

**Date:** Q406 Update  
**Products:** All Embedded Products

**Originator:** ECSD Business Operations  
**Type:** Product Update

## Embedded Products RoHS-Compliant and Lead-Free Status

AMD is aware that the European Union Directive entitled "Restriction on the use of certain Hazardous Substances in Electrical and Electronics Products" (RoHS), 2002/95/EC, became effective on 1 July 2006 and restricts the use of six substances within electrical and electronic equipment. The substances are:

<u>Substance</u>	<u>Proposed EU limit (by weight)</u>
• Lead (Pb)	0.1%
• Mercury (Hg)	0.1%
• Cadmium (Cd)	0.01%
• Hexavalent Chromium (Cr6+)	0.1%
• Polybrominated biphenyls (PBB)	0.1%
• Polybrominated diphenyl ethers (PBDE).	0.1%

The only RoHS substance that is intentionally used in some AMD Embedded processors is Lead (Pb). Pb is present in certain products, which continue to be offered in a Pb-bearing version.

Pb is also present in AMD Geode™ NX and Embedded E64 processors. Pb is contained in the flip chip C4 interconnection solder (between the Silicon die and the package substrate) and the solder used to attach the pins to the bottom of the package substrate. The European Commission amended the RoHS Directive to exempt these specific uses of Pb in flip chip microprocessors. (Decision 2005/747/EC published in the Official Journal of the European Union on October 25, 2005). Pb was also contained in the solder paste material used to attach the passive components (capacitors and resistors) to the package substrates. However, we have converted to a Pb-free solder paste material for this application. Thus, after converting the solder paste to a Pb-free solder paste, these processor packages are fully "RoHS compliant". See individual product information below for further details.

We will use the following terms to describe AMD Embedded products in this bulletin:

**"Pb-free"** - AMD Embedded products that are designated as Pb-free contain materials with a maximum of 0.1% lead per homogeneous material, and are otherwise compliant with the RoHS Directive.

**"RoHS-compliant"** – AMD Embedded products which are designated as "RoHS-compliant" meet all aspects of RoHS requirements and may include applications of Pb in solders that are specifically exempted under the RoHS Directive.

*All new Embedded products introduced by AMD will have RoHS-compliant versions available.*

AMD Embedded Lead-free (Pb-Free) and RoHS-compliant products (with the exception of the Embedded Opteron products, which are identified by date code only), are identified by unique Ordering Part Numbers (OPNs) which are explained in this document. OPNs are marked on the top side of the device, and on the shipping container labels.

In addition, there is increasing industry discussion on "Green" materials sets. This potential new category of product chemistry restrictions would purportedly encompass both "Pb-free" and "RoHS-Compliant"

requirements, as well as include additional restrictions on the use of certain chemicals. Since no suitable industry-standard definition exists for the term “Green” at this time, AMD Embedded will limit product designations to ‘Pb-free” and “RoHS-Compliant”, and will continue to monitor industry progress toward final agreement on the meaning of “Green”.

This bulletin contains information on the availability of Pb-free and RoHS-compliant AMD Embedded products.

➤ **Products/Package code which will be offered in a RoHS-compliant & Lead-Free (Pb-free) version (A complete list of OPN's is listed on pages 6-8).**

**EPD**

ElanSC520 BGA  
Am186CC PQR  
Am186CH PQR  
Am186CU PQR  
Am186ER PQL  
Am188ER PQL

**NPD**

Am79C874 PQT  
Am79C875 PQR  
Am79C972B PQL  
Am79C972B PQR  
Am79C973B PQL  
Am79C973B PQR  
Am79C975B PQL  
Am79C975B PQR  
Am79C976 PQR

**GEO**

AMD Geode™ GX BGD  
Geode GX BGU  
Geode LX BGU  
CS5535 UDC BGA  
CS5536 BGA  
SC1200 UFH BGU  
SC1201 UFH BGU  
SC2200 UFH BGU  
SC3200 UFH BGU

➤ **Products/Package code offered in a RoHS-compliant version**

- AMD Geode™ NX OGF \*
- Embedded E64

\* RoHS-compliant package became available in May 2006. Therefore, this product will no longer be offered in the standard package.

