

Opportunities in Portable Power Management

If you enjoy reading about career opportunities in power electronics, you now have another source for news about the profession. Starting in the June issue, my column on Career Development appears in Power Systems Design magazine (online now). My first column "[Big Power Challenges in Little Products Create Opportunities for Power Specialists](#)" discusses opportunities for system designers, IC designers, and field application engineers in portable power applications.

This article discusses some of the technical challenges faced by engineers in developing portable electronic devices and the chips used to power them. It also explores how these technical challenges together with industry trends have affected the opportunities for engineers with power supply design expertise. The article is accompanied by a table of sample job openings at portable device OEMs and semiconductor companies. In the table below, you'll find additional, updated job listings in the portable power field.

Table. Additional job openings for electrical engineers in portable power design (listings downloaded between 6-26-2010 and 6-28-2010.)

Company	Job title (location)	Description of position	Qualifications sought
Apple	Mobile Power Systems Architect, DC-DC (Santa Clara Valley, Calif., USA)	Apple is looking for a world-class Power Electronics engineer with exceptional knowledge of ultra low-power system architecture, specification, design, hardware implementation and verification testing. The candidate will be responsible for electrical design of dc-dc converters for mobile and handheld products. The candidate will also be involved with cross-functional product teams in managing the development of the power electronics subsystems.	<ul style="list-style-type: none"> • BSEE or higher & 7+ years of Power Systems design/ architecture experience. • Design knowledge of DC-DC regulators including schematic capture, component selection, PCB layout, and characterization. • Great understanding of analog fundamentals in the design of power electronics. • Hands-on lab experience is a must. • Project management experience with multi-national vendors.
Apple	Power/ Battery Silicon Program Manager (Santa Clara Valley, Calif., USA)	Responsibilities for iPod/iPhone Power / Battery Silicon Program Manager: Drive the development of the next generations of power supply and battery related silicon for iPod and iPhone, including specification development, management of technical interaction between Apple and its suppliers, pre and post silicon verification.	<ul style="list-style-type: none"> • Hands-on expertise in the development of power and battery related silicon. • Strong expertise in: DCDC, LDO, battery charger ADCs and other mixed signal technology. • Ability to rapidly identify, drive and leverage the latest mixed signal technologies as they relate to our products. • Personal, communication, and organizational skills to coordinate multiple internal teams and vendors. • Attention to project detail and task tracking.
Analogic Tech	Staff Engineer, Strategic	Reporting to the Product Line Director, the successful candidate will be responsible for the definition of new power management IC	<ul style="list-style-type: none"> • BSEE or equivalent with 5+ years of related work experience in the analog

	<p>Applications Engineer (Santa Clara, Calif., USA)</p>	<p>products related to display and lighting products. He or she must have a thorough understanding of the system requirements for power management solutions and will have the following responsibilities:</p> <ul style="list-style-type: none"> • Determine customer applications requirements to define value added platform products • Identify sponsor customers and prepare OTS to achieve customer validation • Work with marketing, design and engineering to ensure product can be designed, tested and manufactured to meet the corporate GPM goals as well as the customer's target price and production schedule • Implement the necessary hardware/firmware system to verify and evaluate device performance • Work with FAEs and customers to ensure success at beta site customers • Train customer applications group to ensure a smooth transition • Assist Product Line Director in preparing business plans specifically product roadmap, product plan and new market identification • Assist in the promotion of the company and product line by customer visits, preparation of application notes, and technical seminars at appropriate conferences 	<p>power management field</p> <ul style="list-style-type: none"> • Practical and theoretical knowledge of power systems related to LED backlight and/or LCD biasing and control would be an advantage • Thorough understanding of power management systems related to displays • Excellent communicator, both internally at AnalogicTech and externally to customers • Ability to work with little supervision • Technically competent • Proficient at technical writing specifically OTS documents and technical papers • Experience in analog or power management IC products • The candidate is most likely to come from either a competitor or a customer working in the field of mobile phones and or LCD displays
<p>Fairchild Semiconductor</p>	<p>Product Applications Engineer (San Jose, Calif., USA)</p>	<p>The Product Line Applications Engineer will lead power management applications support for medical, consumer, enterprise and industrial applications. They will be responsible for offering competent technical support, in-depth understanding of applications and product solutions to customer power management problems. He/she will work directly together with Field Technical Sales at key focus customers to support design-in of power management product solutions and technical product definitions for new product requirements. He/she will develop applications collateral and system-level understanding of focus applications within the market segments and communicate with marketing, system/design engineering teams to facilitate the development of key IP and vision to 3-yr + product roadmaps for advanced products and their alignment to customer needs.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Provide Customer Support and Design-in activity at Fairchild key customer accounts in the medical, consumer, enterprise and industrial for key power management solutions including DC/DC and Linear 	<ul style="list-style-type: none"> • Minimum 6 years experience in applications of analog power management principles, products and systems for DC/DC conversion, LED Lighting, Multi-cell battery Charging and distributed DC power bus architectures. Prior experience with applications support for power solutions for customer in the following market segments: medical diagnostic/portable, set-top box, IP modems, notebooks, enterprise/POS equipment, solar power, communications, networking equipment, industrial handhelds/tools. • Experience with design-in of power management solutions in identified markets and working with customer engineer to identify solutions at design phase and defining technical specifications. • Ability to develop applications material and hardware

