



**SKYWORKS®**

## Applications

- Battery-powered devices
- Universal Serial Bus (USB)-powered peripheral devices
- Consumer, industrial, medical, automotive: battery-powered or wireline devices
- Smartphones
- Tablet, desktop, and notebook computers
- Set-top boxes
- Wireless infrastructure
- Portable navigation devices (PNDs)
- Digital still cameras
- Portable electronic devices
- PC cards (PCMCIA)

## Features

- High efficiency at light and maximum load
- Ease of design
- Cost-effective
- Small form factor
- Skyworks Green™ packaging

## Power Management Solutions

### Select Products Available from Stock for Prototype or High-volume Production

Skyworks Solutions is pleased to offer a select group of power management products from our diverse power, lighting, and display portfolio that are in stock and ready for immediate design into demanding applications. These select power management products include the most popular battery chargers, DC/DC converters, voltage regulators and light-emitting diode (LED) drivers, all of which are readily available to ship in 3k reels.

Skyworks' power management solutions provide designers with reduced design time and cost advantages while delivering power efficiency, excellent performance, and even better value in a small form factor package. Let us help solve your design challenges with smartphones, tablets, set-top boxes, wireless infrastructure systems, smart energy and connected home platforms, as well as automotive, aerospace, defense, medical and other diverse applications.

#### **Battery Chargers**

- Linear Chargers
- Switching Chargers
- Supercap Chargers

#### **DC/DC Converters (Switching Regulators)**

- Step-up Converters
- Step-down Converters
- Low Drop-out (LDO) Linear Regulators

#### **Display and Lighting**

- Lighting Management Units
- RGB LED Controllers
- White LED Drivers

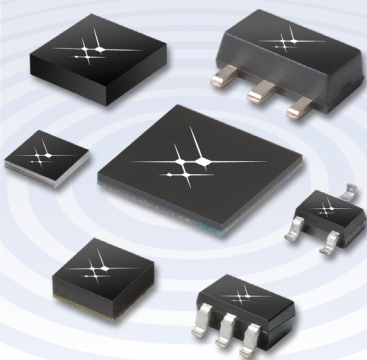
#### **Multi-function Power Management Integrated Circuit (PMIC/PMU)**

#### **Power Half Bridges**

#### **Port Protection and Power Distribution**

- Current Limited Load Switches (USB PCMCIA)
  - Single Input High Side Switches / Current Limiters
- I/O Expander Serial Controlled Load Switches
- Slew Rate Controlled
- Over Voltage Protection

#### **Supervisors/Monitors, Voltage Detectors – Microprocessors**



Skyworks Green™ products are compliant to all applicable materials legislation and are halogen-free. For additional information, please refer to Skyworks Definition of Green™, document number SQ04-0074.

## Battery Chargers

Battery management products are total power management ICs (TPMICs) that manage the charging, sequencing, and protection of lithium-ion/polymer batteries in personal portable electronics. Skyworks' linear and switching chargers are designed for single and/or dual cell lithium-ion/polymer batteries. These full-featured battery management ICs maximize charging speed and minimize power loss during power delivery to the system. Additionally, they offer integrated system protection using USB and/or adaptor input and dynamic charging capabilities. Many of these products contain unique circuit features to provide advanced IC thermal management during charging and proprietary input power control when supplied from USB port sources. New additions to this product line also feature over voltage protection up to 28 V.

### Linear Chargers

Skyworks' linear chargers are designed for single and dual cell lithium-ion/polymer batteries and offer an attractive, low-cost, low noise solution. These full-featured battery management ICs provide multiple levels of power savings, with system protection integrated inside along with single path, dual path, and dynamic charging capabilities. Electrical specifications are shown in Table 1.

### Switching Chargers

Linear charger ICs commonly used today to charge single-cell lithium-ion batteries offer an attractive, low-cost, low noise solution, but they can't deliver the higher efficiency levels needed to support higher charge rates and shorter charging cycles. Switching chargers, on the other hand, offer dramatically improved efficiency and higher charge rates. By using the best of both charging methodologies, Skyworks' switching chargers offer portable system designers a new way to quickly charge a new generation of higher capacity batteries while minimizing the inherent noise of switch-mode power supplies. Electrical specifications are shown in Table 2.

## Supercap Chargers

Skyworks supercap chargers are programmed, current limited P-channel metal-oxide-semiconductor field-effect transistor (MOSFET) power switches designed for high-side load-switching applications, such as solid-state drive (SSD) memory buffer saving. With programmed current limits, these devices ensure that the power ratings of the host are not exceeded, balancing the system load and supercap charging current automatically to provide enough system load current in top-priority. The integrated discharge path control assures that the system load can still be supported in the short term when the input power has not fully charged the supercap. The current limit is programmed by an external resistor allowing  $\pm 10\%$  accuracy at room temperature. Electrical specifications are shown in Table 3.