➤ **Active Products NOT offered in Lead-Free (Pb-Free)**

**EPD**

AM186ER PQR  
AM188ER PQR

➤ **Product Marking/Identification**

All RoHS-compliant products can be identified by their OPN and topside marking, with the exception of embedded Opteron, which is identified by date code only.

**EPD and NPD**

Some typical OPN examples are listed below:

**Standard**

ELANSC520-100AC  
ELANSC520-100AI

**RoHS-compliant & Lead-free**

ELANSC520-100AD  
ELANSC520-100AF

**Standard**

ANXL1500FGC3M

**RoHS-compliant**

ANXL1500FGC3F

The last character of the OPN traditionally has been used to define the operating temperature ranges, such as commercial or industrial (specific temperature ranges are defined in each

product's datasheet). For EPD and NPD products this last character now shows whether a part uses a standard or lead-free package. The common codes used within ECSD are as follows:

C = Commercial Operating Temperature Range

**D = *Lead-Free* Commercial Operating Temperature Range**

I = Industrial Operating Temperature Range

**F = *Lead-Free* Industrial Operating Temperature Range**

M = Geode NX Commercial Operating Temperature Range

**F = *RoHS-compliant* Geode NX Commercial Operating Temperature Range**

### **Geode**

Typical OPN examples are listed below:

#### **Standard**

CS5535-UDC

SC1201UFH-266

AGXD533AAXF0CC

ALXC800EETJCVC

#### **Lead-free**

CS5535-UDCF

SC1201UFH-266F

AGXD533AAXF0CD

ALXC800EETJCVD

The last character of the OPN indicates whether the part uses a standard (often called eutectic) or lead-free package.

**F** = Lead Free on the Geode SCx20x processors, and the CS5535 companion chip

**D** = Lead Free on the Geode GX and LX processors

### **Embedded E64 Processors**

OPNs do not change; all Embedded E64 product with date code 0529 and later are RoHS-Compliant.

## Embedded Products: RoHS-Compliant & Lead-Free (Pb-free) Status

Prod. Line	External Device	Package	Assembly Site	Lead-Free Plating or Ball Composition	Intended MSL/Temp Rating	Product status
EPD	ElanSC520	BGA388 (ball grid array)	ASEKH	Sn95.5Ag4.0Cu0.5	MSL 4, 250+0/-5 C	Currently available
EPD	Am186CC Am186CH Am186CU	PQR160 (leadframe)	ASEKH	Sn + Cu2.0	MSL 3, 250+0/-5 C	Currently available
EPD	Am186ER Am188ER	PQL100 (leadframe)	ATK-K3	Sn	MSL 3, 250+0/-5 C	Currently available
NPD	Am79C874	PQT080 (leadframe)	ASEKH	Sn + Cu2.0	MSL 3, 255+5/-0 C	Currently available
NPD	Am79C875	PQR100 (leadframe)	ASEKH	Sn + Cu2.0	MSL 3, 250+0/-5 C	Currently available
NPD	Am79C972B Am79C973B Am79C975B	PQR160 (leadframe)	ASEKH	Sn + Cu2.0	MSL 3, 250+0/-5 C	Currently available
NPD	Am79C972B Am79C973B Am79C975B	PQL176 (leadframe)	ATK-K3	Sn	MSL 3, 250+0/-5 C	Currently available
NPD	Am79C976 Am79C977	PQR208 (leadframe)	ATK-K1	Sn	MSL 3, 250+0/-5 C	Currently available
GEO	GX	BGD368 (ball grid array)	ASEKH	Sn-Ag3.5	MSL3/260	Currently available
GEO	GX	BGU396 (ball grid array)	ASEKH	Sn-Ag3.5	MSL3/260	Currently available
GEO	LX	BGU481 (ball grid array)	ASEKH	Sn-Ag3.5	MSL3/260	Currently available
GEO	CS5535	BGA208 (ball grid array)	ASEKH	Sn-Ag3.5	MSL3/260	Currently available
GEO	CS5536	BGA208 (ball grid array)	ASEKH	Sn-Ag3.5	MSL3/260	Currently available
GEO	SC1200 SC1201 SC2200 SC3200	BGU481 (ball grid array)	ASEKH	Sn-Ag3.5	MSL3/260	Currently available