		<p>Regulators, LED Lighting, Smart Power Switches, and Charging solutions.</p> <ul style="list-style-type: none"> • Identify future product requirements and make technical needs more visible for a given application space monitoring competitive products and technical trends. <ol style="list-style-type: none"> 1. Application specific product roadmaps, power management system requirements. 2. Critical IP gaps and technical requirements 3. Definition and communication of associated product value given customer power management challenges and requirements, industry standards. 4. Identification of market windows and timescales <ul style="list-style-type: none"> • Team up with sales & technical marketing force to drive necessary design-in activity of products to fuel sales growth. • Compile technical application notes, demonstration boards/kits, validation data and training materials to support field training to technical sales and distribution teams to align value proposition and market fit of products to key accounts/segments. • Able to understand and communicate with senior technology leaders within division on advanced power management applications and system principles. 	<p>relevant to customer power management system including advanced characterizations on devices and applications boards with power management methodologies.</p> <ul style="list-style-type: none"> • Capable of performing bench-level testing including but not limited to Transient Response, Line/Load Regulation, PSRR, Regulation Accuracy, Noise analysis, EMI, Ground Bounce, Temperature Sensitivity, Power Consumption and Efficiency analysis in static and dynamic applications. This requires experience in lab environment with PCs/test software, Digital Scopes, Multi-meters, Power Supplies, Spectrum analyzers and relevant probes, sensors, and loads. Ability to summarize results and implications in written reports and presentations to marketing and design teams. • Ability to design demonstration and customer evaluation boards/kits with experience in PCB layout with CAD, component selection/placement, and design layout methodologies for power management to account for parasitic, noise, efficiency, etc. • Good listening skills are required to understand customer problems, generate technical proposals and articulate solutions and system knowledge in power management. • Ability to work closely with product marketing, design team, and customers and support to define the technical roadmap and articulate system-level architectures and technical requirements. • Domestic and International travel is required to support customers and field teams.
Micrel	Sr Design Engineer (Perkasie, Penn., USA)	<p>The ideal candidate will:</p> <ol style="list-style-type: none"> 1. Be highly experienced in DC/DC converter design from the application to the transistor level. 2. Have excellent understanding of analog 	7+ years of related experience.

