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# Richtek Power IC Solutions for IoT / Portable / Wearable / Battery-Powered Applications

Sep. 2018

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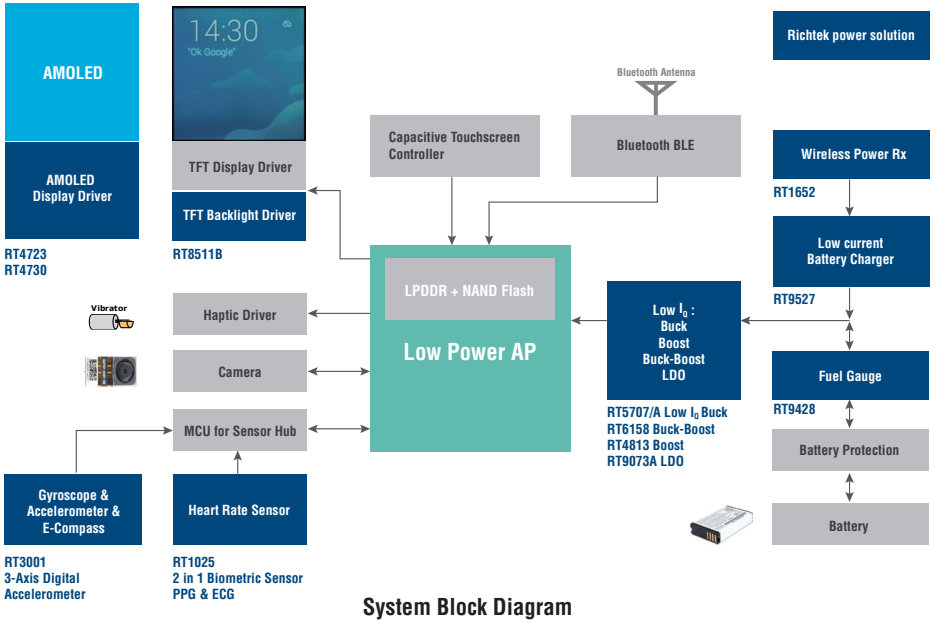
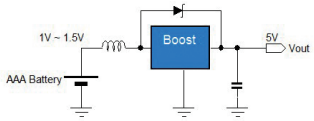
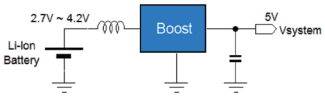
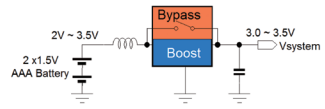
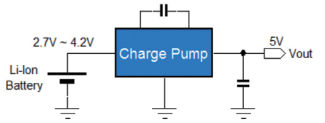
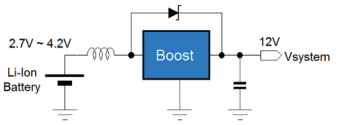
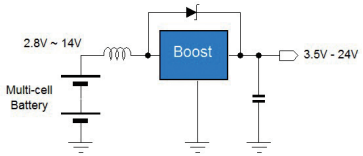



**System Block Diagram**

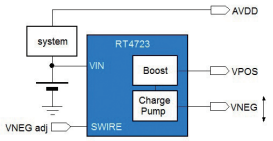
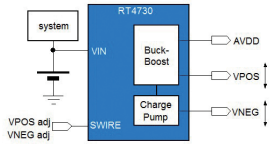
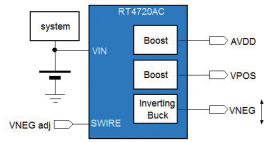
RICHTEK

Richtek Technology Corporation is one of the world's leading analog IC companies. The company consistently delivers inventive power management solutions that improve the performance of consumer electronics, computers, and communications equipment. Richtek adds value to end equipment by synthesizing technological innovation, uncompromised quality, and devotion to customer service. Founded in 1998, the Company is headquartered in Taiwan with additional offices in Asia, the U.S., and Europe. For more information about Richtek and its analog IC solutions, please visit the Company's Web site at www.richtek.com.

