

SPACE



BRIEF

Edition 7 - January 2013



From The Editors

Hello everyone and welcome to this issue of Microsemi's Space Brief. This edition brings you the latest news on Microsemi's comprehensive range of components and systems for space applications - from FPGAs and ASICs to RF components and diodes from transistors and power converters to power distribution solutions. We hope you find the content useful, and we request that you pass the newsletter to your colleagues who are not already on our mailing list. Instructions for registering to receive this quarterly brief are included at the end.

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Recent Product News

RTAX-DSP FPGAs Achieved QML Class V and Q Qualifications

Microsemi has achieved Qualified Manufacturers List (QML) Class V and QML Class Q qualifications for the RTAX-DSP field programmable gate arrays (FPGAs). RTAX-DSP is built upon the same process and technology as Microsemi's RTAX-S/SL product family with the additional of embedded radiation-tolerant multiply-accumulate math blocks which can perform up to 125 MHz across military temperatures and voltages. RTAX-DSP integrates complex DSP functions into a single device, resulting in efficient utilization when implementing arithmetic functions, such as those encountered in DSP algorithms, without sacrificing reliability or radiation tolerance.

Microsemi's QML-V FPGAs undergo 2,000 hours of life testing on each wafer lot and destructive physical analysis on each assembly lot. This removes the need for customers to perform these tests, providing scheduling and cost benefits. This qualification demonstrates Microsemi's continuing commitment to the space community and our intent to secure industry certifications to provide an added level of assurance that Microsemi products are of the highest quality and reliability.

RTAX-DSP FPGAs in Class V screening flow are available now. Customers can source Microsemi's highest quality and reliability FPGAs by referencing the Defense Logistics Agency (DLA) standard military drawing (SMD) part numbers:

<http://www.dscc.dla.mil/Programs/Smcr/PnSearchResults.aspx?field=Source&operation=Contains&value=actel>.

For more information on RTAX-DSP, see:

<http://www.microsemi.com/soc/products/milaero/rtaxdsp/default.aspx> or contact a local Microsemi sales representative by going to: <http://www.microsemi.com/products/0>.

Microsemi Launching New Radiation-Tolerant Product Family

Microsemi is launching the first member of its new radiation-tolerant standard SG product family. The "SGR" product family offers the same industry renowned and proven high reliability ICs from our longstanding SG product group with the addition of guaranteed radiation tolerance. These include PWM controllers, linear voltage regulators, op amps, and interface circuits. Through process enhancements, these new devices are guaranteed to meet specifications after being exposed to these radiation effects:

- Total Dose (TID) - guaranteed to a minimum of 100krad(Si)
- Enhanced Low Dose Radiation Sensitivity (ELDRS) - guaranteed to a minimum of 50krad(Si)
- Single Event Latch-up (SEL) - guaranteed up to 87MeVmm²/mg

The SGR1846 current mode PWM controller is available for sampling now and will be in production Q2 2013. The SGR1845, another PWM controller, will be available for sampling later this quarter, followed by our SGR137 negative voltage regulator. Initially, parts will be screened per Microsemi's internal S-level flow. Activities are underway to offer the family as QML-V listed products. More information will be following in news releases and in further issues of the Microsemi Space Brief or contact a local Microsemi sales representative by going to:

<http://www.microsemi.com/products/0>.

Gallium Nitride (GaN) FETs

Microsemi is the first in the industry to offer enhancement mode GaN FETs, 40V & 100V in U4A packaging otherwise known as SMD 0.22 packaging. These products, with part numbers MGN2915U4A and MGN2901U4A support natural logic level drive and are currently in the sampling stage. The MGN2915 is a 40V part with a maximum R_{ds(on)} of 4mΩ and a total gate charge specification of 12nC. It is a great switching alternative for radiation-hardened MOSFETs in point-of-load converters (POLs) that are running from input line voltages of 15V or less. The MGN2901U4A could be used in forward converter applications utilizing input line voltages of 28V – 36V. The low gate charge specifications of these FETs can reduce switching losses and improve the efficiency of your converter applications by as much as 6%. More information will be following in news releases and in further issues of the Microsemi Space Brief or contact a local Microsemi sales representative by going to: <http://www.microsemi.com/products/0>.

Leader in Radiation Hardened Transistors

Microsemi is a leader in radiation-hardened bipolar transistor products. We have an extensive product portfolio with 11 different package types in leaded and surface mount and voltages ranging from 15V to 350V. We understand customer specific requirements for ELDRS performance and the effects of ELDRS on die/package combinations.

Currently we offer ELDRS data along with lot-to-lot TID data for a small set of products: JANSR2N2222A, JANSR2N2907, JANSR2369, JANSR2N3700. We are bringing ELDRS testing in-house currently which will expand and facilitate our ability to put products in the market in a timely fashion. For further information please see:

<http://www.microsemi.com/design-support/product-brochures#hi-rel-products>.

