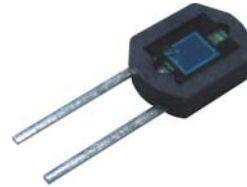


BS520E0F

Visible light detecting Photodiode



■ Features

1. Spectral Sensitivity similar to that of the human eye
2. Thin package
3. Low dark current ($I_d = 10 \text{ pA MAX. @ } V_r = 1 \text{ V}$)
4. Infrared-light cutoff resin package
5. Lead free and RoHS directive component

■ Agency Approvals/Compliance

1. Compliant with RoHS directive (2002/95/EC)
2. Content status of 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) (popular name : *China RoHS*) ; refer to page 6

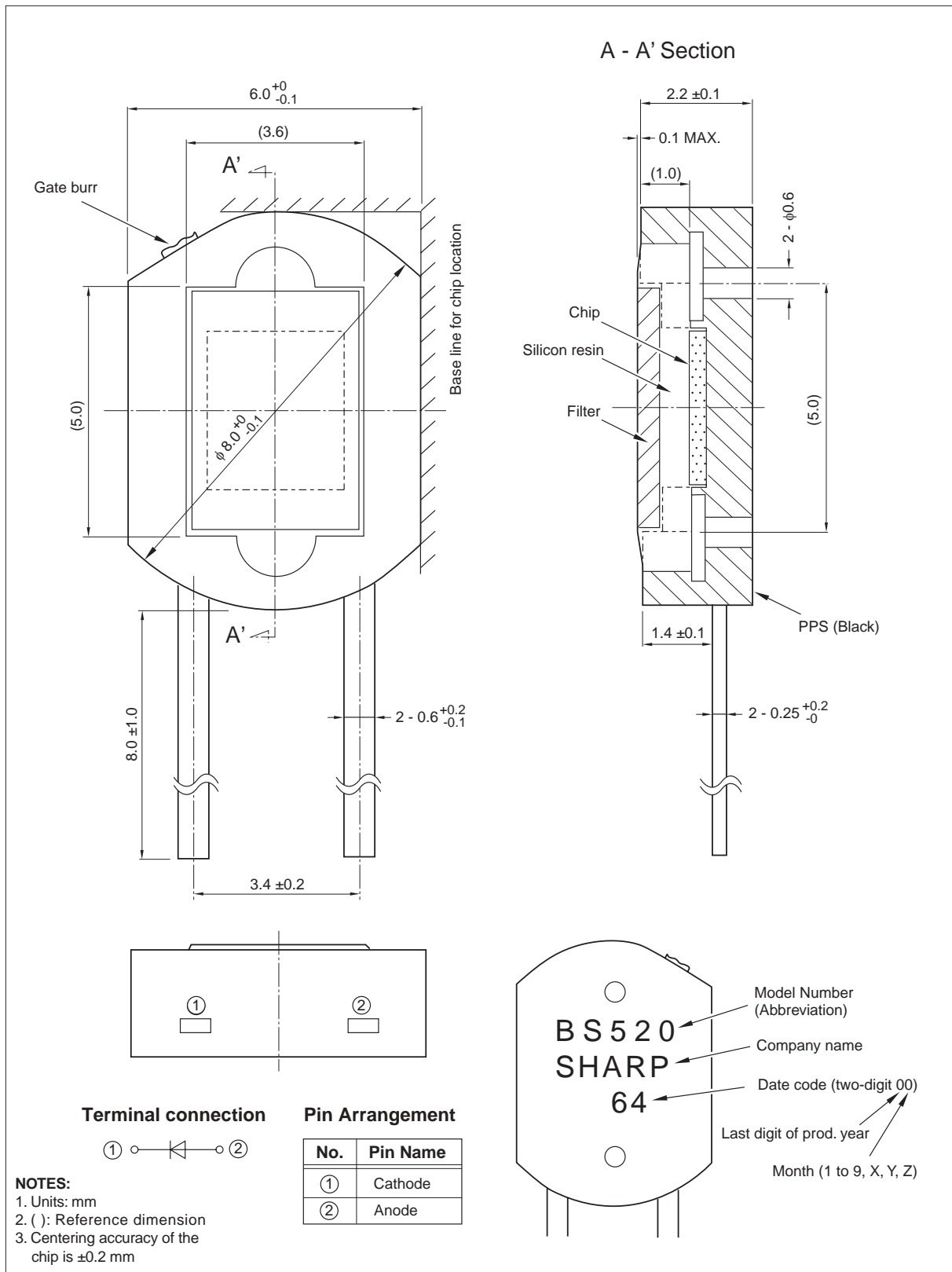
■ Applications

1. Automatic exposure systems
2. Precision optical instruments
3. Optoelectronic switches
4. Automatic stroboscopes

Notice The content of data sheet is subject to change without prior notice.

