PT481E00000F

Pale Blue Transparent Resin, Narrow Angle, Darlington Phototransistor

■ Features

1. Side view detection package
2. Molded plastic with pale blue transparent resin lens
3. Peak sensitivity wavelength: 800 nm (TYP.)
4. High sensitivity (I_C: 10 mA @ Ee = 0.1 mW/cm^2)
5. Narrow acceptance angle (±13° TYP.)
6. Lead-free and RoHS directive compliant

■ Agency Approvals/Compliance

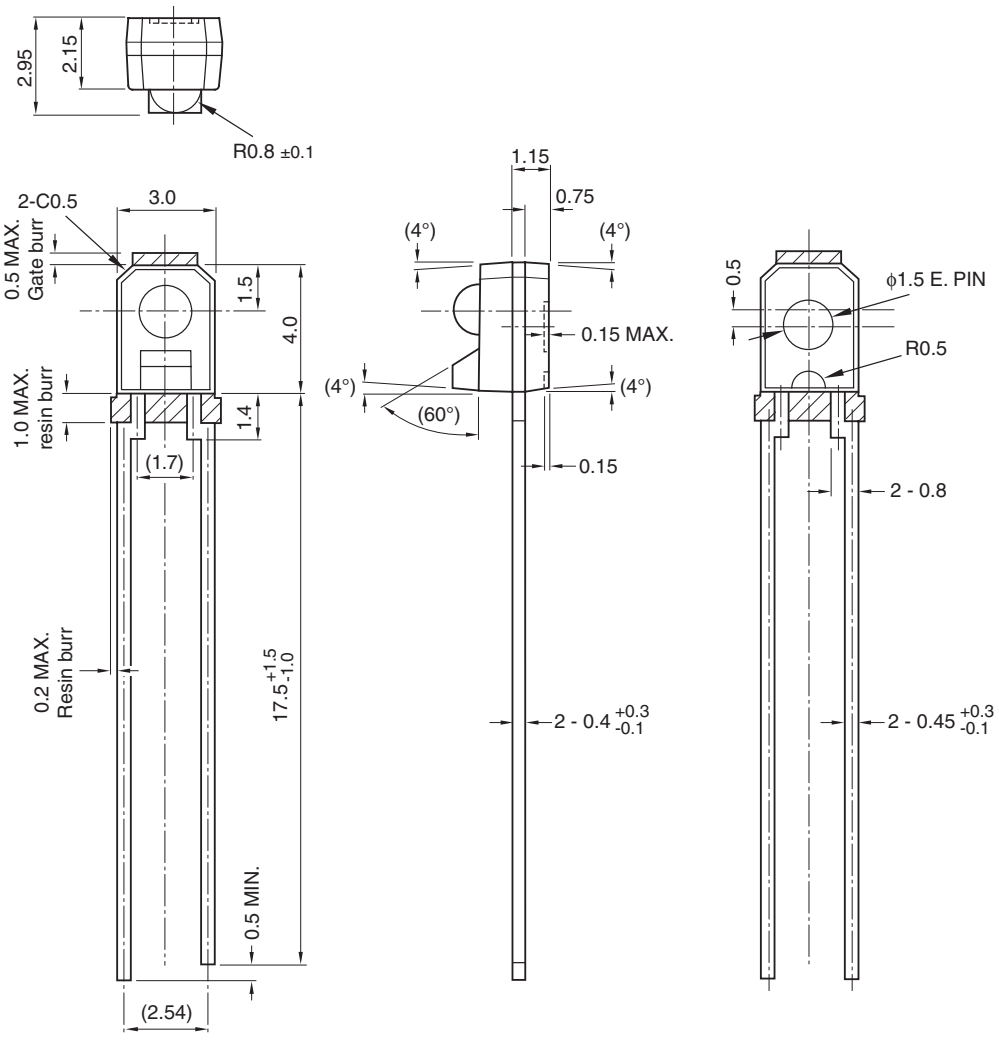
1. Compliant with RoHS directive (2002/95/EC)
2. Content information about the six substances specified in “Management Methods for Control of Pollution Caused by Electronic Information Products Regulation” (popular name: China RoHS) (Chinese: 电子信息产品污染控制管理办法); refer to page 7.

