TOSHIBA PHOTO IC Si MONOLYTHIC PHOTO IC

TPS831

HIGH-SPEED OPTICAL REMOTE CONTROLLERS

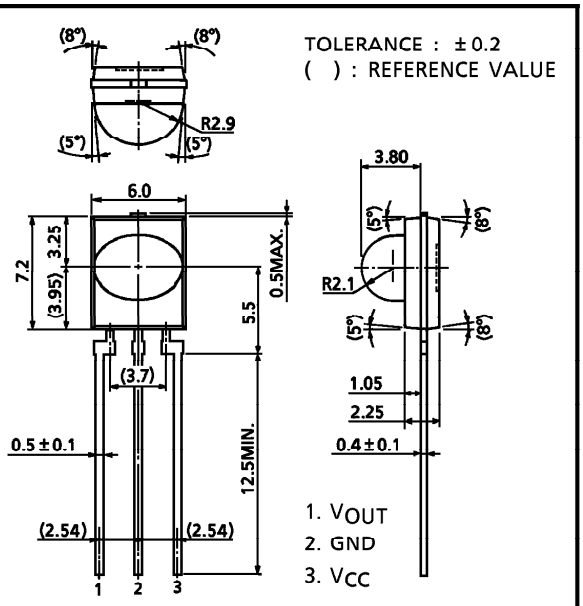
CORDLESS CONTROLLERS FOR VIDEO-GAMES

ELECTRONIC ORGANIZERS AND OTHER NEW PORTABLE INFORMATION TOOLS

IR DATA COMMUNICATION

- The TPS831 is a photo IC which includes a photodiode, I-V converter, band-pass filter and AGC amplifier on a single chip.
- The device's carrier frequency is as follows
  : $f_0 = 455kHz$
- The device's supply voltage is as follows
  : $V_{CC} = 5V$
- Visible light cut-off frequency : 800nm
- The TLN105B and TLN115A are available as infrared LEDs for remote controllers.

Unit : mm



JEDEC	—
EIAJ	—
TOSHIBA	0-6A1

Weight : 0.3g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

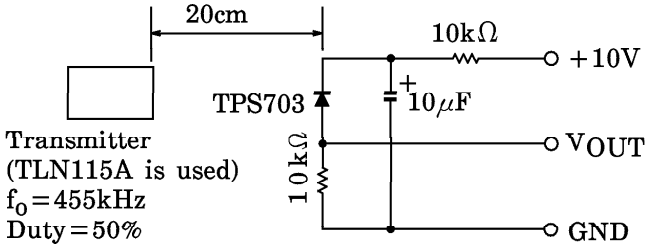
CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	7	V
Operating Temperature Range	T_{opr}	−20~60	°C
Storage Temperature Range	T_{stg}	−30~100	°C
Soldering Temperature Range (5s)	T_{sol}	260	°C

OPTO-ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, Ta = 25°C, C = 1000pF : Note 1)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V_{CC}	—	3	5	7	V
Supply Current	I_{CC}	E = 0	—	1.2	3.0	mA
Electromagnetic Sensitivity	E_S	(Note 5)	—	250	—	V_{p-p}/m
Transmission Range	L (Note 3)	The burst wave shown in (Note 4) is transmitted by a standard transmitter. (Note 2) External light intensity < 500ℓx Output Current < 10μA	3	5	—	m
High-Level Output Voltage	V_{OH}		4.0	—	—	V
Low-Level Output Voltage	V_{OL}		—	—	0.5	V
ON Pulse Width	T_{ON}		16	25	40	μs
OFF Pulse Width	T_{OFF}		—	63	—	μs
Carrier Frequency	f_o	—	—	455	—	kHz
Radiation Angle	θ_H	Horizontal angle, L/2 (Note 6)	±55	±63	—	°
	θ_V	Vertical angle, L/2 (Note 6)	±25	±30	—	°

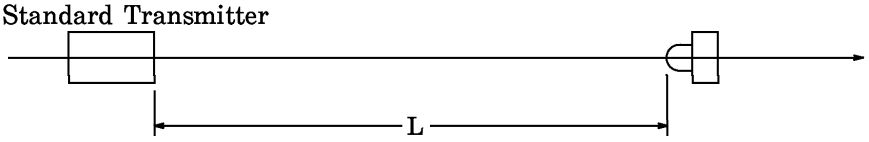
(Note 1) Measurements for the TPS831 are based on a standard circuit that includes a 1000pF capacitor between V_O and GND to prevent oscillation.