In the absence of confirmation by device specification sheets, SHARP takes no responsibility for any defects that may occur in equipment using any SHARP devices shown in catalogs, data books, etc. Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device.

■ **Outline Dimensions**



■ Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating	Unit
Reverse voltage	V_R	10	V
Operating temperature	T_{opr}	-20 to +60	°C
Storage temperature	T_{stg}	-30 to +80	°C
Soldering temperature *1	T_{sol}	260	°C

*1 10 s (MAX.), 1 mm or more from part body.

■ Electro-optical Characteristics

(Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Short circuit current	I_{SC}	$E_V = 100 \text{ lx}$ *2	400	550	650	nA
Short circuit current temperature coefficient	βT	$E_V = 100 \text{ lx}$ *2	–	0.02	0.06	%/°C
Reverse voltage	V_R	$I_R = 1 \mu\text{A}$	10	–	–	V
Dark current	I_d	$V_R = 1 \text{ V}, RH \leq 65\%$	–	3.0	10	pA
Dark current temperature coefficient	αT	$V_R = 1 \text{ V}, RH \leq 65\%$	–	4.0	5.0	double/10°C
Terminal capacitance	C_t	$V_R = 0, f = 100 \text{ kHz}$	–	600	1,000	pF
Spectral sensitivity infrared radiation ratio	ΔI_R	I_{sc}'/I_{sc} *3	–	5.0	10	%
Peak emission wavelength	λ_p		500	560	600	nm
Response time	t_r, t_f	$E_V = 100 \text{ lx}, R_L = 100 \text{ k}\Omega$	–	180	–	μs

*2 E_e : Illuminance by CIE standard light source A (tungsten lamp)

$$*3 \quad \Delta I_R = \frac{I_{SC}'(700 \text{ nm or more})}{I_{SC}(\text{All wavelength})}$$