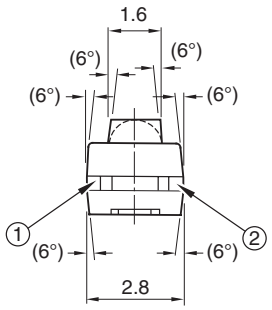
■ Applications

1. Optoelectronic switches
2. Automatic stroboscopes
3. Mechanical Systems
4. Office automation equipment
5. Audio visual equipment

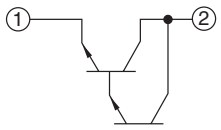
Sheet No.: D1-A01301EN
Date: November 30, 2007

■ External Dimensions





Terminal connection



Pin Arrangement

No.	Name
①	Emitter
②	Collector

NOTES:
1. Units: mm
2. Unspecified tolerence: ±0.2 mm
3. ( ): Reference dimensions
4. Package: Light blue transparent epoxy resin
5. Mold burrs (0.05 mm MAX.) are not included in outline dimensions
6. Resin protrusion: 1.0 mm MAX.
7. Lead step is 1.4 mm MAX. from the part's resin

■ Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V_{CEO}	35	V
Emitter-collector voltage	V_{ECO}	6	V
Collector current	I_C	50	mA
Collector power dissipation	P_C	75	mW
Operating temperature	Topr	-25 to +85	°C
Storage temperature	Tstg	-40 to +85	°C
Soldering temperature *1	Tsol	260	°C

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

■ Electro-optical Charactertistics

(Ta = 25°C)

Parameter	Symbol	Conditions *1	MIN.	TYP.	MAX.	Unit
Collector current	I_C	Ee = 0.1 mW/cm^2, V_{CE} = 2 V	1.5	10	25	mA
Dark current	I_{CEO}	Ee = 0, V_{CE} = 10 V	–	1.0	1000	nA
Collector-emitter saturation voltage	V_{CE}(sat)	Ee = 1 mW/cm^2, Ic = 2.5 mA	–	0.7	1.0	V
Collector-emitter breakdown voltage	BV_{CEO}	I_C = 0.1 mA, Ee = 0	35	–	–	V
Emitter-collector breakdown voltage	BV_{ECO}	I_E = 0.01 mA, Ee = 0	6	–	–	V
Peak sensitivity wavelength	λp	–	–	800	–	nm
Response time (Rise)	tr	V_{CE} = 2 V, I_C = 10 mA, R_L = 100 Ω	–	80	–	μs
Response time (Fall)	tf		–	70	–	μs

*1 Ee: Irradiance by CIE standard light source A (tungsten lamp)

Fig. 1 Collector Power Dissipation vs. Ambient Temperature

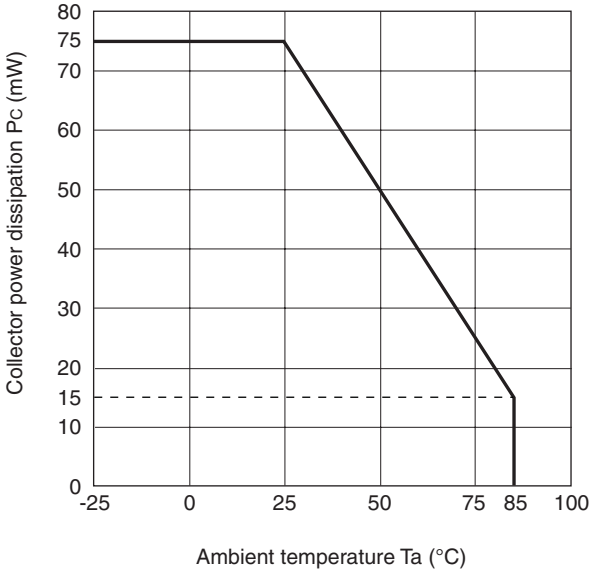


Fig. 2 Spectral Sensitivity (TYP.)

