Silicon PIN Photodiode

BPW24R

SIVAGO® SEMICONDUCTOR

Description

BPW24R is a high sensitive silicon planar photodiode in a standard TO–18 hermetically sealed metal case with a glass lens.
A precise alignment of the chip gives a good coincidence of mechanical and optical axes. The device features a low capacitance and high speed even at low supply voltages.

Features

- Hermetically sealed TO–18 case
- Exact central chip alignment
- Cathode connected to case
- Angle of half sensitivity $\varphi = \pm 12^\circ$
- Extra fast response times at low operating voltages
- High photo sensitivity
- Radiant sensitive area A=0.78 mm^2
- Suitable for visible and near infrared radiation
- For photodiode and photovoltaic cell operation

Applications

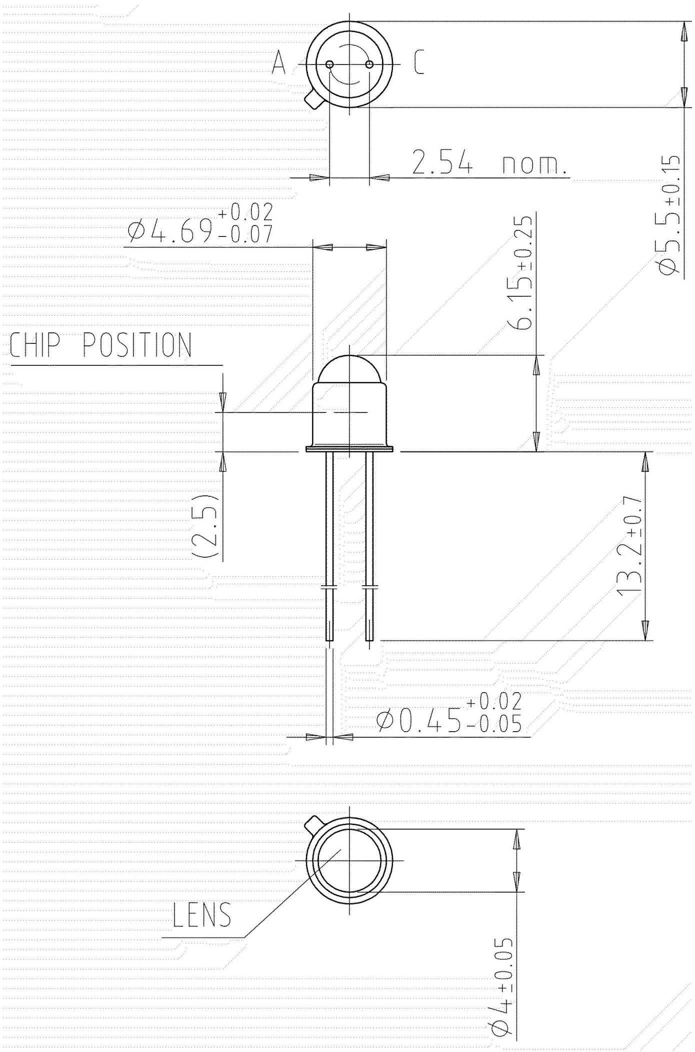
High speed photo detector

Absolute Maximum Ratings

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Value	Unit
Reverse Voltage		V_R	60	V
Power Dissipation	$T_{amb} \leqq 25$ °C	P_V	210	mW
Junction Temperature		T_j	125	°C
Operating Temperature Range		T_{amb}	–55...+125	°C
Storage Temperature Range		T_{stg}	–55...+125	°C
Soldering Temperature	t ≦ 5 s	T_{sd}	260	°C
Thermal Resistance Junction/Ambient		R_{thJA}	350	K/W

PACKAGE DIMENSIONS



NOTES:

1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25mm(.010") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.

