

SPACE



BRIEF

Edition 5 - June 2012



From The Editors

Happy Spring and welcome to Microsemi's Space Newsletter. This edition brings you the latest news on Microsemi's comprehensive range of components and systems for space applications – from discrete transistors, point-of-load power converters, and hybrids, to FPGAs, ASICs and power management systems for space use. 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 newsletter are included at the end.

Articles in this edition

- [RTSX-SU EV Standard Military Drawings Posted](#)
- [RT ProASIC[®]3 FPGAs in CQ256 Package Now Available](#)
- [RT ProASIC[®]3 New Extended Flow \(E-Flow\) Offering](#)
- [New Radiation-Hardened DC-DC Power Converters 28V Input, 50W Output](#)
- [RTAX-S/SL/DSP FPGAs Datasheet Updated](#)
- [Linear Regulators with Enhanced Single Event Capability Now Available](#)
- [FPGA Technical Articles](#)
- [Microsemi's Commitment to Space](#)
- [Upcoming Appearances and Events](#)
 - [NASREC](#)
 - [RADECS](#)
- [Space Forums](#)
- [Register to Receive Microsemi Space Brief](#)

RTSX-SU EV Standard Military Drawings Posted

The RTSX32SU and RTSX72SU EV flow Standard Military Drawings (SMDs) are now posted on the Defense Logistics Agency (DLA) website. These SMDs include the latest enhancement to the RTSX-SU FPGAs EV screening flow, which is the equivalent of MIL-PRF-38535 QML Class V test flow without the official certification. To assure reliability of the RTSX-SU bimetallic wire bonds, we now perform a bake at 300°C for an hour followed by a destructive wire bond pull on two sample units at wire bond setup. This enhancement shows Microsemi's continuous commitment to provide space customers with the highest quality and reliability products. Customers can now order the highest quality RTSX-SU FPGAs by simply referring to the SMDs on the DLA website. For detailed SMDs, please refer to:

<http://www.dscc.dla.mil/Programs/Smcr/PnSearchResults.aspx?field=Vspn&operation=Starts&value=RTSX>

RT ProASIC[®]3 FPGAs in CQ256 Package Now Available

The first ceramic quad flat pack (CQFP) package of the RT ProASIC3 FPGA family, CQ256, is now available for order. CQ256 was introduced to provide space customers with a more cost-effective integration than higher pin count packages. CQFP is also the industry-standard package for space applications, with well-established board integration and inspection procedures. RT ProASIC[®]3 is the first reprogrammable flash FPGA of its kind to offer the flexibility of re-programmability, requiring no additional mitigation for radiation-induced configuration upsets. For more information, refer to the RT ProASIC[®]3 datasheet:

http://www.microsemi.com/soc/documents/RTPA3_DS.pdf

RT ProASIC[®]3 New Extended Flow (E-Flow) Offering

Microsemi recently added the extended screening flow, also known as E-flow, to the RT ProASIC[®]3 FPGA family. The extended flow provides additional processing steps and a higher level of reliability assurance which is required in many space applications. The RT ProASIC[®]3 datasheet will be updated with the flow details in July. The E-flow RT ProASIC[®]3 FPGAs are available for order now. For more information and pricing, please contact your Microsemi sales representatives:

<http://www.microsemi.com/soc/company/contact/offices/default.aspx>

New Radiation-Hardened DC-DC Power Converters 28V Input, 50W Output

The high-reliability SA50-28 single, dual and triple output converters continue to add to the stable of DC-DC converters. These surface mount technology converters provide military and commercial satellites with continuous protection against naturally occurring "total dose" ionized radiation, which can negatively impact system performance while maximizing the board real estate resulting in similar packaging and weight density to hybrid alternatives. This DC-DC power converter is added to our family of DC-DC converters such as the industry's first 120 volt, 50 watt high-reliability single, dual and triple output rad-hard DC/DC converters announced by Microsemi earlier this year. The robust SA50-120 series is a standard product targeted at satellites with greater than 5 kilowatts of operating power. All Microsemi solutions are differentiated by power, security, reliability and performance and the rad-hard DC/DC converters adds to the current product depth. For further information about this and all our DC-DC converters visit:

<http://www.microsemi.com/documents/products/SA50-28-515T.pdf>

RTAX-S/SL/DSP FPGAs Datasheet Updated

The RTAX-S/SL/DSP FPGA datasheet has recently been updated to Revision 15. A key update in this revision is the addition of the MIL-PRF-38535 QML Class V screening flow for RTAX-S/SL. The latest revision also has the access timing numbers for 8 and 16 blocks of cascaded SRAM. For a complete list of datasheet changes, please refer to the latest RTAX-S/SL/DSP datasheet:

http://www.microsemi.com/soc/documents/RTAXS_DS.pdf

Customer Notification CN1211 was released to notify customers of the updated datasheet:

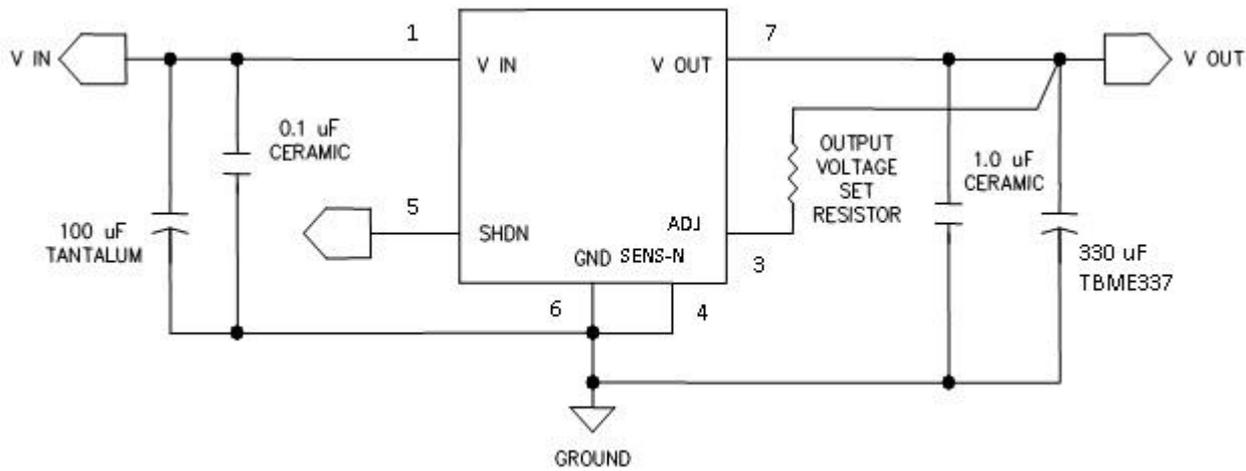
http://www.microsemi.com/soc/documents/CN1211_RTAX_DS.pdf

Linear Regulators with Enhanced Single Event Capability Now Available

The MHL8701 and MHL8705 are a new series of space qualified regulators capable of extremely low dropout voltages which will improve overall power dissipation when used to power FPGAs, ASICs and any other peripheral device used in satellite power distribution systems. The new parts are optimized for input rail voltages of +3.3V and +5V with a current capability of 3A to 5A. The MHL87XX series incorporates an optimized L-C output filter to achieve high Single Event Transient (SET) ratings of at least LET= 85 MeV when bombarded by heavy ions.

Improved Single Event performance is required by space level power distribution systems. Heavy ions can cause major disruption to the regulator output causing a glitch (transient) in the output that could exceed the maximum required voltage of the FPGA rails. If this happens, the FPGA and many mixed signal devices can create digital errors and cause the device to lose valuable data. Advanced mixed signal devices such as FPGAs, are extremely sensitive to changes in the power rails and typically must have a power source that is stable within 5 percent of its nominal value over the end-of-life of the product. The MHL870X series regulators provide added protection against this serious disruption of power by providing an attenuation path (L-C Filter) to ground.

The new regulators are easily configured by the addition of one resistor to set the output voltage. Additionally, one input electrolytic capacitor and one output electrolytic capacitor is needed to complete the final regulator application. See circuit below.



The new regulators have the following features:

- Radiation-tolerant to 300Krad
- Low drop out voltage of 400mV at 2.0A
- Thermal shutdown @ 150C
- Available with fixed and adjustable outputs
- Shutdown pin for output control
- Space level screening to MIL- PRF- 38534

The product is currently at the end of development and ready for sampling. Qualification is expected to complete by November of 2012. QML qualification (MIL-PRF- 38534) is planned for 2013. Samples can be obtained by contacting Microsemi sales or contacting HRG marketing:
 Al Ortega: 508-365-7874

