

TOSHIBA Photo-IC Silicon Epitaxial Planar

TPS820(B,F)

Lead(Pb)-Free

Photo-Electric Switches

Copiers, Printers, and Facsimiles

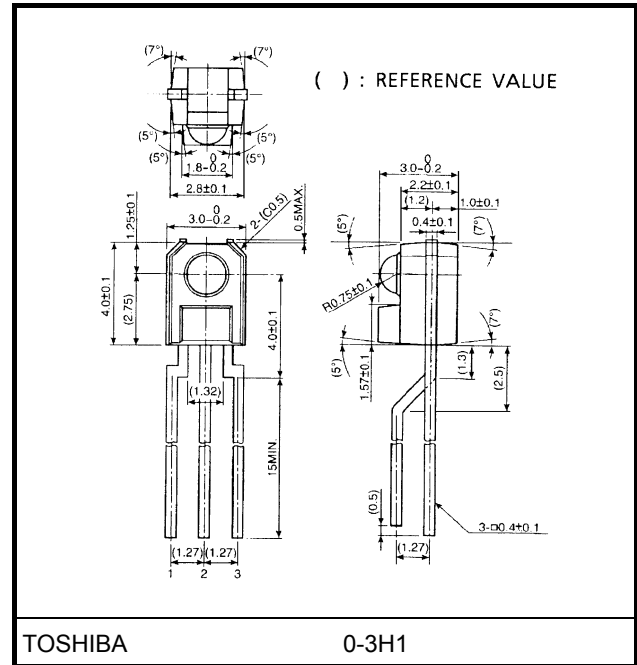
Luminosity Adjustment for Various Types of Equipment

Unit: mm

The TPS820(B,F) is a linear output photo-IC (current output type) which incorporates a photodiode and a current amp circuit in a single chip.

The sensitivity is superior to that of a phototransistor and its illuminance output linearity is excellent.

- High sensitivity: $I_L = 1.5 \text{ mA (Min) @} E = 0.1 \text{ mW/cm}^2$
- Little fluctuation in light current
- Output linearity of illuminance is excellent.
- Low current consumption: $I_{CC} = 1 \text{ } \mu\text{A (max) at } V_{CC} = 5 \text{ V}$
- Housed in compact side-view epoxy resin package
- Black package impermeable to visible light
- The TPS820 is suitable for use in combination with the TLN117(F) infrared LED lamp whose package size is the same.



Weight: 0.12 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

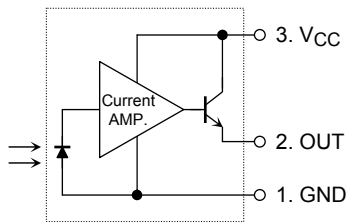
Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.5~7	V
Output voltage	V_O	$\leq V_{CC}$	V
Light current	I_L	10	mA
Power dissipation	P	250	mW
Power dissipation derating	$\Delta P/^\circ\text{C}$	-3.33	mW/°C
Operating temperature range	T_{opr}	-25~85	°C
Storage temperature range	T_{stg}	-40~100	°C
Soldering temperature (5 s) (Note1)	T_{sol}	260	°C

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: At the location of 1.3 mm from the resin package bottom