## DC/DC Converters (Switching Regulators)

Skyworks' high efficiency pulse width modulation (PWM) switch-mode voltage regulators are ideal for a wide variety of products such as smartphones, PNDs, notebook computers, set-top boxes, digital still cameras, and other portable electronic devices. Solutions are available for a wide range of output power, optimizing both size and performance for specific power levels. The switch-mode products utilize high switching frequencies to minimize output inductor and capacitor size. Internal compensation eliminates additional external components. These products provide excellent light load efficiency and minimum light load ripple. In addition to excellent efficiency, many SwitchReg™ products offer fast turn-on time and fast transient response capabilities. Taking advantage of advanced modular bipolar CMOS DMOS (BCD) processes allows very low resistance switches and eliminates the need for special packages that require additional thermal relief.

### **Step-up Converters**

Step-up converter solutions are available for a wide range of output power, optimizing both size and performance for specific power levels. The switch-mode products utilize high switching frequencies to minimize output inductor and capacitor size. These devices are available in fixed and adjustable outputs and are designed to be stable with both ceramic and titanium output capacitors. Other standard features include over-current, over-temperature, on/off enable, and power good indicator circuits. Electrical specifications are shown in Table 4.

### **Step-down Converters**

Step-down converter solutions are available for a wide range of output power, optimizing both size and performance for specific power levels. The switch-mode products utilize high switching frequencies to minimize output inductor and capacitor size. These devices are available in fixed and adjustable outputs and are designed to be stable with both ceramic and titanium output capacitors. Other standard features include over-current, over-temperature, on/off enable, and power good indicator circuits. Electrical specifications are shown in Table 5.

### **Low Drop-out (LDO) Linear Regulators**

Linear voltage regulators (PowerLinear™) products include MicroPower™, NanoPower™, and OmniPower™ LDO linear regulators which provide regulated power sources in products such as smartphones, PNDs, notebook computers, set-top boxes, digital still cameras, and other portable personal electronic devices. Skyworks' LDO regulator products are designed to provide a well regulated power supply while at the same time maximize the performance for a given application. NanoPower™ LDO regulators typically operate with a ground current level of 1.1  $\mu$ A. The MicroPower™ product line has LDO regulators optimized for low output noise and high power supply ripple rejection, making them well suited for sensitive RF and wireless circuit applications. Other MicroPower™ single- and dual-channel LDO regulators from Skyworks feature fast transient response to meet the most demanding load requirements. OmniPower™ LDO regulators are suitable for general purpose linear regulation requirements across a wide range of applications. All Skyworks LDO regulators are designed to be highly reliable and stable over a wide range of operating conditions.

In addition, LDO regulator devices function with a wide variety of input and output capacitor types. However, they are ideally suited for stability with ceramic capacitors. Low-cost ceramic capacitors are recommended to help increase circuit performance, reduce printed circuit board area, and minimize cost. To further enhance application reliability under adverse operating conditions, all PowerLinear™ LDO regulators include over-current and over-temperature protection circuits. Electrical specifications are shown in Table 6.

## **Display and Lighting**

### **Lighting Management Units**

Given the complexity and diversity of feature sets found in today's smartphones, designers can gain tremendous advantage in terms of design time and cost by using Skyworks's lighting management unit (LMU) solutions. These devices drive multiple LEDs as well as integrate multiple LDOs linear regulators. Optimized for single-cell lithium-ion/polymer powered systems, the unique capabilities of these devices make them ideal for I<sup>2</sup>C-based high performance smartphones and other mobile devices. LMUs also add an automatic fade-in/fade-out backlight control that simplifies design and reduces processor overhead. Electrical specifications are shown in Table 7.

### **RGB LED Controllers**

These SmartSwitch™ devices are members of the Application Specific Power MOSFET™ (ASPM™) product family. They are intended for controlling RGB fashion lighting in portable products and operate with an input voltage ranging from 1.8 V to 5.5 V, making them ideal for 2.5 V, 3.3 V, or 5 V systems. They can also be used for a combination of general purposes where a load requires a low-side switch connection to ground.

These devices simplify design and layout limitations by eliminating the need for multiple general-purpose input/output (GPIO) control lines and discrete MOSFETs to control product features. To simplify switch implementation and reduce pin count, the state of each output channel is controlled with a single GPIO via the EN/SET pin using Simple Serial Control™ (S<sup>2</sup>Cwire™) one-wire interface. Electrical specifications are shown in Table 8.