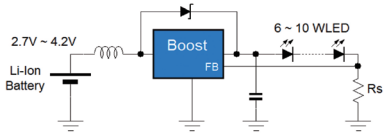
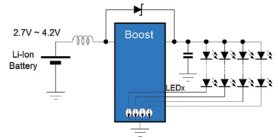
## Boost Converters

| Topology | Part Number | Vin | Vout | I | Iq | Fsw | Key Features | Package |
|---|---|---|---|---|---|---|---|---|
|  | RT9266 | 2.0V-6.0V | 2.6V-6.0V | 2A switch | 55uA | 500kHz | → 1.0V low start-up input voltage<br>→ Deliver 3.3V 100mA with 1 alkaline cell | SOT-23-6<br>SOT-89-5 |
|  | RT4812 | 1.8V-5.5V | 1.8V-5.5V | 2.1A out | 90uA | 500kHz | → Synchronous<br>→ CMCOT topology<br>→ Selectable average I-lim 1A & 2.1A | TSOT-23-8 |
| | RT4813 | 1.8V-5.5V | 1.8V-5.5V | 3.1A out | 120uA | 500kHz | → Synchronous<br>→ I²C Programmable average I-lim: 0.55A-3.1A | UQFN2x2-9 |
|  | RT4803 | 1.8V-5.0V | 2.85V-4.4V (3.3V/3.55V/I²C) | 2A out | 65uA | 2.5MHz | → Synchronous<br>→ Low Iq 15uA @ Force bypass<br>→ Stand-alone or I²C control | WL-CSP1.67x1.67-16(BSC) |
| | RT4803A | 1.8V-5.0V | 2.85V-4.4V (3.15V/3.4V/I²C) | 2A out | 55uA | 2.5MHz | → Synchronous<br>→ Low Iq 4uA @ Force bypass<br>→ Stand-alone or I²C control | WL-CSP1.67x1.67-16(BSC) |
|  | RT9361A | 2.8V-5.0V | 5.0V/4.5V | 0.1A out | 2mA | 1MHz | → Charge pump | SOT-23-6<br>TSOT-23-6<br>WDFN2x2-6 |
|  | RT9277C | 2.5V-5.5V | 3V-16V | 1.6A switch | 2mA | 640k/1.2MHz | → Asynchronous<br>→ Ext. programmable Soft Start | MSOP-8<br>WDFN3x3-8 |
| | RT9297 | 2.6V-5.5V | 2.6V-24V | 3.8A switch | 4mA | 640k/1.24MHz | → Asynchronous<br>→ Programmable Soft Start | WDFN3x3-10 |
|  | RT8509 | 2.8V-14V | 3.5V- 24V | 3.5A switch | 1mA | 1.2MHz | → Asynchronous<br>→ Soft Start<br>→ Ext. comp. | WDFN3x3-10 |
| | RT8509A | 2.8V-14V | 3.5V- 24V | 4.5A switch | 5mA | 1.2MHz | → Asynchronous<br>→ Soft Start<br>→ Ext. comp. | WDFN5x5-12 |

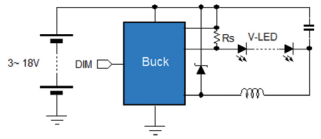
## AMOLED Power ICs

| Topology | Part Number | VBAT | Iout | Key Features | Package |
|---|---|---|---|---|---|
|  Optimized for 1" to 2" AMOLED displays with non-symmetrical supplies  | RT4723 | 2.5V-4.6V | 30mA | → Dual output with integrated Boost converter for Vpos and charge pump for Vneg | WL-CSP1.39x2.07-15(BSC) |
|  Optimized for 1" to 2" AMOLED displays requiring symmetrical supplies  | RT4730 | 2.9V-4.8V | 50mA | → Dual output with integrated Buck-Boost converter for Vpos and charge pump for Vneg | WL-CSP2.34x2.34-16(BSC) |
|  Optimized for 3.5" to 5" AMOLED displays requiring non-symmetrical supplies  | RT4720AC | 2.9V-4.5V | 300mA (Vneg&Vpos)<br>50mA (AVDD) | → Triple output with three integrated DC/DC converters for Vpos, Vneg and AVDD | WQFN3x3-16 |