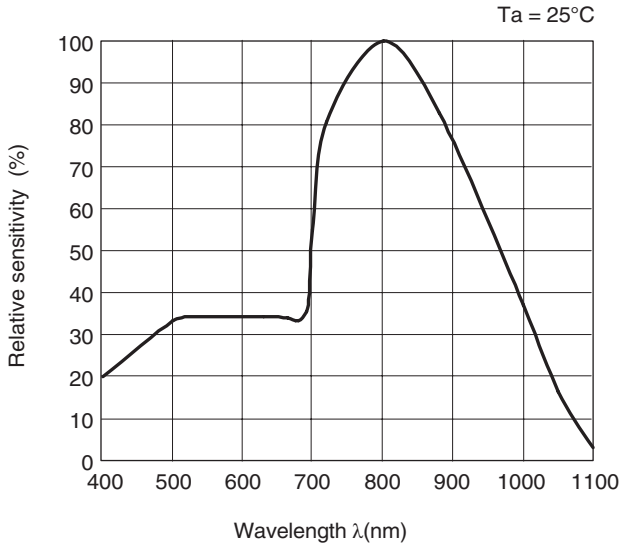


Fig. 3 Collector Dark Current vs. Ambient Temperature

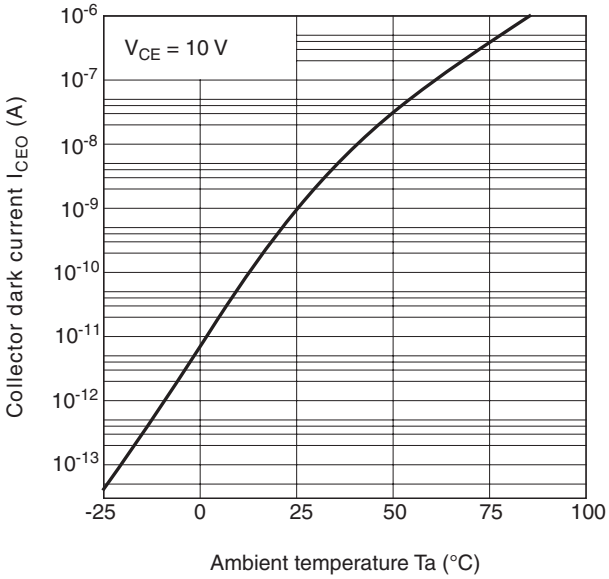


Fig. 4 Collector Current vs. Irradiance

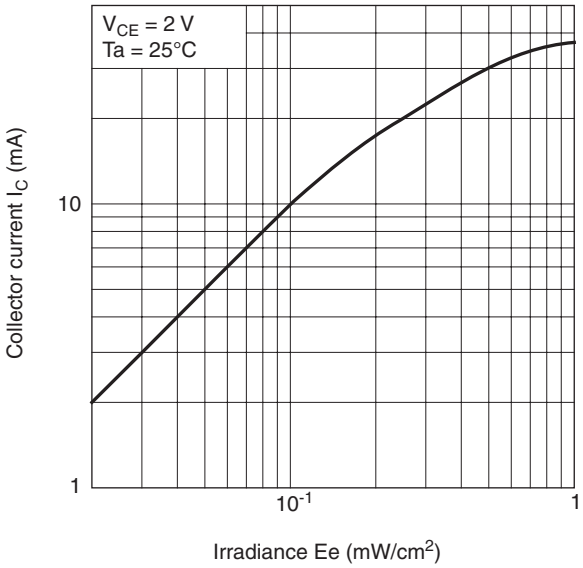


Fig. 5 Relative Collector Current vs. Ambient Temperature

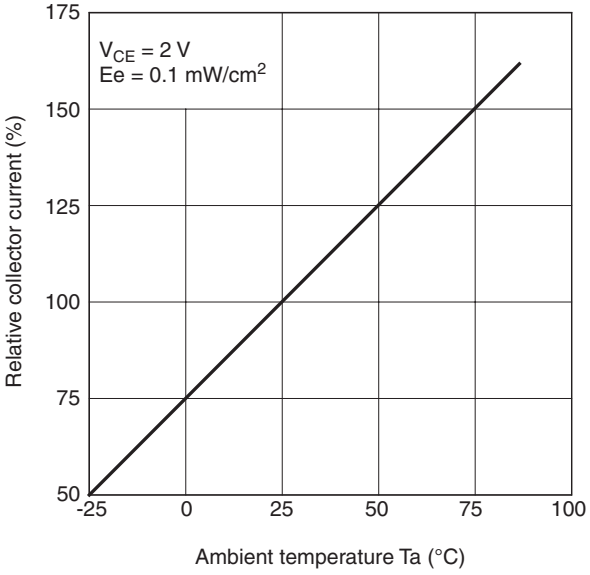


Fig. 6 Collector Current vs. Collector-Emitter Voltage

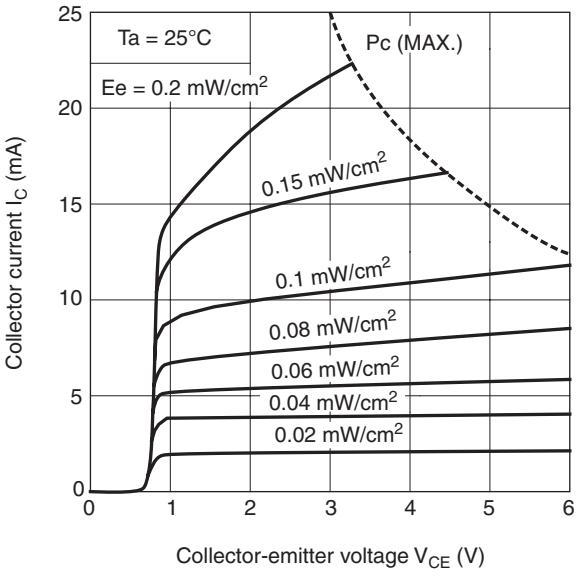


Fig. 7 Response Time vs. Load Resistance

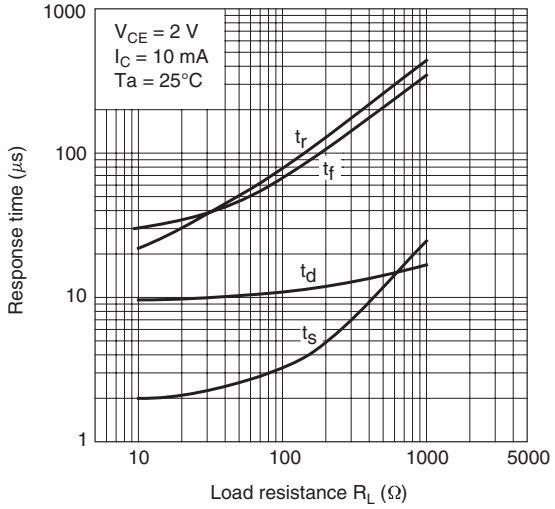