### **White LED Drivers**

Skyworks offers a wide array of innovative solutions for white LED backlighting including regulated voltage output charge pumps and regulated current output charge pumps. Regulated voltage charge pumps are ideal for use in low-cost LCD panel backlighting applications. Regulated current charge pumps provide constant current source or sink outputs to drive white LEDs. By providing constant current to a white LED, uniform brightness can be assured across an array of white LEDs regardless of variations in the LED forward voltage. Products in this device family use single and multiple fractional charge pump topologies to maximize voltage conversion efficiency from lithium-ion/polymer batter sources. Electrical specifications are shown in Table 9.

### **Multi-function Power Management Integrated Circuit (PMIC/PMU)**

These devices are highly integrated system power management units offering a wide combination of step-up charge pump regulators, step-up and step down switching regulators, and low drop out regulators. Electrical specifications are shown in Table 10.

### **Power Half Bridges**

Skyworks' power half bridges include multiMHz power switches that can be used to provide compact voltage regulation in high-speed power supplies. Integrating input level shifting, high-speed break-before-make (shoot-through protection) circuitry, and low resistance, these power MOSFETs reduce board space, parts count, and stray parasitics in switching power supplies. FastSwitch™ buffered half bridge products may be used to drive inductors directly, as high-current gate drivers for discrete power MOSFETs. In addition, a dual buffered half-bridge may be used to drive multiple outputs or can be configured as a full bridge to affect a DC motor or Class-D audio driver. Electrical specifications are shown in Table 11.

### **Port Protection and Power Distribution**

#### **Current Limited Load Switches (USB PCMCIA)**

Current Limited Load Switches are designed for high-side power switching applications to cover a wide range of port protection applications for USB, PCMCIA (PC cards), and IEEE 1394 (FireWire) ports in desktop and notebook computers. Port protection switches provide inrush current limiting, short-circuit and over-temperature protection, input control level shifting, and fault flags. Designers can select different current limit options from preset thresholds to user-adjustable limits using just one external resistor. Single, dual, and quad switches are available to fulfill a wide array of application requirements. Devices intended for USB applications have complete Underwriters Laboratories® approval.

#### **Single Input High Side Switches / Current Limiters**

These SmartSwitch™ devices are members of the Application Specific Power MOSFET™ (ASPM™) product family. The devices are available in a number of channel configurations and have an integrated current-limiting circuit to protect the input supply against large changes in load current which could cause the supply to fall out of regulation. Electrical specifications are shown in Table 12.

#### **I/O Expander Serial Controlled Load Switches**

These SmartSwitch™ devices are members of Skyworks' Application Specific Power MOSFET™ (ASPM™) product family. They are targeted for I/O expansion applications and operate with an input voltage ranging from 1.8 V to 5.5 V, making them ideal for 2.5 V, 3.3 V, or 5 V systems, as well as systems powered by lithium-ion batteries. These devices can also be used for general purpose power load switching.

To simplify switch implementation and reduce pin count, the state of each output channel is controlled with a single GPIO via the EN/SET pin using Skyworks' Simple Serial Control™ (S<sup>2</sup>Cwire™) one-wire interface. These devices have very low quiescent supply current significantly improving power efficiency. Electrical specifications are shown in Table 13.

### **Over Voltage Protection**

Skyworks' over-voltage protection (OVP) switches provide up to 28 V over-voltage and overcurrent protection when powering low-voltage systems such as cell phones, MP3, and PDAs or when charging Lithium Ion batteries from a badly regulated supply.

These devices are inserted between the power supply or charger source and the load to be protected. The devices consist of a low resistance OVP switch, under-voltage lockout protection, over-voltage monitor and protection, over-current protection, battery over-voltage protection, fast shut-down circuitry, and a fault output flag. In normal operation the OVP switch acts as a slew-rate controlled load switch, connecting and disconnecting the power supply from IN to OUT. A low resistance N channel MOSFET is used to minimize the voltage drop between the voltage source and the load and to reduce the power dissipation.

When the voltage on the input exceeds the programmed over-voltage trip point, the device immediately turns off the internal OVP switch disconnecting the load from the abnormal voltage, preventing damage to any downstream components. In the case of an over-current condition, it limits the system current at the threshold value, and if the over current persists, the OVP switch is turned off after a blanking period. If the battery voltage rises to an unsafe level battery over-voltage protection (BOVP) threshold, the IC disconnects OUT from the charging input power IN until the battery voltage returns to an acceptable value. BOVP or over-current protection (OCP) blanking time ignores short-time transients of over-battery voltage and overload current. Additionally, these devices also monitor their own die temperature and turn the OVP switch off if it becomes too hot. Electrical specifications are shown in Table 14.

