

TOSHIBA

TPS812, TPS814

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

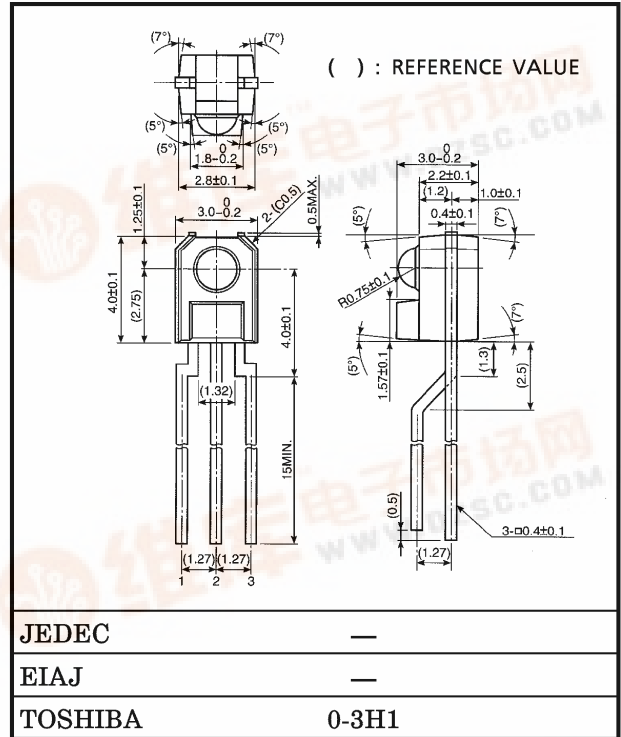
HANDY TERMINALS

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	≦ V _{CC}	
Output Current	I _O	50	mA
Output Current Derating (Ta > 25°C)	ΔI _O / °C	-0.67	mA / °C
Power Dissipation	P _O	250	mW
Power Dissipation Derating	ΔP _O / °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

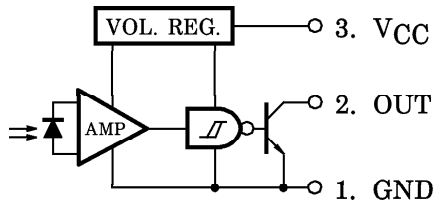
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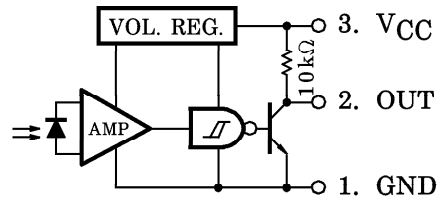


PIN CONNECTION

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”	t _{pLH}	Ta = 25°C VCC = 5V E = 2mW / cm ² RL = 280Ω (Note 3)	—	5.5	15	μs
		“H”→“L”	t _{pHL}		—	2.5	9	
	Rise Time		t _r		—	0.02	0.5	
	Fall Time		t _f		—	0.08	0.5	

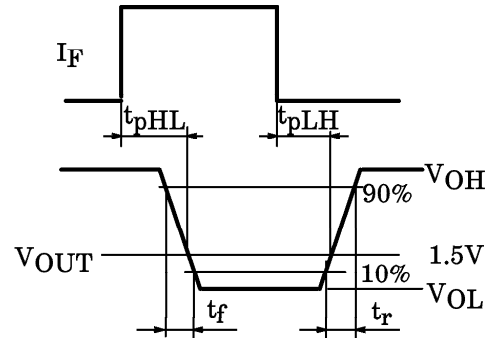
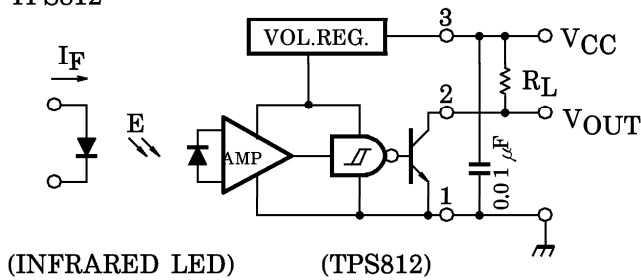
Note 2 : CIE standard light source A (standard tungsten bulb) with color temperature = 2856°K