Basic Characteristics

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Breakdown Voltage	I_R = 100 μA, E = 0	$V_{(BR)}$	60	200		V
Reverse Dark Current	V_R = 50 V, E = 0	I_{ro}		2	10	nA
Diode Capacitance	V_R = 0 V, f = 1 MHz, E = 0	C_D		11		pF
	V_R = 5 V, f = 1 MHz, E = 0	C_D		3.8		pF
	V_R = 20 V, f = 1 MHz, E = 0	C_D		2.5		pF
Open Circuit Voltage	E_e = 1 mW/cm², λ = 950 nm	V_o		450		mV
Temp. Coefficient of V_o	E_e = 1 mW/cm², λ = 950 nm	TK_{Vo}		–2		mV/K
Short Circuit Current	E_e = 1 mW/cm², λ = 950 nm	I_k		55		μA
Temp. Coefficient of I_k	E_A = 1 klx	TK_{Ik}		0.1		%/K
Reverse Light Current	E_e = 1 mW/cm², λ = 950 nm, V_R = 20 V	I_{ra}	45	60		μA
Absolute Spectral Sensitivity	V_R = 5 V, λ = 870 nm	s(λ)		0.60		A/W
	V_R = 5 V, λ = 900 nm	s(λ)		0.55		A/W
Angle of Half Sensitivity		φ		±12		deg
Wavelength of Peak Sensitivity		λ_p		900		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		600...1050		nm
Rise Time	V_R = 20 V, R_L = 50 Ω, λ = 820 nm	t_r		7		ns
Fall Time	V_R = 20 V, R_L = 50 Ω, λ = 820 nm	t_f		7		ns

Typical Characteristics (T_{amb} = 25°C unless otherwise specified)

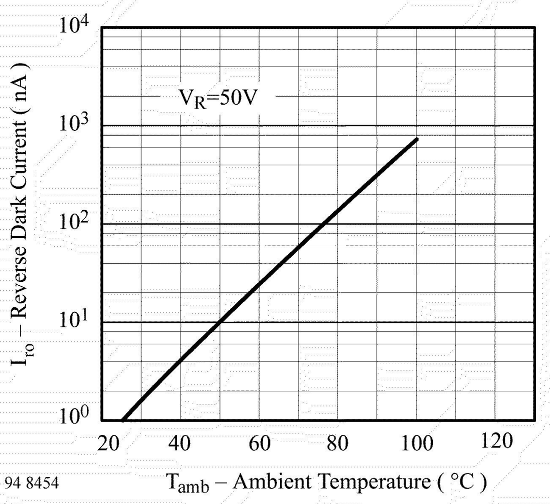


Figure 1. Reverse Dark Current vs. Ambient Temperature

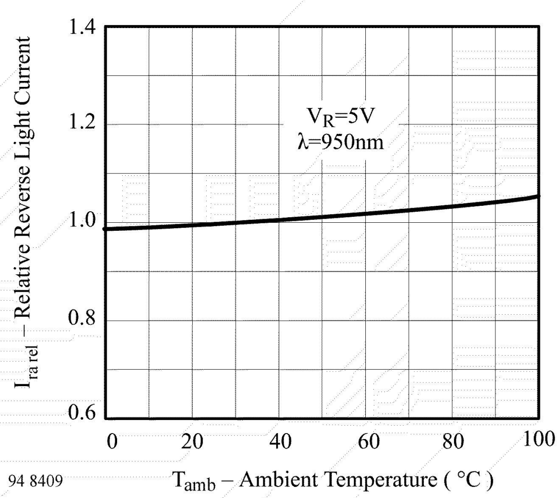


Figure 2. Relative Reverse Light Current vs. Ambient Temperature

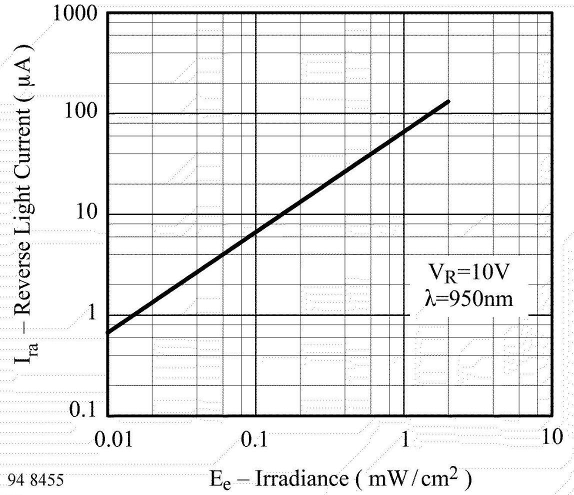


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Figure 3. Reverse Light Current vs. Irradiance