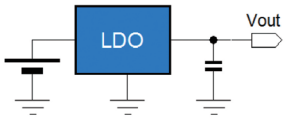
## LED Drivers

| Topology | Part Number | Vin | Vout | I | Key Features | Package |
|---|---|---|---|---|---|---|
|  Low power<4W | RT9285B | 2.7V-5.5V | up to 20V | 0.4A switch | → 1MHz Fsw<br>→ Built-in Diode | WDFN2x2-8<br>TSOT-23-6 |
| | RT4533 | 2.5V-5.5V | up to 36.5V | 1.2A switch | → 1.1MHz Fsw<br>→ Asynchronous for 10 WLEDs | TSOT-23-6 |
| | RT8511B | 2.7V-24V | up to 43V | 2.2A switch | → 500KHz Fsw<br>→ 43V Asynchronous<br>→ 100-8kHz Direct PWM dimming | WDFN2x2-8 |
| Single/multi-string  | RT8532 | 2.5V-24V | up to 43V | 2.5A switch | → 0.5M/1MHz Fsw<br>→ 6 String 10 WLEDs/per string<br>→ Direct PWM dimming & PWM to Analog dimming | WQFN3x3-20 |

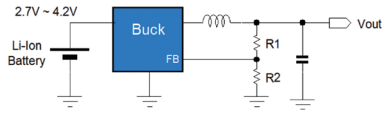
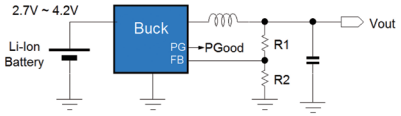
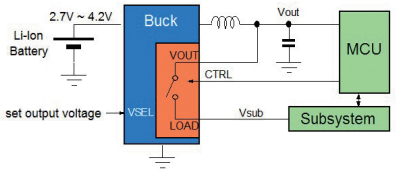
## LED Drivers

| Topology | Part Number | Vin | Vout | I | Key Features | Package |
|---|---|---|---|---|---|---|
|  Buck or Boost | RT8498 | 3.0V-18V | 3.0V-18V | 2A switch | → 350kHz Fsw<br>→ Multi-topology<br>→ Analog, PWM Digital or PWM to Analog dimming | SOT-23-6 |