Fig. 1 Short Circuit Current vs. Illuminance

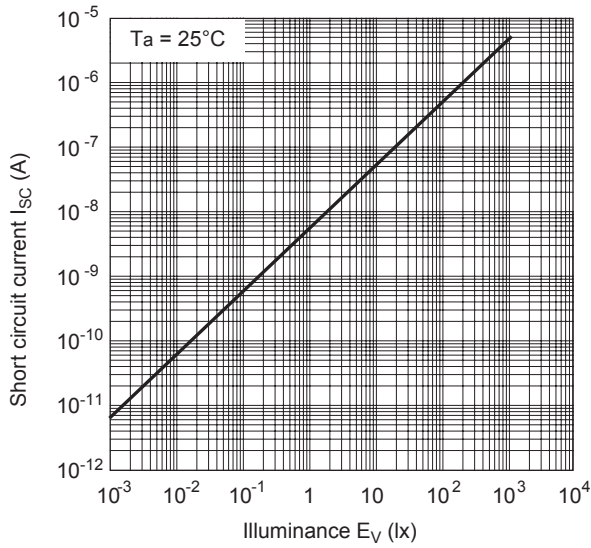


Fig. 3 Dark Current vs. Reverse Voltage

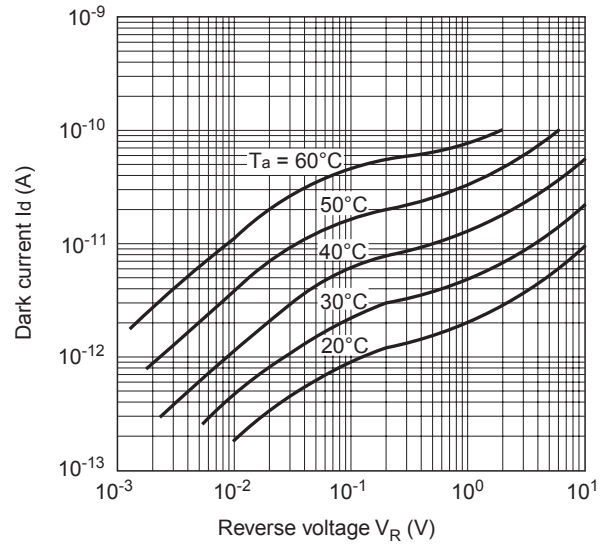


Fig. 2 Relative Short Circuit Current vs. Ambient Temperature

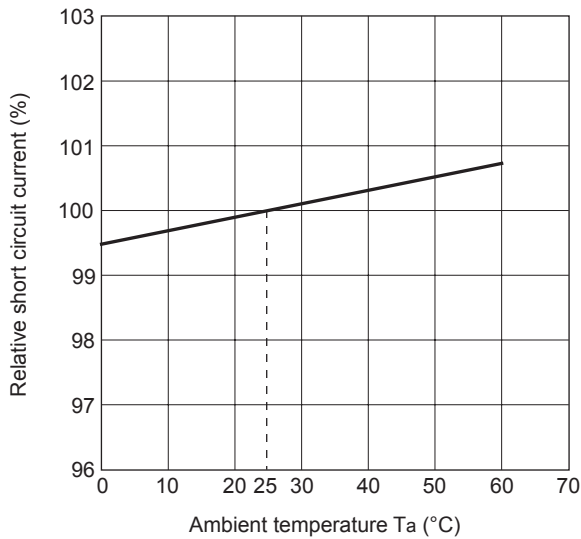


Fig. 4 Spectral Sensitivity

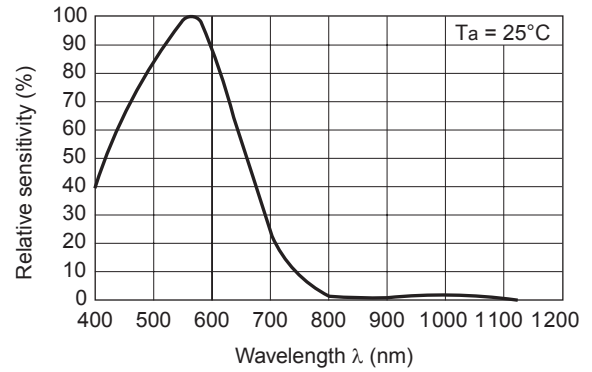
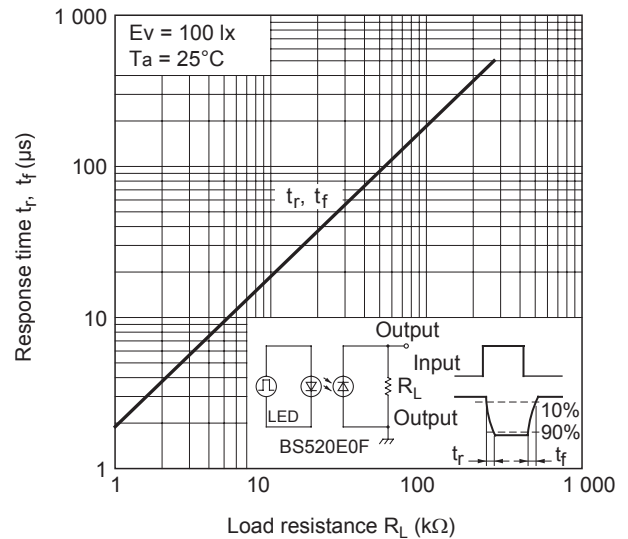


Fig. 5 Response Time vs. Load Resistance



■ Design Notes

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

■ Manufacturing Guidelines**● Soldering Instructions**

1. Sharp does not recommend using preheat or solder reflow methods when soldering this part.
2. If hand soldering, use temperatures $\leq 260^{\circ}\text{C}$ for ≤ 10 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.

● 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 30 seconds 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: Isopropyl alcohol.

● **Presence of ODC etc.**

This product shall not contain the following materials.

And they are not used in the production process for this product.

Regulation substances : CFCs, Halon, Carbon tetrachloride, 1,1,1-Trichloroethane (Methylchloroform)

Specific brominated flame retardants such as the PBB and PBDE are not used in this product at all.

- The RoHS directive (2002/95/EC)

This product complies with the RoHS directive (2002/95/EC).