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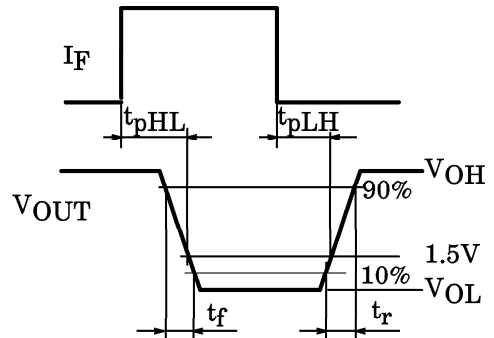
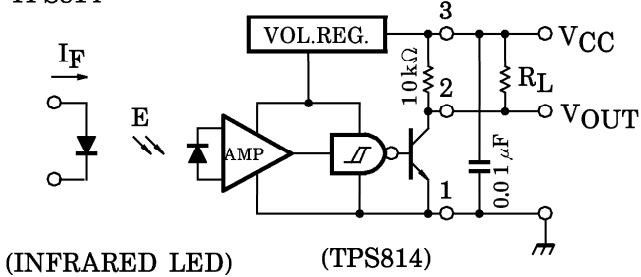
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Note 3 : Switching time measurement circuit and waveform

TPS812



TPS814

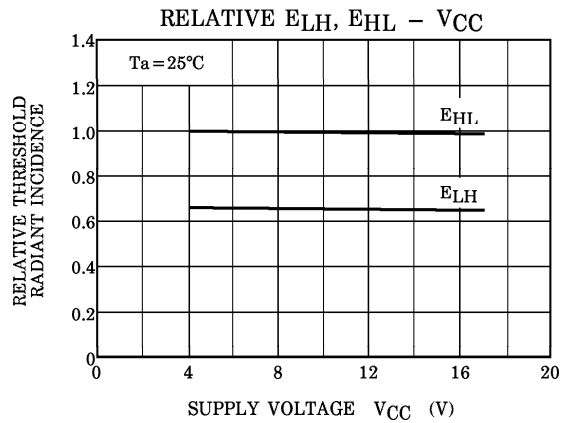
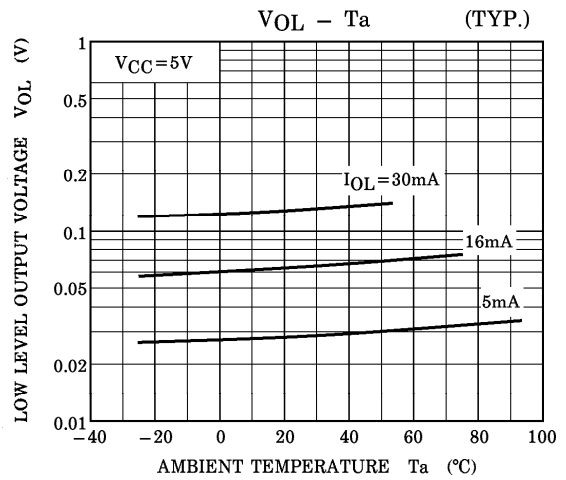
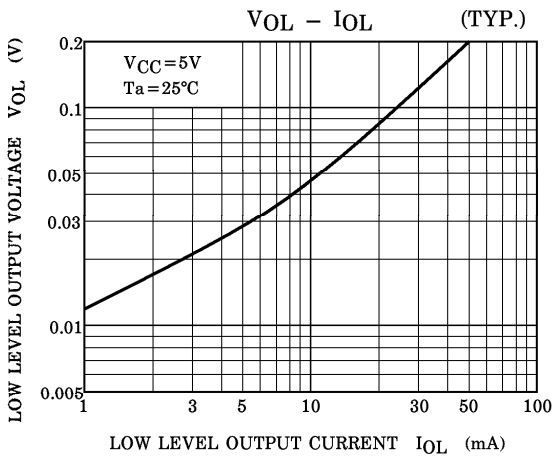
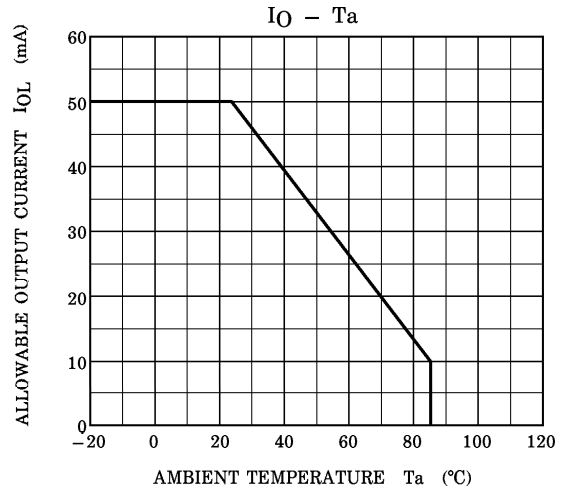
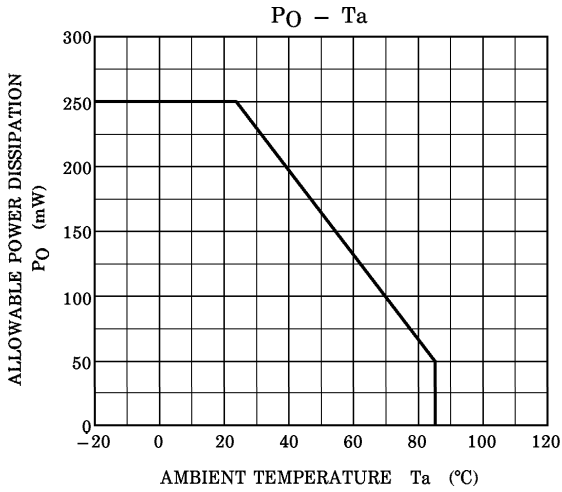