Fig. 8 Test Circuit for Response Time

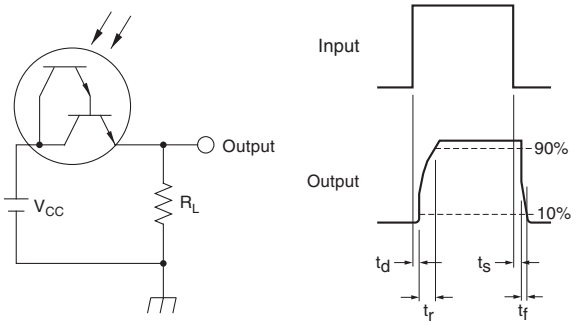


Fig. 9 Collector-to-Emitter Saturation Voltage vs. Irradience

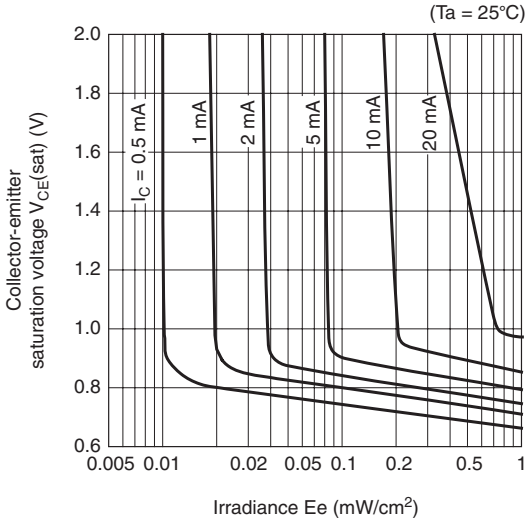


Fig. 10 Relative Output vs Distance

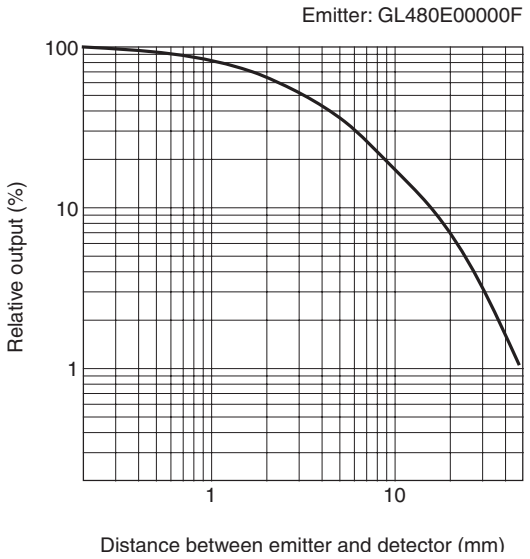
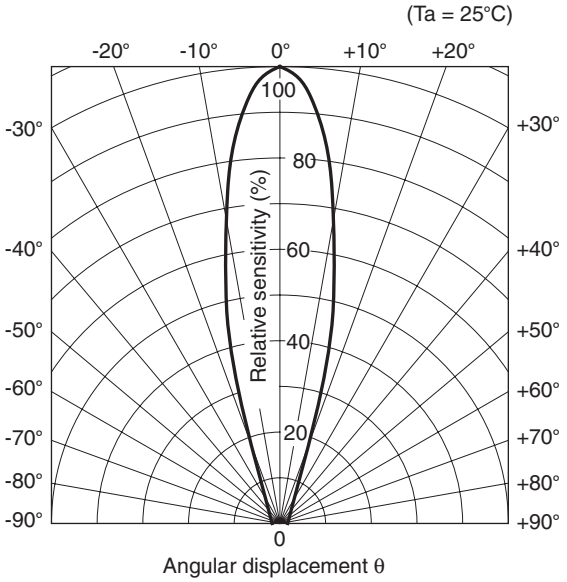


Fig. 11 Sensitivity vs. Axis (TYP.)



Graph data is for reference only and is not guaranteed data.

■ Design Notes

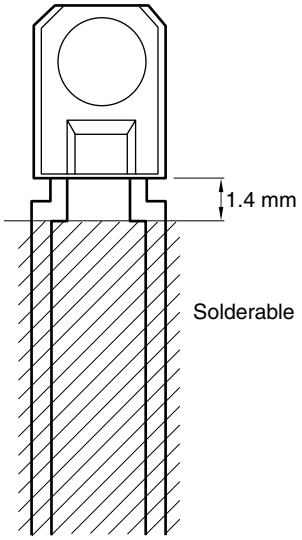
1. This product is not designed to resist electromagnetic and ionized-particle radiation.

■ Manufacturing Guidelines

● Soldering Instructions

1. Sharp does not recommend soldering this part using preheat or solder reflow methods. Leads on this part are pre-coated with lead-free solder. See Figure 12.
2. If hand soldering, use temperatures ≤260° for ≤5 seconds.
3. When mounting this device, care should be taken to prevent any boundary exfoliation (pad lifting) between the solder, the pad, and the circuit board.
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.