Object substances: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

- Content of 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)

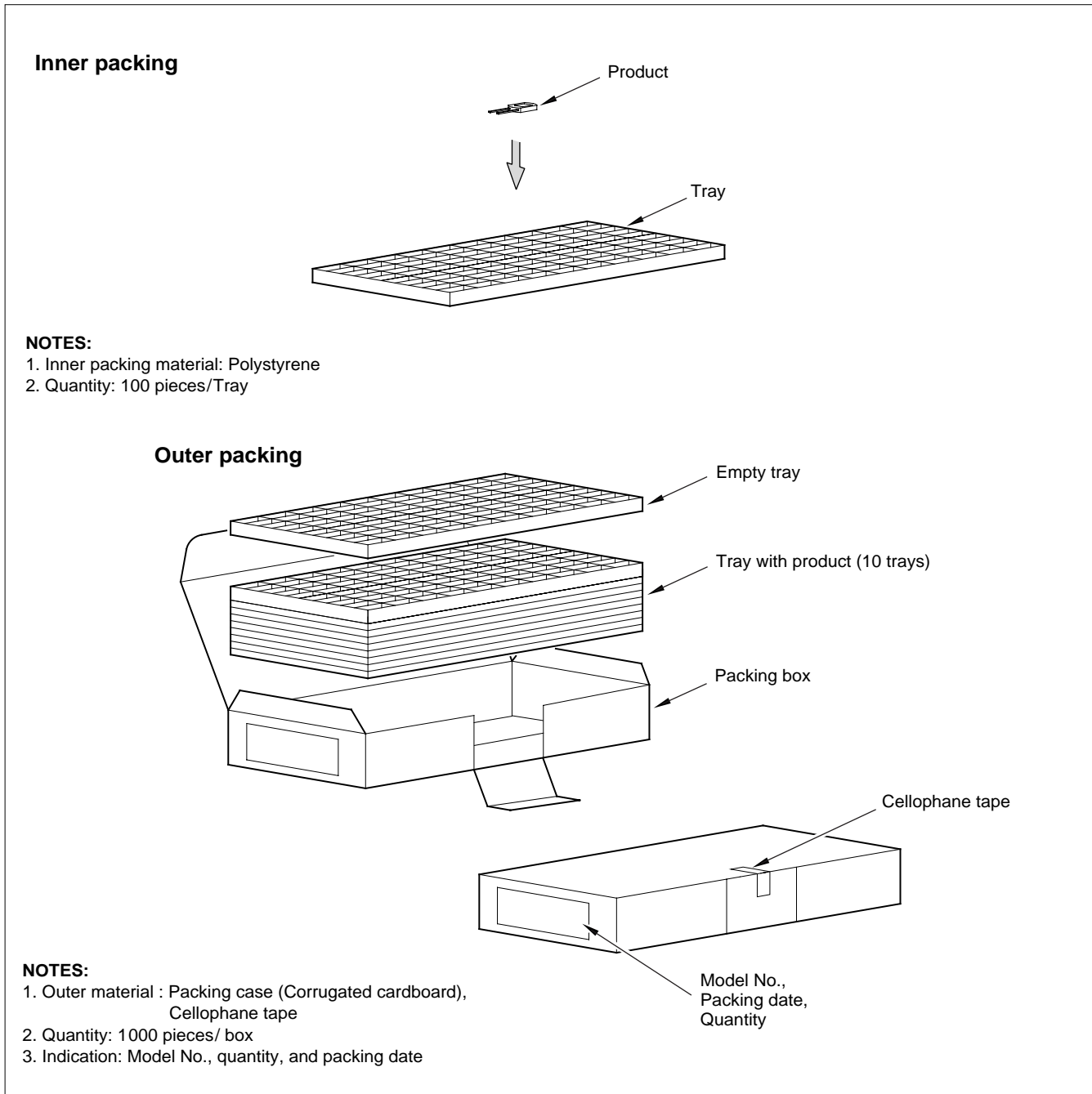
Category	Toxic and hazardous substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Photodiode	✓	✓	✓	✓	✓	✓

✓: 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 polyethelene tray, with an average quantity of 100 pieces per tray.
2. The trays are stacked ten to a box (1,000 pieces per box) in such a way that they alternate in direction as shown in the illustration on page 5.
3. Product mass: 0.21 g (approximately)

● Packing Method



■ Important Notices

· The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.

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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 reliability 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.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:

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

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