

Statement on Restricted Substances for Semiconductor Products and Evaluation Modules

To the best of TI's knowledge, TI's semiconductor products designated as "RoHS," "RoHS Exempt" or "Green" (as defined below):

- Contain below the restricted substances maximum concentration values in Annex II of Directive 2011/65/EU on the Restriction on Use of Hazardous Substances ("RoHS"). As amended by Directive (EU) 2015/863, the European Union added four phthalates subject to RoHS Annex II effective July 22, 2019.

| Substance | Threshold | EU RoHS Directive |
|--|----------------|-----------------------------------|
| Cadmium (Cd) | 0.01% (100ppm) | 2002/95/EC amended 2011/65/EU |
| Lead (Pb) | 0.1% (1000ppm) | 2002/95/EC amended 2011/65/EU |
| Mercury (Hg) | 0.1% (1000ppm) | 2002/95/EC amended 2011/65/EU |
| Hexavalent Chromium (Cr ⁶) | 0.1% (1000ppm) | 2002/95/EC amended 2011/65/EU |
| Polybrominated biphenyls (PBBs) | 0.1% (1000ppm) | 2002/95/EC amended 2011/65/EU |
| Polybrominated diphenylethers (PBDEs) | 0.1% (1000ppm) | 2002/95/EC amended 2011/65/EU |
| Bis(2-ethylhexyl) phthalate (DEHP) | 0.1% (1000ppm) | EU 2015/863, enforced 22 Jul 2019 |
| Butyl benzyl phthalate (BBP) | 0.1% (1000ppm) | EU 2015/863, enforced 22 Jul 2019 |
| Dibutyl phthalate (DBP) | 0.1% (1000ppm) | EU 2015/863, enforced 22 Jul 2019 |
| Diisobutyl phthalate (DIBP) | 0.1% (1000ppm) | EU 2015/863, enforced 22 Jul 2019 |

- TI ICs may be subject to one of the following RoHS Annex III exemptions for lead (Pb). (For externally purchased components, other ROHS exemptions may apply):

| EU RoHS Exemption | Description | Category |
|-------------------|--|--|
| 7(a) | Lead in high melting temperature type solders (i.e. lead based alloys containing 85 % by weight or more lead) | 2002/95/EC amended 2011/65/EU |
| 7(c)-i | Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound | 2002/95/EC amended 2011/65/EU |
| 7(c)-iv | Lead in PZT based dielectric ceramic materials for capacitors being part of integrated circuits or discrete semiconductors | 2002/95/EC amended 2011/65/EU |
| 15(a) | Lead in solders to complete a viable electrical connection between the semiconductor die and carrier within integrated circuit flip chip packages where at least one of the following criteria applies: - A semiconductor technology node of 90 nm or larger; - A single die of 300 mm ² or larger in any semiconductor node; - Stacked die packages with die of 300 mm ² or larger, or silico interposers of 300 mm ² or larger | 2011/65/EU amended (EU) 2019/172: Categories 1 to 7 & 10 |
| 15 | Lead in solders to complete a viable electrical connection between the semiconductor die and carrier within integrated circuit flip chip packages | 2011/65/EU amended (EU) 2019/172: Categories 8, 9 & 11 |

- Do not exceed the IEC 62474 database (formerly the Joint Industry Guide –JIG101) and the Global Automotive Declarable Substance List (GADSL) for regulated substances, thresholds and applications in electronics.

- Meets the China Management Methods for controlling Pollution by Electronic Information Products ("China RoHS"). For semiconductor products containing lead, the China RoHS EFUP is 50 years (www.ti.com/leadfree).

TI defines "RoHS Compliant," "RoHS Exempt" and "Green" products as follows:

- **RoHS Compliant:** Means TI semiconductor products that are compliant with the current RoHS requirement that the maximum concentration values of the ten substances listed in RoHS Annex II do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI semiconductor products labeled as "RoHS Compliant" are suitable for use in specified lead-free processes. TI may also reference these types of semiconductor products as "Pb-Free." These TI semiconductor products are also fully compliant with GADSL and the IEC 62474 database for electronic requirements.
- **RoHS Exempt:** Means TI semiconductor products that contain lead (Pb) above the RoHS Annex II threshold, but that fall within one of the specific RoHS exemptions listed above.
- **Green:** Means the content of Chlorine (Cl) and Bromine (Br)-based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold; Antimony trioxide (Sb₂O₃) contained in halogen based flame retardant materials meets the <=1000ppm threshold requirement; and Beryllium Oxide (BeO) is <=1000ppm.

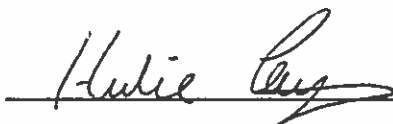
Note: Although not publicly available, the existence and/or concentrations of TI proprietary materials in TI semiconductor products are in full compliance with regulatory requirements in effect as of the date below. TI semiconductor products not designated as "RoHS Compliant," "RoHS Exempt" or "Green" are below the regulatory thresholds for RoHS for all substances except Lead (Pb), which may be found in materials such as leadframe plating or solder balls. EU RoHS status can be checked at www.ti.com/productcontent.

For semiconductor products containing lead, the China RoHS EFUP is 50 years (www.ti.com/leadfree).

All transport, retail, and other sales packaging used for TI semiconductor products complies with the Packaging and Packaging Waste Directive (EU) 94/62/EC, as amended.

TI's semiconductor products are considered "components" under RoHS. Therefore, the CE marking, declaration of conformity, and internal product control provisions set forth in Article 7 of RoHS do not apply.

Evaluation modules (EVMs): As of July 22, 2019, TI EVMs are in compliance with all RoHS Article 7 requirements.

Signature: 
 Name/Title: Hubie Payne, Vice President, Worldwide Quality
 Date: Aug 5, 2019

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