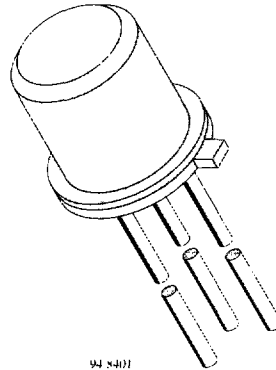


Silicon NPN Phototransistor

Description

BPX38 is a high sensitive silicon NPN epitaxial planar phototransistor in a standard TO-18 hermetically sealed metal case with a flat glass window.

A superior linearity of photocurrent vs. irradiation makes it ideal for linear applications. A base terminal is available to enable biasing and sensitivity control.



Features

- Hermetically sealed TO-18 case
- Flat window
- Very wide viewing angle $\varphi = \pm 40^\circ$
- Exact central chip alignment
- Base terminal available
- High photo sensitivity
- High linearity
- Suitable for visible and near infrared radiation
- Selected into sensitivity groups

Applications

Detector for analogue and digital applications in industrial electronics, measuring and control, e.g. long range light barriers with additional optics, optical switches, alarm systems.

Absolute Maximum Ratings

$T_{amb} = 25^\circ\text{C}$

Parameter	Test Conditions	Symbol	Value	Unit
Collector Base Voltage		V_{CBO}	80	V
Collector Emitter Voltage		V_{CEO}	70	V
Emitter Base Voltage		V_{EBO}	7	V
Collector Current		I_C	50	mA
Peak Collector Current	$t_p \leq 10 \mu\text{s}$	I_{CM}	200	mA
Total Power Dissipation	$T_{amb} \leq 25^\circ\text{C}$	P_{tot}	250	mW
Junction Temperature		T_j	125	$^\circ\text{C}$
Operating Temperature Range		T_{op}	-55...+125	$^\circ\text{C}$
Storage Temperature Range		T_{stg}	-55...+125	$^\circ\text{C}$
Soldering Temperature	$t \leq 5 \text{ s}$, distance from touching border $\geq 2 \text{ mm}$	T_{sd}	260	$^\circ\text{C}$
Thermal Resistance Junction/Ambient		R_{thJA}	400	K/W
Thermal Resistance Junction/Case		R_{thJC}	150	K/W

Basic Characteristics

$T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	$I_C = 1 \text{ mA}$	$V_{(BR)CEO}$	70			V
Collector Dark Current	$V_{CE} = 25 \text{ V}, E = 0$	I_{CEO}		10	200	nA
Collector Emitter Capacitance	$V_{CE} = 0 \text{ V}, f = 1 \text{ MHz}, E = 0$	C_{CEO}		23		pF
Emitter Base Capacitance	$V_{EB} = 0 \text{ V}, f = 1 \text{ MHz}, E = 0$	C_{EBO}		47		pF
Collector Base Capacitance	$V_{CB} = 0 \text{ V}, f = 1 \text{ MHz}, E = 0$	C_{CBO}		41		pF
Collector Light Current	$E_c = 0.5 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_{CE} = 5 \text{ V}$	I_{ca}	0.5			mA
Temp. Coefficient of I_{ca}	$\lambda = 950 \text{ nm}$	TK_{Ica}		1		%/K
Base Light Current	$E_c = 0.5 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_{CB} = 5 \text{ V}$	I_{ba}		4		μA
Angle of Half Sensitivity		φ		± 40		deg
Wavelength of Peak Sensitivity		λ_p		920		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		630...1040		nm
Collector Emitter Saturation Voltage	$E_c = 0.5 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, I_C = 0.1 \text{ mA}$	V_{CEsat}		0.15	0.3	V

Type Dedicated Characteristics

$T_{amb} = 25^{\circ}\text{C}$

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Current Gain	$V_{CE} = 5 \text{ V}, I_C = 1 \text{ mA}$	BPX38-4	B		330		
		BPX38-5	B		520		
		BPX38-6	B		650		
Collector Light Current	$E_c = 0.5 \text{ mW/cm}^2, \lambda = 950 \text{ nm}, V_{CE} = 5 \text{ V}$	BPX38-4	I_{ca}	0.5	0.7	1.0	mA
		BPX38-5	I_{ca}	0.8	1.25	1.6	mA
		BPX38-6	I_{ca}	1.25	2		mA
Rise Time/ Fall Time	$V_{CE} = 5 \text{ V}, I_C = 1 \text{ mA}, R_L = 1 \text{ k}\Omega, \lambda = 820 \text{ nm}$	BPX38-4	t_r, t_f		15		μs
		BPX38-5	t_r, t_f		20		μs
		BPX38-6	t_r, t_f		25		μs