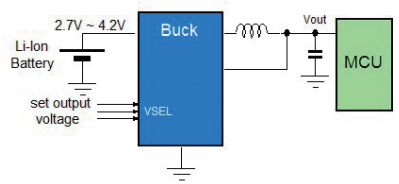
## LDOs

| Topology | Part Number | Vin | Vout | Iout | Iq | dropout | Key Features | Package |
|---|---|---|---|---|---|---|---|---|
|  | RT9073A/N | 1.2V-5.5V | Fixed 0.9V-3.3V | 250mA | 1uA | 0.45V@0.25A | → With Enable | ZQFN1x1-4 (ZDFN1x1-4 ), SC-82, SOT-23-5, SC-70-5 |
| | RT9063 | 2.5V-6.0V | Fixed 1.2V-3.3V | 250mA | 1uA | 0.4V@0.2A | | SOT-23-3, SOT-89-3 |
| | RT9078 | 1.2V-5.5V | Fixed 0.8V-3.45V | 300mA | 2uA | 0.15V@0.3A | → With Enable | TSOT-23-5 , ZQFN1x1-4 (ZDFN1x1-4) |
| | RT9080 | 1.2V-5.5V | Fixed 0.8V-3.3V | 600mA | 2uA | 0.31V@0.6A | → With Enable | TSOT-23-5 , ZQFN1x1-4 (ZDFN1x1-4) |
| | RT9058 | 3.5V-36V | Fixed 2.5-12V | 100mA | 2uA | 0.3V@10mA | | SOT-23-3, SOT-89-3 |
| | RT9086 | 2.2V-5.5V | Adj. 1.2V-4.5V | 250mA | 16uA | 0.12V@0.25A | → Ultra-high PSRR<br>→ With Enable<br>→ –40°C to 125°C $T_J$ operating | WL-CSP0.67x0.67-4(BSC), SOT-23-5 |
| | RT9076 | 2.5V-6V | Fixed 1.2V-3.3V | 250mA | 25uA | 0.4V@0.2A | | SOT-23-3 |
| | RT9013 | 2.2V-5.5V | Fixed 1.2V-2.85V | 500mA | 25uA | 0.25V@0.5A | → Very low noise | SC-82, SOT-23-5, SC-70-5, WDFN2x2-6 |
| | RT9083 | 1.2V-5.5V | Fixed 0.9V-3.3V | 250mA | 30uA | 0.45V@0.25A | → With Enable | TSOT-23-5 |
| | RT9055 | 1.5V-5.5V | Fixed 1.0V-3.5V | 300mA<br>+300mA | 29uA<br>+29uA | 0.24V@0.3A | → Dual outputs<br>→ With Enable | WL-CSP0.8x1.2-6 |
| | RT9081A | 0.8V-5.5V | Fixed 0.9V-1.8V<br>Adj. 0.8V-3.6V | 500mA | 80uA | 0.14V@0.5A | → Low Vin / low Vout<br>→ With Enable<br>→ Vbias 2.4V-5.5V | ZADFN1.2x1.2-6 |
| | RT9193 | 2.2V-5.5V | Fixed 1.5V-5.0V | 300mA | 90uA | 0.22V@0.3A | → Low Vin / low Vout<br>→ With Enable | SC-70-5, SOT-23-5, TSOT-23-5, WDFN2x2-6, MSOP-8 etc. |

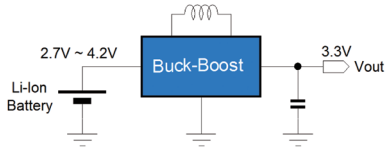
## Buck Converters

| Topology | Part Number | Vin | Vout | Iout | Iq | Fsw | Key Features | Package |
|---|---|---|---|---|---|---|---|---|
|  **CMCOT mode**<br>→ Fast transient<br>→ max duty-cycle 80%<br>→ PSM and force-PWM | RT5710 | 2.5V-6.0V | 0.6V-3.4V | 1A | 22uA | 1.5MHz | | WDFN2x2-6 |
| | RT8096 | 2.5V-6.0V | 0.6V-3.4V | 1A | 22uA | 1.5MHz | → Power Good | (T) SOT-23-5/6 |
| | RT5711 | 2.5V-6.0V | 0.6V-3.4V | 1.5A | 22uA | 1.0MHz | | WDFN2x2-6 |
| | RT5796 | 2.5V-6.0V | 0.6V-3.4V | 1.5A | 22uA | 1.0MHz | → Power Good | (T) SOT-23-5/6 |
| | RT5712 | 2.7V-6.0V | 0.6V-3.4V | 2A | 22uA | 1.0MHz | | WDFN2x2-6 |
| | RT8097 | 2.7V-6.0V | 0.6V-3.4V | 2A | 22uA | 1.0MHz | → Power Good | SOT-23-5/6 |
| | RT5797 | 2.7V-6.0V | 0.6V-3.4V | 3A | 22uA | 1.0MHz | → Power Good | WDFN2x2-8 (S) |
|  **ACOT mode**<br>→ Ultra-fast transient<br>→ Power Good<br>→ 100% duty-cycle mode | RT5784A/B | 2.5V-6.0V | VFB=0.6V | 2A | 25uA | 1.5MHz | → Power Good | WDFN2x1.5-8J (FC) |
| | RT5785A/B | 2.5V-6.0V | VFB=0.6V | 2A | 25uA | 1.5MHz | → Power Good | TSOT-23-8 (FC) |
| | RT5795A | 2.5V-5.5V | VFB=0.45V | 2A | 30uA | 2.7MHz | → PSM only | WDFN2x2-8S |
| | RT5788A/B | 2.5V-6.0V | VFB=0.6V | 4A | 35uA (A) | 1.5MHz | → Power Good | TSOT-23-8 (FC) |
| | RT5789A/B | 2.5V-6.0V | VFB=0.6V | 6A | 35uA (A) | 1.5MHz | → Power Good | TSOT-23-8 (FC)<br>UDFN2.5x2-8 (FC) |
|  **HCOT mode**<br>→ Ultra-fast transient<br>→ 100% duty-cycle mode<br>→ Ultra low Iq<br>→ Build in load switch | RT5706 | 2.2V-5.5V | 1.2V / 1.8V | 400mA<br>( 500mA Ipeak ) | 0.36uA | 1.2MHz | → Ultra low Iq<br>→ Load switch<br>→ 1 Vout select pin | WL-CSP0.9x1.6-8 (BSC)<br>WDFN2x2-8L |

