

Low Power Consumption Photo-IC

TPS842

Outline

The TPS842 is a digital-output Si photo-IC which incorporates a photodiode, an amplifier circuit and a schmitt trigger circuit in a single chip. The TPS842 is a low-voltage drive device which has been designed for 3.3-V systems. The device allows construction of low-voltage systems which thus consume less power. In addition, the sensitivity of the device is superior to that of a phototransistor.

Features

- Compact side-view epoxy resin package (black package impermeable to visible light)
 - Digital-output Si photo-IC which incorporates a photodiode, amplifier circuit and schmitt trigger circuit in a single chip
 - Low-voltage drive: operating power supply voltage: $V_{CC} = 2.7\text{ V} \sim 7\text{ V}$
 - High-speed response: $t_{pLH} = 15\ \mu\text{s}$
 - Threshold radiant incidence: $E_{HL} = 0.3\text{ mW/cm}^2$ (max) @ $T_a = 25^\circ\text{C}$
 - Digital output: low-level output when optical input signal is received (open-collector)
 - Direct connection to TTL and CMOS devices possible



Maximum Rating (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Supply Voltage	V _{CC}	7	V
Output Voltage	V _O	15	V
Low-Level Output Current(Ta=Topr)	I _{OL}	8	mA
Operating Temperature	T _{opr}	-25 ~ 85	°C
Storage Temperature	T _{stg}	-40 ~ 100	°C
Soldering Temperature(5s) (Note1)	T _{sol}	260	°C

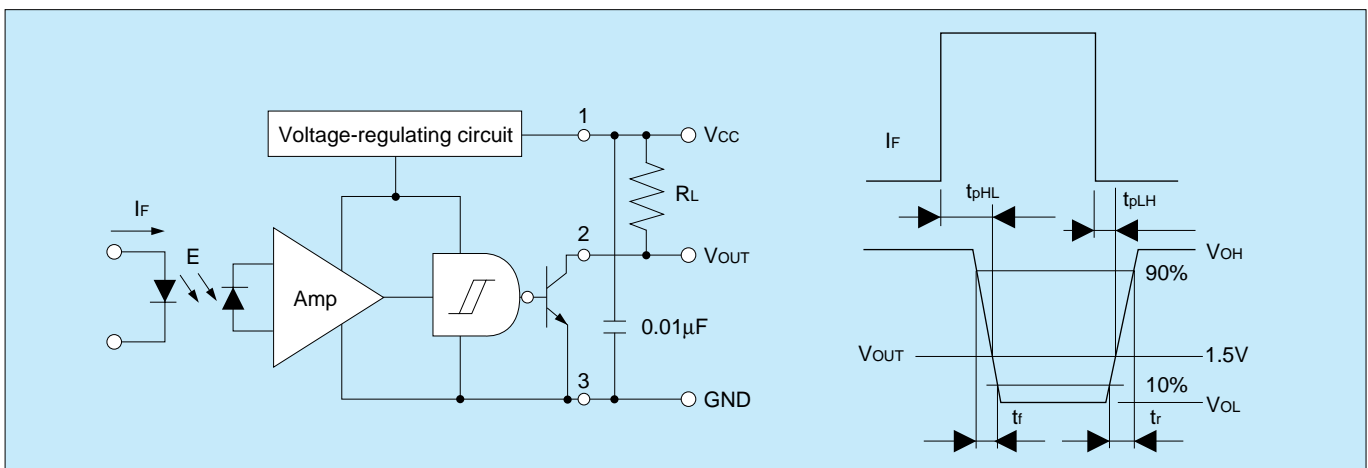
Note 1: Soldering is carried out 1.3 mm from the resin which comprises the underside of the package.

Optical and Electrical Characteristics (unless otherwise specified: Ta = 25° ~ 85°C and V_{CC} = 2.7 V ~ 7 V)

Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Supply Voltage	V _{CC}	–	2.7	–	7	V
High-Level Supply Current	I _{CCH}	E=0	–	0.01	1.2	mA
Low-Level Supply Current	I _{CCL}	E=2mW/cm ² (Note2)	–	–	2.0	mA
High-Level Output Current	I _{OH}	E=0, V _O =15V	–	–	6.3	μA
Low-Level Output Voltage	V _{OL}	E=2mW/cm ² (Note2) I _{OH} =8mA	–	–	0.4	V
Threshold Radiant Incident(H→L)	E _{HL}	Ta=25°C	–	0.1	0.3	mW/cm ²
		–	–	–	0.6	
Hysteresis	E _{HL} /E _{LH}	Ta=25°C	1.1	1.5	2	–
Peak Wavelength	λ _p	–	–	900	–	nm
Switching Time	Propagation delay time(L→H)	Ta=25°C V _{CC} =3.3V E=2mW/cm ² (Note2) R _L =10kΩ(Note3)	–	–	15	μs
	Propagation delay time(H→L)		–	–	9	
	Rise time		–	0.8	–	
	Fall time		–	0.05	–	

Note2: The light used is a CIE standard A light source (standard tungsten bulb and color temperature = 2870 °K)

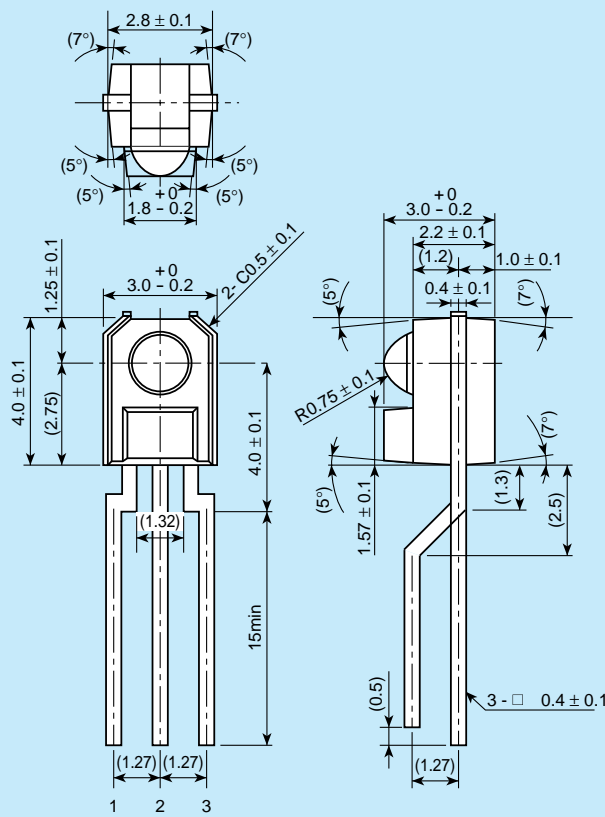
Note3: Test conditions when measuring rise and fall time



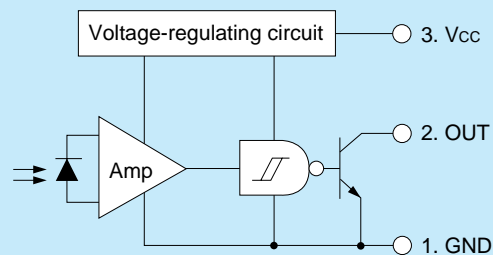
Recommended Operating Condition

Characteristics	Symbol	Min	Typ.	Max.	Unit
Supply Voltage	V _{cc}	2.7	–	5.5	V
Output Voltage	V _o	–	–	13.2	V
Low-Level Output Current	I _{oL}	–	–	8	mA
Operating Temperature	T _{opr}	0	–	70	°C

Package Dimensions



Internal Circuit Diagram

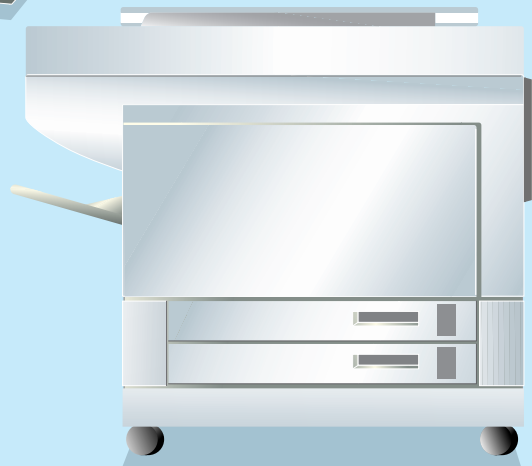


Applications

- Photo-electric switches
- Office equipment: (copying machines, printers and fax machines)
 - Drum rotation detection, paper detection and paper feed detection
- Vending machines, ticket machines and ATMs
- Handheld terminals



Copying machines



Printers



Fax machines

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