Typical Characteristics ($T_{amb} = 25^{\circ}\text{C}$ unless otherwise specified)

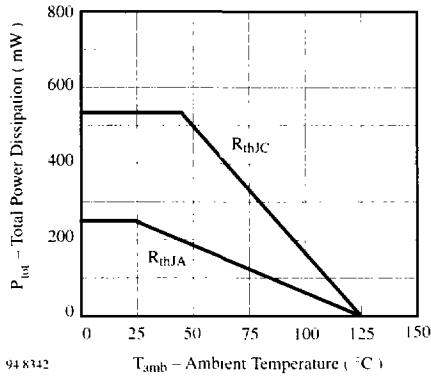


Figure 1. Total Power Dissipation vs. Ambient Temperature

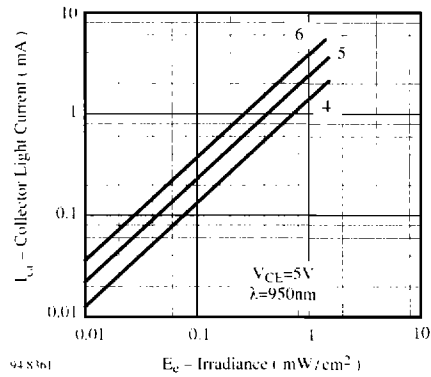


Figure 4. Collector Light Current vs. Irradiance

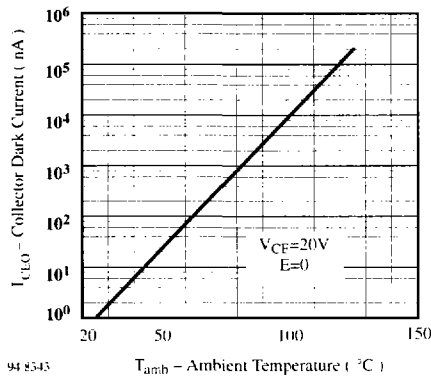


Figure 2. Collector Dark Current vs. Ambient Temperature

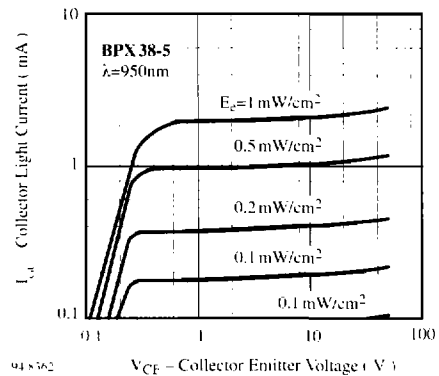


Figure 5. Collector Light Current vs. Collector Emitter Voltage

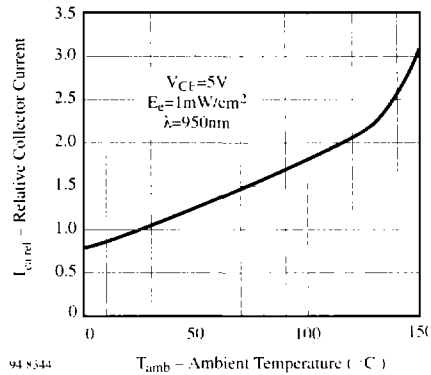


Figure 3. Relative Collector Current vs. Ambient Temperature

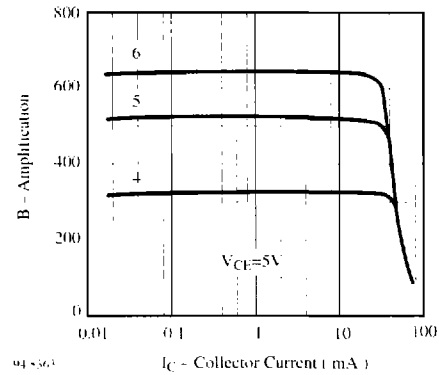


Figure 6. Amplification vs. Collector Current

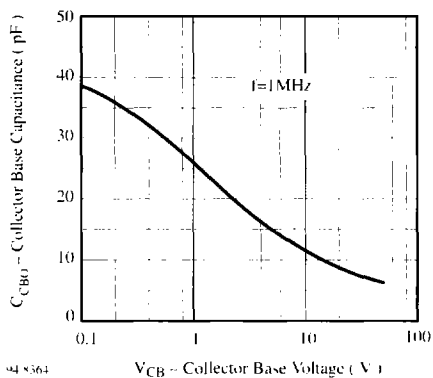


