



ST-ERICSSON – POWERING THE MOBILE FUTURE

As a world leader in the development of wireless platforms and semiconductors, ST-Ericsson is right at the forefront of the drive to extend the battery lives of increasingly power-hungry mobile phones, tablets and other handheld devices.

One of the key considerations for consumers choosing a portable device is how long it will operate before it needs to be re-charged. Mobile phones based on ST-Ericsson's platforms, which incorporate advanced power management technologies, can now offer several weeks of stand-by time, half-a-day of talk-time or more than 100 hours of music playback time on one charge.

Consumers are also looking for smartphones, in particular, to support high-definition (HD) video recording, HD video streaming, online gaming and other rich multimedia applications. To meet this demand, the latest smartphones are equipped with powerful application processors, high-resolution displays and high-speed modems. Without power-management technologies, this advanced hardware would quickly drain a handset's battery.

POWER MANAGEMENT TECHNOLOGY

ST-Ericsson's power management solutions use an array of sophisticated technologies to ensure that even the most advanced smartphones can still last a day on one battery charge. For example, ST-Ericsson has developed state-of-the-art power conversion and heat management techniques which prevent intensively-used devices from becoming too hot. In order to save space and lower costs, ST-Ericsson's power management technology is generally integrated into the "analog and mixed-signal" system-on-a-chip, which also manages battery charging and incorporates the audio sub-system and high-speed interfaces with other devices.

ST-Ericsson is the leading supplier in mobile handset standalone analog baseband ICs, with an estimated global market share of 32% in 2010, according to IHS iSupply. To date, it has shipped more than three billion such integrated circuits. ST-Ericsson's portfolio of power-management solutions is based on leading-edge 130nm silicon technology, which enable devices to benefit from the optimal combination of low power, high performance and low cost-of-materials.

To address different segments of the mobile device market, ST-Ericsson has developed a range of power management solutions:

STANDALONE SOLUTIONS

Aimed at smartphones, tablets and other mid-to-high-end devices, ST-Ericsson's standalone "analog and mixed-signal" systems manage power consumption and battery charging, while also supporting high-performance audio and video solutions.

The fast-growing popularity of smartphones and tablets, which run very sophisticated multimedia applications, means that demand for these high-performance standalone components is growing quickly.

ST Ericsson's standalone analog and mixed signal solutions support:

- Very high power sources and efficient conversion (>90%) with the accurate performance required by the most demanding devices, such as tablet computers

- High speed interfaces, such as USB3, HDMI, SD and SATA
- Crystal-clear audio performances for headsets (>100db SNR) and loudspeakers (2W) with multi-channel playing and recording capabilities

INTEGRATED SOLUTIONS

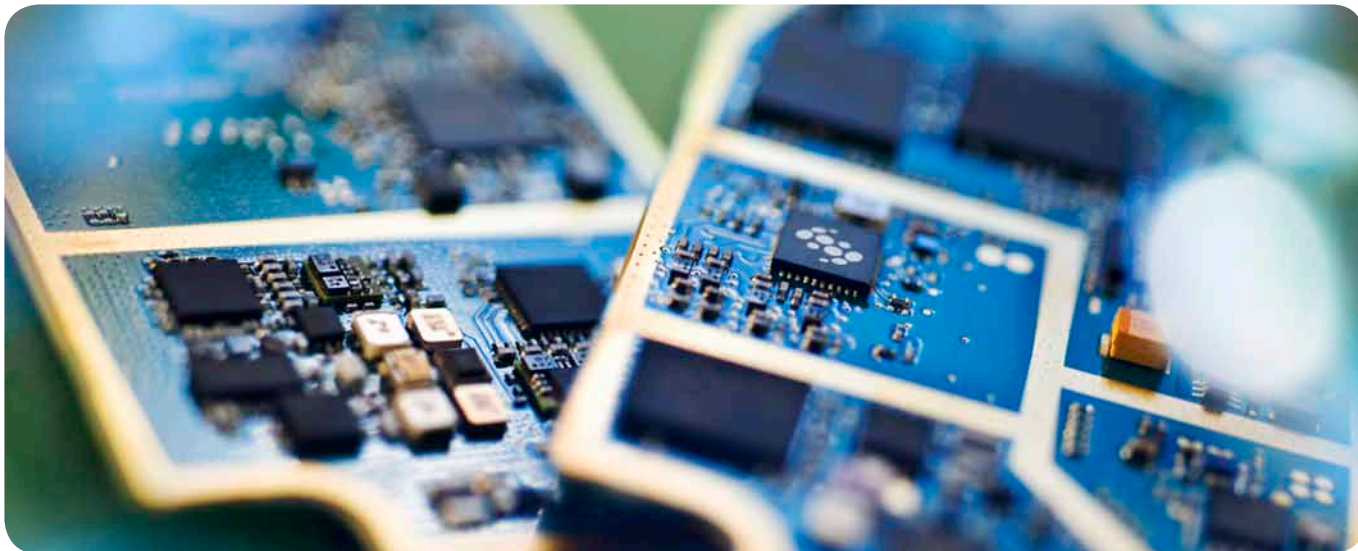
At the mid-to-low end of the mobile phone market, manufacturers generally prefer analog and mixed-signal solutions to be integrated into a device's main system-on-a-chip, enabling the production of very compact, highly cost-effective devices. ST-Ericsson's market-proven solutions are all integrated onto one piece of silicon, saving space and cost for device manufacturers.

