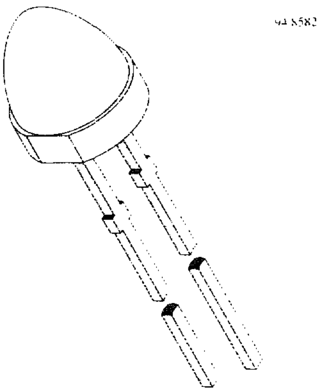
Silicon NPN Phototransistor

Description

S351P is a very high sensitive silicon NPN epitaxial planar phototransistor in a low profile ø 5mm (T–1¾) plastic package. Due to its waterclear epoxy the device is sensitive to visible and near infrared radiation.



Features

- Very high photo sensitivity (6mA)
- Low profile T–1¾ clear plastic package
- Angle of half sensitivity φ = ± 20°
- Suitable for visible and near IR radiation

Applications

Optical switches
Counters and sorters
Interrupters
Tape and card readers
Encoders
Position sensors

Absolute Maximum Ratings

T_{amb} = 25°C

Parameter	Test Conditions	Symbol	Value	Unit
Collector Emitter Voltage		V_{CEO}	70	V
Emitter Collector Voltage		V_{ECO}	5	V
Collector Current		I_C	50	mA
Peak Collector Current	$t_p/T = 0.5,\ t_p \leqq 10$ ms	I_{CM}	100	mA
Total Power Dissipation	$T_{amb} \leqq 25$ °C	P_{tot}	185	mW
Junction Temperature		T_j	100	°C
Operating Temperature Range		T_{amb}	–55...+100	°C
Storage Temperature Range		T_{stg}	–55...+100	°C
Soldering Temperature	$t \leqq 5$ s	T_{sd}	260	°C
Thermal Resistance Junction/Ambient		R_{thJA}	400	K/W

Basic Characteristics

$T_{amb} = 25\,°C$

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Collector Emitter Breakdown Voltage	I_C = 1 mA	$V_{(BR)CEO}$	70			V
Collector Dark Current	V_{CE} = 20 V, E = 0	I_{CEO}		1	200	nA
Collector Emitter Capacitance	V_{CE} = 5 V, f = 1 MHz, E=0	C_{CEO}		6		pF
Collector Light Current	E_e=1mW/cm², λ=950nm, V_{CE}=5V	I_{ca}	4	6		mA
Angle of Half Sensitivity		φ		±20		deg
Wavelength of Peak Sensitivity		λ_p		850		nm
Range of Spectral Bandwidth		$\lambda_{0.5}$		620...980		nm
Collector Emitter Saturation Voltage	E_e=1mW/cm², λ=950nm, I_C=1mA	V_{CEsat}			0.3	V
Turn–On Time	V_S=5V, I_C=5mA, R_L=100Ω	t_{on}		6		µs
Turn–Off Time	V_S=5V, I_C=5mA, R_L=100Ω	t_{off}		5		µs
Cut–Off Frequency	V_S=5V, I_C=5mA, R_L=100Ω	f_c		110		kHz

