

TPS831(F)

Unit : mm

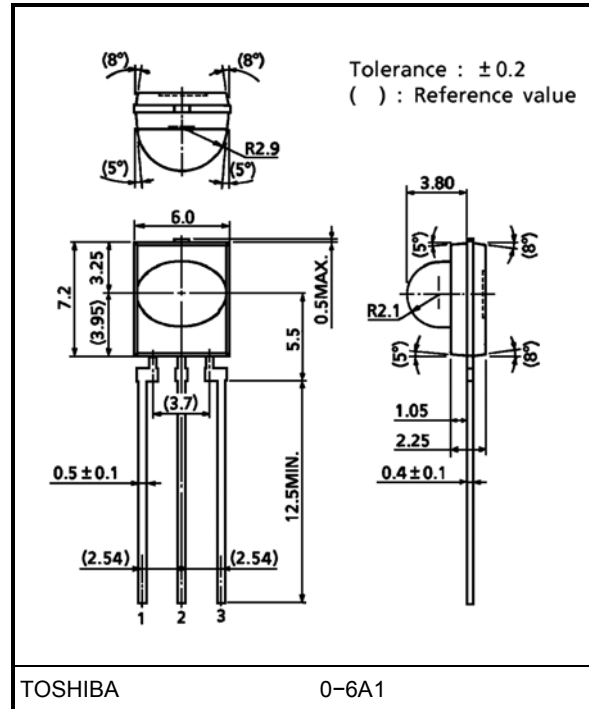
Lead Free Product

High-Speed Optical Remote Controllers

Wireless Mouse, Wireless keyboard

IR Data Communications

- Photodiode, I-V converter, band-pass filter and AGC amplifier all incorporated in a single chip
- Carrier frequency: $f_0 = 455\text{kHz}$ (typ.)
- Supply voltage: $V_{CC} = 5\text{V}$
- Visible light cut-off frequency: 800nm
- TLN105B(F) available as infrared LEDs for remote controllers



Weight: 0.3 g (typ.)

Maximum Ratings (Ta = 25°C)

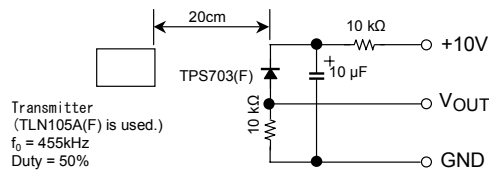
Characteristic	Symbol	Rating	Unit
Supply voltage	V_{CC}	7	V
Operating temperature range	T_{opr}	-20~60	°C
Storage temperature range	T_{stg}	-30~100	°C
Soldering temperature range (5 s)	T_{sol}	260	°C

Optical And Electrical Characteristics ($V_{CC} = 5V$, $T_a = 25^\circ C$, $C = 1000pF$: 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	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).	3	5	—	m
High-level output voltage	V_{OH}		4	—	—	V
Low-level output voltage	V_{OL}		—	—	0.5	V
On pulse width	T_{ON}	External light intensity < 500 lx Output current < 10 μ A	16	25	40	μ s
Off pulse width	T_{OFF}		—	63	—	μ s
Carrier frequency	f_o	—	—	455	—	kHz
Radiation angle	θ_H	Horizontal angle, L / 2 (Note 6)	± 55	± 63	—	$^\circ$
	θ_V	Vertical angle, L / 2 (Note 6)	± 25	± 30	—	$^\circ$

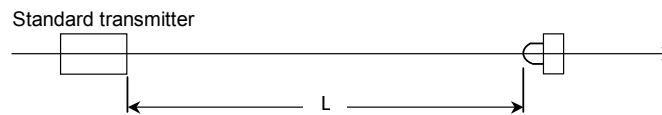
(Note 1): Measurements for the TPS831(F) are based on a standard circuit which includes a 1000-pF capacitor between V_O and GND to prevent oscillation.

