GA1A2S100SS/ GA1A2S100LY

OPIC™ Linear Output Ambient Light Sensor



■ Features

1. Linear output, suitable for indoor or outdoor use
2. Light sensitivity and response curve similar to that of the human eye
3. OPIC light detector: integrated photodiode and signal processing circuit
4. Lead frame packages:
   Straight leads: GA1A2S100SS
   L-bend: GA1A2S100LY
5. Stable over specified temperature range
6. Lead-free and RoHS-directive compliant

■ Agency Approvals/Compliance

1. Compliant with RoHS directive (2002/95/EC)
2. Content information about the six substances specified in “Management Methods for Control of Pollution Caused by Electronic Information Products Regulation” (popular name: China RoHS) (Chinese: 电子信息产品污染控制管理办法); refer to page 7.

■ Applications

1. Auto-dimming circuits
2. Office automation equipment
3. Audio visual equipment
4. Home appliances
5. Touch panels

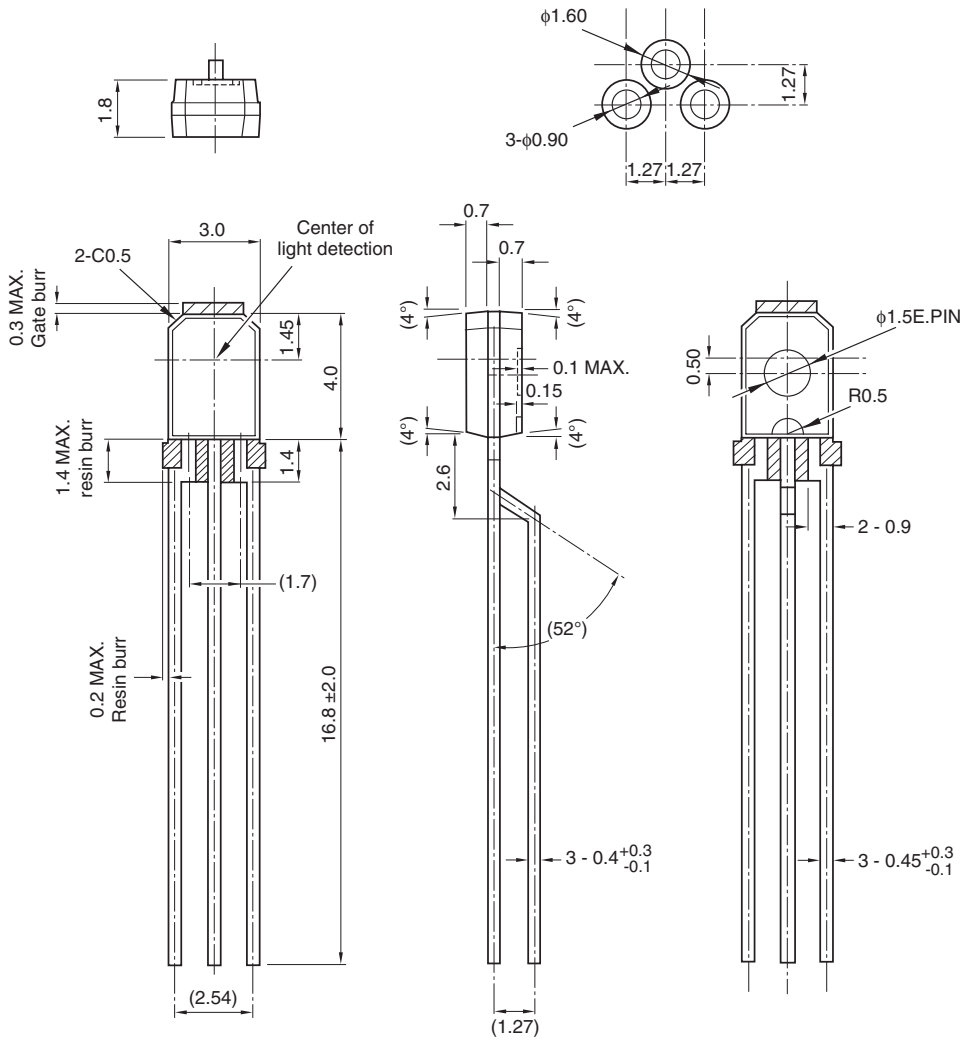
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Date: October 1, 2007
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■ External Dimensions

