Teardowns, deep analysis of competing products and technologies for new product development, patents' enforcement, and defense

Vehicle Electrification and Wide Bandgap Semiconductors in the Spotlight

By Louis Burgyan, LTEC Corporation

June 2017. The LTEC Team just completed participation in the IEEE Applied Power Electronics Conference in Tampa, Florida, where we presented fresh ideas about how to "*Improve new product positioning, reduce time to market, protect your IP through benchmarking and deep analysis."* We will be heading out soon to Chicago to participate in the **2017 IEEE Transportation and Electrification Conference and Expo** (ITEC), held on June 22-24 at the Navy Pier http://itec-conf.com/. If you plan to attend, please visit our **Booth No. 303** and browse through our 50+ recent technical brochures related to advanced automotive electronics and wide bandgap semiconductors. Also, I would like to invite you to attend our presentation ***"Benchmarking Power Transistors and Power Modules for High-temperature Operation (200C)."*** For those of you not attending, please check out our partial list of new brochures below; and if interested, contact us for further details.

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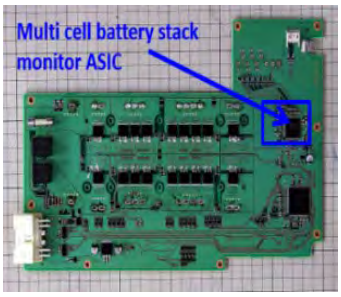
!!Coming soon!! New technical analysis reports:

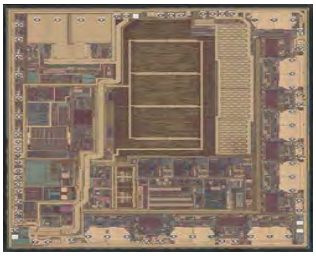
Click on the links below

Suzuki Wagon R "Mild Hybrid" battery cell monitor system analysis report



The Suzuki Wagon R model uses "Smart Hybrid Vehicle by Suzuki" (SHVS), a mild hybrid technology in which an Integrated Starter Generator (ISG) is used to charge the battery while breaking. The energy is then reused to generate additional torque while the vehicle is accelerating. The new system increases fuel economy as well as maximum speed. In this model, the battery capacity is about 3.3 times larger than that of the conventional model. [17G-0001-1]

NXP (Freescale) MC33771 battery cell monitor ASIC function estimation report



This is an ASIC function estimation analysis report of the NXP MC3377, a novel Li-Ion battery cell controller IC designed for automotive applications. Since the datasheet hasn't been released yet to the market, while samples are available, we extracted the block diagram of this innovative IC revealing pin functions identification, block sizes. Great opportunity to learn! [17G-0007-1]

Toyota Prius ZVW52 on-board charger for plug-in hybrid vehicles

LTEC Corporation is planning to release an analysis report of a new Toyota Prius PHV (ZVW52) OBC produced by Toyota Industries Corporation. The new system delivers 1.7 times higher charge to the battery than the conventional unit, uses a novel control method to minimize power loss during AC-DC conversion thus improving charging efficiency. [16G-0014-1]

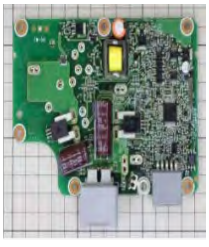
New technical analysis reports

Bi-directional automotive DC-DC converter circuit analysis report

This fifty-seven page report is focused on the PCB and a detailed circuits analysis of a bi-directional DC-DC converter produced by Sumitomo Wiring Systems, Ltd., for hybrid vehicles. PCB structural details with various dimensions, component list, block diagram, detailed circuit schematic diagram, and the results of our transformer inductance measurements are included in this report. [17G-0005-1]