## Embedded Products : RoHS-compliant Status

Prod. Line	External Device	Package	Assembly Site	Lead-Free Plating or Ball Composition	Intended MSL/Temp Rating	Product Status
EPD	Geode NX (Thoroughbred)	OGF453 (pin grid array)	AMD	N/A (socket mount)	N/A	Currently available
E64	Athlon64	AM2 – UOF940	AMD	N/A (socket mount)	N/A	Currently available
E64	Embedded Opteron	UOG940	AMD	N/A (socket mount)	N/A	Currently available
E64	Embedded Opteron	L1 – LG1207	AMD	N/A (socket mount)	N/A	Currently available
E64	Sempron	UOG754	AMD	N/A (socket mount)	N/A	Currently available
E64	Sempron	S1 – UOL638	AMD	N/A (socket mount)	N/A	Currently available
E64	Sempron	AM2 – UOF940	AMD	N/A (socket mount)	N/A	Currently available
E64	Turion	S1 – UOL638	AMD	N/A (socket mount)	N/A	Currently available



## RoHS-compliant & Lead-free (Pb-Free) Product Offerings

Prod. Line	External Device	PKG	Standard OPN	Pb-free OPN
EPD	ElanSC520	BGA388	ELANSC520-133AC 8A	ELANSC520-133AD 8A
EPD	ElanSC520	BGA388	ELANSC520-100AC	ELANSC520-100AD
EPD	ElanSC520	BGA388	ELANSC520-100AI	ELANSC520-100AF
EPD	Am186CC	PQR160	Am186CC-25KC\W C	Am186CC-25KD\W C
EPD	Am186CC	PQR160	Am186CC-25KI\W C	Am186CC-25KF\W C
EPD	Am186CC	PQR160	Am186CC-40KC\W C	Am186CC-40KD\W C
EPD	Am186CC	PQR160	Am186CC-40KI\W C	Am186CC-40KF\W C
EPD	Am186CC	PQR160	Am186CC-50KC\W C	Am186CC-50KD\W C
EPD	Am186CH	PQR160	Am186CH-25KC\W C	Am186CH-25KD\W C
EPD	Am186CH	PQR160	Am186CH-25KI\W C	Am186CH-25KF\W C
EPD	Am186CH	PQR160	Am186CH-40KC\W C	Am186CH-40KD\W C
EPD	Am186CH	PQR160	Am186CH-40KI\W C	Am186CH-40KF\W C
EPD	Am186CH	PQR160	Am186CH-50KC\W C	Am186CH-50KD\W C
EPD	Am186CU	PQR160	Am186CU-25KC\W C	Am186CU-25KD\W C
EPD	Am186CU	PQR160	Am186CU-25KI\W C	Am186CU-25KF\W C
EPD	Am186CU	PQR160	Am186CU-40KC\W C	Am186CU-40KD\W C
EPD	Am186CU	PQR160	Am186CU-40KI\W C	Am186CU-40KF\W C
EPD	Am186CU	PQR160	Am186CU-50KC\W C	Am186CU-50KD\W C
EPD	Am186ER/Am188ER	PQL100	Am186ER/Am188ER-25VC\W	Am186ER/Am188ER-25VD\W
EPD	Am186ER/Am188ER	PQL100	Am186ER/Am188ER-25VI\W	Am186ER/Am188ER-25VF\W
EPD	Am186ER/Am188ER	PQL100	Am186ER/Am188ER-33VC\W	Am186ER/Am188ER-33VD\W
EPD	Am186ER/Am188ER	PQL100	Am186ER/Am188ER-40VC\W	Am186ER/Am188ER-40VD\W
EPD	Am186ER/Am188ER	PQL100	Am186ER/Am188ER-40VI\W	Am186ER/Am188ER-40VF\W
EPD	Am186ER/Am188ER	PQL100	Am186ER/Am188ER-50VC\W	Am186ER/Am188ER-50VD\W
EPD	Am186ER/Am188ER	PQL100	Am186ER/Am188ER-50VI\W	Am186ER/Am188ER-50VF\W
NPD	AM79C874	PQT080	AM79C874VC	AM79C874VD
NPD	AM79C874	PQT080	AM79C874VI	AM79C874VF
NPD	AM79C875	PQR100	AM79C875KC	AM79C875KD
NPD	AM79C875	PQR100	AM79C875KI	AM79C875KF
NPD	AM79C972B	PQR160	AM79C972BKC\W	AM79C972BKD\W
NPD	AM79C972B	PQR160	AM79C972BKI\W	AM79C972BKFW
NPD	AM79C972B	PQL176	AM79C972BVC\W	AM79C972BVD\W
NPD	AM79C972B	PQL176	AM79C972BVI\W	AM79C972BVF\W

