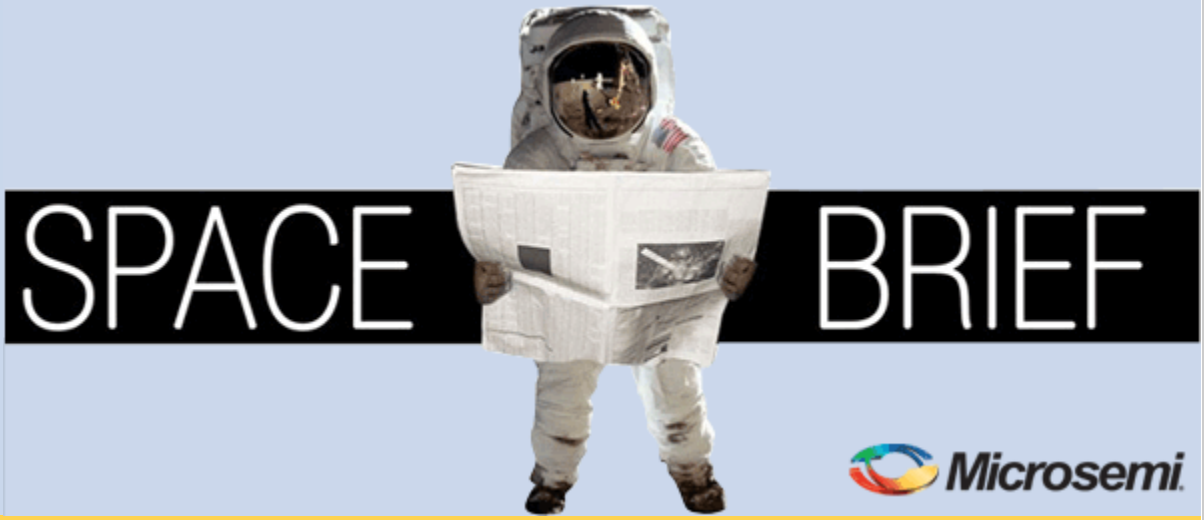


Articles in this edition:

Welcome to Microsemi's Space Brief quarterly newsletter. In this edition, highlights include Microsemi introducing an updated version of the model 9800B, announcing an export control update, our recent product notifications and an update on the events Microsemi has attended and will be organizing throughout the year. We hope you find our newsletter useful and encourage you to pass this edition to your colleagues. Instructions for registering to receive this quarterly space brief are included at the end of the newsletter.

Recent Product News

Lawrence Hybrid Facility passes DLA audit

During the month of April, our Microsemi Lawrence Hybrid facility completed and successfully passed a DLA audit covering the requirements of MIL-PRF- 38534 guidelines. This group produces micro-electronic products for the Space and Military market segments. Products including: Space Level Point-of-Load converters (POLs), linear regulators and custom hybrids. We recently moved this plant from our Danvers, MA location to Lawrence, MA allowing us to integrate this group with our Lawrence discrete facility.

The facility is now a center of excellence for all Space Level discrete and micro-electronic products. Integration of this group allows us to further develop our power system expertise and support our customers with highly reliable solutions for power conversion systems. Developing new discrete and micro-electronic technologies for this market will centralize our resources and use these new technologies to create next generation power solutions for the space and high-reliability markets.

There is an extensive new products program that will provide many exciting new products for this industry. Technologies such as GaN, Rad-Hard MOSFETs, high efficiency POLs, high-density DC-DC converters and Rad-Hard low-dose bipolar transistors are now just starting to be introduced into the market. These new products will become available over the next three years from 2014 to 2017.

For more information, email Al Ortega at Al.Ortega@microsemi.com.