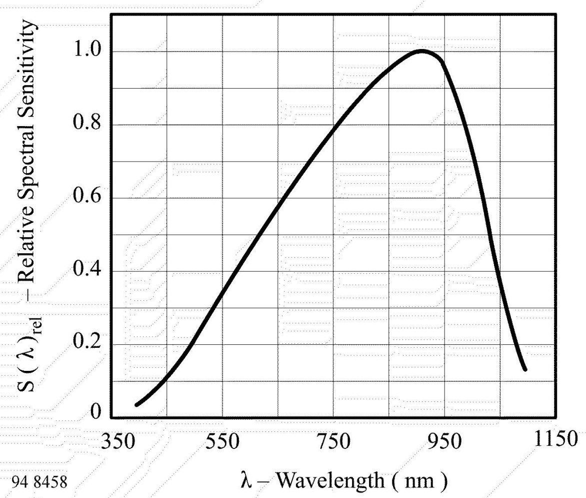

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Figure 6. Relative Spectral Sensitivity vs. Wavelength

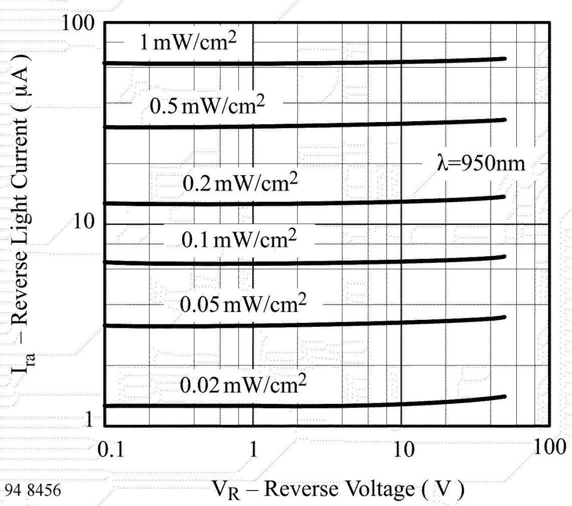

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Figure 4. Reverse Light Current vs. Reverse Voltage

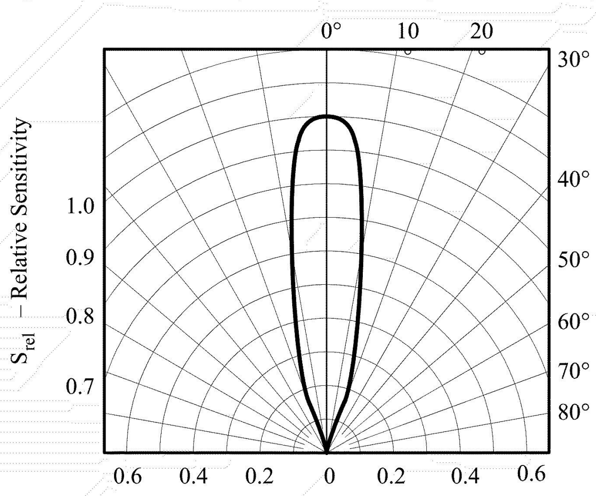

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Figure 7. Relative Radiant Sensitivity vs. Angular Displacement

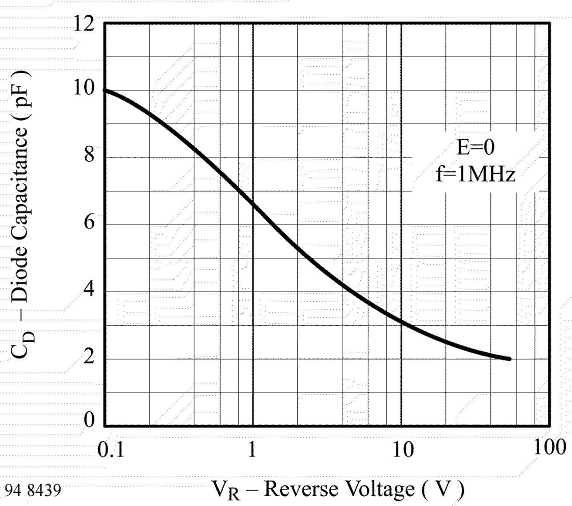

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Figure 5. Diode Capacitance vs. Reverse Voltage