### **Slew Rate Controlled**

These SmartSwitch™ devices are members of the Application Specific Power MOSFET™ (ASPM™) product family. They are intended for high-side load-switching applications and operate with an input voltage ranging from 1.8 V to 5.5 V, making them ideal for 2.5 V, 3.3 V, or 5 V systems. These devices have low RDS(ON), allowing a low forward voltage drop and high current handling capability. Electrical specifications are shown in Table 15.

### **Supervisors/Monitors, Voltage Detectors – Microprocessors**

The microprocessor supervisor product line offers significant enhancements to Skyworks' standard voltage detectors. These devices provide a variety of additional user-selectable options beyond simple power-on or low-voltage reset functions. Selectable enhanced features may include reset delay functions, manual reset capabilities, and watchdog timers. Microprocessor supervisor devices are commonly used in notebook computers, cellular telephones, portable electronic products, and embedded systems. Electrical specifications are shown in Table 16.

## Power Management Specification Tables

Electrical specifications for our select power management products are provided in Tables 1 through 16 on the following pages.

### Battery Chargers

**Table 1. Linear Chargers**

Part Number	Number of Cells	Max. Protected $V_{IN}$ (V)	Max. Charging $V_{IN}$ (V)	Max. Charge Current (mA)	Number of Input Channels	Dynamic Power Mgmt.	Automatic Charge Reduction	Active Digital Thermal Loop Control	Charge Rate Control	Package (mm)
AAT3663	1/2	N/A	13.20	1000	USB or AC Adaptor	No	No	Yes	External Resistor	TDFN 14L 3 x 3 x 0.75
AAT3670	1	N/A	5.50	1600	USB and AC Adaptor	Yes	Yes	Yes	External Resistor	QFN 24L 4 x 4 x 0.90
AAT3672	1	N/A	6.50	1600	USB or AC Adaptor	Yes	Yes	Yes	External Resistor	TDFN 14L 3 x 3 x 0.75
AAT3673	1	N/A	6.50	1600	USB or AC Adaptor	Yes	Yes	Yes	External Resistor	TDFN 16L 4 x 4 x 0.8
AAT3681	1	N/A	7.50	300	USB or AC Adaptor	No	No	No	External Resistor	SC70JW 8L 2.0 x 2.1 x 1.05
AAT3681A	1	N/A	7.50	500	USB or AC Adaptor	No	No	No	External Resistor	SC70JW 8L 2.2 x 2.0 x 1.05
AAT3685	1	N/A	5.50	1000	USB or AC Adaptor	No	Yes	No	External Resistors	TDFN 12L 3 x 3 x 0.75
AAT3693	1	N/A	7.50	1600	USB or AC Adaptor	No	No	Yes	External Resistors	TDFN 10L 2.2 x 2.2 x 0.75

**Table 2. Switching Chargers**

Part Number	Number of Cells	Max. Protected $V_{IN}$ (V)	Max. Charging $V_{IN}$ (V)	Max. Charge Current (mA)	Number of Input Channels	Dynamic Power Mgmt.	Automatic Charge Reduction	Active Digital Thermal Loop Control	Charge Rate Control	Max. Switching Frequency (kHz)	Package (mm)
AAT3620	1	N/A	6	2000	USB or AC Adaptor	No	No	No	External Resistor	1500	TDFN 14L 3 x 3 x 0.75

**Table 3. Supercap Chargers**

Part Number	Number of Channels	Enable	Fault Flag	$I_{LIM}$	Typ. $I_Q$ ( $\mu$ A)	Typ. $R_{DS(ON)}$ ( $m\Omega$ )	$V_{IN}$ (V)	Package (mm)
AAT4712	1	Yes	POK; RDY	0.15–2.4 A	70	50	2.5–5.5	TDFN34 16L 3 x 4 x 0.75