		<p>circuit analysis.</p> <p>3. Direct and guide the activities of a technical design function responsible for designing, developing, modifying and evaluating analog and mixed signal integrated circuitry.</p> <p>4. Determine design approaches and parameters and conduct experimental tests and evaluate results. 5. Review vendor capability to support product development.</p>	
National Semiconductor	<p>Principal Applications Engineer – Power (Phoenix, Ariz., USA)</p>	<p>A Principal Applications Engineer defines next generation power supply controller integrated circuits (IC's) and designs DC to DC power converters to demonstrate new product performance. Other duties include evaluation of new IC's in typical application circuits and authoring the new product data sheets. A candidate must have a good working knowledge and design experience with multiple power converter topologies, magnetics, compensation, component selection, circuit board layout and thermal management. Excellent communications skills, both written and verbal, are mandatory. Familiarity with Pspice, Mathcad, PCB Routing tools and MS Office software is desirable. Understanding of IC design and test issues is advantageous but not a requirement.</p>	<ul style="list-style-type: none"> • Familiarity with Pspice, Mathcad, PCB Routing tools and MS Office software is desirable. Understanding of IC design and test issues is advantageous but not a requirement. • Experience with Digital/Programable Power is advantageous. • Experience with Telecommunications Systems is advantageous. • Excellent communications skills, both written and verbal, are mandatory. • Experience working in a team environment. <p>Minimum education/experience requirements: 8 years with BSEE or equivalent; 7 years with MSEE or equivalent; 4 years with Ph.D. or equivalent.</p> <ul style="list-style-type: none"> • Design experience in high performance power supply design. • Good communication and coordination skills. • Ability to work in a team environment.
National Semiconductor	<p>Power Management Applications Engineer (Longmont, Colo., USA)</p>	<p>In the semiconductor applications engineer role you will be responsible for technical support in the development and implementation of customer applications using National's power management products. You will assist customers to design-in National power ICs for their applications by providing technical information. Support may be provided via telephone to explain and interpret device datasheets and reference applicable information not contained in datasheets. You may also provide customer support by writing application notes and magazine articles, conducting training for customers and NSC Field Applications Engineers, providing schematic generation, board layout and fab coordination of evaluation and customer demo boards, troubleshooting</p>	<p>Necessary skill requirements - a demonstrated Working knowledge of analog power management circuits including LDO, buck and boost type of switching regulators, extensive lab experience and the ability to validate product performance to spec, trouble shoot electrical circuits, PCB boards, analyze product failures, etc., the ability to program in MatLab and/or Visual Basic, Skilled with PCB design and layout tools such as Virtuoso or Protel, a history of publishing development and customer support collaterals such as data sheets, application notes, training documents, trouble shooting guides, etc., excellent with Microsoft Office and basic statistical analysis.</p>

		<p>customers applications, writing code, supporting PQA's, and gathering and distributing typical device performance data.</p>	<p>Additional skills preferred but not mandatory - a basic understanding of RF transmitters used in portable/wireless applications, knowledge of RF power amplifier fundamentals and how system performance is impacted by the RF PA non-linearities. In addition, knowledge of, or the ability to research, understand and articulate 3G/4G 3GPP uplink wireless system requirements and how they equate to board level performance requirements.</p> <p>Minimum education/experience requirements - 5 to 8 years with BSEE or international equivalent; 4 to 7 years with MSEE or international equivalent; 2 to 4 years with PhD EE or international equivalent.</p>
<p>National Semiconductor</p>	<p>Sustaining Power Apps Engineer – Simple Switcher Business Unit (Santa Clara, Calif.)</p>	<p>Supports customers, field apps, and sustaining engineering (80%) Solves customer problems by:</p> <ul style="list-style-type: none"> • Providing detailed and thorough schematic and layout analysis and solutions • Visiting key customers to solve problems • Designing boards, testing customer circuits, advising improvements • Creates and maintains database of known bugs, solutions, tips, etc • Supports sustaining product engineering as necessary with root cause investigations • Updates and maintains datasheets, app notes, and eval boards as needed • Generates material for customer and FAE training <p>New product development (20%)</p> <ul style="list-style-type: none"> • Contributes to new product development and definitions • Writes app notes (for both new and sustaining products) • Contributes to applications team technical initiatives • Contributes to new silicon evaluation (taking data, problem analysis) <p>Top priority will be providing direct technical support for power management customers. You will work with customers to troubleshoot and identify problems in their applications. You will develop technical solutions for customers including schematics, and if</p>	<p>The successful candidate will have 10+ years experience with power supply design. Demonstrated experience with power systems and customer interface is mandatory. Candidates must possess strong interpersonal skills and the ability to communicate effectively with all levels of customers and management.</p>