Honda Fit DC-DC converter circuit analysis report for hybrid vehicle

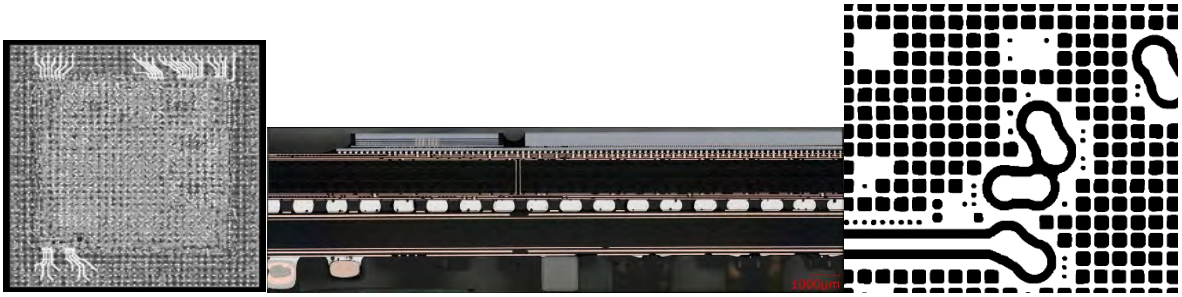
DC-DC converter



Control board

This thirty-two page report is focused on the PCB and offers detailed circuit analysis of the DC-DC converter. PCB structural details with various dimensions, component list, block diagram, detailed circuit schematic diagram, and transformer inductance measurement results are included in the report. [17G-0004-1]

Apple A10 (iPhone7) package analysis



Using our proprietary delayering and high-quality digitization technology, we extracted all five RDL layers used in TSMC's InFO package deployed in the A10 processor of Apple's iPhone7. Unlike its flip-chip substrate-based fan-out predecessors, InFO technology relies on multiple RDLs, improved chip alignment accuracy, and it can easily accommodate high I/O count. Even with the five RDLs, package thickness is reduced by 20%. Additional benefits of the technology are 10% lower heat generation and 20% higher I/O speed. Many more details including cross-sections, Line/Space (L/S), thickness info of the RDL are in the report. Gerber, dxf, PADS (ASCll), ODB++ files are also available for ease of analysis. [16G-0011-1]

Wolfspeed (Cree) CAS325M12HM23 SiC power module

This module has a lighter Al-SiC base plate instead of Cu. The report reveals how this state-of-the-art module achieves significant reduction in weight and volume while achieving continuous operation at 175℃. All relevant construction details including layout, EDX materials analysis are included. Note that we have prepared other 2nd gen and 3rd gen SiC device analysis reports as well. [16G-0013-1]

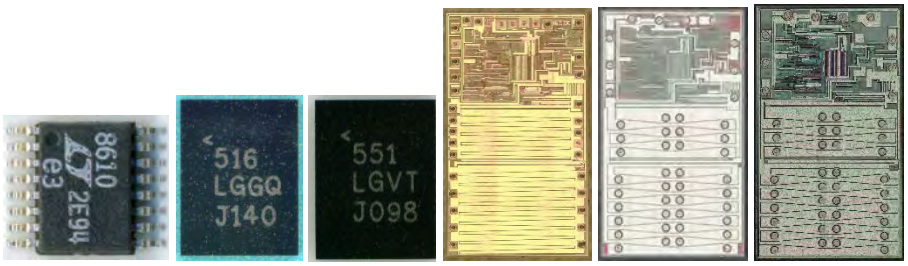
Benchmarking the Nissan Serena Pro Pilot ADAS ECU

This is the first commercial vehicle that facilitates automatic driving in the same line of a highway while relying upon the ADAS ECU and the Pro Pilot camera module. The system performs speed control, tracking, stop and hold functions, steering control throughout the entire speed range. This report reveals system block diagram and the details of the main PCB. [16G-0012-1]

Click on the links below and visit www.ltecusa.com

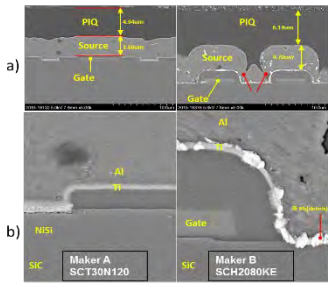
for additional brochures:

LT8610/14/40 DC-DC converter IC structure analysis



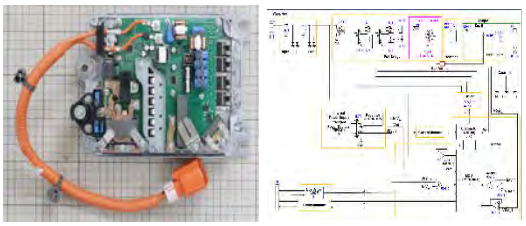
This report reveals technics to reduce conduction losses. [16G-0010-1]

