green (RoHS & no Sb/Br)	Call TI	Level-3-260C-168 HR	-40 to 85	6030B1A4	Samples
TWL6030B1A4CMRR	ACTIVE	FCBGA	CMR	187	2500	Green (RoHS & no Sb/Br)	Call TI	Level-3-260C-168 HR	-40 to 85	6030B1A4	Samples
TWL6030B1AACMR	ACTIVE	FCBGA	CMR	187	260	TBD	Call TI	Call TI		6030B1AA	Samples
TWL6030B1AACMRR	ACTIVE	FCBGA	CMR	187	2500	TBD	Call TI	Call TI		6030B1AA	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)

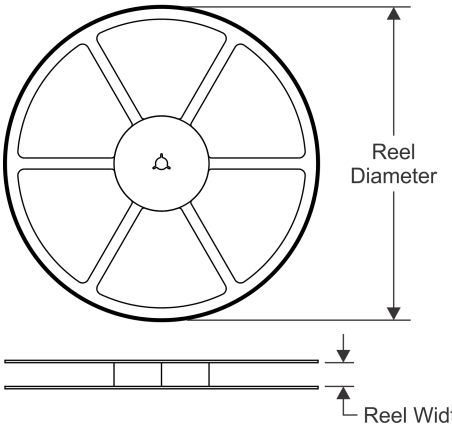
(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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

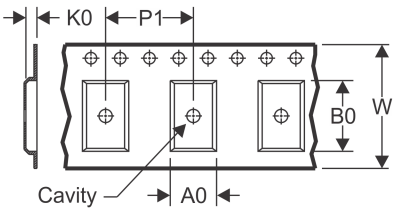
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

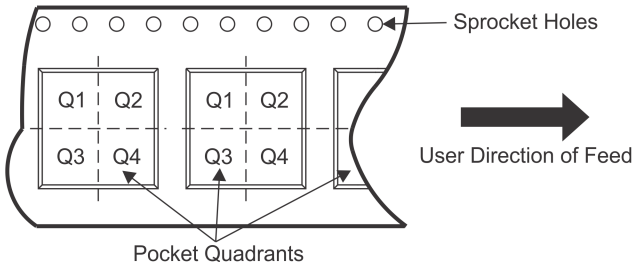


TAPE DIMENSIONS



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

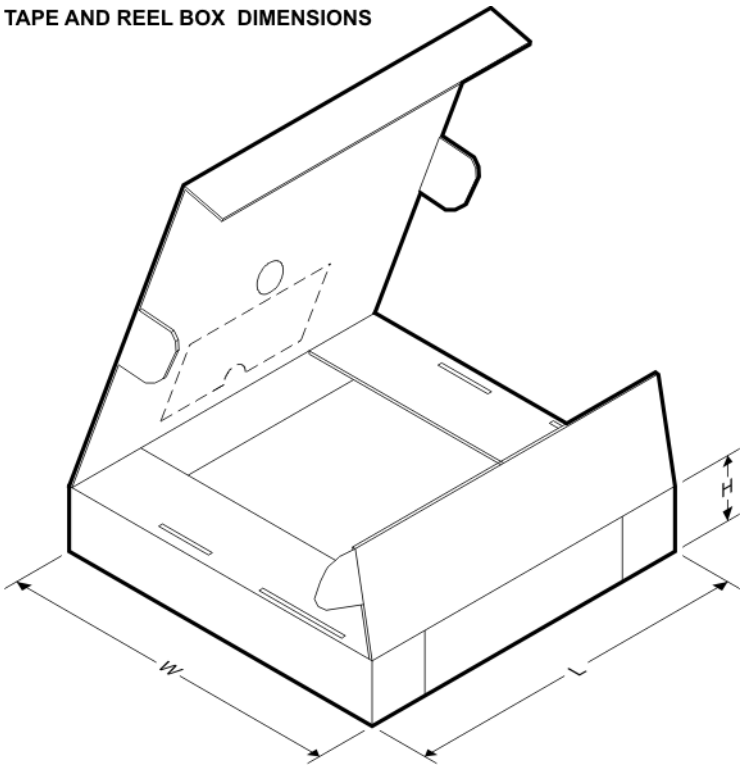
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
TWL6030B107CMRR	FCBGA	CMR	187	2500	330.0	16.4	7.3	7.3	1.5	12.0	16.0	Q1
TWL6030B1A0CMRR	FCBGA	CMR	187	2500	330.0	16.4	7.3	7.3	1.5	12.0	16.0	Q1
TWL6030B1A4CMRR	FCBGA	CMR	187	2500	330.0	16.4	7.3	7.3	1.5	12.0	16.0	Q1
TWL6030B1AACMRR	FCBGA	CMR	187	2500	330.0	16.4	7.3	7.3	1.5	12.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TWL6030B107CMRR	FCBGA	CMR	187	2500	336.6	336.6	31.8
TWL6030B1A0CMRR	FCBGA	CMR	187	2500	336.6	336.6	31.8
TWL6030B1A4CMRR	FCBGA	CMR	187	2500	336.6	336.6	31.8
TWL6030B1AACMRR	FCBGA	CMR	187	2500	336.6	336.6	31.8

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