Packing Quantity Specification

1. 500Pcs/1Bag,20 Bag/1Box

2. 4Boxes/1Carton

Label Form Specification

- PRODUCT: Part Number
- CODE NO.: Product Serial Number
- QTY: Packing Quantity
- LOT No: Lot Number
- REMARKS:Remarks

Notes

Lead Forming

1.During lead frame bending, the lead frame should be bent at a distance more than 3mm from bottom of the epoxy.

Note: Must fix lead frame and do not touch epoxy before bending to avoid Phototransistors broken.

2.Lead forming should be done before soldering.

3.Avoid stressing the Phototransistor package during leads forming. The stress to the base may damage the Phototransistor's characteristics or it may break the Phototransistors.

4.Cut the Phototransistor lead frame at room temperature. Cutting the lead frame at high temperatures may cause failure of the Phototransistors.

5.When mounting the Phototransistors onto a PCB, the PCB holes must be aligned exactly with the lead position of the Phototransistor. If the Phototransistors are mounted with stress at the leads, it causes deterioration of the epoxy resin and this will degrade the Phototransistors.

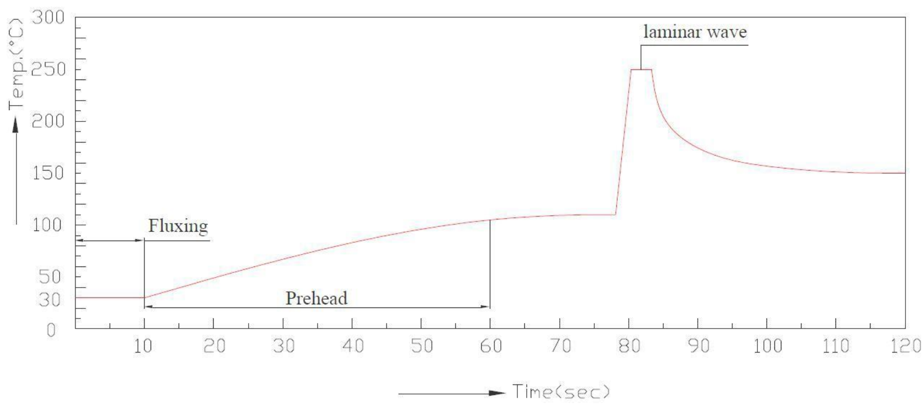
Soldering

1. Careful attention should be paid during soldering. When soldering, leave more than 3mm from solder joint to epoxy bulb, and soldering beyond the base of the tie bar is recommended.

2. Recommended soldering conditions:

Hand Soldering		DIP Soldering	
Temp. at tip of iron	300°C Max. (30W Max.)	Preheat temp.	100°C Max. (60 sec Max.)
Soldering time	3 sec Max.	Bath temp. & time	260 Max., 5 sec Max
Distance	3mm Min.(From solder joint to epoxy bulb)	Distance	3mm Min. (From solder joint to epoxy bulb)

3. Recommended soldering profile



4.Avoiding applying any stress to the lead frame while the Phototransistors are at high temperature particularly when soldering.

5.Dip and hand soldering should not be done more than one time

6.After soldering the Phototransistors, the epoxy bulb should be protected from mechanical shock or vibration until the Phototransistors return to room temperature.

7.A rapid-rate process is not recommended for cooling the Phototransistors down from the peak temperature.

8.Although the recommended soldering conditions are specified in the above table, dip or hand soldering at the lowest possible temperature is desirable for the Phototransistors.

9.Wave soldering parameter must be set and maintain according to recommended temperature and dwell time in the solder wave.

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