Fig. 12 Soldering Area



● 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)
Photo Transistor	✓	✓	✓	✓	✓	✓

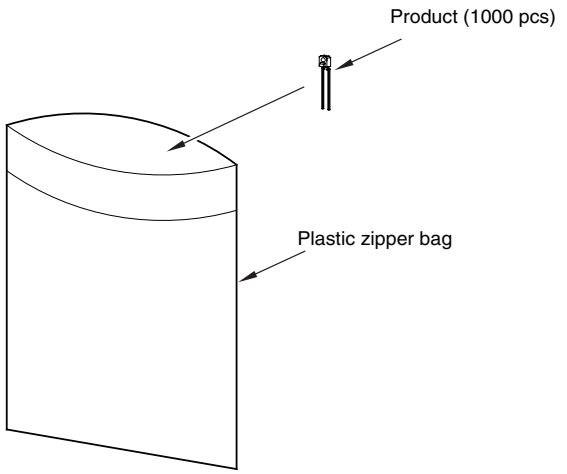
NOTE: ✓ indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard.

■ Packing Specifications

1. Parts are packed in a plastic zip-top bag, with a quantity of 1000 pieces per bag.
2. Bags are secured in a box as shown in Figure 13.
3. Product mass: 0.09 g (approximately)

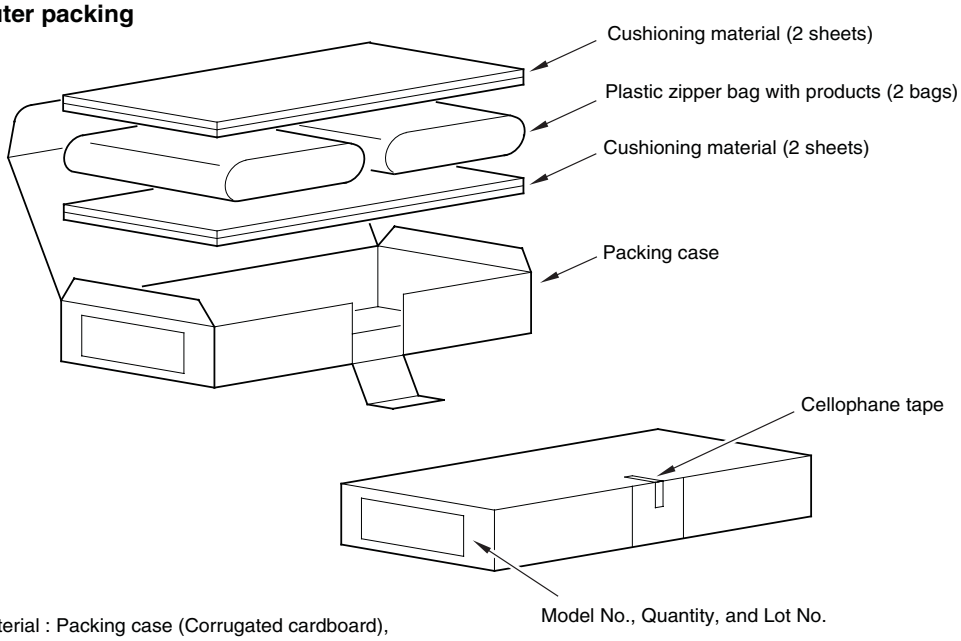
Fig. 13 Packing Composition

Inner packing



NOTES:
1. Inner packing material : Plastic zipper Bag (Polyethylene)
2. Quantity: 1000 pcs/bag

Outer packing



NOTES:
1. Outer material : Packing case (Corrugated cardboard),
   Cushioning material (Urethane), Cellophane tape
2. Quantity: 2000 pcs/box
3. Regular packaged mass: Approximately 270 g
4. Indication: Model No., Quantity, and Lot No.

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

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