Al Ortega
Product Line Manager, High-Reliability Group

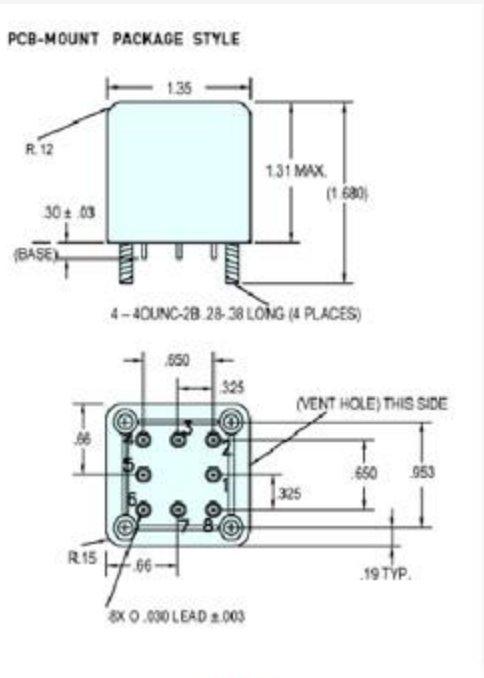
Recent Product Updates and Notifications

Microsemi 9800B Product Introduction

Microsemi is introducing an updated version of the model 9800B Space Qualified Ovenized Crystal Controlled Oscillator (OCXO). The 9800B is designed for output frequencies of 40 MHz to 125MHz. The updated design provides improved performance for phase noise, temperature stability, short term stability and long term accuracy. The oscillator is a part of the 9600 and 9700 families of oscillators for which more than 400 oscillators have been delivered for military, scientific and commercial satellite applications. In addition to high levels of performance, the 9800 is available in a compact 1.3 x 1.3 x 1.3 inch size, requires only 1.3W of quiescent power in a vacuum and operates during high levels of shock and vibration.

9800s are available as fixed frequency OCXOs with an initial accuracy of +/- 2e-7 or as OC/VCXOs with a tuning range of +/- 3 PPM for fine frequency adjustment or for phase lock. For more information, email Peter Cash at Peter.Cash@microsemi.com

9821B OCXO



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Peter Cash
Director of Space, Defense and Avionics, Government Programs Group

RTAX-S/SL/DSP and Axcelerator FPGA Customer Notifications

The Libero®IDE v9.2 software was released recently. This version includes timing enhancements for the RTAX™—S/SL/DSP and Axcelerator® FPGA families. These timing enhancements are captured in Customer Notification CN1410. Libero IDE v9.2 also provides a new SRAM design rule check to prevent the usage of a pipeline SRAM configuration, which can result in a race condition in the RTAX-S/SL/DSP and Axcelerator SRAM blocks. For more information, refer to Customer Notification CN1411. The Libero IDE v9.2 router will not create connections using more than four unbuffered long lines for RTAX4000-S/SL/DSP FPGAs. Customer Notification CN1412 details this routing update and guidance for existing designs.

These Customer Notifications can be found at the following locations:

CN1410: http://www.microsemi.com/document-portal/doc_download/133706-cn1410-timing-enhancements-for-rtax-s-sl-dsp-and-axcelerator-fpgas-in-libero-ide-v9-2-software

CN1411: http://www.microsemi.com/document-portal/doc_download/133707-cn1411-pipeline-sram-update-for-rtax-s-sl-dsp-rtax-and-axcelerator-ax-fpgas-in-libero-ide-v9-2

CN1412: http://www.microsemi.com/document-portal/doc_download/133708-cn1412-routing-enhancements-for-rtax4000s-sl-dsp-fpgas-in-libero-ide-v9-2-software

Microsemi recommends that RTAX and Axcelerator customers upgrade to the latest version of the Libero IDE v9.2 software to take advantage of these enhancements and updates. The Libero IDE software can be downloaded from the Microsemi website: http://www.microsemi.com/products/fpga-soc/design-resources/design-software/libero-ide#downloads

For any clarifications or questions on RTAX-S/SL/DSP, contact Microsemi SoC ITAR Tech Support:

Web: www.microsemi.com/soc/mycases
Phone (NA): 888.988.ITAR
Phone (Int'l): +1 650.318.4900
Email: soc_tech_itar@microsemi.com

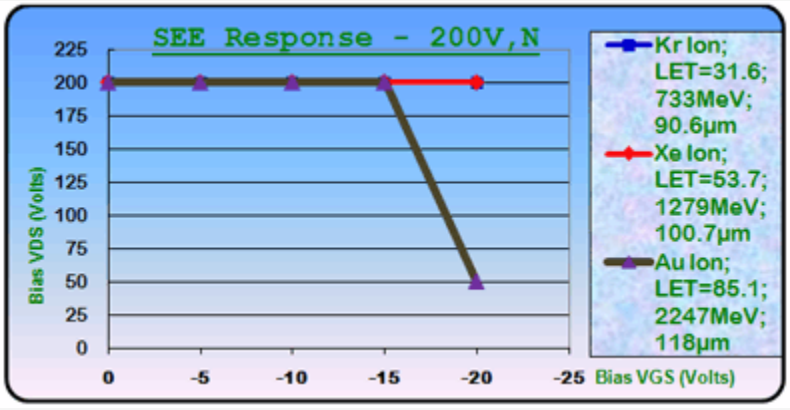
For any clarifications or questions on Axcelerator, contact Microsemi SoC Tech Support:

Web: www.microsemi.com/soc/mycases
Phone (NA): 800.262.1060
Phone (Int'l): +1 650.318.4460
Email: soc_tech@microsemi.com

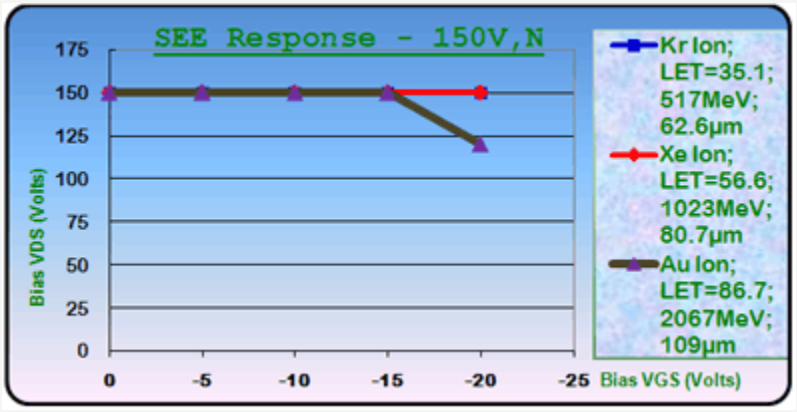
Minh U. Nguyen
Marketing Manager, Space FPGAs, SoC Products Group

New Rad-Hard MOSFETs tested at TAMU

Recent testing of Microsemi's new generation two Rad-Hard MOSFETs at Texas A&M University (TAMU), has shown superior performance. I2MOSTM Rad-Hard products exhibit true SEE performance at full-rated voltages. Results showed the devices maintained their full-rated VD bias under worst case SEE conditions with an LET of 85. The 200 volt, MRH20N19U3 passes SEE testing with Au ions at VGS= -5 V, -10 V and -15 V. There was no degradation at gold ion levels until VGS = -20 V.



Designers may now use the full voltage rating of the part for electrical margin calculations. No need to de-rate the MRH20N19U3. Also shown is the 150 V, MRH15N19U3 with similar SEE results.



For more information, email Al Ortega at Al.Ortega@microsemi.com.

Al Ortega
Product Line Manager, High-Reliability Group

Space News

Export Control Update

Microsemi applauds the Administration's issuance of revisions to Category XV of the U.S. Munitions List (USML) that will end excessive restrictions on space systems like commercial satellites and related articles. The revisions are designed to increase US exports of commercial satellites by removing the arms label from widely available space components that were included into Category XV of the Munitions list. To understand the significance of this reform, it is estimated in a 2012 Aerospace Industries Association (AIA) report, US manufacturers lost over $20 billion in satellite revenue from 1999 to 2009 due to previous rules.

