TOSHIBA Photo-IC Silicon Epitaxial Planar

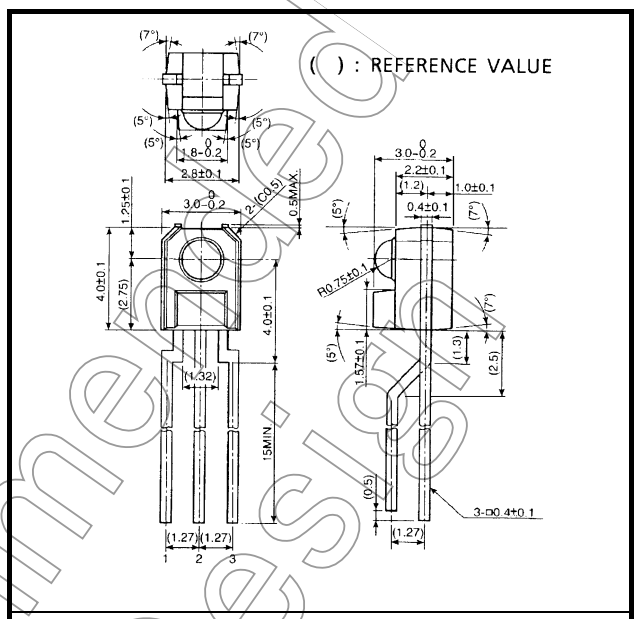
TPS820(B,F)

Photo-Electric Switches

Copiers, Printers, and Facsimiles

Luminosity Adjustment for Various Types of Equipment

Unit: mm



Weight: 0.12 g (typ.)

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 mA (Min) @E = 0.1 mW/cm^2
- Little fluctuation in light current
- Output linearity of illuminance is excellent.
- Low current consumption: I_{CC} = 1 μA (max) at V_{CC} = 5 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.

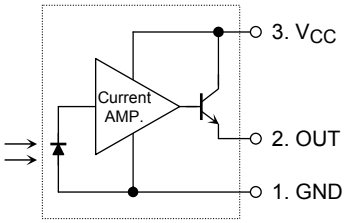
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	−0.5~7	V
Output voltage	V_O	≦ V_{CC}	V
Light current	I_L	10	mA
Power dissipation	P	250	mW
Power dissipation derating	ΔP/°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

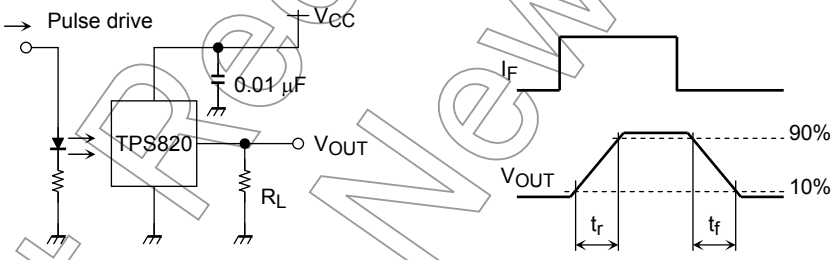


Optical and Electrical Characteristics (Ta = 25°C, V_{CC} = 5 V)

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 mW/cm^2 (Note2)	150	—	600	μA
Light current (2)	$I_L(2)$	E = 0.1 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 mW/cm^2 (Note2) R_L = 10 kΩ	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 V	—	250	—	μs
Fall time	t_f	R_L = 10 kΩ (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)

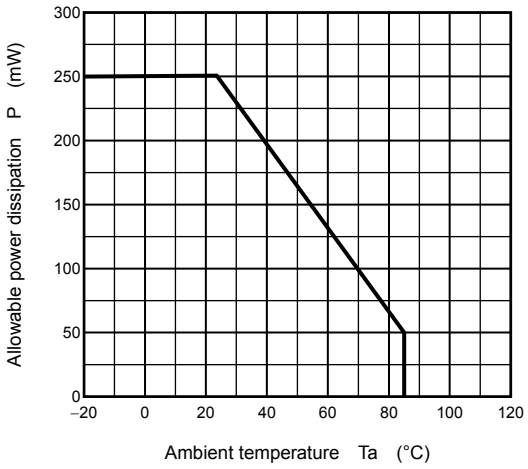
Note 3: Switching time measurement circuit and waveform



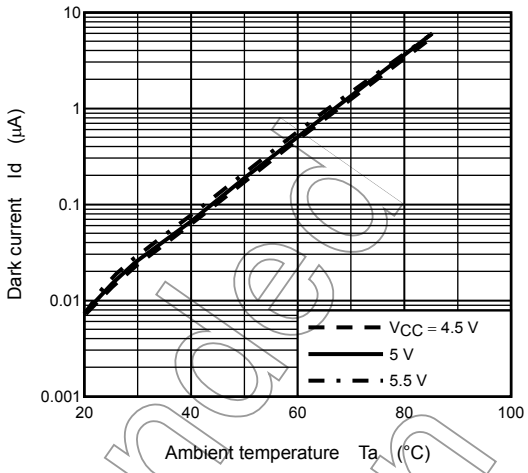
Precautions

- 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 μF 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.