<b>Prod. Line</b>	<b>External Device</b>	<b>PKG</b>	<b>Standard OPN</b>	<b>Pb-free OPN</b>
NPD	AM79C973B	PQR160	AM79C973BKC\W	AM79C973BKD\W
NPD	AM79C973B	PQL176	AM79C973BVC\W	AM79C973BVD\W
NPD	AM79C975B	PQR160	AM79C975BKC\W	AM79C975BKD\W
NPD	AM79C975B	PQL176	AM79C975BVC\W	AM79C975BVD\W
NPD	AM79C976	PQR208	AM79C976KC	AM79C976KD
NPD	AM79C976	PQR208	AM79C976KI	AM79C976KF
NPD	AM79C977	PQR208	AM79C977KC	AM79C977KD
NPD	AM79C977	PQR208	AM79C977KI	AM79C977KF
GEO	Geode GX	BGD368	AGXD466AAXD0CC	AGXD466AAXD0CD
GEO	Geode GX	BGD368	AGXD466AAXD0TC	AGXD466AAXD0TD
GEO	Geode GX	BGD368	AGXD500AAXE0CC	AGXD500AAXE0CD
GEO	Geode GX	BGD368	AGXD500AAXE0TC	AGXD500AAXE0TD
GEO	Geode GX	BGD368	AGXD533AAXF0CC	AGXD533AAXF0CD
GEO	Geode GX	BGD368	AGXD533AAXF0TC	AGXD533AAXF0TD
GEO	Geode GX	BGU396	AGXD466EEXD0BC	AGXD466EEXD0BD
GEO	Geode GX	BGU396	AGXD500EEXE0BC	AGXD500EEXE0BD
GEO	Geode GX	BGU396	AGXD533EEXF0BC	AGXD533EEXF0BD
GEO	Geode LX	BGU481	ALXC700EETHCVC C0	ALXC700EETHCVD C0
GEO	Geode LX	BGU481	ALXC700EETH2VC C0	ALXC700EETH2VD C0
GEO	Geode LX	BGU481	ALXC800EETJCVC C0	ALXC800EETJCVD C0
GEO	Geode LX	BGU481	ALXD800EEXJ2VC C0	ALXD800EEXJ2VD C0
GEO	CS5535	BGA208	CS5535-UDC	CS5535-UDCF
GEO	CS5536	BGA208	CS5536AC B1	CS5536AD B1
GEO	SC1200	BGU481	SC1200UFH-266 D3	SC1200UFH-266F 33
GEO	SC1200	BGU481	SC1200UFH-266B D3	SC1200UFH-266BF 33
GEO	SC1201	BGU481	SC1201UFH-266 D3	SC1201UFH-266F 33
GEO	SC1201	BGU481	SC1201UFH-266B D3	SC1201UFH-266BF 33
GEO	SC2200	BGU481	SC2200UFH-233 D3	SC2200UFH-233F 33
GEO	SC2200	BGU481	SC2200UFH-266 D3	SC2200UFH-266F 33
GEO	SC2200	BGU481	SC2200UFH-266B D3	SC2200UFH-266BF 33
GEO	SC2200	BGU481	SC2200UFH-300 D3	SC2200UFH-300F 33
GEO	SC3200	BGU481	SC3200UFH-233 D3	SC3200UFH-233F 33
GEO	SC3200	BGU481	SC3200UFH-266 D3	SC3200UFH-266F 33

