Power Electronics for Electric Vehicles 2016-2026

Description: This report of over 190 very detailed slide format pages is replete with new forecasts, analysis and infographics seeing the roadmap and financial projections to a future where land, water and airborne vehicles will be electric. The emphasis is land vehicles. It fully explains why power electronics is becoming more important in the performance and cost of an electric vehicle, hybrid or pure electric.

Reasons given include expected tough 2025 and 2030 regulations making most conventional powertrains illegal and the ongoing quest for performance improvement including better life and reliability. The report explains how power electronics may be part of the powertrain traction system, loosely related to it or not related and what that means, given in many new graphical summaries.

The key parts of recent presentations by the key players are assessed in this work, which was researched in 2016 by PhD level analysts travelling worldwide. Interviews, databases, web searches and conference attendance were extensively used. Old information is useless in this now fast moving field.

The report starts with a comprehensive Executive Summary and Conclusions which includes a close look at all the key issues. Ten year forecasts for power electronics are broken down into motor controllers, recuperation, electricity import, electricity export, BMS with boost converters, climate control and then other, with a full explanation of the many things in these categories. The total printed electronics market in billions of dollars and as percentage of the electric vehicle market is projected, backed up by ten year forecasts by number of 46 categories of electric vehicle land, water and air.

The Introduction then looks at many examples of power electronics explained in the context of powertrain options, future successes and expected failures. It covers such things as why universal and merged motor controllers are both elusive but more per vehicle will appear. Network integration, powertrain options, voltage trends and structural electronics potential are detailed. Design of Power Electronics comes next, embracing where, why and what new forms are appearing. Issues concerning power modules and battery management system design are here, for example.

The fourth chapter consists of new materials and components for power electronics because they are so key to the future. That includes SiC and GaN power semiconductors and new harvesting chemistries. Chapter 5 covers power electronics for 48V mild hybrid and beyond, carefully explaining the rapidly increasing complexity of power circuits and peripherals for these and successor powertrains. Detailed technology roadmaps complete this chapter which is followed by supplier comparisons and a key interview, a large number of other interviews being embedded in the earlier text.

Contents:

1. EXECUTIVE SUMMARY AND CONCLUSIONS
   1.1. Definition
   1.2. Importance
   1.3. PE functions serving the central needs
   1.4. Powertrain evolution
   1.4.1. Existing 12V cars and 24V trucks and buses were out of development potential
   1.4.2. Evolving options
   1.4.3. Future options
   1.4.4. Powertrain comparisons
   1.4.5. Future powertrain winners and losers
   1.4.6. Preferred powertrains by company 2016-2030: survey
   1.5. Power electronics proliferation
   1.5.1. Changes as powertrains evolve
   1.5.2. Example: Power electronics proliferation as 48V mild hybrids evolve
   1.5.3. Window of opportunity for 12V + 48V MH systems & for 48V MH: interviews
   1.6. Market forecasts
   1.6.1. Importance of PE for EVs: forecast to 2020
   1.6.2. Addressable car market
   1.6.3. Forecast $% and $bn 2016-2026 for EV power electronics by type
1.6.4. Global EV forecasts number thousand 2016-2026 in 46 categories
1.6.5. Traction rotating electric machines/ motor controllers per vehicle 2016 and 2026 by 46 types with main powertrain adopted by type
1.6.6. Conventional vs 48V mild hybrid vs electric cars
1.6.7. Technology roadmaps to 2040
1.7. Voltage trends
1.7.1. Pure electric vehicles
1.7.2. Voltage trends for hybrid electric vehicles
1.8. Rotating machine options: power electronics implications
1.8.1. Overview
1.8.2. Controlling integrated motor controls- in-wheel
1.8.3. Control of the increasingly popular two motor systems

2. INTRODUCTION
2.1. Scope
2.2. Power electronics successes
2.3. Power electronics gains importance
2.4. Power electronics fundamentals and trends
2.4.1. Overview
2.4.2. Faster change, more variety of tasks
2.4.3. Downsizing is usually required
2.4.4. Universal controllers are elusive
2.4.5. Special requirements: example fuel cells
2.4.6. Network integration is an issue
2.5. Voltages
2.5.1. Overview
2.5.2. Types using 48V
2.5.3. Exception to the rule: Nanoflowcell 48V premium cars
2.5.4. BMW view of voltage choices
2.6. Integration and structural

3. DESIGN OF POWER ELECTRONICS
3.1. Power electronics architecture in EVs
3.1.1. Pure electric vehicle power electronics choices
3.2. Hybrids
3.3. Future functions requiring new power electronics
3.4. Power module
3.4.1. Power module architecture
3.4.2. Die attachment
3.4.3. Die interconnection, thermal
3.4.4. Power module failure modes
3.4.5. Unusual needs and solutions
3.5. DC DC converter
3.6. On-board charger and CAN bus
3.6.1. Integrated motor drive charger
3.7. Battery Management System BMS