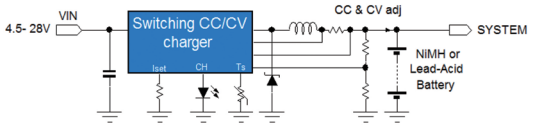
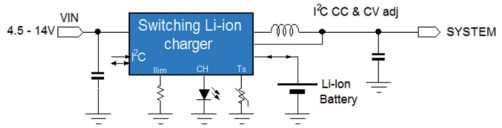
## Buck Converters

| Topology | Part Number | Vin | Vout | Iout | Iq | Fsw | Key Features | Package |
|---|---|---|---|---|---|---|---|---|
|  **HCOT mode**<br>→ Ultra-fast transient<br>→ 100% duty-cycle mode<br>→ Ultra low Iq | RT5707 | 2.2V-5.5V | 1.2V-3.3V | 0.6A/1.0A Ipeak | 0.36uA | 1.2MHz | → Ultra low Iq<br>→ 3 Vout select pins | WL-CSP0.9x1.6-8(BSC) |
| | RT5707A | 2.2V-5.5V | 0.7V-3.1V | 0.4A/0.5A Ipeak | 0.36uA | 1.2MHz | → Ultra low Iq<br>→ 3 Vout select pins | WL-CSP0.9x1.6-8(BSC) |

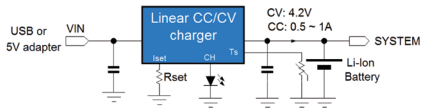
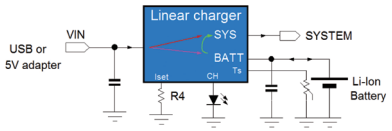
## Buck Boost Converters

| Topology | Part Number | Vin | Vout | Switching current | Iq | Fsw | Key Features | Package |
|---|---|---|---|---|---|---|---|---|
|  | RT6150A/B | 1.8V-5.5V | 2.5V-5.5V | 1.6A | 60uA | 1MHz | → PSM/PWM<br>→ Synchronous | WDFN3x3-10 (A)<br>WDFN2.5x2.5-10 (B) |
| | RT6158H | 2.5V-5.5V | 2.1V-5.2V | 3A | 8uA | 2MHz / 2.2-2.6MHz ext. sync. | → PSM/PWM<br>→ Synchronous | WL-CSP2.07x2.33-25 (BSC) |
| | RT6158A | 2.5V-5.0V | 2.1V-5.2V | 2A | 8uA | 2MHz / 2.2-2.6MHz ext. sync. | → PSM/PWM<br>→ Synchronous | WLCSP2.07x2.33-25 (BSC) |
| | RT6154A/B | 1.8V-5.5V | 1.8V-5.5V (A)<br>3.3V (B) | 5A | 20uA | 2.4MHz / 2.2-2.6MHz ext sync | → PSM/PWM<br>→ Synchronous | WDFN4x3-14A |