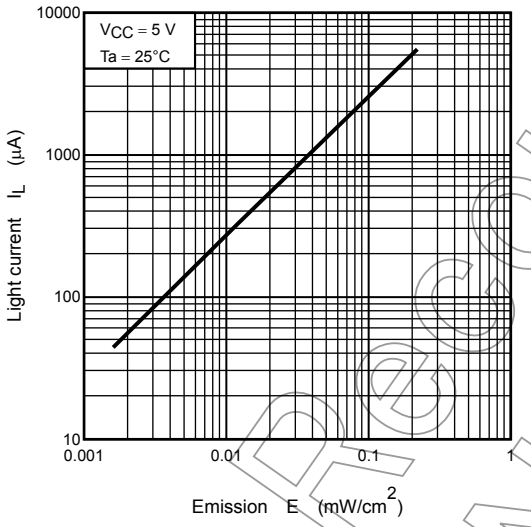
P – Ta



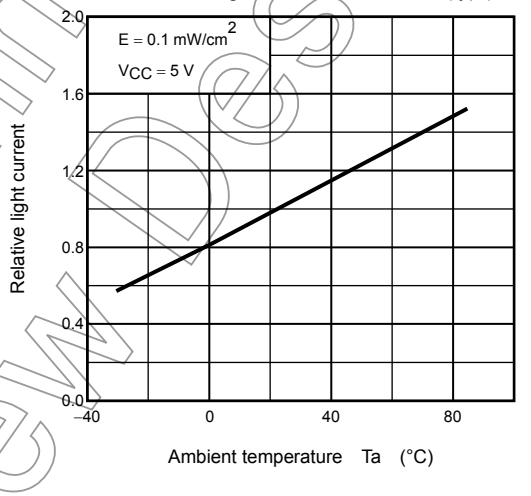
Id – Ta (typ.)



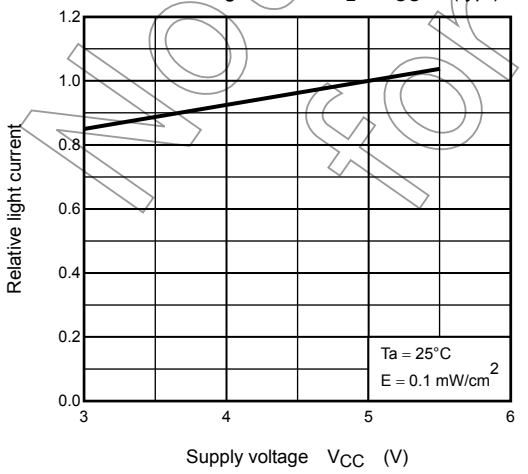
I_L – E (typ.)



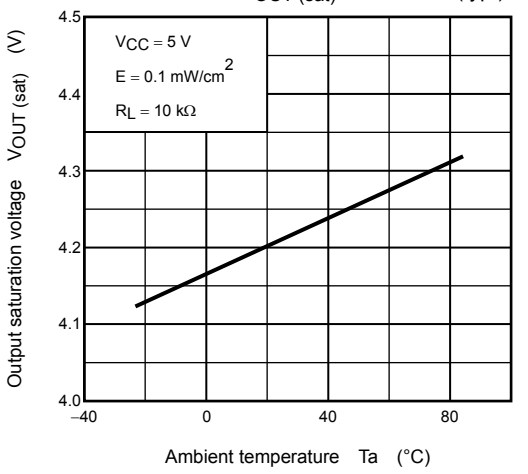
Relative light current I_L – Ta (typ.)



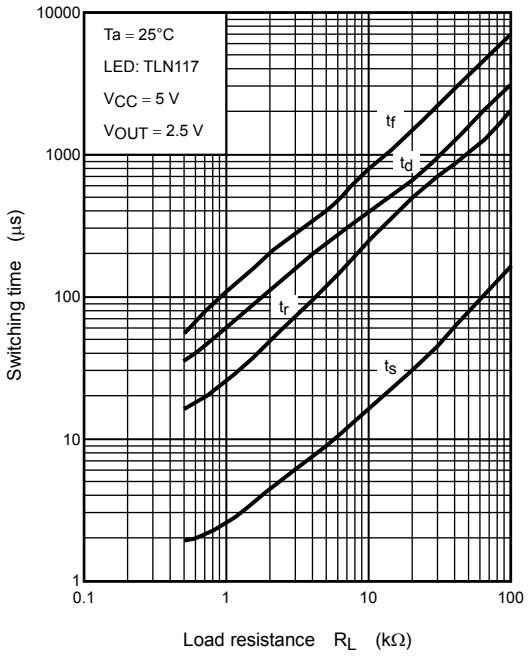
Relative light current I_L – V_{CC} (typ.)