GA1A2S100SS

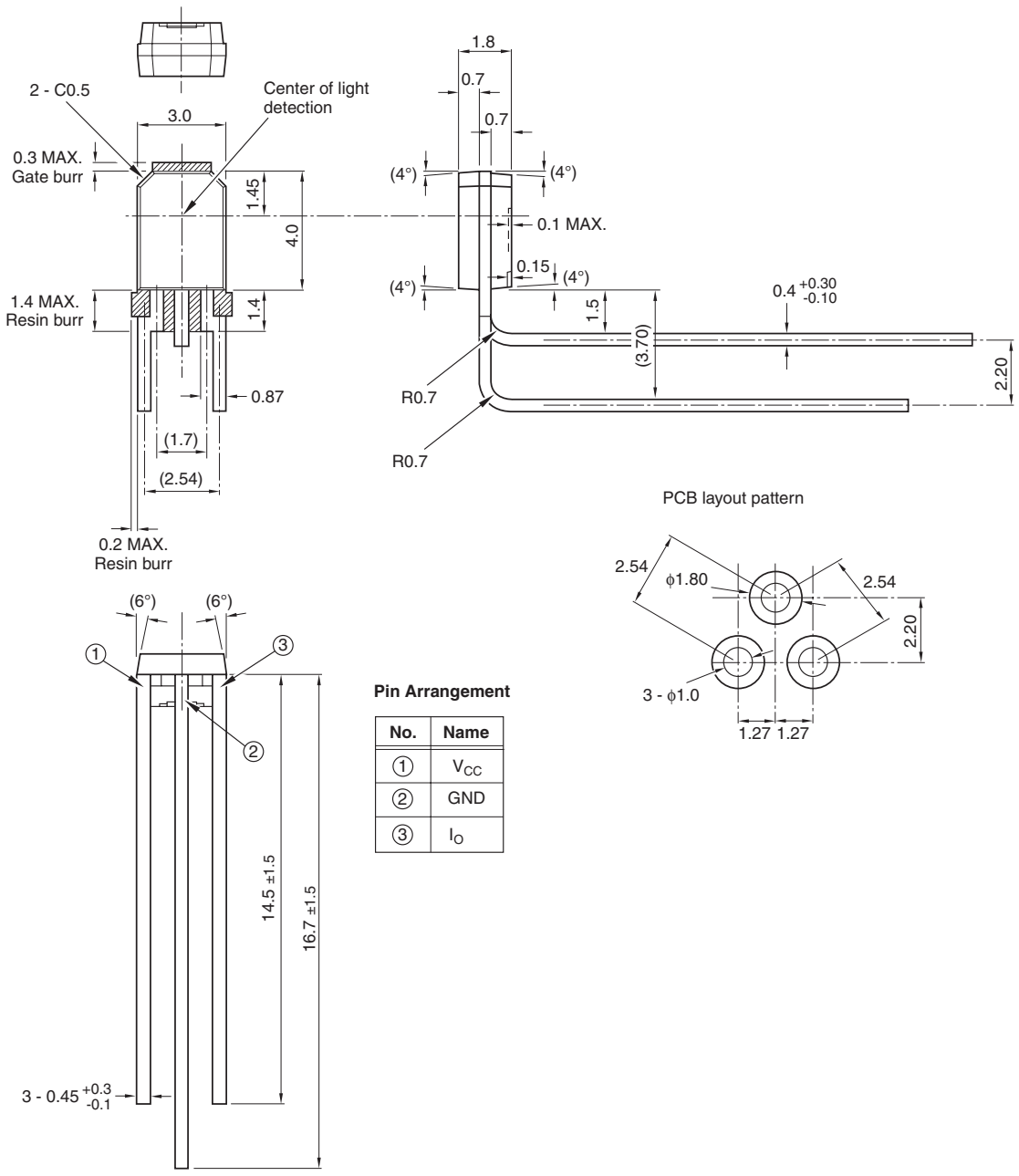


Pin Arrangement

No.	Name
①	V_{CC}
②	GND
③	I_O

NOTES:
1. Units: mm
2. Unspecified tolerence: ±0.2 mm
3. ( ): Reference dimensions
4. Package: Transparent
5. The thin burr thickness (0.05 mm MAX.) and the gate burr (0.3 mm MAX.) are not included in outline dimensions
6. Resin protrusion: 1.4 mm MAX. however, the thin burr adheres to the lead 1.4 mm MAX. from the resin

GA1A2S100LY



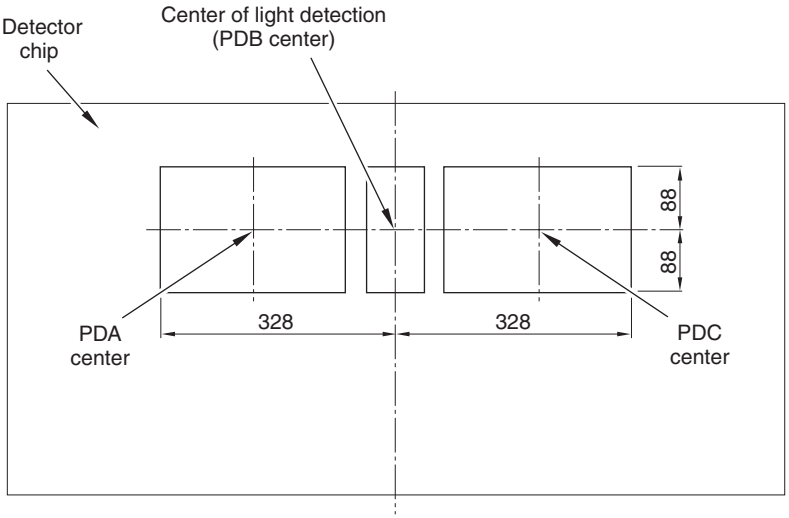
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■ Detector Shape



NOTE: Unit: μm

■ Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.3 to +7.0	V
Output current	I_O	5	mA
Operating temperature	Topr	-40 to +85	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering temperature *1	Tsol	260	°C

*1 Within 5 s (MAX.), no closer than 1.4 mm from edge.

■ Recommended Operating Conditions

(Ta = 0°C to 70°C)

Parameter	Symbol	MIN.	MAX.	Unit
Operating Supply Voltage	V_{CC}	2.7	3.6	V