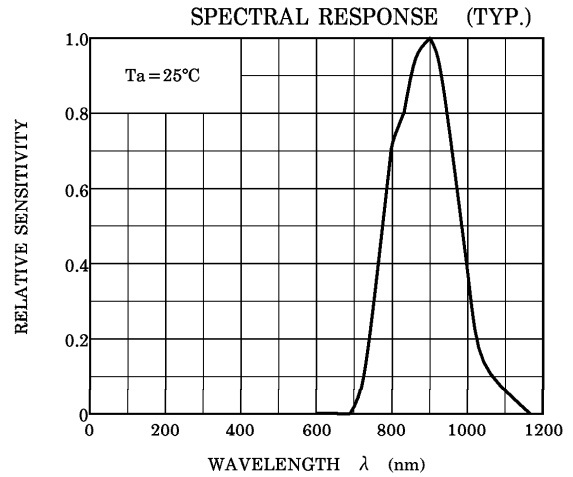
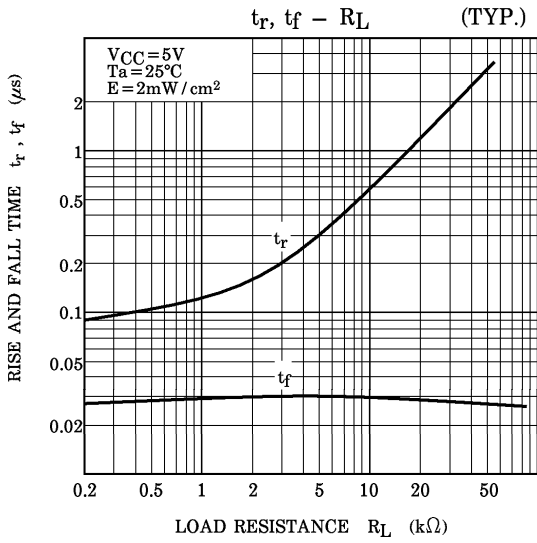
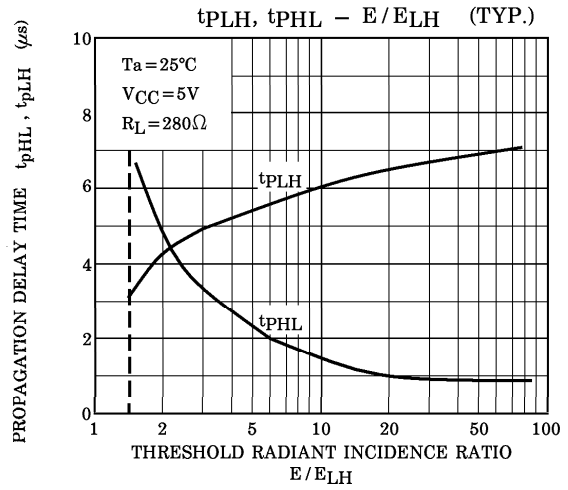
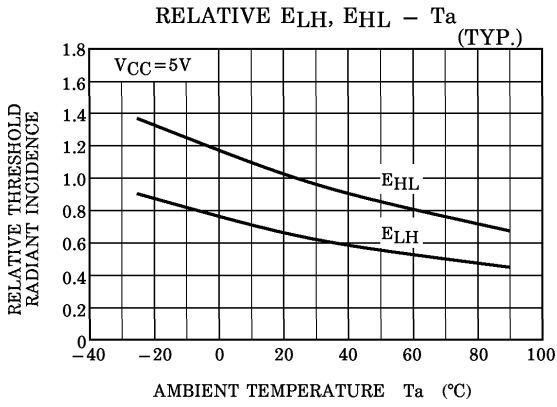
RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	VCC	4.5	—	17	V
Output Voltage	VO	4.5	—	17	V
Low Level Output Current	IOL	—	—	16	mA
Operating Temperature	Topr	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 VCC and GND near the device to prevent unwanted oscillation.





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