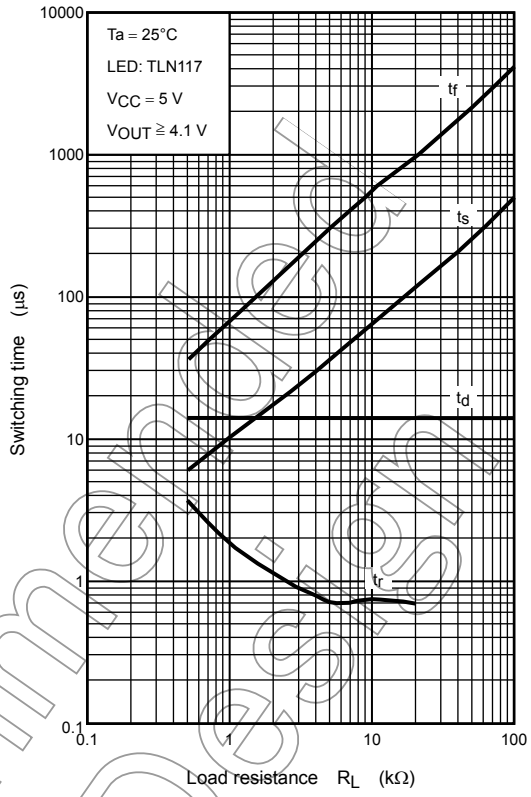
$V_{OUT\ (sat)}$ – Ta (typ.)



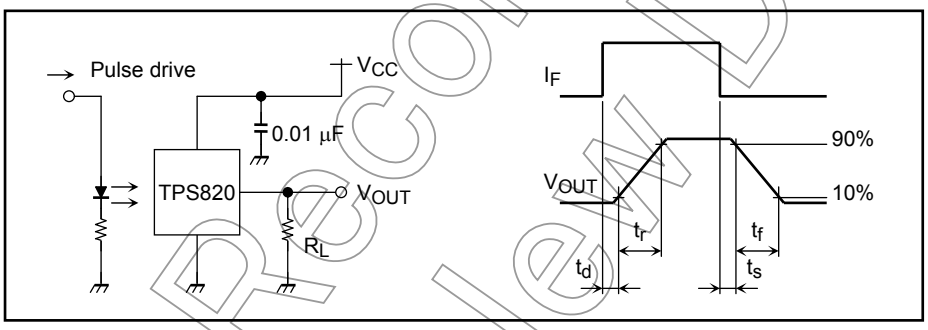
Switching characteristics (no saturation) (typ.)



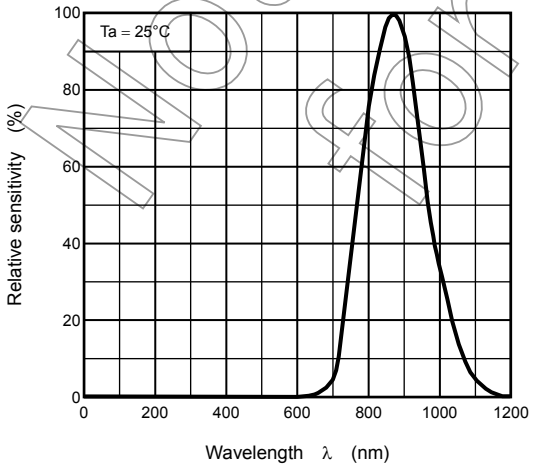
Switching characteristics (saturation) (typ.)



Switching time measurement circuit and waveform

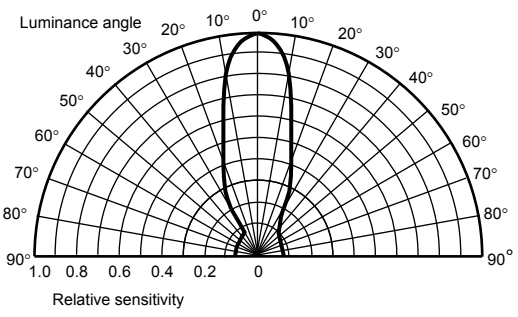


Spectral response (typ.)



Radiation pattern (typ.)

Ta = 25°C



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