Output Voltage	V_{OUT}	0	V_{CC} – 1.0	V
Illuminance Range	E_V	10	10000	lx

■ Electro-optical Characteristics

(Ta = 25°C, V_{CC} = 3.3 V)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply current	I_{CC}	E_V = 1000 lx	325	500	675	μA
Output current *1	I_O1	E_V = 1000 lx	312	480	648	μA
	I_O2	E_V = 100 lx	31.2	48	64.8	μA
	I_O3	E_V = 10 lx	3.12	4.8	6.48	μA
	I_O4	E_V = 0 lx	—	—	1	μA
Output current temperature coefficient *2		E_V = 1000 lx Ta = -20°C to +60°C	-10	—	+10	%
Peak sensitivity	λ_P		—	555	—	nm
Rise time (10% to 90%)*2	tr1	E_V = 10 to 100 lx, R_L = 1 kΩ	—	—	10	ms
	tr2	E_V = 100 to 1000 lx, R_L = 1 kΩ	—	—	2	ms
	tr3	E_V = 1000 to 10000 lx, R_L = 100 kΩ	—	—	500	μs
Fall time (10% to 90%)*2	tf1	E_V = 10 to 100 lx, R_L = 1 kΩ	—	—	10	ms
	tf2	E_V = 100 to 1000 lx, R_L = 1 kΩ	—	—	1	ms
	tf3	E_V = 1000 to 10000 lx, R_L = 100 Ω	—	—	250	μs

*1 Ev = Illuminance by CIE standard light source A (tungsten lamp).
*2 Illuminance is white LED.

