



Pb-Free

TI's Lead (Pb)-Free and Green Program

Topics	Slide #
Committed to the Environment	2
Definitions	3
Industry-Leading Solutions	4
Part Number Changes	5
Part Number Structure	6
Array Part Numbers	7
External Website Features	8
Packing Label Changes	11
Information Resources	12

May 25, 2004

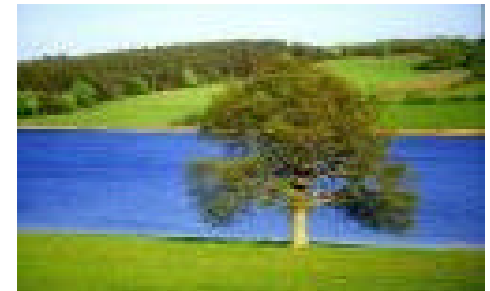
1



Pb-Free

TI is Committed to the Environment

- Participates in industry standards organizations and works with legislative groups to set achievable and meaningful environmental goals
- Began removing Lead (Pb) from products more than a decade ago
 - Over 70% of TI's leadframe components do not contain lead and are compatible with proposed RoHS thresholds
 - All TI Logic products are available Pb-Free
- Is actively qualifying Pb-Free and Green solutions that go beyond current industry thresholds in anticipation of future environmental requirements
- By the end of 2004, >95% of TI products will be available Lead (Pb)-Free and Green





Pb-Free

Lead (Pb)-Free and Green Definitions

RoHS compatible + high temp =



Pb-Free

- **Lead (Pb)-Free:** TI defines "**Lead (Pb)-Free**" or "**Pb-Free**" to mean RoHS compatible, including a lead concentration that does not exceed 0.1% of total product weight, and, if designed to be soldered, suitable for use in specified lead-free soldering processes.



Pb-Free

- halogens - antimony =



Green

- **Green:** TI defines "**Green**" to mean Lead (Pb)-Free and, in addition, uses package materials that do not contain halogens, including bromine (Br), or antimony (Sb) above 0.1% of total product weight.



Pb-Free

Industry-Leading Solutions

Customers recognize TI's nickel-palladium-gold (NiPdAu) as the best lead finish available

- **TI's primary Pb-Free finish is NiPdAu**
 - No other supplier offers as comprehensive a selection of products in NiPdAu
 - Fully compatible with Pb and Pb-Free soldering processes
 - By end of 2004, >95% of TI leadframe products will be converted to NiPdAu and Green
- **TI will offer separate Pb and Pb-Free Array package versions**
 - Array package solder balls can not be made to be compatible with both Pb and Pb-Free solder processes
 - Pb-Free versions will have new industry standard tin-silver-copper (SnAgCu) solder balls
 - TI will continue to offer older Pb solder ball versions as long as customers need them





Pb-Free

Part Number Changes

- Product part numbers **will not change** as long as part is 100% backward compatible with Pb-based solder processes
- Since Ball Array products are not backward compatible, a new Pb-Free version will be offered with a new part number
 - Pb versions of Array products will continue to be offered
- A “Pb-Free Part Number” may be created if this is required to insure supply of Pb-Free products for specific customer projects
 - The “Pb-Free Part Number” will be in addition to the current product part number

TPA2005D1ZQYR



Pb-Free

Part Number Structure

A 2-character suffix aligned with JEDEC E-Cat nomenclature will be added.

Example:

**Standard Part Number:
TPS75701KTTR**

**New “Pb-Free Part
Number”:
TPS75701KTTR**G4****

Category	Description
	Not Lead (Pb)-Free. No ECAT
e	Pb-Free. Not Green rated
e1	SnAgCu (shall not be included in category e2)
e2	Sn alloys with no Bi or Zn excluding SnAgCu
e3	Sn
e4	Preplated (e.g., Ag, Au, NiPd, NiPdAu)
e5	SnZn, SnZnx (no Bi)
e6	Contains Bi
e7	Low temperature solder (<150C) containing In (no Bi)
G	Pb-Free. Green rated.
G1	Green rated. SnAgCu
G2	Green rated. Sn alloys with no Bi or Zn excluding SnAgCu
G3	Green rated. Sn
G4	Green rated. Preplated (e.g., Ag, Au, NiPd, NiPdAu)
G5	Green rated. SnZn, SnZnx (no Bi)
G6	Green rated. Contains Bi



Pb-Free

Array Part Numbers

	Pb-Containing Designator	Pb-Free Designator
Array Packages		
➤ Ball Grid Packages	Gab	Zab
➤ Bumped Die Sales	YE	YZ
➤ NanoStar	YEx	Yzx

Examples:	
Pb Version	TMS320VC5509AGHH
Pb- Free Version	TMS320VC5509AZHH
Pb Version	SN74LVC1G86Y E AR
Pb-Free Version	SN74LVC1G86Y E ZAR

New designators will be assigned and released as required. Contact your Sale Representative for additional information.



Pb-Free

External Website: General Features

Contact Us Buy About TI TI Worldwide my.TI

TEXAS INSTRUMENTS

Quality Data

Reliability Data

Eco-Info

Product Content

Materials of Concern

Packing

General Information

Lead (Pb)-Free

Process & Methodology

Certifications

Industry Standards

REAL WORLD SIGNAL PROCESSING™

Products Applications Support

TI Home > Support > Quality > Eco-Info > Product Content

Eco-Info: Product Content

Search Advanced Search

Keyword Go

Part Number Go

Add to my.TI

Single Part Number Search Disclaimer

Perform a search by "TI Part Number" OR "Customer Part Number".