Pin Configuration

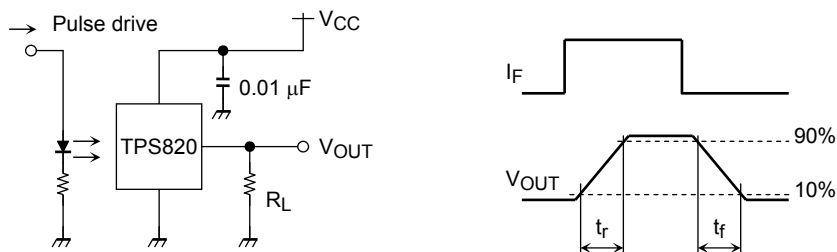


Optical and Electrical Characteristics (Ta = 25°C, VCC = 5 V)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Current consumption	I_{CC}	$E = 0$, I_L must be open between pins	—	0.017	1	μA
Light current (1)	$I_L(1)$	$E = 0.01 \text{ mW/cm}^2$ (Note2)	150	—	600	μA
Light current (2)	$I_L(2)$	$E = 0.1 \text{ mW/cm}^2$ (Note2)	1.5	—	6	mA
Output linearity	$I_L(2)/I_L(1)$	—	8	10	12	—
Saturation output voltage	$V_{OUT(sat)}$	$E = 0.1 \text{ mW/cm}^2$ (Note2) $R_L = 10 \text{ k}\Omega$	4.1	4.2	—	V