Fig. 1 Output Current Characteristics (Typ.)

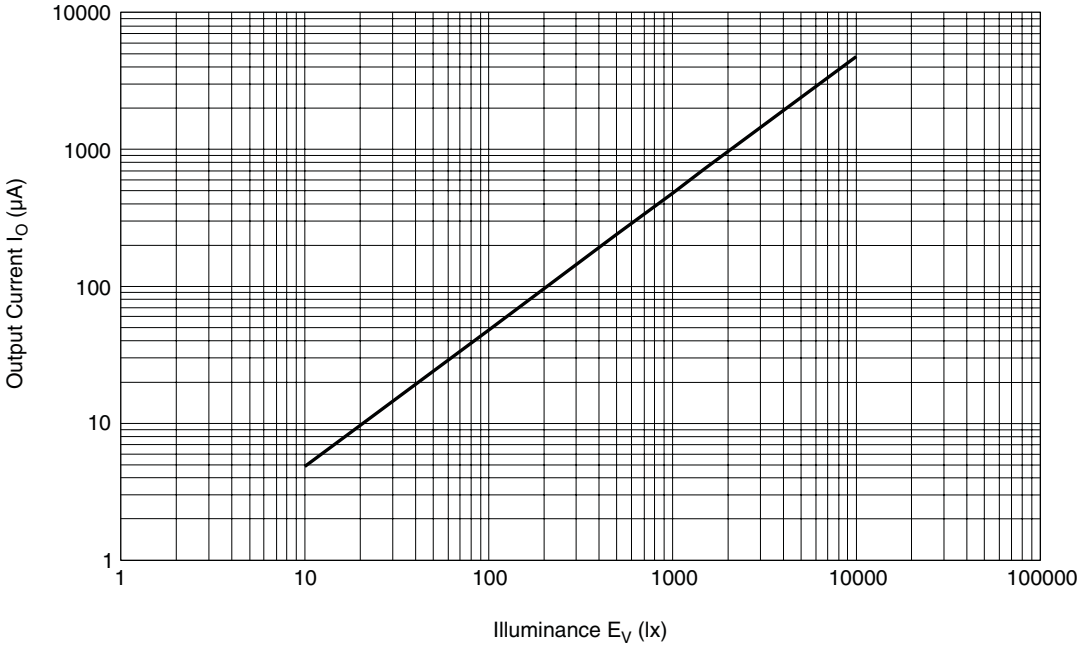
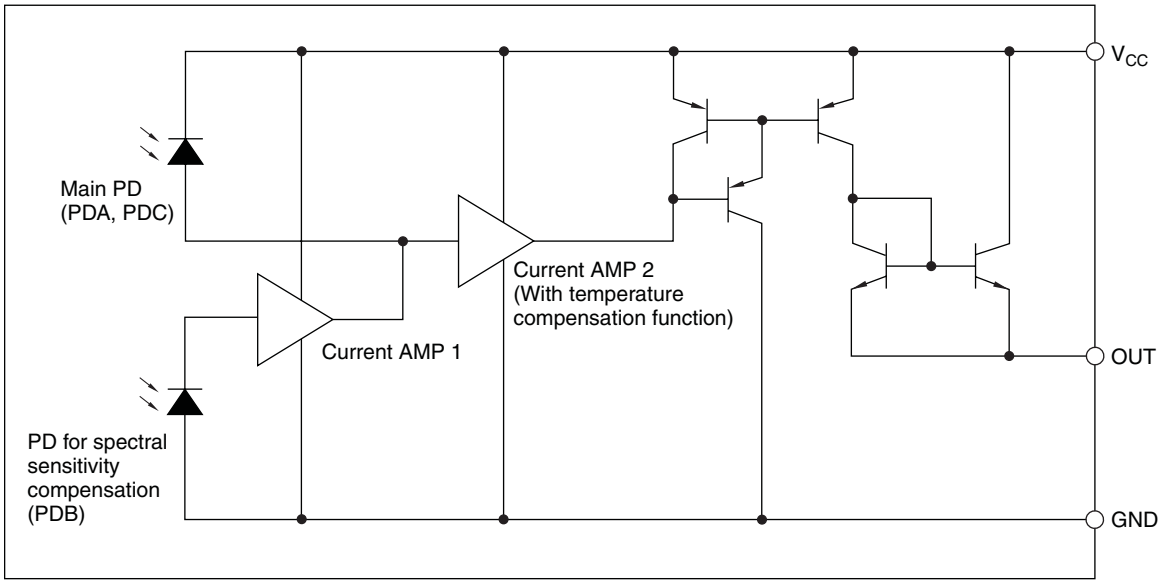


