RESONAC

GPS/JIPS Safety Summary

1. Product NAME

AlGaAs/GaAs chip (SH and DH type)

2. GENERAL STATEMENT

Gallium arsenide, the main ingredient of this product, is arsenide of gallium. The composition formula of this product is expressed as GaAs. Since it is a compound semiconductor, it is frequently used as a material of semiconductor elements by utilizing its characteristics.
Gallium arsenide is classified into IARC (International Agency for Research on Cancer) Group 1 and ACGIH A3, suggesting its carcinogenicity. For this reason, dispose of semiconductors containing gallium arsenide in accordance with national and local regulations. In addition, since there is a risk of inhalation of dust if it is pulverized or crushed, it is necessary to wear appropriate protective equipment to prevent inhalation.

3. CHEMICAL IDENTITY

Item	Description
Chemical or generic name	LED chip
Trade name	AlGaAs/GaAs chip (SH and DH type)
Source/References	Section 3 of the SDS issued by Resonac Photonics Corporation

Composition

Product/ingredient name	%	Chemical Formula	Other No. Japan: Chemical Substances Control Law Japan: Industrial Safety and Health Act	CAS No.
Gallium arsenide	66–76	GaAs	(1)–580 existing chemical substance	1303-00-0
Aluminum gallium arsenide	20–30	AlGaAs	Not applicable (solid solution) existing chemical substance (alloys)	37382-15-3
Gold	0.5–2.5	Au	Not applicable existing chemical substance	7440-57-5

4. USES AND APPLICATIONS

Main uses	Vehicle interior, dot matrix display, seven-segment display, pulse oximeter, industrial mechanical sensor, photo coupler, photo interrupter, photo relay, encoder, smoke sensor, proximity sensor, and remote control

5. PHYSICAL/CHEMICAL PROPERTIES

An LED chip composed of the liquid phase epitaxial growth layer and the growth substrate.

Physical state	Solid
Appearance	Solid

color	Gray
Melting point/freezing point	Not available （GaAs=1238℃）/Not available
Relative density	Not available (GaAs= 5.316g/cm^3)
Sources/references	Section 9 and 10 of the SDS issued by Resonac Photonics Corporation

6. HEALTH EFFECTS

Effect assessment	Results （GHS Hazard Classification）
Acute toxicity (oral)	Classification not possible
Acute toxicity (dermal)	Classification not possible
Acute toxicity (inhalation: gas)	Not applicable
Acute toxicity (inhalation: vapours)	Classification not possible
Acute toxicity (inhalation: dust, mist)	Classification not possible
Skin corrosion/irritation	Classification not possible
Serious eye damage/eye irritation,	Classification not possible
Respiratory sensitisation	Classification not possible
Skin sensitisation	Classification not possible
Germ cell mutagenicity	Classification not possible
Carcinogenicity	Category 1B May cause cancer
Reproductive toxicity	Category 1B May damage fertility or the unborn child
Specific target organ toxicity – Single exposure	Classification not possible
Specific target organ toxicity (repeated exposure)	Category 2 May cause damage to organs through prolonged or repeated exposure (haematopoietic system, lungs, liver)
Aspiration hazard	Classification not possible
Sources/references	Section 2 and 11 of SDS issued by Resonac Photonics Corporation

・ GHS (Globally Harmonized System of Classification and Labelling of Chemicals): A system that classifies chemicals according to the type and degree of hazards, labels the information, and provides safety data sheets according to globally harmonized rules.
・ Not applicable: Since the priority of physical state, chemical structure, chemical property, and hazard items used in the GHS classification procedures does not fall under the category, it is not subject to the classification for the category.
・ Not classified: Sufficient information has been obtained to implement the GHS classification, and as a result of the classification, it does not fall under any of the hazard categories specified in the GHS. It is considered to be a lower hazard.
・ Classification not possible : There is not enough information for GHS classification, and classification is not possible.

7. ENVIRONMENTAL EFFECTS

Effect assessment	Results （GHS Hazard Classification）
Hazardous to the aquatic environment, short-term (acute)	Classification not possible
Hazardous to the aquatic environment, long-term (chronic)	Classification not possible
Hazardous to the ozone layer	Classification not possible
Sources/references	Section 2 and 11 of SDS issued by Resonac Photonics Corporation

Environmental fate/dynamics	
Mobility in soil	No data available
Persistence/degradability	No data available
Bioaccumulation potential	No data available
Conclusion about PBT/vPvB	The criteria for persistent bioaccumulative and toxic (PBT; remaining persistently in the environment and possessing high bioaccumulation potential and toxicity) and very persistent and very bioaccumulative (vPvB; remaining very persistently in the environment and possessing very high bioaccumulation potential) chemicals are believed to inapplicable.
Sources/references	Sections 12 of the SDS issued by Resonac Photonics Corporation