		<p>required, customized hardware solutions such as prototype evaluation boards. You will work with product line design engineers and the applications organization to identify engineering possibilities and limitations. Resolves application and device design issues.</p> <p>This position is the first stage of technical escalation path for the FAE. Supports the closure of key opportunities where technical expertise is required. You will also be a contributing member of the product line applications staff, supporting the definition and development of power management ICs.</p>	
National Semiconductor	<p>Integrated Circuit Design Engineer - Power Management (Santa Clara, Calif., USA)</p>	<p>As a Power IC Design Engineer, you will be responsible for the design and development of switching power supply power ICs for broad market applications from product definition through release to production.</p> <p>Specific responsibilities include:</p> <ul style="list-style-type: none"> Working with other functional groups to define and architect new products Leading the IC design and simulating both system architecture and detailed analog circuit blocks Supervising blocks and full chip layout Debugging at the silicon level and interacting with product engineering to characterize product Supporting test development to ensure proper test coverage of the product Working close with other functional groups to support product release <p>You will be involved with designing integrated switching regulators and switching regulator controllers, and will work with state-of-the-art power supply solutions. These projects will cover many different architectures - current mode, voltage mode, and constant on-time. Ideally, you should be familiar with power switching designs. A function of this role will also be the mentoring of junior designers.</p>	<p>BS in Electrical Engineering or equivalent with 8+ years of design experience in analog integrated circuit design. The majority of experience should be designing at the transistor level in Bipolar, CMOS, DMOS or BiCMOS processes. Knowledge of analog circuit design techniques, including but not limited to, operational amplifiers, voltage/current references, oscillators, comparators, sample and holds, switched capacitor circuits is required. Knowledge of basic digital circuit design techniques, including but not limited to counters and timers is also necessary.</p> <p>The proven capability of execution and developing product on schedule are a must. This engineer must be highly focused and remain committed to obtaining closure on project goals. In the Principal Design Engineer role, your must be able to communicate effectively with managers and peers and work well in a development team.</p>
National Semiconductor	<p>Staff Circuit Design Engineer, Portable Power (Greenock, Scotland)</p>	<p>Reporting directly to the Portable Power Systems Development Manager, you will be responsible for designing and developing integrated circuits (linear regulators and/or DC/DC converters of all architectures and types, battery charging circuits both linear and switching) for portable power applications. Also responsible for circuit and/or logic design, simulation and verification; test box design, construction</p>	<p>Degree in an appropriate technical discipline combined with a minimum of 5 years work related experience post graduation. Good understanding of EDA tools (Cadence, Dracula, UNIX), methodologies and design flows. Additionally, well-developed communication and interpersonal skills will be required. A good understanding of submicron CMOS</p>

		<p>and checkout; evaluation, debugging and characterisation of devices. Also required to supervise and verify layout of designs. Prepare test methods and specifications; assist in preparation of application information, data sheets and demoboards. May propose new circuit ideas, perform feasibility studies for new circuits, and work with packaging team to define new package needs. May also work with CAD team to define and evaluate new CAD tools, and work with Process Development team to define and evaluate new processes.</p> <p>Applies extensive expertise to creatively solve difficult and challenging problems. Integrates various technologies to meet requirements. Develops solution to highly complex problems that require extensive investigation. Often modifies existing processes, procedures or methods to develop solutions. Independently determines best approach to solve problems. Plans and monitors effective development and implementation of highly complex projects. Coordinates tasks of other team members to complete projects. Ensures availability of resources required to complete projects. Helps train other engineers. Communicates with others to coordinate a broad range of activities.</p>	<p>and BiCMOS processes coupled with analog design experience on such is important. Also experience on low voltage, low power CMOS analog design would be a very strong advantage.</p>
<p>ON Semiconductor</p>	<p>Senior/Principal Applications Engineer (Phoenix, Ariz., USA)</p>	<p>The primary function of the Applications Engineer is to support the selection and use of Power FET Division products in customers' applications. This requires a complete understanding of the product (its function, capabilities, and attributes) as well as the targeted applications. The target markets are Computing products, Portable devices such as HDD, Cell Phones, etc. and Power Supply markets. Applications Engineer needs to understand customer requirements, competitive offerings and should be familiar with the requirements of the end equipment. The successful candidate has to have initiative and work with a cross-functional team to achieve the desired divisional goals through design wins and solving customer issues.</p> <p>Critical skills include knowledge of MOSFETs, its attributes, applications and customer requirements, competitor products, and the targeted markets/end equipment for the new products being defined. Applicants must be able to work in a team oriented environment and possess excellent written and verbal communication skills to communicate with and make presentations to customers and other ON staff.</p> <p>The successful candidate will have applications engineering responsibility for</p>	<ul style="list-style-type: none"> • Knowledge of customer applications specifically computer power delivery and POL. • Good technical understanding of dc to dc converters, load switches, battery chargers, and electronics packaging • SPICE simulation and board layout experience is a plus • Excellent interpersonal skills • Experience in Analog circuit and power MOSFETs • Knowledge of Excel, Power Point, and Word • Open to travel internationally • Sensitive to other cultures and able to communicate in different manners (i.e. writing, drawing, schematics, etc.) • Bachelors Degree • Required Experience: 3-5 years