After review of the just released May 2014 Federal Registry, it appears the ITAR/Export Control reform will work out to the advantage of Microsemi's customers. This is subject to confirmation. However, based on several meetings with both Department of State and Commerce leaders over the last three years, the wording is consistent with previous Microsemi input and stated interpretation. We have been very active and vocal with both congress and government officials in the long duration of this reform effort, making certain our concerns were heard prior to the release of the registry. Furthermore, our multiple meetings with Kevin Wolf, Assistant Secretary of Commerce, and the individual responsible for the wording, certainly add credence to Microsemi's interpretation of the reform and its intent.

Specifically, Space Level FPGAs will move from the USML (ITAR controlled) to the less burdensome CCL (Commerce Control List) where many exemptions, including De Minimis and STA, help streamline the process. We are currently evaluating the newly released language to determine the appropriate “new” category for space FPGAs. The Department of Commerce encourages "self-policing" and it is worth noting there has been an open line of communication between Microsemi and the Department of Commerce at the highest level. This presents further advantage to Microsemi's exports.

When it comes to JANS diodes and transistors (certain MOSFETs notwithstanding) nothing has changed, as they remain EAR99. We were told specifically and "with authority" from Assistant Secretary Wolf, previous adjudications are consistent with the new rules and nothing has changed in this respect. QPL MOSFETs > 500 krads will simply move categories (from 9A004.B to 9A515). QPL MOSFETs < 500 krads will take further research and clarification.

As it pertains to FTD Space Cesium and Space CSAC, they remain ITAR controlled.

In conclusion, the US manufacturers of satellites will have the opportunity to compete in a larger

export market. Transferring licensing jurisdiction for those items to the Department of Commerce is expected to ease their exports to 36 countries. Additionally, foreign manufacturers of satellites will have an easier time procuring Microsemi space products without the burden and cost of excessive administration, as the licensing process has been streamlined. However, export restrictions to China will remain.

John Costello
VP Business Development and Government Relations

Parallel Operation of the SA50 Family

In order to increase the total power available, the output terminals of two to six modules may be connected in parallel, supporting up to 300 watts in many possible configurations. Typical configurations include paralleling two SA50-120-28S units to produce 100 watts at 28 volts, paralleling a SA50-120-5-12T with a SA50-5-15T producing +5, +/-12 and +/- 15 volts out. With the 5VOUT tied in parallel, the output current doubles. Since the outputs are isolated from each other, many output voltage configurations can be created. The current sharing accuracy is 10% at maximum load.

The **Remote Sense** terminals may remain unconnected. For best output voltage regulation however, the remote sense terminal of each of the paralleled set of power supplies should be connected to a single point, as close as possible to the positive load terminal or point where the voltage regulation is desired to be maintained.

Similarly, the remote sense return terminal of each power supply should be connected to a single point, as close as possible to the negative load terminal. To insure optimal current sharing, the **Parallel** terminals of the single output power supply modules must be connected together.

This connection should be made relatively short, but it can be made in any order. The **Remote Adjust** function may be used in a paralleled system to adjust the output voltage +/- 10%. The **Sync** functionality remains the same for a system of paralleled modules. The specified sync input signal may be applied to each of the paralleled modules. For best performance, phase shift the sync signal between modules. The use of the sync function is optional for single and or paralleled operation.

The versatility of combining multiple modules with the flexibility of Parallel, Sync, Remote Sense and Remote Adjust allow the power supply designers to tailor power and current to meet their application needs.

For more information, email Kent Brooten at Kent.Brooten@microsemi.com.