Fig. 2 Block Diagram (Equivalent Circuit)



■ Design Considerations

Design Guidelines

1. This product is not designed to be electromagnetic- and ionized-particle-radiation resistant.
2. Sharp recommends bypass capacitors of at least 0.01 µF between V_{CC} and ground, as close as possible to the device.
3. This device contains three photodiodes and amplifies the differential of the photocurrent in each diode. Sharp recommends that the light which falls on the device illuminate it as uniformly as possible.
4. For the most reliable sensing, Sharp recommends guarding the device from stray incident light.

■ Manufacturing Guidelines

Soldering Instructions

1. Sharp does not recommend soldering this part using methods that include preheat or solder reflow.
2. When mounting, care should be taken to avoid boundary exfoliation (pad lifting) between the solder and the circuit board.
3. If hand soldering, use temperatures ≤260°C for ≤5 seconds.
4. Do not subject the package to excessive mechanical force during soldering as it may cause deformation or defects in plated connections. Internal connections may be severed due to mechanical force placed on the package due to the PCB flexing during the soldering process.

Cleaning Instructions

1. Confirm this device's resistance to process chemicals before use, as certain process chemicals may affect the optical characteristics.
2. Solvent cleaning: Solvent temperature should be 45°C or below. Immersion time should be 3 minutes or less.
3. Ultrasonic cleaning: The effect upon devices varies due to cleaning bath size, ultrasonic power output, cleaning time, PCB size and device mounting circumstances. Sharp recommends testing using actual production conditions to confirm the harmlessness of the ultrasonic cleaning methods.
4. Recommended solvent materials: Ethyl alcohol, Methyl alcohol, and Isopropyl alcohol.

■ Presence of ODCs (RoHS Compliance)

This product shall not contain the following materials, and they are not used in the production process for this product:

- Regulated substances: CFCs, Halon, Carbon tetrachloride, 1,1,1-Trichloroethane (Methylchloroform). Specific brominated flame retardants such as the PBBOs and PBBs are not used in this product at all.

This product shall not contain the following materials banned in the RoHS Directive (2002/95/EC).

- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE).
- Content information about the six substances specified in “Management Methods for Control of Pollution Caused by Electronic Information Products Regulation” (Chinese: 电子信息产品污染控制管理办法)

Category	Toxic and Hazdardous Substances					
	Lead (Pb)	mercury (Hg)	Cadmium (Cd)	Hexavalent chromiun (Cr^{6+})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
OPIC Light Sensors	✓	✓	✓	✓	✓	✓

NOTE: ✓ indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard.

