TI empowers design engineers at APEC 2017

Texas Instruments

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POWER
TO DO ANYTHING

Check out the demonstrations in the booth:

700-W Automotive Class-D Audio Amplifier
This complete 700-W automotive audio amplifier solution features an LM25122-Q1 boost converter providing 36 V at 10-A of continuous (20 A at peak) power from a 9-V to 16-V input voltage. The solution contains two TPA3251 Class-D amplifiers that provide 2x 175 W at a 4-Ω load (left and right channel) and 1x 350 W at a 2-Ω load (subwoofer). This PMP11769 reference design was developed for external car audio amplifier applications due to its thin profile and high power output.

Non-Military Drone/Robot Battery Management
The RC 2S1P battery management demonstration shows an interactive GUI that monitors a drone's battery in real time – including state of charge, remaining time to empty, and the battery's state of health. Speed up or slow down the rotors and see the current and voltage profile of the battery. The solution features TI's bq24600 multi-cell synchronous switch-mode charger. The non-military drone, robot, or RC 2S1P battery management solution reference design was developed to add flight time and extend battery life to quadcopters and other non-military consumer and industrial drones.

Start-Stop Effect on BLDC Motor Drives
This live demonstration shows the industry's first automotive brushless DC (BLDC) gate driver operating at cold crank voltages as low as 4.4 V. The DRV8305-Q1 gate driver enables the pump to push fluid through the system in low-voltage conditions. The TIDA-00901 reference design was developed for 12-V 200-W (20-A) BLDC motor drives in automotive applications.

IEEE802.3bt PoE for LED Lighting Applications
The IEEE802.3bt compliant Power over Ethernet (PoE) LED lighting system solution (51 W – Class 6) demonstrates ultra-low standby power consumption, connected lighting control over Ethernet and motion detection. The solution features the TPS2373 and operates using the TPS2373-4 EVM. The PMP20537 reference design was developed for smart lighting and IoT applications such as energy management, reactive room illumination, wayfinding and alert/alarm systems.

Ultra-Efficient Smart Thermostat Power Supply
The demonstration provides power and backup functionality to a WiFi-enabled smart thermostat, which can be controlled with a phone. When the thermostat's desired temperature is adjusted, the appropriate light is illuminated indicating cooling or heating. The power supply takes a 24-VAC input and produces a 5-V and 3.3-V output rail. The solution features the LM5166 65-V ultra-low IQ synchronous buck converter as well as the bq24072 USB-friendly battery charger. The reference design TIDA-01358 was developed to provide LiPo battery charging and seamless switching to backup battery power during a 24Vac brownout.

Ultra-Compact Bidirectional DC/DC Converter for Energy Storage Systems
This highly efficient, ultra-compact bidirectional DC/DC power converter demonstration delivers 480 W to local energy storage and battery back-up power applications. The solution features the UCD3138 integrated digital controller as well as the UCC27210 and CSD16325Q5C. The TIDA-00705 reference design was developed for server power supply units that are embedded with battery backup units.

AC-to-Processor: Powering Tomorrow's Datacenters with GaN
TI's Gallium Nitride (GaN) demonstration shows how the industry's first end-to-end solution revolutionizes datacenter AC-to-processor power density by over 3x. GaN solutions are enabling a new generation of power-conversion designs not previously possible with silicon MOSFETs. These designs enable systems to reach new levels of power density and efficiency. This full solution features the LMG3410, LMG5200, UCD3138A, UCC27714, UCD7138, TMS320F28075, UCC28740, and UCC24636.

12-V to 48-V Bidirectional Power Balancing System
This demonstration shows TI's new LM5170-Q1 controller transferring current in either buck mode (48-V to 12-V) or boost mode (12-V to 48-V) operation. The controller operates smoothly through a dynamic change in current direction without any overshoot. This allows each phase to remain enabled while the direction input is changed, simplifying any sequencing of input signals and allowing for a smooth transition between buck or boost mode.

High-Current PMBus Power Module with Telemetry
The integrated-inductor power module at the heart of this PMBus demo is rated for a maximum of 18 V of input voltage. The module's PMBus compatibility allows for output voltage, current and junction temperature telemetry, each of which is displayed in real time on the computer interface. The module is controllable through a GUI that allows the user to enable or disable the device, and also allows soft start and soft stop. The solution features TI's new TPSM846C23 power module and primarily targets enterprise and communication applications.

Integrated isolated data and power helps enable efficient, reliable industrial system design
The ISOW7841 thermal comparison demo showcases the thermal performance of the ISOW7841 reinforced isolator with integrated power and how it compares to a similar device available in the market today. This demonstrates that the ISOW7841 offers 80% higher efficiency than existing integrated devices. With the industry's lowest power consumption, the ISOW7841 reduces device operating temperature by up to 40° C, enabling higher power delivery, higher channel count and longer system lifetime than other integrated solutions.

In the small form-factor analog input module demo, the ISOW7841 reinforced isolator with integrated power paired with an 8-channel, bipolar input-voltage, 16-bit SAR ADC enables a compact, highly accurate, 8-channel data acquisition design.

High-Efficiency USB Type-C™ Charging
Several demonstrations for a variety of applications showcase TI's highly-efficient USB Type-C charging technology.
The automotive designs include key features such as high switching frequency, low EMI, low quiescent current and wide input voltage featuring LM53635-Q1. The personal electronics designs feature the high efficiency and small size required for these space-constrained applications. USB Type-C reference designs:

PMP40001: 5/12/20-V at 3-A output with 2-3 cell battery input
TIDA-00987: CISPR 25 Class-5 with USB3.0 data support
PMP11594: USB-C 5V, 3A car charger
PMP20172: 36-W USB dual port
TIDA-03027: 60-W Multiport Adapter

60-KW Fast DC EV Charging Station
The 60-KW charging station from Xuji is one of the four million EV charging stations planned for deployment throughout China by 2020. This charging station is equipped with eight 7.5-KW power modules, using two Piccolo™ F2803x microcontrollers per module. It also features TI processors for HMI, high-voltage sensing components and high-voltage gate drivers for improved efficiency and accurate sensing. The TIDM-1000 three-phase power factor correction reference design was developed to minimize energy loss by monitoring power conversion to and from the battery, and improve power conversion efficiencies inside the charging station.

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