

## Vishay Semiconductors

## Silicon NPN Phototransistor



### **DESCRIPTION**

BPV11F is a silicon NPN phototransistor with high radiant sensitivity in black, T-1¾ plastic package with base terminal and daylight blocking filter. Filter bandwidth is matched with 900 nm to 950 nm IR emitters.

### **FEATURES**

Package type: leadedPackage form: T-1¾

• Dimensions (in mm): Ø 5

High radiant sensitivity

Daylight blocking filter matched with 940 nm emitters

• Fast response times

• Angle of half sensitivity:  $\varphi = \pm 15^{\circ}$ 

· Base terminal connected

 Material categorization: For definitions of compliance please see <a href="https://www.vishav.com/doc?99912"><u>www.vishav.com/doc?99912</u></a>



 Detector for industrial electronic circuitry, measurement and control

PRODUCT SUMMARY				
COMPONENT	I <sub>ca</sub> (mA)	φ (deg)	λ <sub>0.5</sub> (nm)	
BPV11F	9	± 15	900 to 980	

#### Note

· Test condition see table "Basic Characteristics"

ORDERING INFORMATION				
ORDERING CODE PACKAGING		REMARKS	PACKAGE FORM	
BPV11F	Bulk	MOQ: 4000 pcs, 4000 pcs/bulk	T-1¾	

#### Note

· MOQ: minimum order quantity

<b>ABSOLUTE MAXIMUM RATINGS</b> (T <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Collector base voltage		V <sub>CBO</sub>	80	V	
Collector emitter voltage		V <sub>CEO</sub>	70	V	
Emitter base voltage		V <sub>EBO</sub>	5	V	
Collector current		I <sub>C</sub>	50	mA	
Collector peak current	$t_p/T = 0.5, t_p \le 10 \text{ ms}$	I <sub>CM</sub>	100	mA	
Power dissipation	T <sub>amb</sub> ≤ 47 °C	P <sub>V</sub>	150	mW	
Junction temperature		Tj	100	°C	
Operating temperature range		T <sub>amb</sub>	- 40 to + 100	°C	
Storage temperature range		T <sub>stg</sub>	- 40 to + 100	°C	
Soldering temperature	$t \le 5$ s, 2 mm from body	T <sub>sd</sub>	260	°C	
Thermal resistance junction/ambient	Connected with Cu wire, 0.14 mm <sup>2</sup>	R <sub>thJA</sub>	350	K/W	



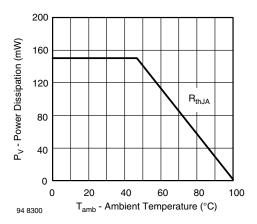
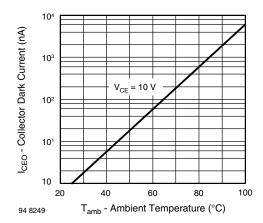


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

BASIC CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Collector emitter breakdown voltage	I <sub>C</sub> = 1 mA	V <sub>(BR)CEO</sub>	70			V
Collector emitter dark current	$V_{CE} = 10 \text{ V}, E = 0$	I <sub>CEO</sub>		1	50	nA
DC current gain	$V_{CE} = 5 \text{ V}, I_{C} = 5 \text{ mA}, E = 0$	h <sub>FE</sub>		450		
Collector emitter capacitance	$V_{CE} = 0 \text{ V, } f = 1 \text{ MHz, } E = 0$	C <sub>CEO</sub>		15		pF
Collector base capacitance	$V_{CE} = 0 \text{ V, } f = 1 \text{ MHz, } E = 0$	C <sub>CBO</sub>		19		pF
Collector light current	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $V_{CB} = 5 \text{ V}$	I <sub>ca</sub>	3	9		mA
Angle of half sensitivity		φ		± 15		deg
Wavelength of peak sensitivity		$\lambda_{p}$		930		nm
Range of spectral bandwidth		λ <sub>0.5</sub>		900 to 980		nm
Collector emitter saturation voltage	$E_e = 1 \text{ mW/cm}^2$ , $\lambda = 950 \text{ nm}$ , $I_C = 1 \text{ mA}$	$V_{CEsat}$		130	300	mV
Turn-on time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$	t <sub>on</sub>		6		μs
Turn-off time	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$	t <sub>off</sub>		5		μs
Cut-off frequency	$V_S = 5 \text{ V}, I_C = 5 \text{ mA}, R_L = 100 \Omega$	f <sub>c</sub>		110		kHz

