

TOSHIBA PHOTO IC SILICON EPITAXIAL PLANAR

TPS812, TPS814

PHOTOELECTRIC SWITCHES

COPIERS, PRINTERS, AND FACSIMILES

COMMODITY AND TICKET VENDING MACHINES
AND TERMINAL EQUIPMENT IN FINANCIAL
COMPUTER SYSTEMS

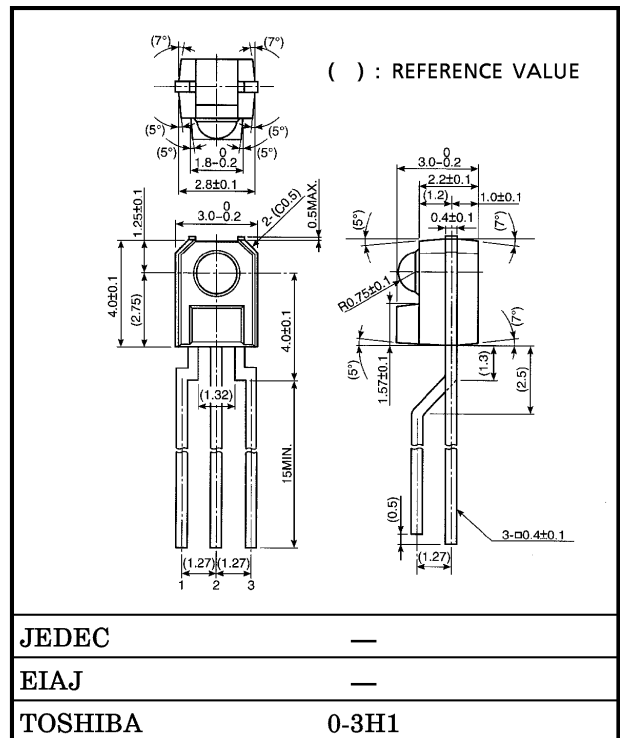
HANDY TERMINALS

The TPS812 and TPS814 represent a Si photo IC of digital output type that integrates a photodiode, amplifier circuit, and Schmitt trigger circuit into a single chip.

These devices respond faster than the phototransistor type. They output a low when light is input.

- Compact side-view epoxy resin package.
- High speed response
: $t_{pLH} = 5.5\mu s$, $t_{pHL} = 2.5\mu s$ (TYP.)
- High sensitivity : $0.3mW/cm^2$ (MAX.)
- Can be directly connected to TTL and CMOS.
- Operates over a wide supply voltage range
: $V_{CC} = 4.5\sim 17V$
- Digital output
TPS812 Open collector
TPS814 With a pull-up resistor

Unit in mm



Weight : 0.12g (TYP.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	17	V
Output Voltage	TPS812	30	V
	TPS814	$\leq V_{CC}$	
Output Current	I_O	50	mA
Output Current Derating (Ta > 25°C)	$\Delta I_O / ^\circ C$	-0.67	mA / °C
Power Dissipation	P_O	250	mW
Power Dissipation Derating	$\Delta P_O / ^\circ C$	-3.33	mW / °C
Operating Temperature Range	T_{opr}	-30~85	°C
Storage Temperature Range	T_{stg}	-40~100	°C
Soldering Temperature (5s) (Note 1)	T_{sol}	260	°C

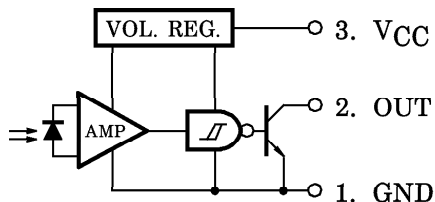
Note 1 : At the location of 1.5mm from the resin package bottom

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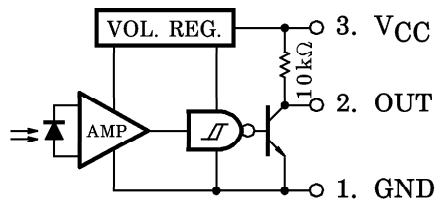
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PIN CONNECTION