## Voltage Regulation

### DC/DC Converters (Switching Regulators)

**Table 4. Step-up Converters**

Part Number	Min. $V_{IN}$ (V)	Max. $V_{IN}$ (V)	Min. $V_{OUT}$ (V)	Max. $V_{OUT}$ (V)	$I_{OUT}$ (mA)	$f_{OSC}$ (kHz)	Typ. $I_Q$ ( $\mu$ A)	Package (mm)
AAT1210	2.7	5.50	$V_{IN}$	18.0	900	2000	250	TDFN34 16L 3 x 4 x 0.75
<b>AAT1217</b>	0.5	$V_{OUT}$	2.5	5.5	600	1200	300	TSOT-23 6L 2.9 x 2.8 x 1 SOT23 6L 2.85 x 2.8 x 1.2
AAT1219	2.4	$V_{OUT} + 0.25$	3.0	5.0	2000 1200	1200	58	TDFN33 12L 3 x 3 x 0.75
AAT1230	2.7	5.50	18	18.0	100	2000	40	TSOPJW 12L 3 x 2.85 x 1.02 TDFN34 16L 4 x 3 x 0.75
AAT2215	2.4	5.25	3.0	5.5	3000	600	55	TDFN33 12L 3 x 3 x 0.75

**Table 5. Step-down Converters**

Part Number	Min. $V_{IN}$ (V)	Max. $V_{IN}$ (V)	Min. $V_{OUT}$ (V)	Max. $V_{OUT}$ (V)	$I_{OUT}$ (mA)	$f_{OSC}$ (kHz)	Typ. $I_Q$ ( $\mu$ A)	Package (mm)
AAT1110	2.7	5.5	0.6	$V_{IN}$	800	1400	27	SC70JW-8 2 x 2.1 x 1.1
AAT1146	2.7	5.5	0.6	$V_{IN}$	400	1400	27	SC70JW-8 2.0 x 2.1 x 1.1 SOT-23 5L 2.85 x 2.8 x 1.2
AAT1153	2.5	5.5	0.600	$V_{IN}$	2000	1200	300	TDFN33 10L 3 x 3 x 0.75
AAT2113B	2.7	5.5	1.000	2.500	1500	3300	55	FTDFN22 8L 2 x 2 x 0.75
AAT2114A	2.7	5.5	1.000	$V_{IN}$	2500	3000	70	QFN33 16L 3 x 3 x 0.90
AAT2120	2.7	5.5	0.600	$V_{IN}$	500	1800	45	STDFN22 8L 2 x 2 x 0.55
AAT2138	2.7	5.5	3.000	$V_{IN}$	2500	2800	90	TDFN 14L 3 x 3 x 0.75
<b>AAT2148</b>	2.7	5.5	0.600	$V_{IN}$	1000	2000	37	QFN33 16L 3 x 3 x 0.85
AAT2153	2.7	5.5	0.600	$V_{IN}$	2500	1400	42	QFN33 16L 3 x 3 x 0.85
AAT2158	2.4	5.5	0.600	$V_{IN}$	1500	1400	42	QFN33 16L 3 x 3 x 0.90
AAT2500	2.7	5.5	0.6	$V_{IN}$	400; LDO 300	1000	25; LDO 70	TDFN33 12L 3 x 3 x 0.75
AAT2522	2.7	5.5	0.60	$V_{IN}$	3000/ch	1400	90	TDFN34 16L 3 x 4 x 0.85
AAT2713	2.7	5.5	0.60	$V_{IN}$	600/ch	1700	70	QFN33 16L 3 x 3 x 0.85
SKY87201-11	2.7	5.5	0.60	$V_{IN}$	600	2000	37	STDFN 8L 2.0 x 2.1 x 1.05

**Table 6. Low Drop-out (LDO) Linear Regulators**

Part Number	Accuracy (%)	Typ. Dropout (mV)	Max. $I_{OUT}$ (mA)	Typ. $I_Q$ ( $\mu$ A)	Power Good	Shutdown	$V_{IN}$ (V)	$V_{OUT}$ (V)	$V_{REF}$ Bypass	Package (mm)
AAT3218	$\pm 1.5$	200	150	70	No	Yes	$V_{OUT} - 5.5$	Fixed 1.2–3.5	Yes	SOT-23 5L 2.85 x 2.80 x 1.20, SC70JW 8L 2.2 x 2.0 x 1.05
AAT3220	$\pm 2.0$	180	150	1.1	No	No	$V_{OUT} - 5.5$	Fixed 1.8–3.3	No	SC59 3L 2.85 x 2.80 x 1.20
<b>AAT3221</b>	$\pm 2.0$	200	150	1.1	No	Yes	$V_{OUT} - 5.5$	Fixed 1.6–3.5	No	SOT-23 5L 2.85 x 2.80 x 1.20, SC70JW 8L 2.2 x 2.0 x 1.05
<b>AAT3222</b>	$\pm 2.0$	200	150	1.1	No	Yes	$V_{OUT} - 5.5$	Fixed 1.6–3.5	No	SOT-23 5L 2.85 x 2.80 x 1.20
AAT3223	$\pm 2.0$	190	250	1.1	Yes	Yes	$V_{OUT} - 5.5$	Fixed 2.8–3.3	No	SOT-23 6L 2.85 x 2.80 x 1.20
AAT3258	$\pm 2.0$	400	300	71	$\mu$ P Reset	Yes	$V_{OUT} - 5.5$	Fixed 1.2–3.5	Yes	TSOPJW 8L 3 x 2.85 x 1.01

**NEW** New products (indicated in blue, bold) are continually being introduced at Skyworks. For the latest information, please visit the new products section of our Web site at [www.skyworksinc.com](http://www.skyworksinc.com).

