

SHOWA DENKO K.K.



## 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 SHOWA DENKO K.K.

Composition

Product/ingredient name	%	Chemical Formula	Other No.	CAS No.
			Japan: Chemical Substances Control Law	
Gallium arsenide	66-76	GaAs	(1)-580	1303-00-0
Aluminum gallium arsenide	20-30	AlGaAs	Not applicable (solid solution)	37382-15-3
Gold	0.5-2.5	Au	Not applicable	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
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### 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°C)/Not available
Relative density	Not available (GaAs= 5.316g/cm <sup>3</sup> )
Sources/references	Section 9 and 10 of the SDS issued by SHOWA DENKO K.K.

## 6. HEALTH EFFECTS

Effect assessment	Results (GHS Hazard Classification)
Acute toxicity (oral)	Classification not possible (Lack of data)
Acute toxicity (dermal)	Classification not possible (Lack of data)
Acute toxicity (inhalation: gas)	Not applicable
Acute toxicity (inhalation: vapours)	Classification not possible (No data available)
Acute toxicity (inhalation: dust, mist)	Classification not possible (No data available)
Skin corrosion/irritation	Classification not possible (Lack of data)
Serious eye damage/eye irritation,	Classification not possible (Lack of data)
Respiratory sensitisation	Classification not possible (No data available)
Skin sensitisation	Classification not possible (Lack of data)
Germ cell mutagenicity	Classification not possible (Lack of data)
Carcinogenicity	Category 1B May cause cancer
Reproductive toxicity	Category 1B May damage fertility
Specific target organ toxicity – Single exposure	Classification not possible (Lack of data)
Specific target organ toxicity (repeated exposure)	Category 2 Causes damage to organs (haematopoietic system, lungs, liver) May cause damage to organs through prolonged or repeated exposure
Aspiration hazard	Classification not possible (No data available)
Sources/references	Section 2 and 11 of SDS issued by SHOWA DENKO K.K.
<ul style="list-style-type: none"> <li>· 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.</li> <li>· 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.</li> <li>· 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.</li> <li>· Classification not possible (No data available): Classification is not possible because there is no sufficiently reliable data to make judgment on GHS classification after examining various information sources and in-house data, etc.</li> <li>· Classification not possible (Lack of data): There is not enough information for GHS classification, and classification is not possible.</li> </ul>	

## 7. ENVIRONMENTAL EFFECTS

Effect assessment	Results (GHS Hazard Classification)
Hazardous to the aquatic environment, short-term (acute)	Classification not possible (Lack of data)
Hazardous to the aquatic environment, long-term (chronic)	Classification not possible (Lack of data)
Hazardous to the ozone layer	Classification not possible (No data available)
Sources/references	Section 2 and 12 of SDS issued by SHOWA DENKO K.K.
<b>Environmental fate/dynamics</b>	
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 SHOWA DENKO K.K.

## 8. EXPOSURE

Details	Exposure potentials through main uses
Occupational exposures	<p>The product is manufactured and used in synthesis or compounding operation in closed batches, but there is a potential for dermal or inhalation exposure in operators in case of maintenance, sampling, equipment failure, etc. (PROC 3).</p> <p>During batch and other process operations, there is a potential for dermal and inhalation exposure to operators during maintenance, sampling, filling, emptying, and equipment failure (PROC 4).</p> <p>There is a potential for dermal or inhalation exposure in operators in association with dust/vapor/aerosol generation, spillage, cleaning of equipment, etc. in the transfer of substances or preparations to ships and large-capacity containers in dedicated equipment or in the transfer of substances or preparations to small-capacity containers under conditions designed to minimize spillage (PROC 8b, 9).</p>
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.

Details	Risk management recommendations
Worker	<p>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.</p> <p>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</p>

	<p>ventilation.</p> <p>Acceptable concentration:  Gallium arsenide: The excess cancer risk levels <math>10^{-3}</math>: <math>3 \mu\text{g}/\text{m}^3</math>, <math>10^{-4}</math>: <math>0.1 \mu\text{g}/\text{m}^3</math> (inorganic arsenic compound [as As]) are disclosed by Japan Society for Occupational Health, and TLV-TWA (time-weighted average) <math>0.01 \text{ mg}/\text{m}^3</math> (as arsenic) and TWA <math>0.0003 \text{ mg}/\text{m}^3</math> (inhalational) are disclosed by ACGIH (American Conference of Governmental Industrial Hygienists).  Aluminum arsenide · gallium: Control concentration <math>0.003 \text{ mg}/\text{m}^3</math> (as arsenic), the excess cancer risk levels <math>10^{-3}</math>: <math>3 \mu\text{g}/\text{m}^3</math>, <math>10^{-4}</math>: <math>0.1 \mu\text{g}/\text{m}^3</math> (inorganic arsenic compound [as As]) are disclosed by Japan Society for Occupational Health. TLV-TWA <math>0.01 \text{ mg}/\text{m}^3</math> (as arsenic) is disclosed by ACGIH.  Manage and control below these values.</p> <p>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</p> <p>Precautions  The operation manager should educate operators about the selection of appropriate protective equipment, proper usage method, and control method of the work site.</p>
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.)	<p>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.</p> <p>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</p>

	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 Showa Denko K.K.


## 10. STATE AGENCY REVIEW

Hazard assessment	Situations of review
International Chemical Safety Cards	none
OECD HPV	none
REACH	(Gallium arsenide) <a href="https://echa.europa.eu/substance-information/-/substanceinfo/100.013.741">https://echa.europa.eu/substance-information/-/substanceinfo/100.013.741</a> (Aluminum gallium arsenide) <a href="https://echa.europa.eu/substance-information/-/substanceinfo/100.206.013">https://echa.europa.eu/substance-information/-/substanceinfo/100.206.013</a> (Gold) <a href="https://echa.europa.eu/substance-information/-/substanceinfo/100.028.332">https://echa.europa.eu/substance-information/-/substanceinfo/100.028.332</a>

## 11. REGULATORY INFORMATION / GHS CLASSIFICATION AND LABELLING INFORMATION

When using the product outside Japan, it must be handled in accordance with applied laws and regulations in that country or territory.

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

Company	SHOWA DENKO PHOTONICS Co., LTD.
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## 13. DATE OF ISSUE / REVISION, ADDITIONAL INFORMATION

Date of issue: December 27, 2022

Revisions:

Date of revision	Revised	Revised item	Version

	section		
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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.