TPS812



TPS814



OPTO-ELECTRICAL CHARACTERISTICS (Ta = -30~85°C, VCC = 4.5~17V, Typical values are all at 25°C.)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Supply Voltage		VCC		4.5	—	17	V	
High Level Supply Current		ICCH	E = 0	—	1.2	3.2	mA	
Low Level Supply Current	TPS812	ICCL	E = 2mW / cm ² (Note 2)	—	2.5	5.2	mA	
	TPS814			—	4	7.5		
High Level Output Current	TPS812	IOH	VO = 30V, E = 0	—	—	15	μA	
High Level Output Voltage	TPS814	VOH	E = 0	0.9VCC	—	—	V	
Low Level Output Voltage		VOL	E = 2mW / cm ² IOL = 16mA (Note 2)	—	0.07	0.4	V	
“H”→“L” Threshold Radiant Incidence		EHL	Ta = 25°C	—	0.1	0.3	mW / cm ²	
				—	—	0.6		
Histerisis Ratio		EHL / ELH	Ta = 25°C	1.1	1.5	2	—	
Peak Sensitivity Wavelength		λP		—	900	—	nm	
Switching Time	Propagation Delay Time	“L”→“H”	Ta = 25°C VCC = 5V E = 2mW / cm ² RL = 280Ω (Note 3)	—	5.5	15	μs	
		“H”→“L”		—	2.5	9		
	Rise Time			tr	—	0.02		0.5
	Fall Time			tf	—	0.08		0.5

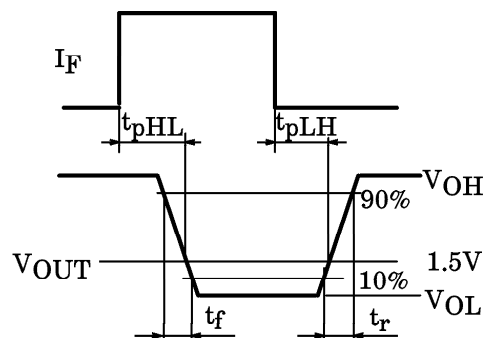
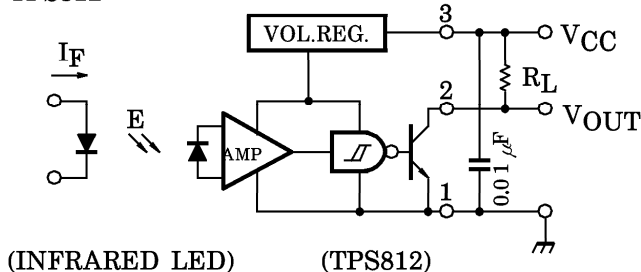
Note 2 : CIE standard light source A (standard tungsten bulb) with color temperature = 2856°K

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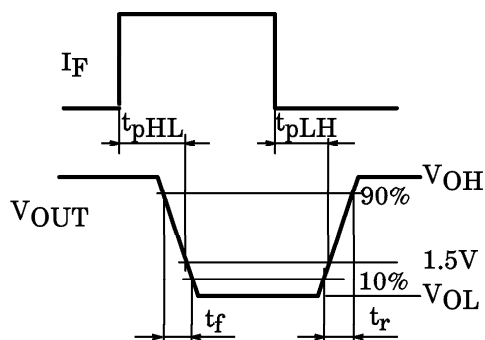
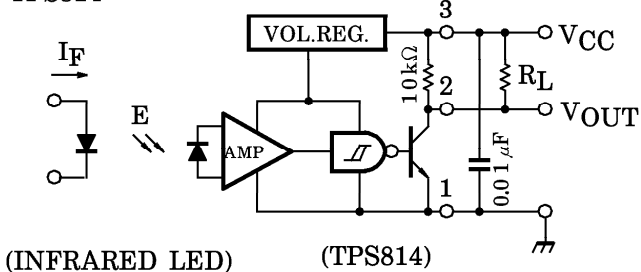
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Note 3 : Switching time measurement circuit and waveform