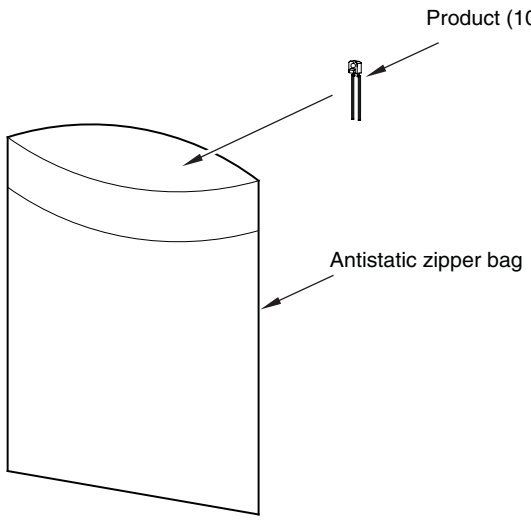
■ Packing Specifications

1. Box shape and general dimensions for GA1A2S100SS conform to those shown in Fig. 3, and to those shown in Fig. 4 for GA1A2S100LY.
2. Inner packing is as shown in the Figures.
3. For GA1A2S100SS:
   Average quantity per bag = 1000 pcs.
   Average quantity per box = 2000 pcs.
4. For GA1A2S100LY:
   Average quantity per sleeve = 100 pcs.
   Average quantity per box = 2000 pcs.
5. Product mass: 0.1 g (approximately)

■ Packing Specification

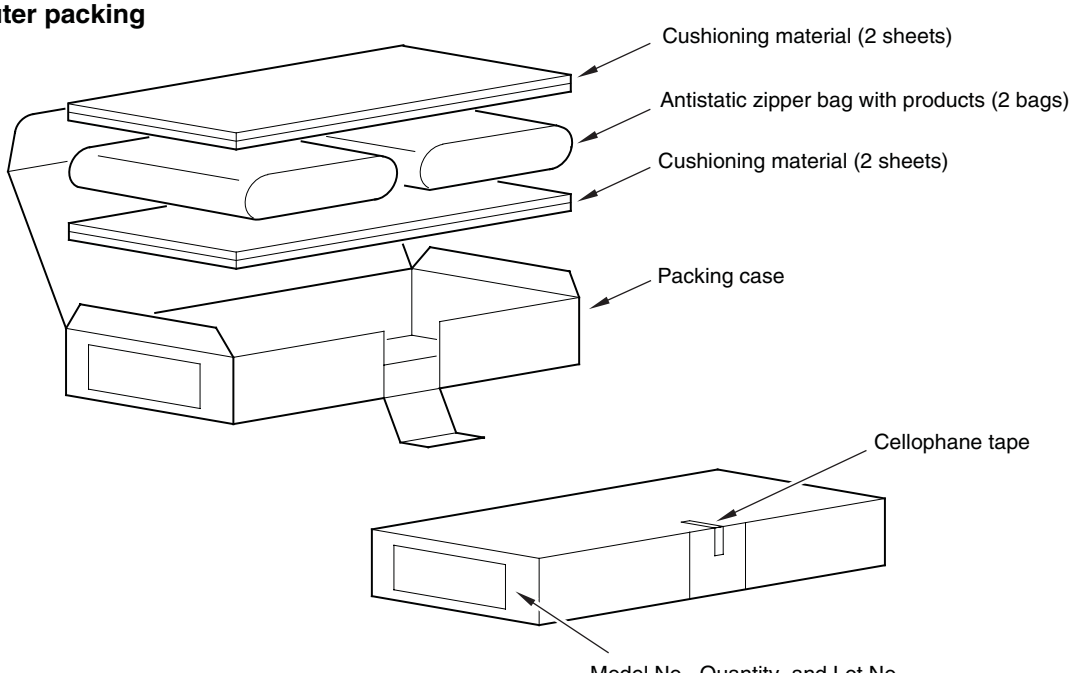
Fig. 3 GA1A2S100SS Packing Composition

Inner packing



NOTES:
1. Inner packing material : Antistatic zipper bag (Polyethylene)
2. Quantity: 1000 pieces/bag

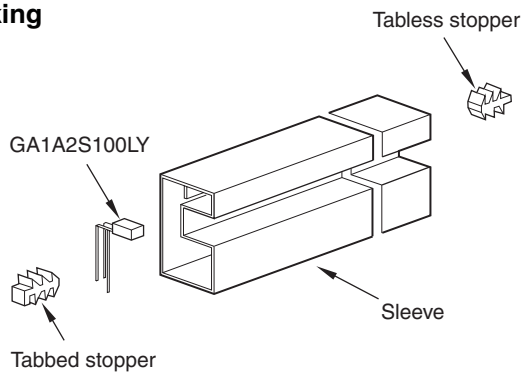
Outer packing



NOTES:
1. Outer material : Packing case (Corrugated cardboard),
   Cushioning material (Urethane), Cellophane tape
2. Quantity: 2000 pieces/box
3. Regular packaged mass: Approximately 280 g
4. Indication: Model No., Quantity, and Lot No.