## Display and Lighting

**Table 7. Lighting Management Units**

Part Number	Backlight LEDs	Max. Backlight $I_{OUT}$ per Channel (mA)	Flash LED Channel(s)	Max. Flash $I_{OUT}$ per/Ch (mA)	Max. Movie Mode $I_{OUT}$ per/Ch (mA)	LDO Output(s)	Min.–Max. LDO $V_{OUT}$	LDO Accuracy (%)	LDO Load Current (mA)	Min.–Max. $V_{IN}$	Interface	Package (mm)
AAT2848	4	30.0	2	300	100	N/A	N/A	N/A	N/A	2.7–5.5	S <sup>2</sup> Cwire™	TQFN33 20L 3 x 3 x 0.75

**Table 8. RGB LED Controllers**

Part Number	Description	Number of Channels	Enable	RGB Control	Low Side Switches	Typ. $I_Q$ (μA)	$V_{IN}$ (V)	Package (mm)
AAT4295	3 Channel Single RGB Controller	3	S <sup>2</sup> Cwire™	Single	3	3	1.8–5.5	SC70JW 8L 2.2 x 2.0 x 1.05

## White LED Drivers

**Table 9. Charge Pump Based White LED Backlight Drivers**

Part Number	Number of LEDs	LED Channels	LED(s) per/Ch	Min. $V_{IN}$	Max. $V_{IN}$	Interface	Peak Efficiency (%)	Current Accuracy (%)	Current Matching (%)	Max. $I_{OUT}$ per/Ch (mA)	Typ. $I_Q$ (μA)	Package (mm)
AAT3110	1	1	1	2.7	5.0	Enable	92	N/A	N/A	100	13	SOT-23 6L 2.85 x 2.8 x 1.2 SC70JW 8L 2 x 2.1 x 1.1
AAT3111	1	1	1	1.8	3.6	Enable	90	N/A	N/A	100	20	SOT-23 6L 2.85 x 2.8 x 1.1 SC70JW 8L 2 x 2.1 x 1.05

**Table 10. Multi-function Power Management Integrated Circuit (PMIC/PMU)**

Part Number	Number of LDO Reg.	Min. $V_{IN}$ (V)	Max. Reg $V_{IN}$ (V)	Max. Charger $V_{IN}$ (V)	Max. Charge Current (mA)	Max. Single/Ch Output Current (mA)	Min. Single/Ch Output Voltage (V)	Max. Step-Up Output Voltage (V)	Output Voltages Control	Operating Frequency (kHz)	Package (mm)
AAT2550	0	2.7	5.5	5.5	1000	600	0.6	$V_{IN}$	External Resistors	1400	QFN44 24L 4 x 4 x 0.93
AAT2603	4	2.7	5.5	6.0	N/A	1200	0.6	$V_{IN}$	External Resistors	1500	TQFN44 28L 4 x 4 x 0.75
AAT2605	5	2.7	5.5	N/A	N/A	300	0.6	N/A	Fixed	N/A	TDFN33 14L 3 x 3 x 0.75
AAT2614	1	2.5	5.5	N/A	N/A	600/300	1.0/1.8	N/A	Fixed	2000	TQFN33 20L 3 x 3 x 0.75 or 16-bump CSP-0.4 1.65 x 1.65

**Table 11. Power Half Bridges**

Part Number	Break Before Make Time (ns)	Max. $I_{OUT}$ (mA)	Logic Input	Typ. $R_{DS(ON)}$ (mΩ) High Side Switch	Typ. $R_{DS(ON)}$ (mΩ) Low Side Switch	$V_{IN}$ (V)	Package (mm)
AAT4900	5	1000	Yes	130	105	2.7–5.5	SOT-23 5L 2.85 x 2.80 x 1.20, SC70JW 8L 2.0 x 2.1 x 1.05
AAT4901	5	700	Yes	220	160	2.0–5.5	SC70JW 8L 2.0 x 2.1 x 1.05
AAT4910	50	N/A	Yes	3000	1700	4.5–28	SC70JW 8L 2.2 x 2.0 x 1.05