EXTENDING MUSIC PLAYBACK

ST-Ericsson has invented innovative technologies specifically-designed to reduce the battery power used by mobile phones when playing music. These technologies include:

The Playback Time Extender (PTE™), which typically doubles the audio playback time of a mobile phone platform by buffering audio data at high speed, enabling the actual playback to consume far less power. Originally developed for audio, the PTE™ technology is now also used for video.

The Supply Modulated Audio Buffer (SMAB™) which makes sure that no power is wasted when amplifying audio signals by adjusting the level of the power supply to the required volume.



RF POWER MANAGEMENT

ST-Ericsson has also developed dedicated power management integrated circuits for a mobile phone's radio frequency (RF) sub-system, which transmits and receives radio signals over the air. ST-Ericsson's RF power management integrated circuits reduce significantly the power consumption of the RF power amplifier, which is typically one of the most energy-hungry components in a mobile phone. This technology can more than double a mobile phone's talk-time or Internet connection time on one battery charge.

ST-Ericsson's PM3533 is a pioneering "all-in-one" solution that enables a dual-mode (3G and 2G) RF system to operate at a lower battery voltage, while ST-Ericsson's PM3110 is 20% smaller than earlier DC/DC regulators for RF power amplifiers. Both the PM3533 and PM3110 are scheduled to be in volume production in the first quarter of 2011.

SMARTER POWER DISTRIBUTION

ST-Ericsson has also introduced an array of innovations designed to optimize the distribution of power within a mobile device. For example, ST-Ericsson has developed:

- Dual DC-DC regulators, which share the same external coil, reducing the size and cost of the circuit board.

- Cap-less LDO: A linear, or non-switching, regulator without any external components, reducing the size and cost of the circuit board.
- 6MHz DC-DC: A high-frequency switching regulator that enables the use of a smaller and cheaper external coil.
- Boost-bypass: A patented solution which can reduce the number of switching regulators needed in a device, saving space and reducing cost.

Moreover, ST-Ericsson has also developed a very efficient DC-DC switched-mode power supply, which uses an advanced process to minimize the number of parasitic components, enabling the conversion of energy with minimal loss.

THE POWERHUB™

The PowerHUB is an innovative energy management concept, which uses cutting-edge micro and nanotechnologies to harvest power for mobile handsets. ST-Ericsson's PowerHUB chips, which are designed to be integrated into a mobile device, can draw energy from both conventional sources, such as a USB or wall socket, and innovative sources, such as solar-cells, wireless charging and, ultimately, even physical movement or heat, automatically using the optimum power source or best combination of sources available to maximize efficiency. By using green

energy sources, PowerHUB products can also help reduce carbon dioxide emissions.

For example, some PowerHUB devices draw on ST-Ericsson's smart solar cell energy converter technology, which maximizes solar cell efficiency. Rather than just charging the battery, this energy is directly injected into the system, enabling devices to be powered solely by the sun when the conditions permit.

PowerHUB chips also use ST-Ericsson's innovative Power Path technology to optimize the current from a charger to a mobile device's needs and, where appropriate, disconnect the device's battery from the power supply system to prevent battery cycling (thereby extending the battery's useful life). The Power Path can also be used to restart a device with a dead battery.

ST-Ericsson has started sampling the PM2300 PowerHUB, which is specially-designed to meet the high-current charging required by tablet computers, and the first products in the PowerHUB family are set to be commercially available in 2011.

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