4. NEW ACTIVE MATERIALS AND COMPONENTS: SIC GAN GAAS ETC
4.1. Overview
4.2. Wide bandgap power semiconductors
4.2.1. Overview
4.2.2. Sumitomo Electric
4.2.3. European Union
4.2.4. Silicon Carbide vs Gallium Nitride vs Si Power Devices: which win?
4.3. Capacitors needed
4.4. Energy harvesting for electric vehicles
4.4.1. Overview
4.4.2. Energy harvesting power handling requirements
4.4.3. Managing regenerative active suspension

5. POWER ELECTRONICS FOR 48V MILD HYBRIDS AND BEYOND
5.1. Purpose and benefits
5.2. Technological heart
5.3. 48V mild hybrid for a car
5.4. Key components mostly different from HEV, PHEV, PEV
5.5. Integrated power control for mild hybrid starter generator
5.6. Key components of 48V mild hybrid system: Audi BSG = Battery Starter Generator
5.7. Many benefits of 48V system adoption based on extra power electronics
5.8. First generation 48V system
5.9. 48V Technology Roadmaps
5.10. Modelling 48V introduction: Volkswagen SUV
5.11. Modelling of 48V introduction: Volkswagen SUV
5.12. Technology timeline 2016-2026

6. SUPPLIER COMPARISONS

7. INTERVIEW WITH CPT 2016
7.1. Visit to Controlled Power Technologies CPT Ltd UK18 January 2016

Order by Fax - using the form below
Order by Post - print the order form below and send to
Research and Markets,
Guinness Centre,
Taylors Lane,
Dublin 8,
Ireland.
Fax Order Form
To place an order via fax simply print this form, fill in the information below and fax the completed form to 646-607-1907 (from USA) or +353-1-481-1716 (from Rest of World). If you have any questions please visit http://www.researchandmarkets.com/contact/

Order Information
Please verify that the product information is correct and select the format(s) you require.

<table>
<thead>
<tr>
<th>Product Name:</th>
<th>Power Electronics for Electric Vehicles 2016-2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web Address:</td>
<td><a href="http://www.researchandmarkets.com/reports/3764812/">http://www.researchandmarkets.com/reports/3764812/</a></td>
</tr>
<tr>
<td>Office Code:</td>
<td>SCPLNTQP</td>
</tr>
</tbody>
</table>

Product Formats
Please select the product formats and quantity you require:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic (PDF) - 1 - 5 Users:</td>
<td>USD 5077</td>
</tr>
<tr>
<td>Electronic and Hard Copy (PDF) - 1 - 5 Users:</td>
<td>USD 5383 + USD 57 Shipping/Handling</td>
</tr>
<tr>
<td>Electronic (PDF) - 1 - 10 Users:</td>
<td>USD 7618</td>
</tr>
<tr>
<td>Electronic and Hard Copy (PDF) - 1 - 10 Users:</td>
<td>USD 7924 + USD 57 Shipping/Handling</td>
</tr>
</tbody>
</table>

* Shipping/Handling is only charged once per order.

Contact Information
Please enter all the information below in BLOCK CAPITALS

<table>
<thead>
<tr>
<th>Title:</th>
<th>Mr</th>
<th>Mrs</th>
<th>Dr</th>
<th>Miss</th>
<th>Ms</th>
<th>Prof</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Name:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email Address: *</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job Title:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Address:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postal / Zip Code:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fax Number:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Please refrain from using free email accounts when ordering (e.g. Yahoo, Hotmail, AOL)
Payment Information

Please indicate the payment method you would like to use by selecting the appropriate box.

☐ Pay by credit card: You will receive an email with a link to a secure webpage to enter your credit card details.

☐ Pay by check: Please post the check, accompanied by this form, to:

Research and Markets,
Guinness Center,
Taylors Lane,
Dublin 8,
Ireland.

☐ Pay by wire transfer: Please transfer funds to:

Account number 833 130 83
Sort code 98-53-30
Swift code ULSBIE2D
IBAN number IE78ULSB98533083313083
Bank Address Ulster Bank,
27-35 Main Street,
Blackrock,
Co. Dublin,
Ireland.

If you have a Marketing Code please enter it below:

Marketing Code: ________________________________

Please note that by ordering from Research and Markets you are agreeing to our Terms and Conditions at http://www.researchandmarkets.com/info/terms.asp

Please fax this form to:

(646) 607-1907 or (646) 964-6609 - From USA
+353-1-481-1716 or +353-1-653-1571 - From Rest of World