## Port Protection and Power Distribution

### Current Limited Load Switches

**Table 12. Single Input Side Switches—Current Limiters**

Part Number	Number of Channels	Enable	Fault Flag	$I_{LIM}$	Typ. $I_Q$ ( $\mu A$ )	Typ. $R_{DS(ON)}$ ( $m\Omega$ )	$V_{IN}$ (V)	Package (mm)
AAT4614	1	Yes	Yes	Adj. 1.6 A	10	160	2.4–5.5	SC70JW 8L 2.0 x 2.1 x 1.05, SOT-23 6L 2.85 x 2.80 x 1.20, SOT-23 5L 2.85 x 2.80 x 1.20
AAT4616	1	Yes	Yes	300 mA to 1.6 A	10	130	2.4–5.5	SOT-23 5L 2.85 x 2.80 x 1.20, TDFN22-8 2 x 2 x 0.75
AAT4616A	1	Yes	Yes	300 mA to 1.6 A	10	130	2.4–5.5	TDFN22 6L 2 x 2 x 0.75

**Table 13. I/O Expander Serial Controlled Load Switches**

Part Number	Number of Channels	Enable	Turn On Rise Time ( $T_R$ )	Typ. $R_{DS(ON)}$ ( $m\Omega$ )	Typ. $I_Q$ ( $\mu A$ )	$V_{IN}$ (V)	Package (mm)
AAT4292	7	AS <sup>2</sup> Cwire™	0.27 $\mu s$	1100	6.3	1.8–5.5	SC70JW 10L 2.2 x 2.0 x 0.55
AAT4296	5	S <sup>2</sup> Cwire™	1.6 $\mu s$	Pch 2.5, Nch 1.9	3.0	1.8–5.5	SC70JW 8L 2.0 x 2.1 x 1.05

**Table 14. Over Voltage Protection**

Part Number	Number of Channels	Enable	Fault Flag	$I_{LIM}$	Typ. $I_Q$ ( $\mu A$ )	Typ. $R_{DS(ON)}$ ( $m\Omega$ )	$V_{IN}$ (V)	Package (mm)
AAT4684	1	Yes	Yes	1.8 A	30	100	3.0–14	TSOPJW 12L 3 x 2.85 x 1.02
AAT4687	1	Yes	Yes	N/A	30	130	3.0–14	SC70JW 10L 2 x 2 x 1.1

**Table 15. Slew Rate Controlled**

Part Number	Description	Number of Channels	Enable	Turn On Rise Time ( $T_R$ )	Typ. $R_{DS(ON)}$ ( $m\Omega$ )	Typ. $I_Q$ ( $\mu A$ )	$V_{IN}$ (V)	Package (mm)
AAT4280A	Slew Rate Controlled Load Switch	1	Yes	0.5 $\mu s$ , 0.1 ms, 1.0 ms	80	0.025	1.5–5.5	SOT-23 6L 2.85 x 2.8 x 1.2, SC70JW 8L 2.2 x 2 x 1.05
AAT4282A	Dual Slew Rate Controlled Load Switch	2	Yes	0.5 $\mu s$ , 0.1 ms, 1.0 ms	60	1.000	1.5–6.5	FTDFN22-8 2 x 2 x 0.75, SC70JW 8L 2.2 x 2 x 1.05
AAT4282B	–	2	Yes	0.065 ms, 0.75 ms	67	0.040	1.5–6.5	TDFN22-8, 2 x 2 x 0.75
AAT4285	12 V Slew Rate Controlled Load Switch	1	Yes	0.1 ms	240	25.000	3.0–13.2	SC70JW 8L 2.2 x 2 x 1.05

**Table 16. Supervisors/Monitors, Voltage Detectors—Microprocessors**

Part Number	Accuracy (%)	Manual Reset	Output: Active Low, Open Drain	Output: Push-Pull Active High	Output: Push-Pull Active Low	Typ. $I_Q$ ( $\mu A$ )	Threshold (V)	$V_{IN}$ (V)	Watchdog Timer	Package (mm)
AAT3510	$\pm 1.5$	Yes	No	No	Yes	5.00	2.6–5.0	1.0–5.5	Yes	SOT-23 5L 2.85 x 2.8 x 1.2
AAT3517	$\pm 1.5$	Yes	Yes	No	Yes	5.00	2.6–5.0	1.0–5.5	Yes	SOT-23 5L 2.85 x 2.8 x 1.2

For additional information, please refer to the following:

### **Application Notes**

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### **Designer Information**

Gerber files and functional block diagrams are available for many power management products.