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

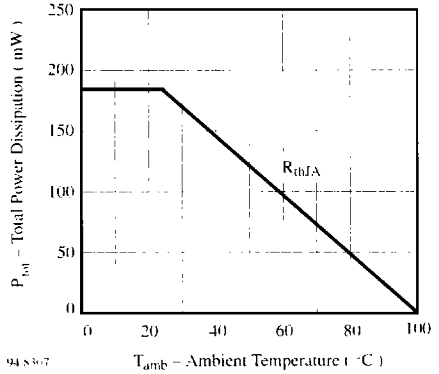


Figure 1. Total Power Dissipation vs. Ambient Temperature

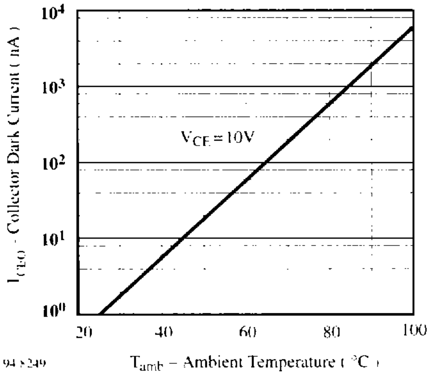


Figure 2. Collector Dark Current vs. Ambient Temperature

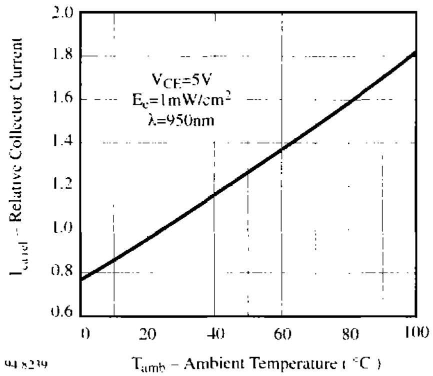


Figure 3. Relative Collector Current vs. Ambient Temperature

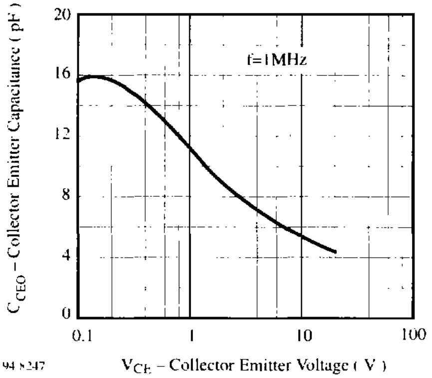


Figure 6. Collector Emitter Capacitance vs. Collector Emitter Voltage

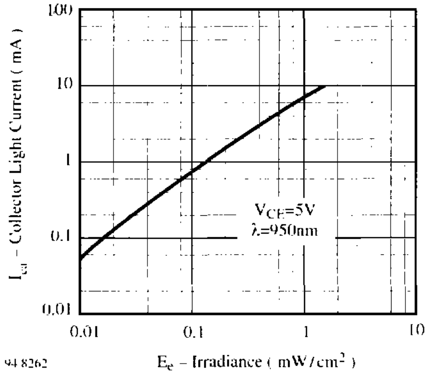


Figure 4. Collector Light Current vs. Irradiance

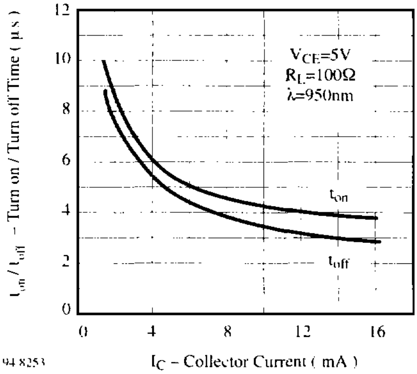


Figure 7. Turn On/Turn Off Time vs. Collector Current

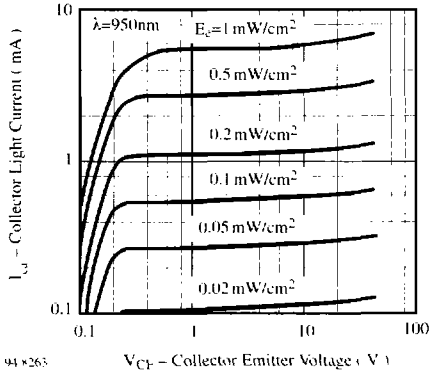


Figure 5. Collector Light Current vs. Collector Emitter Voltage

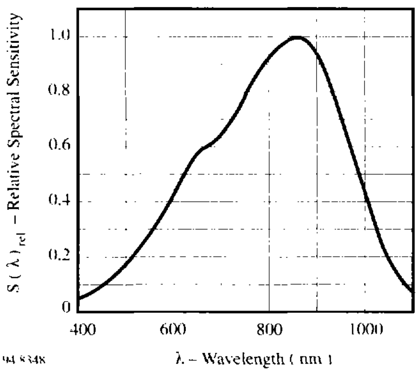


Figure 8. Relative Spectral Sensitivity vs. Wavelength

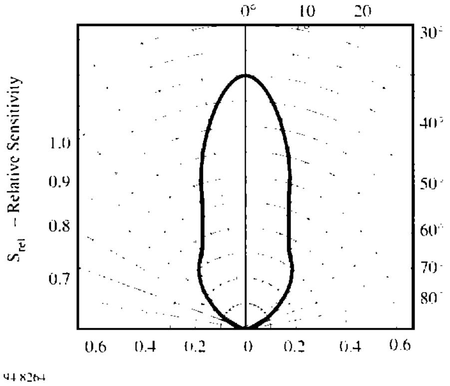


Figure 9. Relative Radiant Sensitivity vs.
Angular Displacement

Dimensions in mm