Recent Product Updates and Notifications

Recent Product Change Notifications on Microsemi FPGAs

Three product change notifications (PCN) have recently been published to Microsemi space customers of record. GIDEP advisories have also been published on the following topics.

- PCN1209: Synplify Software Bug Affecting RTAX-S/SL/DSP and Axcelerator Designs. The software bug was fixed in Microsemi release Synplify Pro AE 2012.03A SP1-2 and general release Synplify Pro G-2012.09.
- Addendum A to PCN1209 provided software patches to identify the Synplify software bug which was described in PCN1209.

- PCN1210: Programming Software Enhancement for RTSX-SU FPGAs in Silicon Sculptor v5.22.2 released.

For further information about these notifications please

see: <http://www.microsemi.com/soc/support/notifications/default.aspx>

There is also a [link](#) where you may register to receive future notifications and product updates.

FPGA Technical Articles

These articles have been published recently to provide customers with recommendations and guidance when designing with Microsemi space FPGAs.

- External clock transient effect on RTAX FPGAs functionality
<http://www.microsemi.com/soc/kb/article.aspx?id=FQ1295>
- Difference in CG1272 package body size of RTAX4000S and RTAX4000D
<http://www.microsemi.com/soc/kb/article.aspx?id=FQ1294>
- RTAX core voltage and current correlation
<http://www.microsemi.com/soc/kb/article.aspx?id=FQ1296>
- RT ProASIC3 PLL outputs termination
<http://www.microsemi.com/soc/kb/article.aspx?id=KI8900>
- Program RTSX-SU device with programming file created for RT54SX-S and vice versa
<http://www.microsemi.com/soc/documents/AFprogrammingFAQ.pdf> (FAQ # 60)

Recent Space Industry News

Satellite Parts Export Control Reform

NOTICE: The changes described below will only be implemented once regulations are promulgated. You should not change any of your export compliance processes and routines based on this Article.

Microsemi and its customers will benefit from the recent Congressional action on Satellite Export Control Reform. In the late 1990's Congress imposed strict export controls in an effort to curb potential weapons proliferation. The unintended consequences resulted in US satellite companies and their US base suppliers to essentially forfeit nearly 40% of their dominant 65%-70% global market share. This over regulation had devastating impact on the space industry with estimated losses in tens of billions of dollar range and thousands of US manufacturing jobs over a decade based on AIA (Aerospace Industries Association) and other reports.

The 2013 National Defense Authorization Act loosens the previously restrictive rules on ComSats and their parts and components from the USML to the CCL where it is far easier to attain a license. Whereas a large majority of Microsemi space devices were not on the USML, and more suited for the CCL anyway, the process and barriers can now be streamlined to accommodate our international commercial satellite customer base. Furthermore there are other compliance tools provided by the US Department of Commerce, specifically the Strategic Trade Authorization (STA) Interactive Compliance Tool, to assist the industry in the determination if a component requires a Commerce license at all.

Over the last year, Microsemi was very involved in the efforts of the new legislation both directly and via the AIA Legislative Committee and continues to be involved in this process. We anxiously await the Commerce Departments release of the new language governing the DOD 1248 category XV devices. For further information please see: <http://www.defense.gov/releases/release.aspx?releaseid=15198>

Your mother told you to count sheep, NASA has a better idea.

Problem: The fluorescent light fixtures on the International Space Station (ISS) are failing as some have been in operation since it was first launched in 1998. Boeing, charged with maintaining the ISS has decided, in conjunction with NASA, to replace the fluorescent lights with longer lasting LED lights. There is an extra benefit to this retrofit: according to NASA, space travelers sleep on average 2 hour less per day than they do on earth. Consequently, sleeping pills are often used to aid in sleep. With the LED lights, the crew should sleep better. Here is the science behind the lights.

According to NASA research the circadian rhythm is regulated by a group of cells in the brain called the hypothalamus. The hypothalamus responds to light information sent by the eye's optic nerve, which in turn controls hormones, body temperature and other functions which influence whether people feel sleepy or wide awake.

Natural daylight contains the full spectrum of light. As evening comes, the blue component diminishes. According to Derk-Jan Dijk, professor of sleep and physiology at the University of Surrey in the UK states in a recently published article:

"It turns out there are receptors in the eye which are tuned toward blue light. Adding blue light to artificial lights visible during the day can actually help us to be alert, but if there is too much blue light in the artificial lights at night that may disrupt sleep."

Solution: The replacement light fixture will have Red, Green, Blue and White LEDs. Not only can they be gradually dimmed to simulate the coming night, but the color spectrum can be changed to reduce blue content, thus stimulating natural sleep.

Boeing's subcontractor came to Microsemi's Power Management Group in La Mirada, CA for their power supply needs. The SA50-120 family was selected because of its input voltage range, triple output and high conversion efficiency of 86%. Operating from 120 Vdc input, it supplies an isolated 3.3 volts and +/- 15 volts out to power the needs of the LED lighting fixture.

The subcontractor needed some modifications made to the SA50-120 family to meet the power requirements of their system. The needed modifications were made and the first evaluation units were shipped to the customer in 18 weeks.