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[www.skyworksinc.com](http://www.skyworksinc.com)

**USA**

**Headquarters: Massachusetts**

Skyworks Solutions, Inc.  
20 Sylvan Road  
Woburn, MA 01801  
Telephone: (781) 376-3000  
Fax: (781) 376-3100  
sales@skyworksinc.com

**California**

Skyworks Solutions, Inc.  
5221 California Avenue  
Irvine, CA 92617  
Telephone: (949) 231-3000  
Fax: (949) 231-3206  
sales@skyworksinc.com

Skyworks Solutions, Inc.  
3230 Scott Boulevard  
Santa Clara, CA 95054  
Telephone: (408) 330-1400  
Fax: (408) 737-4611  
sales@skyworksinc.com

**Maryland**

Trans-Tech, Inc.  
5520 Adamstown Road  
Adamstown, MD 21710  
Telephone: (301) 695-9400  
Fax: (301) 695-7065  
transtech@skyworksinc.com

**EUROPE**

**France**

Skyworks Solutions, Inc.  
60 rue Saint André des Arts  
Bâtiment D  
75006 Paris  
France  
Telephone: +33 1 43548540  
Fax: +33 1 43540005  
irene.pfeiffer@skyworksinc.com

**United Kingdom**

Skyworks Solutions, Ltd.  
South Building  
Walden Court  
Parsonage Lane  
Bishops Stortford  
Hertfordshire CM23 5DB  
United Kingdom  
Telephone: +44 7585 964479  
Fax: +44 01279 464201  
daniel.godsiff@skyworksinc.com

**Finland**

Skyworks Solutions, Inc.  
Keilaranta 16 (5th Floor)  
FIN-02150 Espoo  
Finland  
Telephone: +358 9251 07131  
Fax: +358 9 2510 7129  
tommi.hiillos@skyworksinc.com

**ASIA • PACIFIC**

**China**

Skyworks Solutions, Inc.  
Room 2901-02, Chong Hing  
Finance Center  
No. 288 Nanjing Road (W)  
Shanghai 200003 China PRC  
Telephone: +86 21 23066230  
ext. 60167  
Fax: +86 21 33663398  
elaine.zhao@skyworksinc.com

Skyworks Solutions, Inc.  
Room 2701, 27/F Tower 3  
Kerry Plaza  
No. 1 Zhongxinsi Road  
Futian District  
Shenzhen 518048 China PRC  
Telephone: +86 755 8828 8399  
Fax: +86 755 8828 8358  
jesse.li@skyworksinc.com

Skyworks Solutions, Inc.  
Suite 1315, Tower B, COFCO Plaza, No. 8  
Jianguomennei Avenue  
Dongcheng District  
Beijing 100005 China PRC  
Telephone: +8610 652 60859  
ext. 61602  
Fax: +8610 652 61358  
abby.huang@skyworksinc.com

**Japan**

Skyworks Solutions Co., Ltd.  
Tokyo Opera City Tower 36F  
3-20-2 Nishi-Shinjuku  
Shinjuku-ku  
Tokyo, 163-1436  
Japan  
Telephone: +81 3 5308 5180  
Fax: +81 3 5308 5190  
ahihiro.karikomi@skyworksinc.com

**Korea**

Skyworks Solutions, Inc.  
12th Floor West Wing Posco Center  
892 Daechi 4-Dong, Kangnam-Gu  
Seoul, Korea 135-777  
Telephone: +82 2 3490 3800  
Fax: +82 2 553 5459  
juhee.lee@skyworksinc.com

**Singapore**

Skyworks Global Pte Ltd.  
10 Ang Mo Kio Street 65  
#05-15/16 Techpoint  
Singapore 569059  
Telephone: +65 64031971  
Fax: +65 64031931  
yuenfong.choong@skyworksinc.com

**Taiwan**

Skyworks Solutions, Inc.  
4 F, #198, Section 2  
Tun Hwa S. Road  
Taipei 106, Taiwan ROC  
Telephone: +8862 5559 8992  
Fax: +8662 2735 6508  
joanna.wu@skyworksinc.com

**Skyworks Solutions, Inc.**

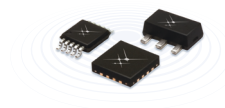
20 Sylvan Road, Woburn, MA 01801

USA: (781) 376-3000 • Asia: 886 2 2735 0399

Europe: 33 (0)1 43548540 • Fax: (781) 376-3100

Email: [sales@skyworksinc.com](mailto:sales@skyworksinc.com) • [www.skyworksinc.com](http://www.skyworksinc.com)

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