TPS812



TPS814

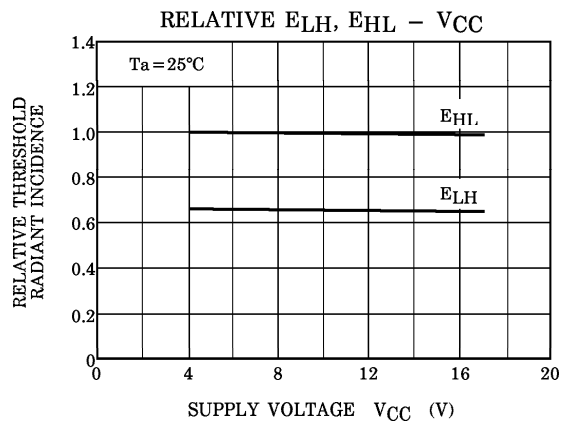
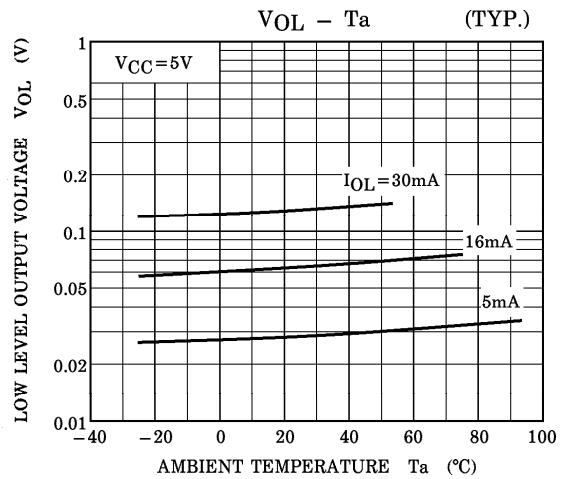
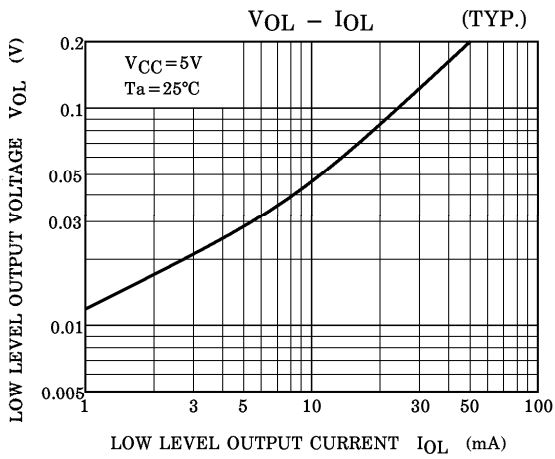
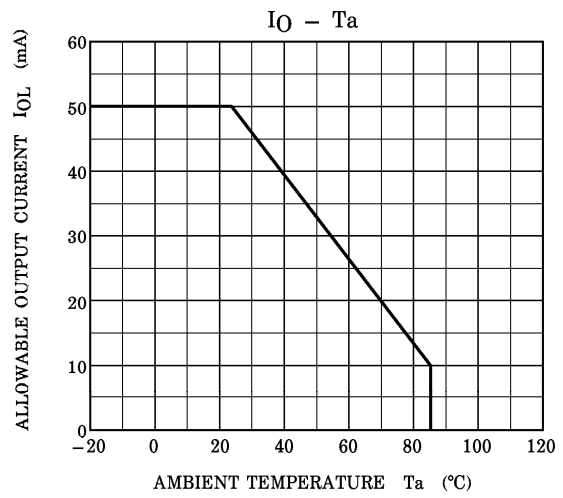
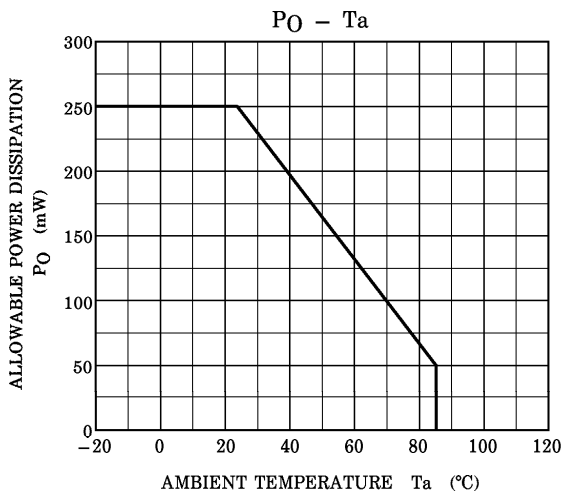