Figure 7. Collector Base Capacitance vs. Collector Base Voltage

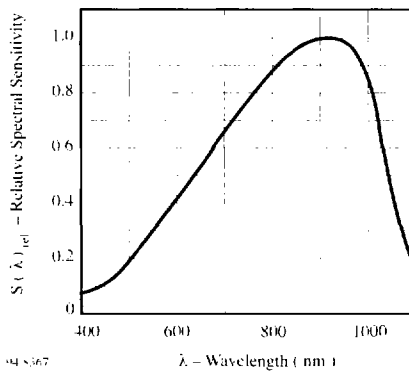


Figure 10. Relative Spectral Sensitivity vs. Wavelength

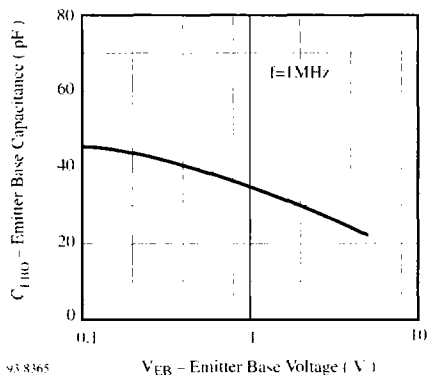


Figure 8. Emitter Base Capacitance vs. Emitter Base Voltage

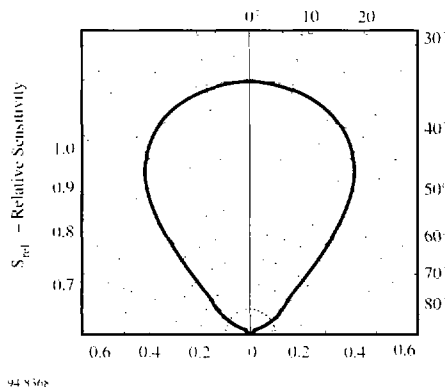


Figure 11. Relative Radiant Sensitivity vs. Angular Displacement

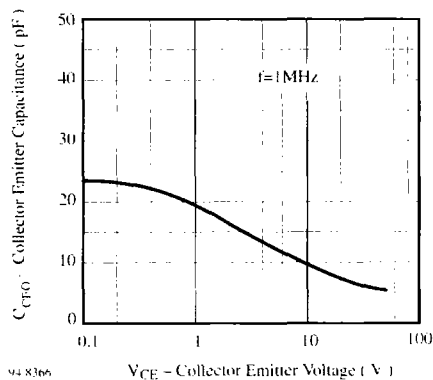
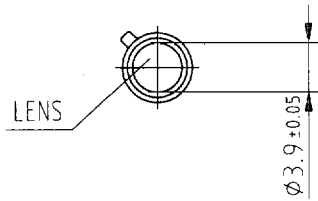
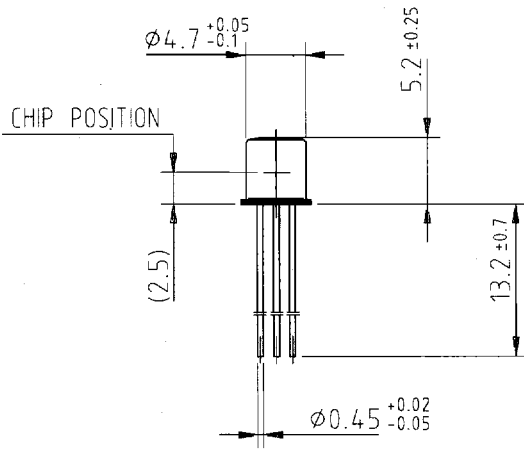
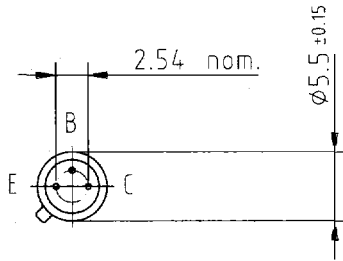
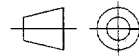


Figure 9. Collector Emitter Capacitance vs. Collector Emitter Voltage

Dimensions in mm



96 12175



technical drawings
according to DIN
specifications