Dark current	I_D	$E = 0$	—	—	0.5	μA
Peak sensitivity wavelength	λ_p	—	—	870	—	nm
Rise time	t_r	$V_{OUT} = 2.5 \text{ V}$	—	250	—	μs
Fall time	t_f	$R_L = 10 \text{ k}\Omega$ (Note3)	—	700	—	μs

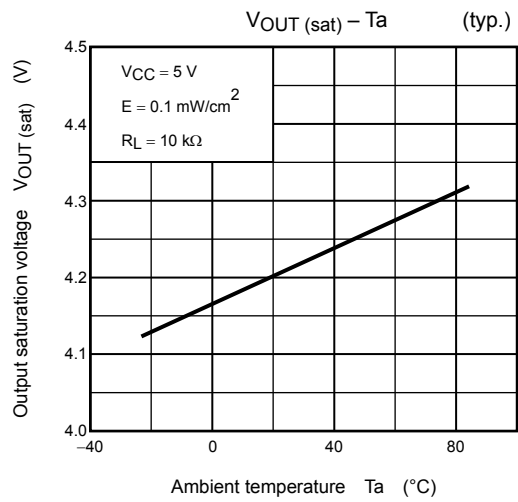
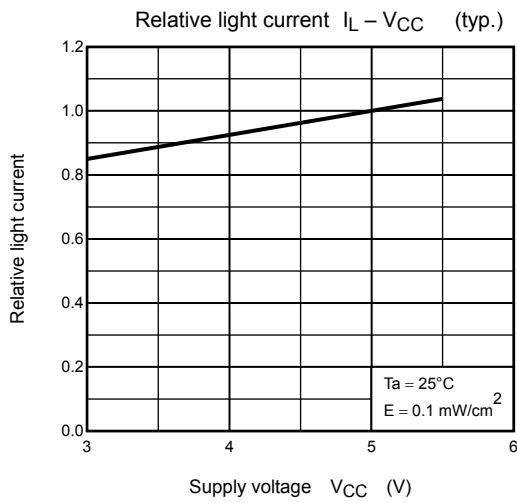
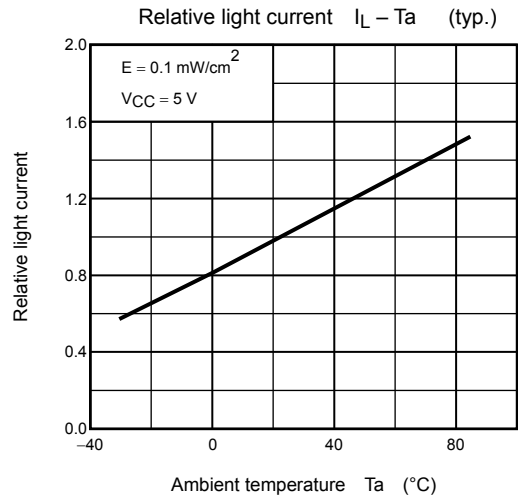
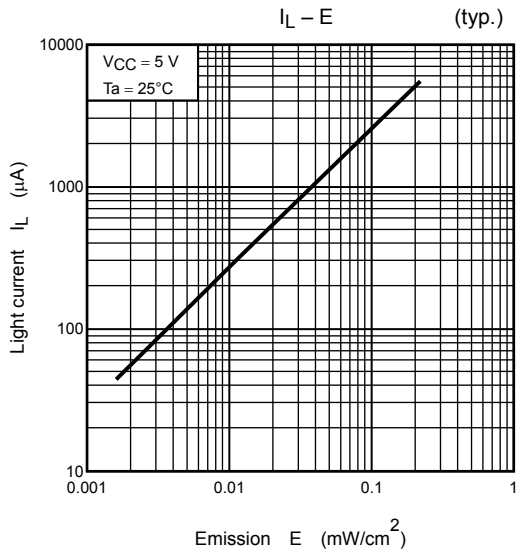
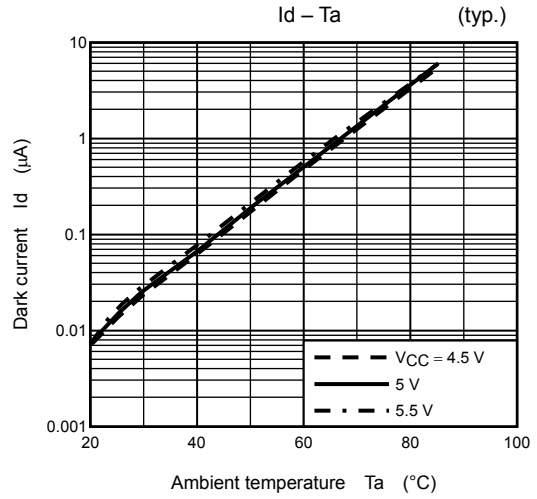
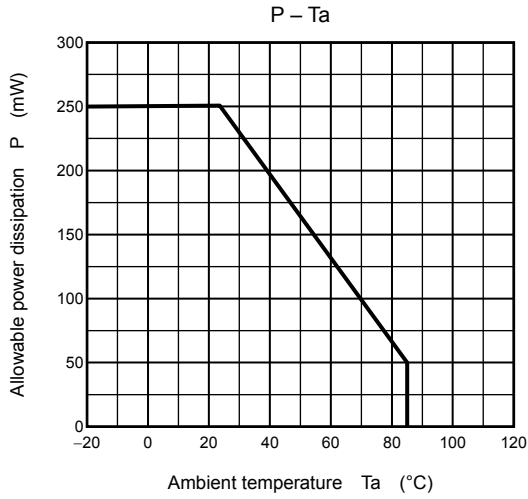
Note 2: The light used is a CIE standard A light source (a standard tungsten bulb with a color temperature of 2856K)