TI Part Number OR **Customer Part Number**

Display Results Per Page

Multiple Part Number Search

Perform a search by "TI Part Number" AND/OR "Customer Part Number". Please enter an **exact part number**. Partial part numbers are not supported. One device per line with no extra characters. Limit of 1000 Devices per Search.

TI Part Number AND/OR **Customer Part Number**

Display Results Per Page

Disclaimer

The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. Certain TI suppliers consider material content information

Related Sites

- Ethics and Integrity
- Corporate Information
- Packaging

www.ti.com/leadfree



External Website: Search Features

The screenshot shows the Texas Instruments website interface. The top navigation bar includes links for Contact Us, Buy, About TI, TI Worldwide, and my.TI. The main header features the Texas Instruments logo and the slogan 'REAL WORLD SIGNAL PROCESSING™'. Below the header, there are tabs for Products, Applications, and Support. A search bar is located in the top right corner, with options for Keyword and Part Number searches. The main content area displays search results for 'TPS62000DGSR', showing 2 matches. A 'Detailed Product Content Email Request' form is visible, with fields for Name, Email, Phone, and Company. A table of 'Summary Results' is also present, listing part numbers, assembly sites, and various compliance status indicators. A 'Definitions' section provides explanations for terms like 'Ext-Mfg', 'Green Orderable', 'Lead (Pb)-Free Orderable', and 'RoHS Compatible'. A red box highlights a link to 'High-level status information with a clickable link to detailed information.' in the left sidebar.

High-level status information with a clickable link to detailed information.

Part Number	Assembly Site	Current Finish	Lead (Pb)-Free Orderable	RoHS Compatible	Green Orderable	Package Type Pins
TPS62000DGSR	Ext-Mfg		N	N	N	DGS 10
TPS62000DGSR	Ext-Mfg		N	N	N	DGS 10

www.ti.com/leadfree



Pb-Free

External Website: Look-up Results

The screenshot shows the Texas Instruments website interface. The top navigation bar includes 'Contact Us', 'Buy', 'About TI', 'TI Worldwide', and 'my.TI'. A search bar is located in the top right corner. The main content area displays 'Eco-Info: Product Content Lookup Results' for the part number 'TPS62000DGSR'. The page is divided into several sections: 'Current Production Information', 'Planned Lead (Pb)-Free Changes - Estimated Dates', 'Planned Green Changes - Estimated Dates', and 'Component Information'. A sidebar on the left contains a 'Quality Data' menu with options like 'Reliability Data', 'Eco-Info', 'Product Content', 'Materials of Concern', 'Packing', 'General Information', 'Lead (Pb)-Free', 'Process & Methodology', 'Certifications', and 'Industry Standards'. A red-bordered box highlights the 'Lead (Pb)-Free' section in the sidebar.

Detailed Pb-Free and Green estimated plan dates plus Component Information about:

- Bond Wire
- Die Attach Adhesive
- Lead Frame
- Mold Compound
- Semiconductor Device

Current Production Information

TI Part Number	TPS62000DGSR	Assembly Site	Ext-Mfg
Current Finish		Package Type Pins	DGS 10
Lead (Pb)-Free Orderable	N	MSL Rating/ Peak Reflow	Level-1-235C-UNLIM/Level--
Lead(Pb)-Free Conversion Date		Green Orderable	N
RoHS Compatible	N	Green Conversion Date	
Package Body Size (W x L x H) mm	3.00X3.00X1.02	Package Total Mass (g)	0.0204

Planned Lead (Pb)-Free Changes - Estimated Dates

Lead(Pb)-Free PCN Release Date	17-Mar-2004	Lead(Pb)-Free Initial Supply Date	15-Jun-2004
Lead(Pb)-Free Assured Supply Date	12-Dec-2004	Lead(Pb)-Free Finish	NIPdAu

Planned Green Changes - Estimated Dates

Green PCN Release Date	17-Mar-2004	Green Initial Supply Date	15-Jun-2004
Green Assured Supply Date	12-Dec-2004		

Component Information

Component	Substance	CAS Number	Amount of Substance(mg)	Percentage %	ppm
Bond Wire					

www.ti.com/leadfree



Pb-Free

Packing Label Changes

- “Pb-Free logo” on packing labels in 2003
 - Parts that utilize a Pb-Free finish *and* are rated for high-temp reflow (250C/260C)
 - Pb-Free parts also carry two level MSL rating information
- JEDEC E-Cat symbols will be incorporated in June 2004
- Pb-Free information contained in 2D barcode

New JEDEC E-cat symbol

New 2-line/2 value MSL Label Format

New Pb-Free Logo

TEXAS INSTRUMENTS
MADE IN: Malaysia
2DC: 2Q:

MSL 2 / 260C / 1 YEAR	SEAL DT
MSL 1 / 235C / UNLIM	03/29/04

OPT:
ITEM: 39
LBL: 5A (L)T0:1750

(1P) SN74LS07NSR
(Q) 2000 (D) 0336
(31T) LOT: 3959047MLA
(4W) TKY (1T) 7523483SI2
(P)
(2P) REV: (V) 0033317
(20L) CSO: SHE (21L) CCO:USA
(22L) ASO: MLA (23L) ACO: MYS

11



Pb-Free

TI Information Resources

For questions, vendor surveys or conversion status information, use our Pb-Free and Green resources:

- **TI Web site www.ti.com/leadfree**

Easy-to-use search engine to determine Pb-Free status and schedule for all TI products

- **Your TI sales representative**

- **ezsurveys@list.ti.com**

Best resource for questionnaires, vendor surveys or for requesting conversion status and material content on long lists of part numbers

12