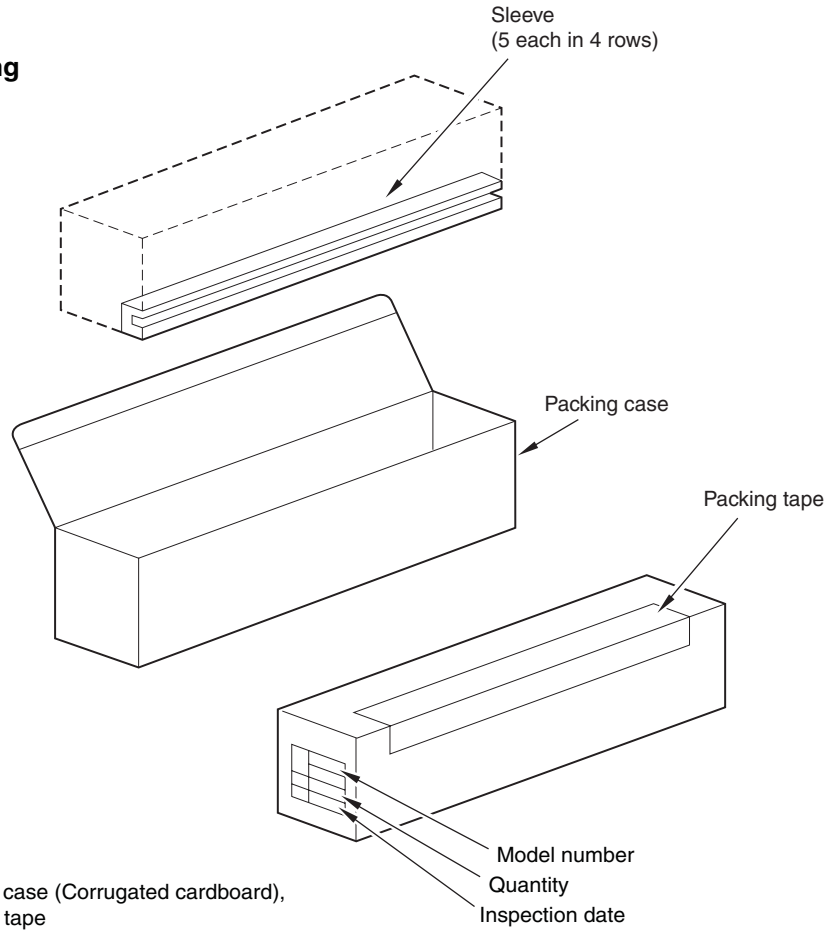
Fig. 4 GA1A2S100LY Packing Composition

Inner packing



NOTES:
1. Inner packing material: Sleeve (HIPS), Stopper (SBR)
2. Quantity: 100 pieces/sleeve

Outer packing



NOTES:
1. Outer material: Packing case (Corrugated cardboard), Packing tape
2. Quantity: 2000 pieces/box
3. Label: Model number, quantity, and inspection date

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(i) The devices in this publication are designed for use in general electronic equipment designs such as:
--- Personal computers
--- Office automation equipment
--- Telecommunication equipment (terminal)
--- Test and measurement equipment
--- Industrial control
--- Audio visual equipment
--- Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliabilty such as:
--- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
--- Traffic signals
--- Gas leakage sensor breakers
--- Alarm equipment
--- Various safety devices, etc.

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--- Telecommunication equipment (trunk lines)
--- Nuclear power control equipment
--- Medical and other life support equipment (e.g. scuba)

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