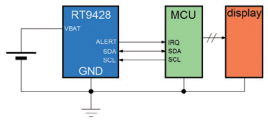
## Switching Chargers

| Topology | Part Number | Vin | VBAT | Key Features | Package |
|---|---|---|---|---|---|
|  Generic switching chargers for lead-acid or Ni-MH batteries | RT9535A | 4.5V-28V | 2.5V-22V | → Internal switch<br>→ Asynchronous Adj. CV<br>→ Fsw 500kHz | WQFN4x4-16 |
| | RT9535B | 4.5V-28V | 2.5V-22V | → ICH 2A<br>→ Internal switch<br>→ Input current limit<br>→ End of charge flag<br>→ ASynchronous Adj. CV<br>→ Fsw 500kHz | WQFN4x4-24 |
| | RT9538 | 4.5V-28V | 2.5V-25V | → External switch, Input current limit, Asynchronous Adj. CV, Fsw 475kHz | WQFN4x4-16 |
|  Li-ion switching chargers for mobile phones, tablet PC with large capacity batteries: single cell Li-ion or LiPo 1800mAh-4000mAh | RT9458 | 4.3V-6V | 3.5V-4.44V (per 20mV) | → I²C control<br>→ Ich(adj.) 0.5A-1.55A<br>→ Int.MOSFETs<br>→ Thermal regulation<br>→ USB OTG 1A | WL-CSP2.1x1.87-20(BSC) |
| | RT9460 | 4.3V-9V | 3.5V-4.62V (per 20mV) | → I²C control & stand-alone<br>→ Ich(adj.) 1.25A-3.125A<br>→ Int.MOSFETs<br>→ NTC sense JEITA CC.<br>→ Thermal regulation<br>→ USB OTG 0.5A/1A | WL-CSP2.52x2.52-25(BSC) |
| | RT9466 | 4V-14V | 3.9V-4.71V (per 10mV) | → I²C I-ch(adj) 0.1~5A<br>→ int. MOSFETs<br>→ NTC sense JEITA CC<br>→ CV. Thermal Reg.<br>→ IR compensation<br>→ USB OTG 0.5A~2.4A<br>→ Ship & Factory mode<br>→ Current reporting | WQFN4x4-24 |
| | RT9468 | 4V-14V | 3.9V-4.71V (per 10mV) | → Supports Direct Charge<br>→ I²C I-ch(adj) 0.1~5A<br>→ int. MOSFETs<br>→ NTC sense JEITA CC<br>→ CV. Thermal Reg.<br>→ IR compensation<br>→ USB OTG 0.5A~2.4A<br>→ Ship & Factory mode<br>→ Current reporting | WQFN4x4-32 |