Note 3: Switching time measurement circuit and waveform

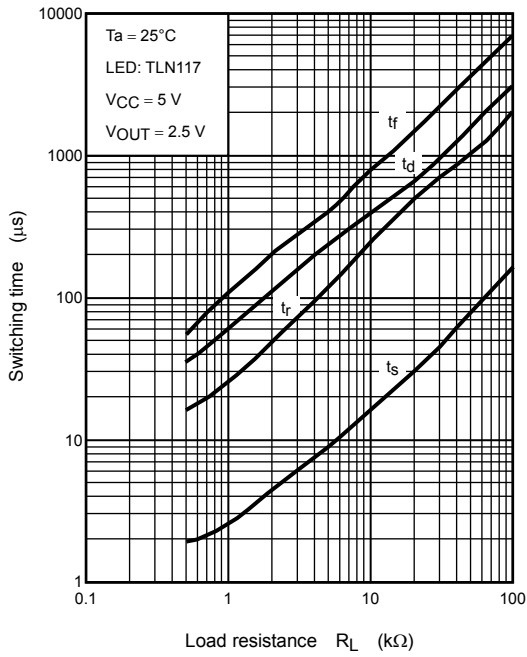


Precautions

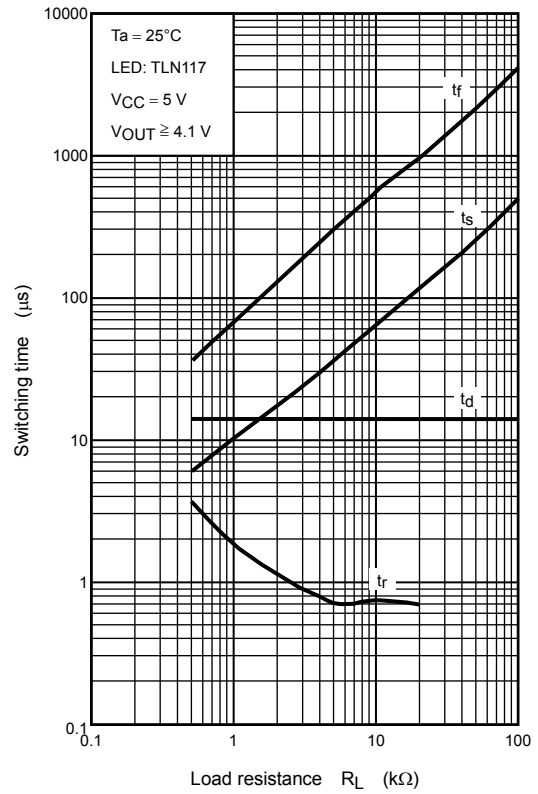
- When this device is used in combination with an LED lamp, the lamp must be an infrared LED lamp.
- To stabilize the power line, insert a bypass capacitor of up to $0.01 \mu\text{F}$ between V_{CC} and GND , close to the device.
- When the power is turned on, the output value will fluctuate for 1 ms as the internal circuit stabilizes.



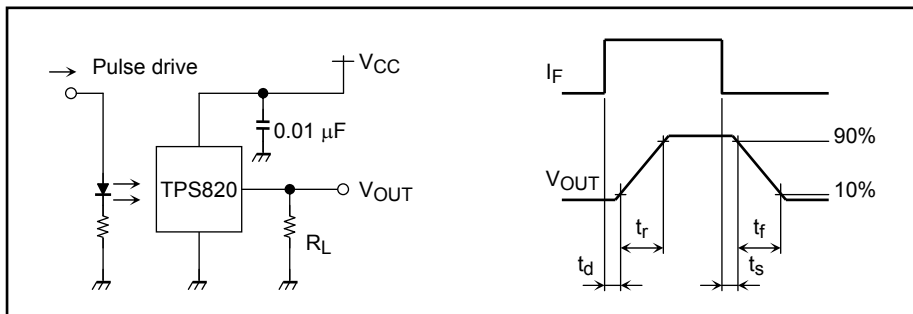
Switching characteristics (no saturation) (typ.)



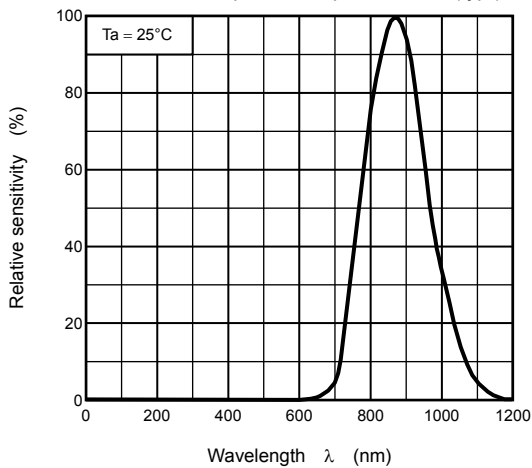
Switching characteristics (saturation) (typ.)



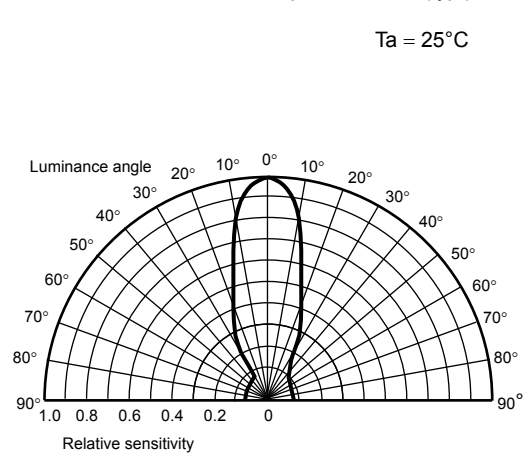
Switching time measurement circuit and waveform



Spectral response (typ.)



Radiation pattern (typ.)



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20070701-EN GENERAL

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