Kent Brooten
National Sales Manager, Power Module Group

Appearances and Events

SPWG - Space Parts Working Group

The Space Parts Working Group event was held April 22nd and 23rd in Torrance, California. This event is an unclassified, international forum for providing information to the aerospace industry and for resolving problems with high-reliability electronic piece parts for space applications.

It was well attended this year by Space professionals eager to hear how they might remain competitive in today's turbulent market. With nearly 30 component suppliers presenting product

line updates, as well as industry experts addressing issues such as export control regulations, hermeticity and counterfeiting to name just a few, there were topics of interest for almost everyone in the space industry.

Microsemi had two key speakers during the event: Director of Space, Defense and Avionics, Peter Cash and Director of Business Development, Jim Larrauri. They introduced the Space, Defense and Avionics group that focuses on providing precision frequency references such as space and military oscillators and atomic clocks and gave an update on the MVR™ MSR™ Series Product, ELDRS testing and also noted the RTG4 product availability. We would like to take this opportunity to thank those of you who also attended our sponsored luncheon during the Space Parts Working Group event.

To view our Microsemi paper presented at the SPWG conference please visit: http://www.microsemi.com/index.php?option=com_docman&task=doc_download&gid=133986

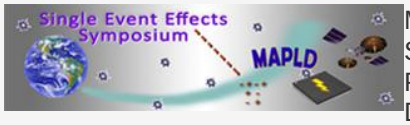
30th Space Symposium

The Space Symposium, formerly called the National Space Symposium, is held each spring at the Broadmoor Hotel in Colorado Springs, CO. The event has become widely known as the premier U.S. space policy and program forum, with attendance in excess of 9,000 participants including many from other nations. The highlight for this year on May 19-22, 2014 was the line-up of senior U.S. Government speakers, the greatest number in the Symposium's 30-year history.

Microsemi hosted a booth at the conference which was represented by Rich Foster, Kent Brooten, Radar Kahler, Jeff Shykula, Ashley Pollock and one of our local channel partners. The booth was visited by a broad range of defense, civil, and commercial customers from the space industry. On-site meetings were held with several prime contractors and subcontractors in the space industry.

For more information, visit http://www.spacesymposium.org/agenda/technical-track. The 31st Space Symposium will be held on April 13-16, 2015 again at the Broadmoor Hotel in Colorado Springs, CO.

SEE Symposium & MAPLD



Microsemi participated in the Single Event Effects (SEE) Symposium coupled with the Military and Aerospace Programmable Logic Devices (MAPLD) Workshop in San Diego, CA on May 19-22, 2014. Microsemi exhibited in the common booth area where we were able to meet with many global industry experts. Microsemi also presented a paper titled; Single Event Effects Characterization in 65 nm Flash-Based FPGA-SOC; by Nadia Rezzak. For further information visit: http://radhome.gsfc.nasa.gov/radhome/see_mapld/index.cfm

NSREC - Nuclear and Space Radiation Effects Conference

Microsemi will be participating in the IEEE Nuclear and Space Radiation Effects Conference (NSREC) July 14-18, 2014 in Paris, France. NSREC will feature a technical program consisting of technical sessions of contributed papers describing the latest observations in radiation effects, short courses on radiation effects, a radiation effects data workshop and an industrial exhibit. Microsemi representatives, including Ken O' Neill and Minh U. Nguyen, will be available during exhibition hours to provide information on Microsemi's wide array of products. Please stop by and visit us at Booth 10. For further information visit: http://www.nsrec.com/

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For more information on how Microsemi is serving the space market, access our brochure at Microsemi Space Solutions Brochure and our space webpage at http://www.microsemi.com/applications/space.

If you have any feedback or content suggestions for the Space Brief Newsletter, email me at SpaceBrief@microsemi.com or click on the “Feedback” link above. Thank you for your assistance in ensuring Space Brief continues to serve the space market and all employees.

Sylvia Keane
Marketing Executive, Aerospace and (Space Brief Editor-in-Chief)