## Linear Single Cell Li-Ion Charger ICs

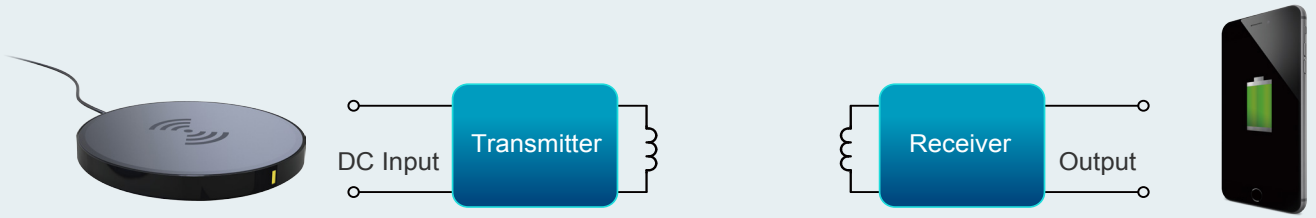
| Topology | | Part Number | AC Adapter | Vin | I-ch (adj.) | CV | Key Features | Package |
|---|---|---|---|---|---|---|---|---|
|  | Low capacity batteries 100mAh~500mAh for sensors, wearables & IOT | RT9527 | 28V | 4.4V-6V | 10mA-600mA | 4.2V | → NTC sense<br>→ Timer<br>→ 2 indicators | WDFN2x2-8 |
| | For 400~1000mAh Li-ion batteries | RT9505 | 18V | 4.5V-6V | 1.2A | 4.2V | → NTC sense<br>→ 2 indicators | WDFN3x3-10 |
| | | RT9502 | 18V | 4.5V-6V | 1.2A | 4.2V | → USB 100/500 mode<br>→ NTC sense<br>→ 2 indicators | WDFN3x3-10 |
| | | RT9532 | 28V | 4.3V-6.2V | 1A | 4.2V & factory mode | → 4.9V LDO<br>→ USB 100/500 mode<br>→ 2 indicators | WDFN3x2-10 |
| | For 400~1000mAh Li-ion batteries & different battery voltages | RT9536 | 28V | 4.3V-5.5V | 1A | 4.2V & 4.35V & factory mode | → 4.9V LDO<br>→ USB 100/500 mode<br>→ 2 indicators | WDFN3x2-10 |
|  | Linear chargers with auto power path | RT9519B | 28V | 4.4V-6V | 1.2A | 4.2V | → APPM<br>→ Adjustable Vbat & Vin current limit 0.1/0.5/1.5A<br>→ NTC sense<br>→ 2 indicators | WQFN3x3-20 |
| | | RT9525 | 28V | 4.2V-6V | 1.2A | 4.2V | → APPM with system off<br>→ Adjustable Vin current limit 0.1/0.5/1.5A<br>→ NTC sense<br>→ 2 indicators | WQFN3x3-16 |

## Battery Gauge

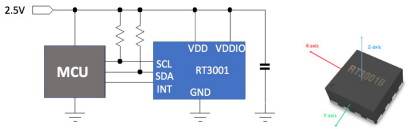
| Topology | Part Number | Vin | Key Features | Package |
|---|---|---|---|---|
|  <br>Single cell Li-ion gauge | RT9428 | 2.5V-4.5V | → 7.5mV sense accuracy<br>→ 3% SOC accuracy<br>→ I²C control with Alert pin | WL-CSP1.6x1.52-8(BSC) |

## Wireless Power

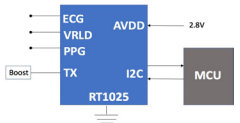
| WPC Family | | | Note |
|---|---|---|---|
| WPC Qi EPP Certified | Transmitter (Tx) | Receiver (Rx) | |
| Low Power(<5W) | RT3181A (LP-A11)<br>WPC Qi EPP Certified | RT1652 | → Find out more for wireless power reference designs and purchase information. |
| Medium Power (5W-15W) | RT3181A (MP-A5)<br>WPC Qi EPP Certified | RT1653 | |




## 3-Axis Accelerometer

| Topology | Part Number | Key Features | Package |
|---|---|---|---|
|  Motion sensor family: 3-Axis accelerometer | RT3001 | → Ultra-low Power Consumption<br>→ 12.7uA @ 50Hz ODR<br>→ 1.4 uA @ 6.25Hz ODR, Wakeup Mode Operation<br>→ 0.11uA @ Power Down Mode Current<br>→ Programmable ±2G, ±4G, ±8G Full Scales<br>→ Programmable Interrupts (Glance, single/double tap, etc.)<br>→ Embedded Deep FIFO<br>→ I²C interface | LGA-12L 2x2 |

## Biometric sensor

| Topology | Part Number | Key Features | Package |
|---|---|---|---|
|  Low-Power, Integrated ECG/PPG AFE for Heart-Rate Monitoring and Measurements | RT1025 | → Integrated AFE solution for Heart-Rate monitoring and measurements<br>→ Integrated low-noise, high-precision voltage and current sensing channels for sensing ECG (Electrocardiography) and PPG (Photoplethysmography) simultaneously<br>→ Over 85dB high CMRR (common-mode rejection ratio) to achieve good noise cancellation<br>→ High levels of integration and high-precision voltage and current sensing channels for scalable medical instrumentation systems<br>→ Also Ideal for low-power medical ECG/PPG, sports and fitness wearable devices etc. | WL-CSP3.10x3.48-41 |

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