STMicro SCT30N120 SiC power semiconductor package analysis



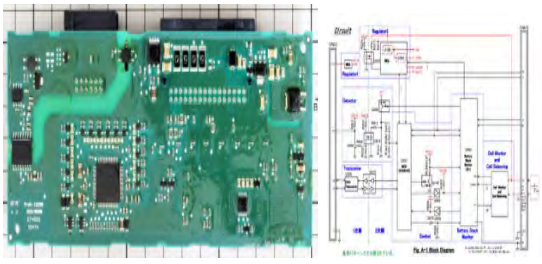
This report comparatively examines the various packaging technologies deployed within four different high-temperature power semiconductor devices designed for operation at their respective specified maximum continuous operating temperature limits, thus revealing ingredients deemed essential to achieve reliable operation at 200°C junction temperature. [15L-5002-1]

Nissan Xtrail DC-DC converter for plug-in hybrid electric vehicles



The report includes PCB layout, BOM, component sizes, and control circuit details. [15H-0881-1-1]

BMW X5 cell supervisory circuit analysis report



This report contains PCB analysis, circuit schematics, and comparison with the BMWi3. [16G-0007-1]

Linear Technologies LTC6811 battery monitor LSI for EVs and HEVs [16L-0003-1]

Toyota Prius ZVW51 motor inverter power card [16G-0017-1]

Toyota Prius motor inverter ASIC function estimation [16G-0015-1]

Wolfspeed C3M0065090D 3rd gen SiC power MOSFET analysis [16G-0005-1]

Panasonic PGA26E19BA GaN HEMT power semiconductor analysis [16G-0003-1]

Toyota Prius ZVW51 DC-AC converter analysis [16G-0001-1]

VW Golf battery charger for plug-in hybrid electric vehicles [15H-0554-1]

Toyota Prius ZVWS51 BMS ASIC structure analysis [15G-0013-1]

Nissan X-trail DC-DC converter thermal analysis [15G-0010-1-1]

Toyota Prius ZVWS51 motor inverter [15G-0008-1]

Toyota Prius ZVWS51 DC-DC converter [15G-0007-1]

Toyota Prius ZVWS51 battery monitor system [15G0006-1]

Toyota Prius BMS ASIC by Denso, schematic analysis [15G-0005-1]

Rohm BSM180D12P3C007 3rd gen SiC power module [15G-0004-1-1]

Sony IMX224LQR CMOS image sensor for automotive applications [15G-0003-1-1]

Panasonic PGA2609DV GaN power semiconductor [15G-0002-1F]

STMicro SCT30N120 SiC power semiconductor [14H-0954-1]

Rohm BM6104 isolated gate driver IC [14H-0363-1-F]

PSMA report on advanced packaging technologies [14H-0252-1]

Toyota Crown HV inverter control system [14H-0129-1]

Valeo Integrated starter (ISG) generator teardown [14G-0953-1]

GaN Systems GS66508P GaN power semiconductor analysis [14G-0924-2]

BMW-i3 battery management system [14G-0019-1]

Bosch 77GHz radar module [13H-0004-2-1]

Honda Accord HEV DC-DC converter [13G-675-1]

Toyota Prius headlight LED analysis [13G-212-1-1]

LTEC Corporation also provides a broad range of services in the field of Intellectual Property (IP) services from patent prior art search to in-depth technical analysis for the automotive industry. Visit our website www.ltecusa.com and let us know how we can help you keep up with the competition or help generate and protect your intellectual property.

About LTEC Corporation

LTEC, Japan's dominant intellectual property analysis company, provides in-depth competitive technical analysis, benchmarking, and reverse engineering services for the research and development engineering and industrial legal communities in the form of an innovative and collaborative approach. The primary focus of the company is on vehicle electrification, autonomous vehicles, ADAS, all types of semiconductors including SiC and GaN devices, automotive, and power electronics. With regional offices in the USA, Japan, Korea, and Taiwan, LTEC helps its customers overcome intellectual property (patent) research, analysis, and protection challenges across all sectors of electronics. With over 100 highly trained engineers and Ph. Ds, and 33-years of an impeccable track record, LTEC stands ready to help retain or gain a competitive edge for its clients worldwide. www.ltecusa.com

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