FPGA Technical Articles

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

Effects of slow rise and fall time in RTAX-S/L/DSP

- <http://www.microsemi.com/soc/kb/article.aspx?id=FQ1228>

Recommendation for calibration verification before programming RTAX-S/L/DSP

- <http://www.microsemi.com/soc/kb/article.aspx?id=FQ1245>

How to prevent synthesis warning of "Found inferred clock"

- <http://www.microsemi.com/soc/kb/article.aspx?id=KI8886>

How unused RTAX-S/SL/DSP HCLK and RCLK I/Os are treated in Libero software

- <http://www.microsemi.com/soc/kb/article.aspx?id=FQ1265>

Microsemi's Commitment to Space

Propelling Space Innovation for More than Half a Century

For the past 55 years, Microsemi has developed products for use in space systems orbiting the Earth, moon, Mars, Venus and the sun, and for equipment used in missions to the surface of Mars, the Eros asteroid, and into the furthest reaches of the solar system. As part of the celebration, Microsemi attended the Space Parts Working Group in April

and presented a paper, a press release was made available and a new space brochure was launched. (http://www.actel.com/documents/Microsemi_Space_Solutions.pdf)

- Microsemi micro positioned relays were launched on Atlas space vehicles in 1957 battling to beat Sputnik in the space race. These relays are still in use today.
- Microsemi invented the first integrated PWM controller for switching power supplies in 1975. It was a breakthrough that provided a mixed signal solution replacing traditional linear products with a high frequency switching device. It was one of the first to combine analog and digital on one chip in a single process while being cost effective and reliable. It ushered in the now ubiquitous switching power supply.
- Microsemi was the first to qualify radiation hardened JANS level bipolar transistors and JANS continue to be a cornerstone of the Microsemi business. Microsemi now has 64 percent of all the JANS qualified listings and are adding new listings every month.
- In 1996, Microsemi produced the first radiation-hardened, non-volatile FPGA. And now, Microsemi has shipped the 10,000th of its current radiation-tolerant RTAX-S FPGA device for flight-critical applications. Microsemi has also shipped tens of thousands of its previous generation spaceflight FPGAs.

Upcoming Appearances and Events

NASREC

Microsemi will be participating in the IEEE Nuclear and Space Radiation Effects Conference (NASREC) July 16 – 20, 2012 in Miami, FL. NSREC features a technical program consisting of eight to ten technical sessions of contributed papers describing the latest observations in radiation effects, a Short Course on radiation effects offered on July 16, a Radiation Effects Data Workshop, and an Industrial Exhibit. Representatives will be available during exhibition hours at the Microsemi booth to provide information across the wide array of Microsemi products. For further information see: www.nsrec.com.

RADECS

Microsemi will be participating in Radiation Effects on Components and Systems (RADECS) September 24-28, 2012 in Biarritz, France. RADECS is held to promote basic and applied science and more specifically research in the field of radiation and its effects on materials, components and systems. The most relevant industries that will benefit from RADECS are Space, Civil Nuclear and Military applications. Representatives will be available during exhibition hours at the Microsemi booth to provide information across the wide array of Microsemi products. For further information see: www.radecs.net.

Space Forums

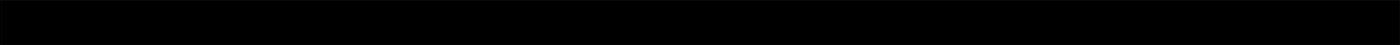
Microsemi's invitation-only, one-day Space Forums address key industry challenges and include technical presentations, new product updates, technology roadmap information and statistical reliability data. The current schedule is as follows:

- December 4, 2012 – Los Angeles
 - Marriott LAX
- Spring 2013 – North America (TBD)
- June 2013 – Noordwijk, Netherlands
- June 2013 – Moscow, Russia
- July 2013 – Bangalore and Ahmedabad, India
- October 2013 – Tokyo, Japan

To help us get the most from these events for you, the participant – we invite your opinions below. Reply to our online survey and be eligible to win a new iPad. To be eligible one must simply complete the survey at this url: <http://www.microsemi.com/soc/emailsurvey/default.aspx?id=1>

Register to Receive Microsemi Space Brief

If you enjoyed reading this newsletter and found the content useful, please pass it to your business colleagues who have not received it. If you are receiving this newsletter from a colleague, you can register to receive your own personal copy, delivered directly to your inbox. Follow this link: <http://www.microsemi.com/soc/interact/default.aspx?p=E402>



Copyright © 2014 Microsemi Corporation. All rights reserved. The Microsemi logo is a registered trademark of Microsemi Corporation.