## RoHS-compliant Product Offerings\*

Prod. Line	External Device	PKG	Standard OPN	RoHS-Compliant OPN*
EPD	Geode NX 1250 (Athlon – Thoroughbred)	OGF453	ANXL1250FYC3M	ANXL1250FYC3F
EPD	Geode NX 1500 (Athlon – Thoroughbred)	OGF453	ANXL1500FGC3M	ANXL1500FGC3F
EPD	Geode NX 1750 (Athlon – Thoroughbred)	OGF453	ANXS1750FXC3M	ANXS1750FXC3F
E64	Embedded Turion	UOG754	TMSMT37BQX5LDE	EMBEDDED 64-Bit OPNs WILL NOT CHANGE; RoHS COMPLIANT PARTS WILL BE IDENTIFIED BY DATE CODE 0529 AND LATER
E64	Embedded Sempron	UOG754	SMS3300BQX2LFE	
E64	Embedded Sempron	UOG754	SMS3000BQX2LFE	
E64	Embedded Opteron	UOG940	OSB144FOT5BKE	
E64	Embedded Opteron	UOG940	OSK148FOT5BKE	
E64	Embedded Opteron	UOG940	OSA152FAA5BKE	
E64	Embedded Opteron	UOG940	OSK165FQU6CAE	
E64	Embedded Opteron	UOG940	OSA165FAA6CAE	
E64	Embedded Opteron	UOG940	OSB240FOT5BLE	
E64	Embedded Opteron	UOG940	OSB244FOT5BLE	
E64	Embedded Opteron	UOG940	OSK248FOT5BLE	
E64	Embedded Opteron	UOG940	OSA252FAA5BLE	
E64	Embedded Opteron	UOG940	OSK265FQU6CBE	
E64	Embedded Opteron	UOG940	OSA265FAA6CBE	
E64	Embedded Opteron	UOG940	OSK848FOT5BME	
E64	Embedded Opteron	UOG940	OSA852FAA5BME	
E64	Embedded Opteron	UOG940	OSK865FQU6CCE	
E64	Embedded Opteron	UOG940	OSA865FAA6CCE	
E64	Embedded Athlon 64	AM2 – UOF940	ADD3000IAA4CNE	
E64	Embedded Athlon 64	AM2 – UOF940	ADD3400IAA5CUE	
E64	Embedded Opteron	UOG940	OSA152FAA5BKE	
E64	Embedded Opteron	UOG940	OSA165FAA6CAE	
E64	Embedded Opteron	UOG940	OSA252FAA5BLE	
E64	Embedded Opteron	UOG940	OSA265FAA6CBE	
E64	Embedded Opteron	UOG940	OSA852FAA5BME	
E64	Embedded Opteron	UOG940	OSA865FAA6CCE	
E64	Embedded Opteron	UOG940	OSB144FOT5BKE	
E64	Embedded Opteron	UOG940	OSB240FOT5BLE	
E64	Embedded Opteron	UOG940	OSB244FOT5BLE	
E64	Embedded Opteron	Socket F (1207)	OSH1210GAS6DGE	
E64	Embedded Opteron	Socket F (1207)	OSH2210GAS6CXE	
E64	Embedded Opteron	Socket F (1207)	OSH8210GAS6CYE	