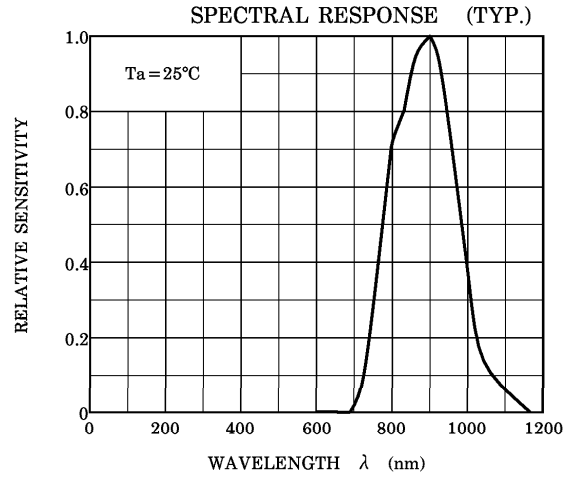
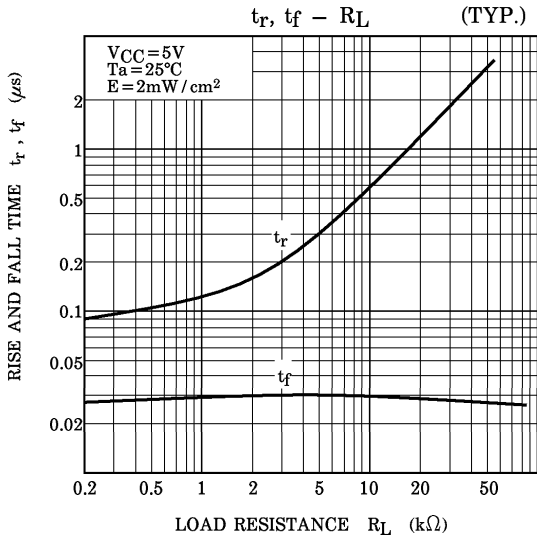
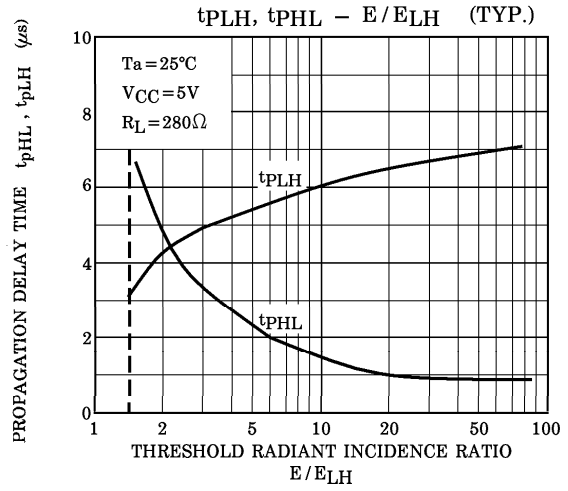
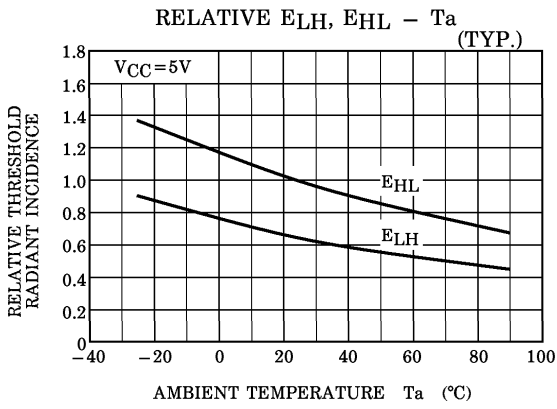
RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	4.5	—	17	V
Output Voltage	V_O	4.5	—	17	V
Low Level Output Current	I_{OL}	—	—	16	mA
Operating Temperature	T_{opr}	0	—	70	°C

PRECAUTIONS

1. When you consider a combined use with an LED, be sure to use an infrared LED. Visible rays in wavelength of less than 700nm cannot be detected.
2. Make sure the shielding plate that is used to detect positions is manufactured from materials with superior light-shielding characteristics. Insufficient shield can cause malfunction.
3. Photo ICs contain a high-sensitivity amplifier. Toshiba recommends connecting a capacitor of about 0.01μF that has good high-frequency characteristics between V_{CC} and GND near the device to prevent unwanted oscillation.





DIRECTIONAL SENSITIVITY CHARACTERISTIC (TYP.) ($T_a=25^{\circ}C$)