The power environment on the ISS can be extreme with sustained voltages on the power bus reaching 165 volts for as long as 10 seconds and spikes of 320 volts for 10 uSec. PMG's experienced engineering department assisted the customer in designing a filter/protection circuit to withstand these worst case parameters. When completed, the entire system was put through its paces at the Johnson Space Center in Houston, Texas. It passed with flying colors! For data sheets or more information contact PMGsales@microsemi.com.

Japanese Aerospace Exploration Agency Microelectronics Workshop

Microsemi participated in the 25th Japanese Aerospace Exploration Agency (JAXA) Microelectronics Workshop (MEWs) on November 1-2, 2012 at the Tsukuba International Congress Center in Japan. This was a highly technical workshop that covered the status of and the future trends in the space industry. Microsemi's Chief Technology Officer, Jim Aralis spoke on the topic of "Applying a System View to Efficient Multi-Device Product Development," illustrating how system-level architectural analysis can be used to create product development roadmaps that result in higher performance and reliability in space systems, while concurrently reducing total system costs. Additionally, Microsemi exhibited in the exclusive booth area where we were able to meet with many global industry intellectuals. To see the presentation given at this conference go to: https://eeepitnl.tksc.jaxa.jp/mews/en/25th/data/1_9.pdf

Radiation Hardened Electronic Technology (RHET) Conference

Microsemi participated in the RHET conference hosted by the Air Force Research Laboratory in Irvine, CA on October 30-31, 2012. RHET is a meeting for the space avionics community with presentations oriented to requirements, plans and programs for the space and missile electronic systems technology base. Microsemi was proud to have the opportunity to participate in this event and present updates on some of our critical space technologies including our radiation-tolerant FPGAs, power supply systems and standard DC/DC converters, and the latest in discrete and hybrid technology and roadmaps. We would like to take the opportunity to thank those of you who attended our sponsored luncheon at this event.

Microsemi Space Forum - Los Angeles

The Los Angeles Space Forum was held successfully on December 4, 2012 with attendance from many key space customers. The Forum's content covered an extensive portfolio of our space products and solutions from all divisions including cross-divisional collaboration. There were 2 different tracks of information allowing guest to attend session by session at their preference. One track focused on Power and Mixed Signal and the other on Digital topics. The day was packed with vital information that can be seen by going here: <http://www.microsemi.com/spaceforum-2012>

Microelectronics Reliability and Qualification Workshop

The Microelectronics Reliability and Qualification Workshop (MRQW) was hosted by The Aerospace Corporation on December 11 - 12, 2012 in Los Angeles, CA. Microsemi attended this workshop and presented a paper on qualification of programming software for RT FPGAs.

Upcoming Appearances and Events

Hardened Electronics and Radiation Technology Conference and Exhibition

Microsemi will be participating in the Hardened Electronics and Radiation Technology (HEART) Conference and Exhibition in Albuquerque, NM, March 19 - 22, 2013. HEART provides a professional forum specifically for classified or sensitive research and development investigations. The concentration is on research and development in space radiation, nuclear, electro-magnetics and solid-state physics. Representatives will be available during exhibition hours at Microsemi's booth #9 to provide information across the wide array of Microsemi products. Stop by and see us! For further information see: <http://www.heart-conference.org>

Single Event Effect Symposium & Military Aerospace Programmable Logic Devices

Microsemi will be presenting at the upcoming Single Event Effect (SEE) Symposium and Military Aerospace Programmable Logic Devices (MAPLD) Conference on April 9 - 12, 2013 in San Diego, CA. At SEE the presentations address all aspects of single-event effects (SEE) in microelectronic and photonic devices, circuits, and systems. MAPLD presentations explore the use of programmable devices for use in military and aerospace with an emphasis of proper operation in extreme conditions at high altitude and in space. Stop by and see us during our presentation. For further information see: http://radhome.gsfc.nasa.gov/radhome/see_mapld/

Space Forums

Microsemi is happy to confirm its continuing commitment in 2013 to a series of Space Technology Forums. At these technology forums, Microsemi semiconductor experts in space-related products will present information on the company's latest and most innovative space solutions, technology roadmaps, advanced packaging techniques, solutions to combat the effects of radiation, and more. In addition, applications engineers will discuss system-level challenges and potential solutions.

Who Should Attend: The Microsemi Space Forum is an ideal technology event for component engineers, design engineers, system-level architects, R&D engineers and other space industry professionals interested in the latest space-related solutions, system performance, reliability, packaging, radiation, and new digital and analog components for space applications

The current schedule is as follows:

June 2013 – Noordwijk, Netherlands (Grand Hotel Huis Ter Duin)

July 2013 – India (Bangalore & Ahmedabad)

October 2013 – East Coast, North America

November 2013 – Tokyo, Japan & Moscow, Russia

For more information on how Microsemi is serving the space market, please visit our brochure at:

[Microsemi Space Solutions Brochure](#) and our Space website at: <http://www.microsemi.com/applications/space>

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