Prod. Line	External Device	PKG	Standard OPN	RoHS-Compliant OPN*
E64	Embedded Opteron	UOG940	OSK148FOT5BKE	
E64	Embedded Opteron	UOG940	OSK165FQU6CAE	
E64	Embedded Opteron	UOG940	OSK248FOT5BLE	
E64	Embedded Opteron	UOG940	OSK265FQU6CBE	
E64	Embedded Opteron	UOG940	OSK848FOT5BME	
E64	Embedded Opteron	UOG940	OSK865FQU6CCE	
E64	Embedded Opteron	Socket F (1207)	OSP1214GAU6DGE	
E64	Embedded Opteron	Socket F (1207)	OSP2214GAU6CXE	
E64	Embedded Opteron	Socket F (1207)	OSP8214GAU6CYE	
E64	Embedded Sempron	UOG754	SMS3000BQX2LFE	EMBEDDED 64-Bit OPNs WILL NOT CHANGE; RoHS COMPLIANT PARTS WILL BE IDENTIFIED BY DATE CODE 0529 AND LATER
E64	Embedded Sempron	UOG754	SMS3300BQX2LFE	
E64	Embedded Sempron	S1 – UOL638	SMS3500HAX4CME	
E64	Embedded Turion 64	S1 – UOL638	TMDTL52HAX5CTE	
E64	Embedded Turion 64	UOG754	TMSMT37BQX5LDE	
E64	Embedded Athlon 64	AM2 – UOF940	ADA4200IAA5CUS	
E64	Embedded Athlon 64	AM2 – UOF940	ADD4200IAA5DKS	
E64	Embedded Opteron	UOG940	OSA248FAA5BLS	
E64	Embedded Opteron	UOG940	OSA250FAA5BLS	
E64	Embedded Opteron	UOG940	OSA270FAA6CBS	
E64	Embedded Opteron	UOG940	OSA275FAA6CBS	
E64	Embedded Opteron	UOG940	OSA280FAA6CBS	
E64	Embedded Opteron	UOG940	OSA285FAA6CBS	
E64	Embedded Opteron	UOG940	OSA875FAA6CCS	
E64	Embedded Opteron	UOG940	OSA885FAA6CCS	
E64	Embedded Opteron	UOG940	OSK250FAA5BLS	
E64	Embedded Opteron	UOG940	OSK270FAA6CBS	
E64	Embedded Opteron	Socket F (1207)	OSP2216GAA6CQS	
E64	Embedded Sempron	AM2 – UOF940	SDA3000IAA3CNS	
E64	Embedded Sempron	AM2 – UOF940	SDA3200IAA2CNS	
E64	Embedded Sempron	AM2 – UOF940	SDA3400IAA3CNS	
E64	Embedded Sempron	AM2 – UOF940	SDD3400IAA3CNS	
E64	Embedded Sempron	S1 – UOL638	SMS3200HAX4CMS	
E64	Embedded Turion 64	S1 – UOL638	TMDTL60HAX5CTS	
E64	Embedded Turion 64	UOG754	TMSMT28BQX4LDS	
E64	Embedded Turion 64	UOG754	TMSMT30BQX5LDS	
E64	Embedded Opteron	Socket F (1207)	OSA2210GAA6CQS	
E64	Embedded Opteron	Socket F (1207)	OSA1210IAA6CSS	
E64	Embedded Opteron	Socket F (1207)	OSA1216IAA6CSS	

Note : \* As of May 2006, the RoHS-Compliant versions of the E64 products are the only versions available. The E64 “Standard” OPN and the “RoHS-Compliant OPN” are the same.

➤ **RoHS Compliance Certification Letter**

AMD now has a standard RoHS compliance certification letter that is expected to be a satisfactory response to all customer requests for a formal statement. An electronic version can be found at [http://www.amd.com/us-en/assets/content\\_type/DownloadableAssets/AMD\\_RoHS\\_Statement.pdf](http://www.amd.com/us-en/assets/content_type/DownloadableAssets/AMD_RoHS_Statement.pdf).

Please forward all product inquiries to: [james.saul@amd.com](mailto:james.saul@amd.com).