8. EXPOSURE

Detals	Exposure potentials through main uses
Occupational exposures	This product is manufactured and used in closed batch processes or other processes where there is a potential for exposure to the product, but in operations, such as during maintenance, sampling, and equipment failure, there is a potential for dermal and inhalation exposure to workers (PROC 3 and 4). There is potential for dermal and inhalation exposure in operators in the transfer of substances and preparations from ships or large capacity containers in small containers or specialized equipment [e.g., dust/vapor/aerosol generation, spills, equipment cleaning] (PROC 8b, 9).
Consumer exposures	This product is not used directly by general consumers.
Environmental exposures	The product is manufactured and used in closed systems or other potentially exposed processes. Therefore, in the production process, the product may be released primarily to the air and water environment (ERC 1).
Precautions	If there is a possibility of exposure in other uses, take appropriate measures with reference to recommended risk management measures.

9. RISK MANAGEMENT RECOMMENDATIONS

Recommended risk management measures can minimize risks to workers, consumers, and the environment from Section 8 exposure scenarios.

Detals	Risk management recommendations
Worker	Technical measures: Chronic toxicity such as carcinogenicity and reproductive toxicity has been identified for this product. Handle the product in a room with forced general ventilation using local exhaust ventilation by using appropriate protective equipment to protect operators from dust. Always wash your hands after handling the product.
	Local and general ventilation: The product should be handled in a place where forced general ventilation is possible with local exhaust ventilation. In addition, since there is a possibility of exposure during the transfer operation to containers, etc., perform the operation in a room where forced general ventilation is possible with local exhaust

	ventilation.
	Acceptable concentration: Gallium arsenide: The excess cancer risk levels 10^{-3}: 3 $\mu g/m^3$, 10^{-4}: 0.1 $\mu g/m^3$ (inorganic arsenic compound [as As]) are disclosed by Japan Society for Occupational Health, and TLV-TWA (time-weighted average) 0.01 mg/m^3 (as arsenic) and TWA 0.0003 mg/m^3 (inhalational) are disclosed by ACGIH (American Conference of Governmental Industrial Hygienists). Aluminum arsenide・gallium: 0.003 mg/m^3 (as arsenic) is disclosed by Japan Society for Occupational Health, and TLV-TWA 0.01 mg/m^3 (as arsenic) is disclosed by ACGIH. Manage and control below these values.
	Protective equipment: When handling the product, wear respiratory protective equipment (a certified dust mask [with a collection rate of 95% or higher]), chemically resistant rubber gloves (APF20 [with a protection rate of 95%]), protective glasses, and protective clothing to avoid skin contact. In addition, wear face protective equipment according to the use status. [Example of protective equipment] Respiratory protective equipment: dust mask (mask with collection rate of 95% or higher) Hand protective equipment: chemically resistant rubber gloves (APF20 [protection rate 95%]) Eye protective equipment: protective glasses Skin and body protective equipment: Protective clothing
	Precautions The operation manager should educate operators about the selection of appropriate protective equipment, proper usage method, and control method of the work site.
Consumer	Since the substance is not used by general consumers, the possibility of exposure to consumers is extremely low.
Environment	Install appropriate wastewater treatment facilities and exhaust gas treatment facilities. In addition, take measures to prevent leakage, and pay attention to periodic confirmation of discharge volume, daily control, and handling.
Special notes (emergency measures in case of leakage, etc.)	Precautions for human, protective equipment, and emergency measures: In case of leakage, wear appropriate protective equipment (respiratory protective equipment, protective clothing, rubber gloves, and eye or face protective equipment), and remove it from the windward side using a vacuum cleaner or dust removal.
	Environmental precautions: Do not discharge product into the environment such as drains or rivers. In case of leakage, immediately remove it from the windward side with a vacuum cleaner and dust removal. In addition, prepare appropriate fire extinguishing equipment (carbon dioxide, dry sand, water spray, and powder) in case of ignition.

Precautions	For normal handling, emergency response, disposal, and transportation control measures, refer to sections 4, 5, 6, 7, 8, 13, and 14 of the SDS issued by Resonac Photonics Corporation.

10. STATE AGENCY REVIEW

Hazard assessment	Situations of review
International Chemical Safety Cards	none
OECD HPV	none
NITE-CHRIP(NITE Chemical Risk Information Platform)	https://www.nite.go.jp/en/chem/chrip/chrip_search/srhInput
GHS Classification Results by the Japanese Government	(Gallium arsenide) https://www.nite.go.jp/chem/english/ghs/19-mhlw-0007e.html

