

## ams expands family of power management ICs for Nvidia Tegra and other multi-core ARM processors

### New AS3722 PMIC and AS3728 power stages supply new Tegra K1 mobile processor SoC in Nvidia's 'Jetson' reference design kit

Unterpremstaetten, Austria (15 December, 2014), ams AG (SIX: AMS), a leading provider of high performance sensors and analog ICs, today added to its family of power management ICs (PMICs) for mobile multi-core ARM processors with the AS3722, which provides a complete power-control solution for Nvidia's Tegra K1 mobile system-on-chip (SoC).

ams is also releasing today the AS3728, an 8A high-voltage power stage to complement the AS3722's high-current DC-DC controllers. The AS3728 provides for a streamlined power architecture in embedded systems, since it can supply the high current required by processor cores directly from a 12V power rail. The AS3722 PMIC and multiple AS3728 devices power the Tegra K1 processor in Nvidia's Jetson TK1 reference design board. The Tegra K1, Nvidia's latest mobile SoC, features a quad-core ARM® Cortex®-A15 CPU and 192 CUDA® graphics processing cores.

Together, the AS3722 and the AS3728 power stage provide a space-saving and thermally efficient power solution for advanced multi-core ARM processors. This makes them ideal for use in compact mobile devices such as tablets and notebooks, and in industrial applications such as security cameras and fanless (sealed housing) computers, in which the system designer must carefully manage the temperature of circuit boards carrying multiple high-power components. This is because the AS3722 enables a board layout optimized for thermal performance. Thanks to a patented design innovation by ams, the feedback interface to the AS3722 only requires two wires (one control signal, one temperature signal) instead of the four or five wires typically required by other PMICs.

With fewer traces connecting the PMIC to the processor, the two devices can be placed far apart in the board layouts of space-constrained devices. This dramatically reduces the size and intensity of the hotspot around the processor compared to conventional power architectures in which the processor and PMIC, both handling high currents simultaneously, must be located side-by-side.

The AS3722 also helps reduce board space requirements, integrating all the power rails required by a sophisticated processor such as the Tegra K1. The AS3722 includes four step-down DC-DC regulators operating at up to 4MHz, three step-down DC-DC controllers, 11 universal LDOs, a real-time clock with a 1µA total current requirement, and a control interface accessed via an I<sup>2</sup>C or serial peripheral interface.

The AS3728 power stage has a highly thermally efficient design and supports two phases, each of



4A (maximum), with an independent control input for each. The device incorporates separate low- and high-side N-channel MOSFETs for each phase.

The AS3722's three DC-DC controllers may each control the two phases of an AS3728, to provide a maximum 24A power output. The 3MHz switching frequency of the DC-DC controllers provides for a fast response to load transients and keeps the size of the external components to a minimum. The DC-DC controllers also implement automatic phase selection, ensuring that the circuit switches between single- and multiple-phase modes depending on the output current, to optimize energy efficiency while maintaining instant full-load capability when required in the event of a load transient.

'The latest ARM processors for mobile devices are packed with high-performance cores, and so require a complex power circuit that can supply high currents in a tiny space without the risk of overheating the components,' said Don Travers, Product Line Manager of ams. 'The AS3722 meets the need for sophisticated power control in the Tegra K1 and similar devices, integrating a huge number of supply rails while providing for ample physical separation between the hot processor and the PMIC.'

The AS3722 is housed in a 124-pin CTBGA package (8mm x 8mm x 0.5mm) or a 108-pin CSP (4.8mm x 3.6mm x 0.4mm). The AS3728 is housed in a 2.4mm x 1.6mm x 0.4mm package which can be assembled on a standard 4mil PCB without the need for vias.

Both the AS3722 PMIC and the AS3728 power stage are available for volume production today. The AS3722 is priced at \$4.12 each in 1,000-unit quantities. The AS3728 is \$0.54. An evaluation kit, the AS3722-CT-00\_EK\_ST AS3728, is available online from ams.

For more information or to request samples, visit:

- [www.ams.com/Power-Management-Units/AS3722](http://www.ams.com/Power-Management-Units/AS3722)
- [www.ams.com/Power-Management-Units/AS3728](http://www.ams.com/Power-Management-Units/AS3728)

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ams is a global leader in the design and manufacture of advanced sensor solutions and analog ICs. Our mission is to shape the world with sensor solutions by providing a seamless interface between humans and technology. ams' high-performance analog products drive applications requiring extreme precision, dynamic range, sensitivity, and ultra-low power consumption. Products include sensors, sensor interfaces, power management and wireless ICs for consumer, communications, industrial, medical, and automotive markets.

With headquarters in Austria, ams employs over 1,600 people globally and serves more than 8,000 customers worldwide. ams is listed on the SIX Swiss stock exchange (ticker symbol: AMS). More information about ams can be found at [www.ams.com](http://www.ams.com).



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