



*Maxim Integrated Products
120 San Gabriel Drive
Sunnyvale, CA 94086
Phone: 408-737-7600
FAX: 408-737-71*

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Notification to Maxim Customers and Industry

Subject: Field Failures associated with Sumitomo EMExxxxU Series phosphorus-based molding compound

This notification is intended for Maxim customers and anyone in the industry who may be unaware of this potential problem.

Sumitomo EMExxxxU Series phosphorus-based molding compound was introduced to the industry in approximately 1996. Phosphorus particles were reportedly included as a flame retardant replacing Bromine and Antimony in response to popular political pressure to create a more “environmentally-friendly” material for use in semiconductor products. The molding compound was incorporated by subcontractor assemblers without full knowledge of the impact of the phosphorus material. This change appears to have created potential degradation in products manufactured industry-wide by subcontractor assemblers who used the Sumitomo EMExxxxU Series molding compound. This particular molding compound has become associated with failures in products across the industry in which silver dendrite growth forms between adjacent pins and results in high resistance shorts between the pins. Unfortunately, millions of units were shipped by the industry containing the Sumitomo EMExxxxU Series molding compound before the problem was known.

We stress that we are giving this advisement out of caution. Maxim has not been able to reproduce this failure mechanism and Maxim understands from Sumitomo that there has been no conclusive determination that the Sumitomo EMExxxxU Series molding compound is the direct cause of this failure mechanism. Circumstantial evidence, however, does suggest that there is a causal relationship, and that the change to a different molding compound has avoided this failure mechanism. Upon learning of the silver dendrite failure mechanism, Maxim contacted its subcontractor assembler, Amkor Technology, Inc., and Sumitomo Plastics America, Inc., the US representative of Sumitomo Bakelite Co.Ltd., the manufacturer of the EMExxxxU Series molding compound. Maxim was advised that Sumitomo had already been working on changes to the molding compound to correct this condition. Sumitomo then issued a Product Change Notification (PCN) to their direct customers, the subcontract assemblers. While the changes Sumitomo made to the molding compound appear to have resolved the problem, Sumitomo apparently already had plans to stop manufacturing the molding compound at the time Maxim learned of the silver dendrite failure mechanism. Maxim was among the first companies in the industry to demand that subcontract assemblers stop using the Sumitomo EMExxxxU Series molding compound in product assembly, even though there was no direct evidence of the causal relationship.

Maxim has identified one standard product that was assembled by subcontractors using the Sumitomo EMExxxxU Series molding compound that has exhibited failures: The MAX2104 sold by LSI as the L64733.

MAX2104 Sold as LSI L64733:

Maxim manufactured the MAX2104 exclusively for LSI from November 1999 to July 2001. During this time, the product was co-branded as the LSI L64733. The MAX2104/L64733 product with date codes preceding 0145 contains the Sumitomo EMExxxxU Series molding compound.

There have been no reported failures of MAX2104 product sold directly by Maxim. Between July and November 2001, MAX2104 product sold directly by Maxim (Date Codes 0126 to 0144) contained a phosphorous-based molding compound that was modified by Sumitomo without Maxim's knowledge. This modified version appears to have reduced the potential for problems, as there have been no reported failures within this time period. MAX2104 product sold after November 21, 2001, (Date Codes 0145 and later) was manufactured with non-phosphorus molding compound and has had no reported failures.

Summary of Issues:

- Sumitomo EMExxxxU Series phosphorus-based molding compound appears to be associated with the reported failures.
- The failure mechanism is silver dendrite growth causing high resistance shorts between pins.
- Maxim has not been able to reproduce the failure mechanism in the lab. The "exact" cause of silver dendrite growth has not been determined, but the Sumitomo EMExxxxU Series molding compound appears to contribute to the cause.
- Some, but not all, customers of the MAX2104 packaged as LSI L64733 have reported field failures. The incidence of reported failures among customers is inconsistent. Failures appear to occur on parts bearing Assembly Date Codes prior to 0030 (August of 2000).
- Devices labeled exclusively as MAX2104 (supplied directly from Maxim) have zero reported failures.
- Maxim recommends that customers who experience failures with products manufactured with Sumitomo EMExxxxU Series molding compound not de-solder the failed parts prior to failure analysis as de-soldering from boards can alter the failure mechanism.

Your Maxim Customer Service Representative can assist you with any questions and provide you with additional information.

Contact Information:

If you have inquiries regarding this information please contact Bryan Preeshl at the following address:

Bryan Preeshl
Executive Director, Quality Assurance
Maxim Integrated Products
408-331-4422 (Direct)
408-737-7600 (Switchboard)
bryan_preeshl@maximhq.com (email)