(Note 2) Standard Transmitter

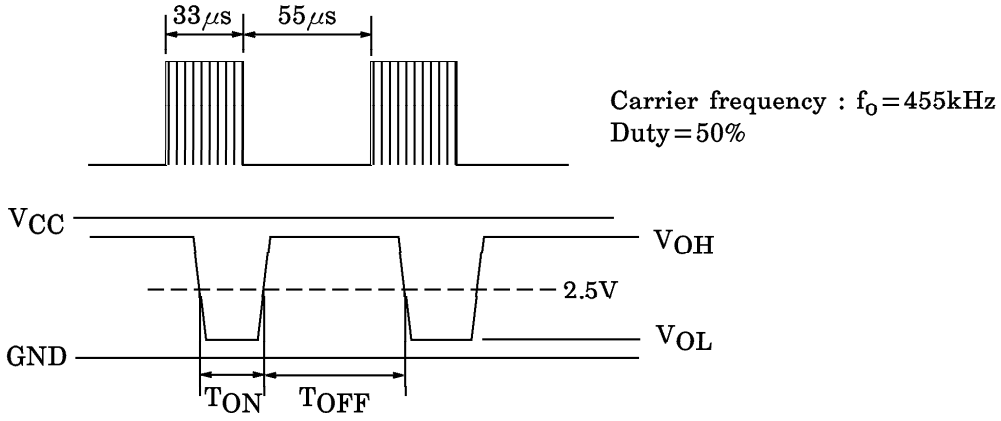


In the figure above, the transmitter shall be set as the output V_{OUT} will be 80mVpp. The TPS703 in this application has a short circuit current I_{SC} = 1.24μA measured at E = 0.1mW/cm². (E is the radiant incidence using a CIE standard light source A)