## **BASIC CHARACTERISTICS** (T<sub>amb</sub> = 25 °C, unless otherwise specified)





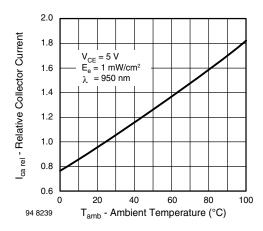


Fig. 3 - Relative Collector Current vs. Ambient Temperature

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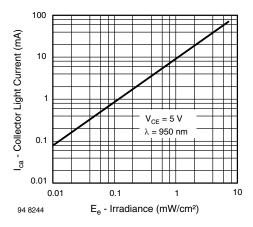


Fig. 4 - Collector Light Current vs. Irradiance

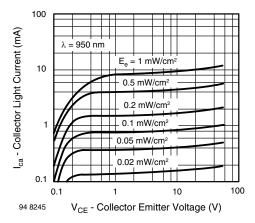


Fig. 5 - Collector Light Current vs. Collector Emitter Voltage

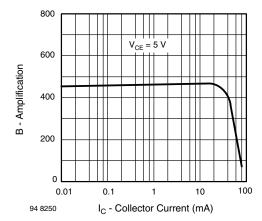


Fig. 6 - Amplification vs. Collector Current

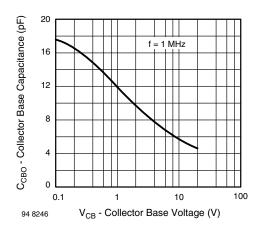


Fig. 7 - Collector Base Capacitance vs. Collector Base Voltage

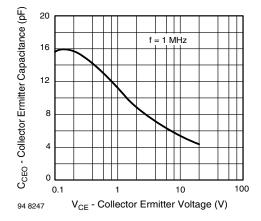


Fig. 8 - Collector Emitter Capacitance vs. Collector Emitter Voltage

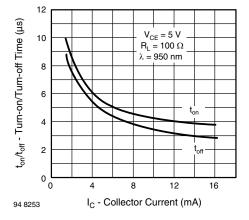
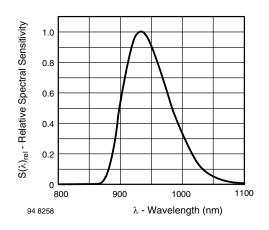


Fig. 9 - Turn-on/Turn-off Time vs. Collector Current



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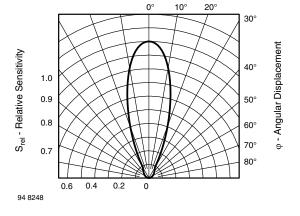
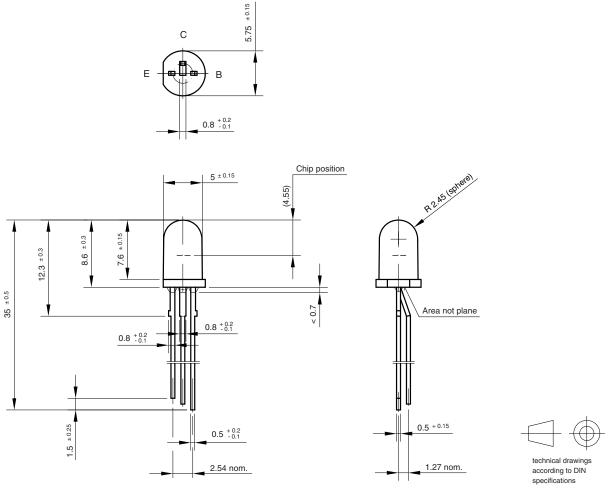


Fig. 10 - Relative Spectral Sensitivity vs. Wavelength

Fig. 11 - Relative Radiant Sensitivity vs. Angular Displacement

### **PACKAGE DIMENSIONS** in millimeters



Drawing-No.: 6.544-5188.01-4

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