11. REGULATORY INFORMATION／GHS CLASSIFICATION AND LABELLING INFORMATION

Regulatory information only in Japan

Applicable laws	Regulatory situations
Industrial Safety and Health Act	Dangerous or Harmful Substances Subject to Be Indicated their Names(Article 57 Paragraph (1) of the Act, Article 18 item(ⅰ) and item(ⅱ) appended Table No. 9 of the Enforcement Order) Arsenic and arsenic compounds Dangerous Articles and Harmful Substances Whose Names, etc. Should Be Notified(Article 57-2 of the Act, Article 18-2 item(ⅰ) and item(ⅱ) appended Table No. 9 of the Enforcement Order) Arsenic and arsenic compounds(Cabinet Order Number : 458) Specified chemical substances Class 2, Group-2 Substances (Article 2, Section 1, Items 2 and 5 of Ordinance on Prevention of Hazards Due to Specified Chemical Substances) Arsenic or arsenic compounds Specified Chemical Substances/substances under special supervision (Article 38-3 of Ordinance on Prevention of Hazards Due to Specified Chemical Substances) Arsenic or arsenic compounds Working Environment Evaluation Standards(Article 65-2 Paragraph (2) of the Act) Arsenic or arsenic compounds
Poisonous and Deleterious Substances Control Act	Poisonous Substances/Excluded Items (Article 1 of the Designation Order) Arsenic compounds/gallium arsenide and preparations containing arsenic compounds
Water Pollution Prevention Act	Harmful Substances (Article 2 of the Act, Article 2 of the Enforcement Order, and Article 1 of the Ministerial Ordinance for Establishing Effluent Standards) Arsenic or arsenic compounds
Air Pollution Control Act	Hazardous Air Pollutants, Substance requiring priority action (9th report of the Central Environment Council) Arsenic or arsenic compounds

Waste Disposal and Cleaning Act	Industrial waste subject to special control (Article 2, Paragraph 5 of the Act, Article 4 of the Enforcement Order) Industrial waste subject to special control containing arsenic and arsenic compounds
Act on Control of Export, Import and Others of Specified Hazardous Wastes and Other Wastes (Basel Law)	Hazardous components of waste, those stipulated in Article 2, Paragraph 1, Item 1, A of the Act (Heisei 10 Three Ministry's Notification No. 1) Substances containing arsenic elements
Water Supply Act	Harmful Substances (Article 4, Paragraph 2 of the Act), Water quality standards (Heisei 15 Ministerial Ordinance No. 101) Arsenic and arsenic compounds
Sewerage Act	Water Quality Criteria Substances (Article 12-2, Paragraph 2 of the Act, Article 9-4 of the Enforcement Order) Arsenic and arsenic compounds
Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement and Transfer Register / PRTR)	Class I designated chemical substance, Specific class 1 designated chemical substance (Article 2-2 of the Act, Enforcement Ordinance Article 1 Appended Table 1, Article 4) Arsenic and Inorganic arsenic compound (Cabinet Order Number : 332), As Arsenic (38%)
Labor Standards Act	Occupational disease chemicals (Article 75, paragraph 2 of the Act, Enforcement Ordinance Article 35, Appended Table 1-2, Item (4)-1) Arsenic and arsenic compounds (excluding hydrogen arsenide) Carcinogen (Article 75, Paragraph 2 of the Act, Enforcement Ordinance Article 35, Appended Table 1-2, Item 7) Inorganic arsenic compound
Soil Contamination Countermeasures Act	Specified hazardous substances (Article 2, Paragraph 1 of the Act, Article 1 of the Enforcement Order) Arsenic and arsenic compounds
UN classification	Not applicable

Hazards	Classification results (hazard information)
Health hazards	Carcinogenicity, Category 1B
	Reproductive toxicity, Category 1B
	Specific target organ toxicity (repeated exposure), Category 2 (haematopoietic system, lungs, liver)

Labelling Information	
Hazard pictograms (GHS)	
Signal word (GHS)	Danger
Hazard statements (GHS)	May cause cancer. (H350) May damage fertility (H360) prolonged or repeated exposure (haematopoietic system, lungs, liver). (H373)

12. CONTACT INFORMATION

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13. DATE OF ISSUE / REVISION, ADDITIONAL INFORMATION

Date of issue: December 27, 2022

Revisions:

Date of revision	Revised section	Revised item	Version
January 1, 2023	3, 6, 7, 10-13	update to the latest information	rev.2

The contents are based on the safety data sheet (SDS) revised on January 1, 2023.

Special instructions:

Content of substances of PRTR Law: Arsenic content representative value 54% (53%-54%). Arsenic content varies depending on types, so we will provide information separately.

14. DISCLAIMER

The safety summary is part of the effort for the voluntary management of chemical substance in the chemical industry (GPS/JIPS: Japan Initiative of Product Stewardship). The purpose of the safety summary is to provide information on the safe handling of the product as an overview and not to provide professional information, such as the risk evaluation process and its impact on human health and the environment. This document is not meant to serve as an alternative to risk evaluation, such as a Safety Data Sheet (SDS) or a Chemical Safety Report (CSR). This safety summary is being written as accurately as possible based on data such as laws, materials, and information available at the time of publication, but it does not include all data. It does not guarantee anything.