



Gennum's EU RoHS Directive 2002/95/EC Compliance Initiatives

Gennum believes that companies not only have a legislated accountability, but a moral and ethical responsibility to preserve and protect the quality of the environment in which it functions in both the short and long terms. The electronics industry continues to embrace environmental initiatives to reduce the level of hazardous materials contained in electronic components and systems. As part of our commitment to comply with global environmental initiatives, Gennum has adopted standards for hazardous materials use that comply with the European Union directive **EU RoHS Directive 2002/95/EC** and the corporate initiatives of our customers. Gennum has introduced Pb-free and Green/RoHS compliant versions of our products well in advance of the deadlines set out in these initiatives. We are also pleased to announce that Gennum was successfully registered to ISO14001:1996 on March 21, 2005.

Backwards Compatibility and Continuous Improvement

With the exception of BGA packages, our Pb-free, Green/RoHS compliant packages are fully compatible with existing assembly processes as well as Pb-free assembly processes, thereby allowing our customers to transition to Pb-free assembly according to their own requirements. Gennum also continues to work with our supply chain to ensure that products are manufactured using materials that are not only robust but also provide forward compliance to environmental initiatives. Implementing these solutions will allow us to continue to meet the needs of our global customers as well as fulfilling our responsibilities to the global community as a whole.

Gennum's RoHS/Lead-free Strategy

- 1) All RoHS compliant Pb-free/Green SMT packages will be qualified to 260C reflow (max).
- 2) All RoHS compliant Pb-free/Green packages will be backwards compatible with low temperature reflow processes, with the exception of BGA packages.
- 3) All leaded devices will have matte-Sn terminations. *
- 4) All leaded devices will be processed with a stress relieving anneal to minimize Sn whisker growth.
- 5) PDIP packages will be converted to RoHS compliant/Pb-free format. These products will not be qualified to 260C reflow.
- 6) BGA packages will be initially converted to SnAgCu Pb-free balls with RoHS compliant/Green die attach (DA) epoxy and molding compound (MC).
- 7) BGA packages will be converted to halogen-free substrates when this substrate technology becomes widely available, to mitigate supply risk.
- 8) All new products will only be introduced in Pb-free formats, with the exception of BGA's which will be available in both SnAuCu and PbSn formats.

Table 1: RoHS Compliant Pb-free/Green Package availability

Package Family	Termination	Package Materials	Date Available	MSL Rating
QFP	Matte-Sn*	RoHS Compliant	Available now	3
QFN	Matte-Sn	RoHS Compliant	Available now	1-3
SOIC	Matte-Sn	RoHS Compliant	Available now	2
PLCC	Matte-Sn	RoHS Compliant	Available now	3
BGA	SnAgCu	RoHS Compliant, halogen in laminate	Available now	3
BGA	SnAgCu	RoHS, Halogen-free substrate	Q4, 2005	3
PDIP	Matte-Sn	Standard	Available now	N/A
PDIP	Matte-Sn	RoHS Compliant	Q2, 2005	N/A

*A limited number of products are manufactured with SnBi terminations.

Product Identification:

In order to assist our customers during transition from standard to Pb-free products, Gennum is introducing a new set of part numbers for all existing products. These part numbers will include the following extensions.

Table 2: Pb-free and Green Product Identification

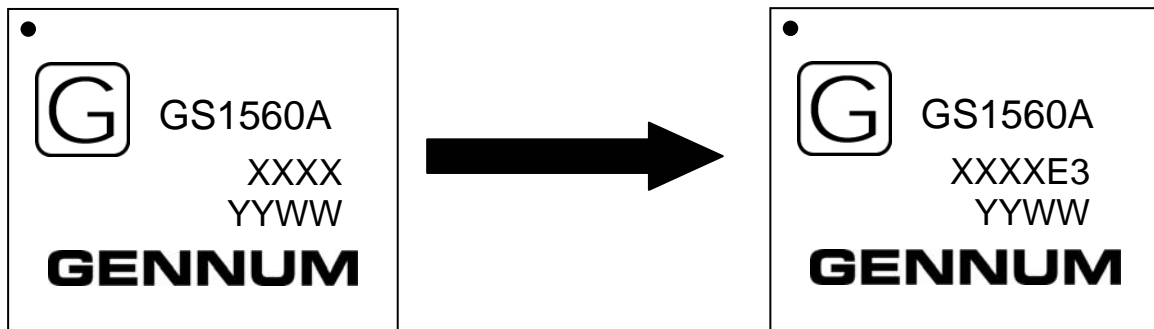
Product Name Extension	Definition
E1	Pb-free terminations only, RoHS compliant
E2	Pb-free terminations, RoHS compliant, non-halogen free, qualified to 260C reflow
E3**	Pb-free terminations, RoHS compliant, halogen-free, qualified to 260C.

Table 3: Example of part numbers

Product Part Number	Description
GS1560ACF	Standard Package
GS1560ACFE3	Pb-free terminations, RoHS compliant, halogen-free, qualified to 260C reflow

Product marking will be modified such that the product work order will have the same extension added to the end of the work order number (see example marking diagram below).

Figure 2: Sample of product marking change:



**A limited number of module-based products may contain RoHS compliant halogenated materials

Gennum's Green Initiative

In 2003 Gennum introduced our Green Initiative throughout our supply chain to ensure ongoing compliance to the EU RoHS Directive 2002/95/EC. The following are the key elements of this initiative;

- 1) The 'Warranty for non-inclusion of hazardous materials'. With this warranty, every supplier warrants that products and materials supplied to Gennum comply with the EU directives as well as the directives of several Japanese companies.
- 2) A complete list or BOM of all materials contained in products and materials delivered by every supplier to Gennum, including all shipping and packing materials. The list must specify the chemical contents of each material and the purpose of these materials. Alternatively Material Safety Data sheets may be submitted for each material used.
- 3) Certificates of analysis of the content of the following materials **in both the products and the packing materials (boxes, trays, bands, tubes etc) that are being delivered to Gennum,**
 - cadmium and cadmium compounds (ppm)
 - hexavalent chromium and its compounds (ppm)
 - lead and lead compounds (ppm)
 - mercury and mercury compounds (ppm)
- 4) Validation that every subcontractor is registered to ISO14001 or equivalent or is working to implement similar environmental controls.
- 5) Every supplier will notify Gennum in the event of any change to the management responsible for hazardous materials and for any changes in the materials, hazardous material content, manufacturing site or processes used in the manufacture of any product, materials or packaging materials delivered to Gennum, in order that Gennum can verify that these changes/materials are compliant with our customer requirements.
- 6) Going forward, each of our suppliers will renew these documents on an annual basis. These requirements have been included in all new Gennum procurement specifications and Vendor/Supplier qualifications.
- 7) Gennum has implemented a monitoring program to perform sample ICP analysis for Pb, Cd, Hg and Cr on all package families, including both product and packaging materials. Every package family has been tested in order to establish an initial baseline.
- 8) In response to reliability concerns regarding the use of red phosphorous as a flame retardant in molding compounds, Gennum has ensured that all of our products are free of red phosphorous.