		new products under development and other sustaining. The engineer shall generate collateral material (application notes, demo boards etc.) to enable timely introduction of new products and provide training to marketing and sales.	
Texas Instruments	Applications Engineer (Dallas, Texas)	<p>In this role, you'll be responsible for developing evaluation modules, hardware and firmware validations, customer technical design-in and design-win support including customer system design and layout review, and custom pack electronics design.</p> <p>Specific responsibilities include:</p> <ul style="list-style-type: none"> • Developing evaluation modules for battery monitoring products including battery fuel gauging, protectors, and authentication. • Validating new battery management hardware and firmware product validations. • Providing customer design in and design win technical support. • Designing custom battery pack electronics circuits. • Characterizing the Li-Ion battery chemistry. • Writing application notes, product validation reports, and providing technical presentations at major power management related conferences. • Providing technical training for field application engineers, distributors, and customers. 	<p>The ideal candidate will have 5+ years of design experience in power management, analog and digital electronics hardware design. Hardware debug experience is a must.</p> <p>ESD and EMI experience are a plus. Visual Basic, .Net and Visual C programming skills are desired. Embedded system experience is preferred.</p> <p>This engineer must be able to work effectively with design, system, and firmware teams on complex projects. Strong verbal and written communication skills are essential.</p>
Wolfson Microelectronics	Principal Analogue Design Engineer (Edinburgh, Scotland)	<p>We are seeking an innovative and enthusiastic Analogue Design Engineer to join our development team. The candidate should have extensive experience of operating in a semiconductor design environment. The successful candidate will be involved in all areas of analogue design, including cell level design, analogue systems architecture and chip assembly within complex mixed signal ICs.</p> <p>Duties: The successful candidate will be expected to take responsibility for specification, architecture choice, transistor design, verification, layout supervision and chip level integration of a range of analogue circuits. In addition the role requires the candidate to lead complete design projects from definition to delivery and work closely with cross-functional teams comprising new project architecture, various design disciplines, test engineering, customer application support and project management. The candidate is expected to participate in technical mentoring, definition of best design</p>	<p>Skills:</p> <ul style="list-style-type: none"> • In-depth experience of industry standard Analogue design tools • Demonstrable successes in design and tape-out on CMOS processes, ideally at 0.18um and below <p>Experience and expertise in several of the following areas:</p> <ul style="list-style-type: none"> • ADC/DAC design • Audio circuit design • Switched Capacitor circuits • Delta-Sigma designs • Operational amplifier design • Low power design techniques • Switching power supplies • Layout techniques • Transistor level design • Top level chip assembly <p>Behaviours:</p>

		<p>practice, continuous improvement initiatives and peer review activities.</p>	<ul style="list-style-type: none"> • Takes ownership of personal and team tasks and makes them happen on time • Team player but able to function autonomously • Innovative and clear thinker in all areas of work • Conscientious and hardworking • Pays close attention to detail without losing sight of the overall goal. • Excellent technical mentor • Demonstrates commercial awareness in decision making <p>Qualifications: Honours degree in Electronic Engineering or other engineering related discipline.</p>
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