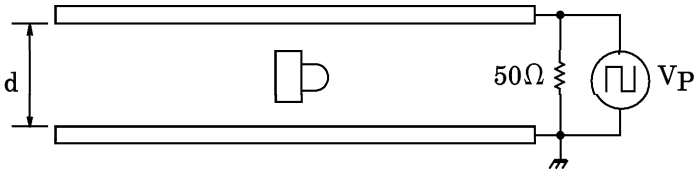
(Note 3) Transmission Distance L



(Note 4) Burst Wave

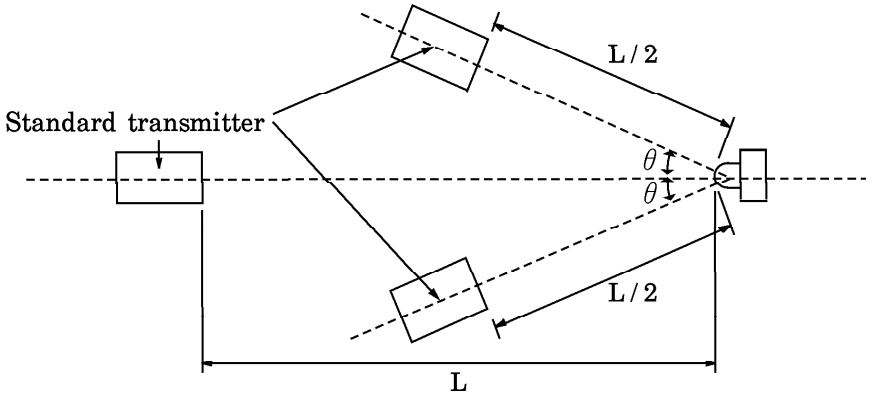


(Note 5) Electromagnetic Sensitivity

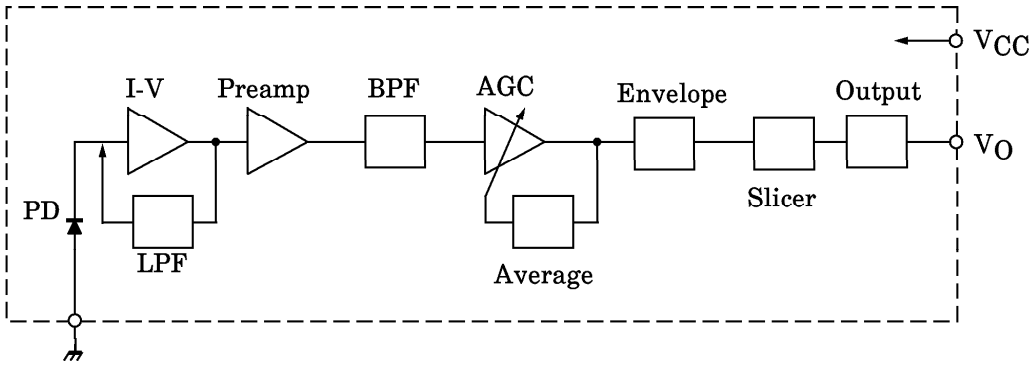


$E_S = V_P / d \ (V_{p-p}/m)$

(Note 6) Radiation Angle



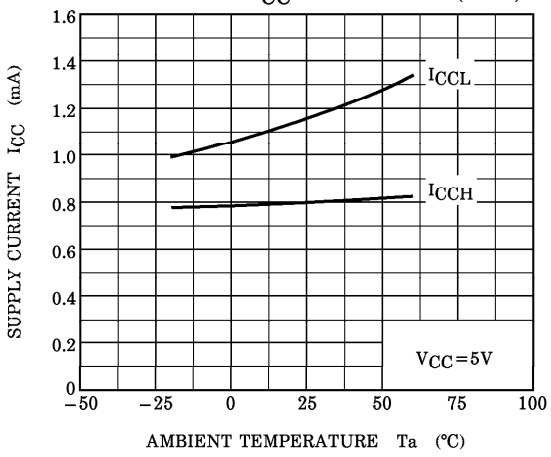
Circuit Block Diagram



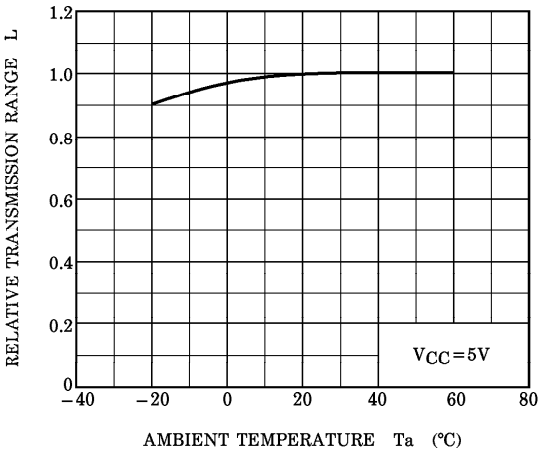
PRECAUTIONS

1. If a lead is formed, it should be formed at a distance of 2mm from the body of the device. Forming the lead should not cause stress to the body of the device. Soldering must be performed after lead forming.
2. Insert a bypass condenser of up to 0.01μF between V_{CC} and GND near the device to stabilize the power supply line.
3. Within 100μs of V_{CC} turning on, the output voltage changes to stabilize the inner circuit.

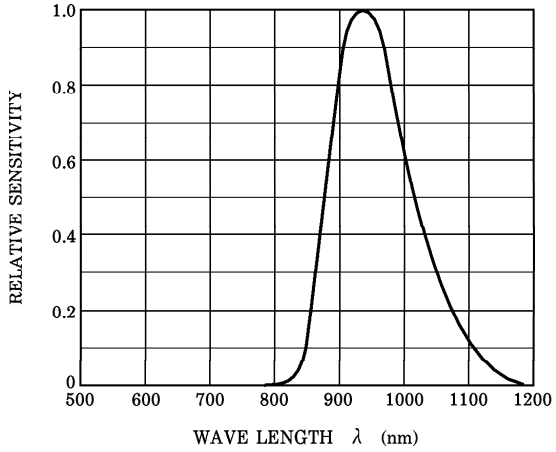
I_{CC} – Ta (TYP.)



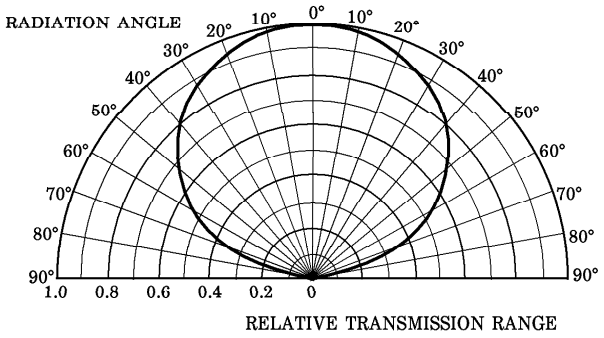
RELATIVE L – Ta (TYP.)



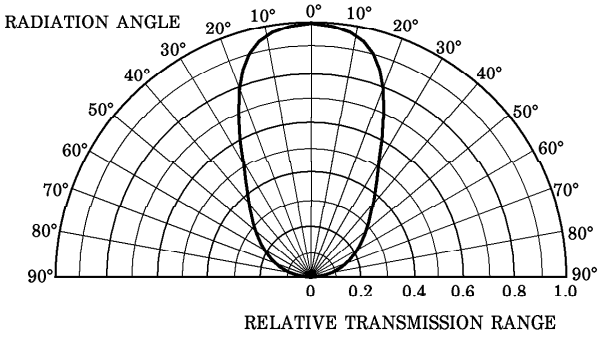
SPECTRAL RESPONSE (TYP.)



DIRECTIONAL SENSITIVITY CHARACTERISTICS (TYP.)
(Ta = 25°C)
HORIZONTAL



DIRECTIONAL SENSITIVITY CHARACTERISTICS (TYP.)
(Ta = 25°C)
VERTICAL



CARRIER FREQUENCY CHARACTERISTICS (TYP.)