(Note 2): Standard transmitter

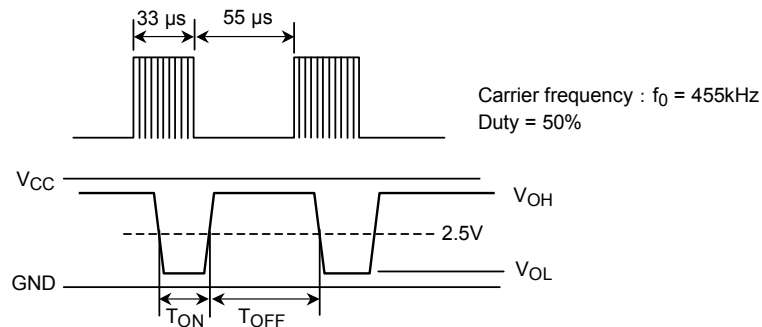


In the figure above, the transmitter output V_{OUT} is 80m Vpp.
The TPS703(F) in this application has a short-circuit current of $I_{sc} = 1.24\mu A$ when measured at $E = 0.1mW / cm^2$. (E is the radiant incidence when a CIE standard light source A is used.)

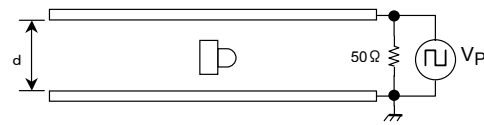
(Note 3): Transmission range L



(Note 4): Burst wave

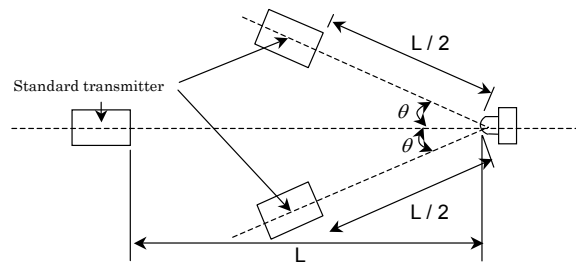


(Note 5): Electromagnetic sensitivity

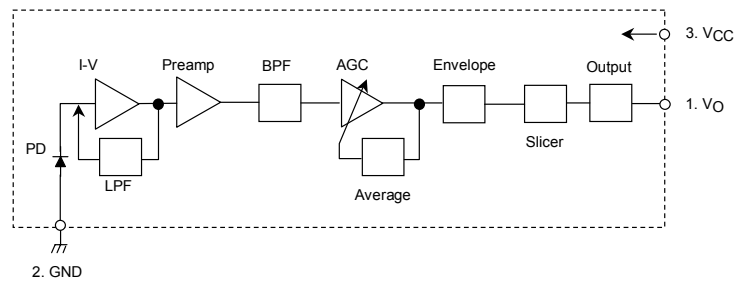


$$E_S = V_P/d (V_{P-P}/m)$$

(Note 6): Radiation angle



Circuit Block Diagram



Bit Pattern Designing Example (reference)

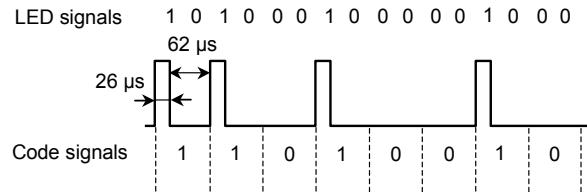
- Example of code signal = 11010010

Sequence of LED signals = 1 must be avoided. If LED signals of 1 sequence, TPS831(F) may not receive LED signals properly. After an LED signal of 1, 0 must be sent (55 μ s or longer interval necessary). Please take this into account when designing a bit pattern.

The following shows the bit pattern t example that is converted at first code signals to LED signals as shown on the right diagram.

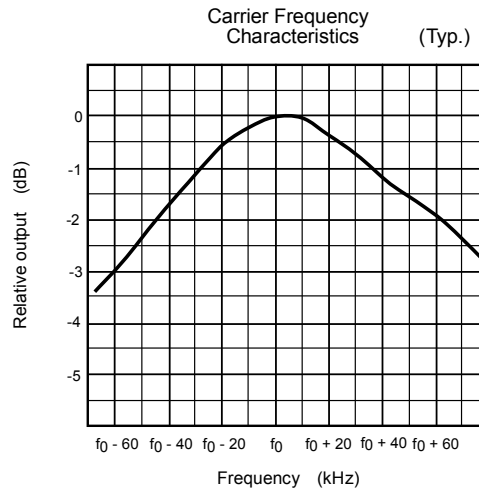
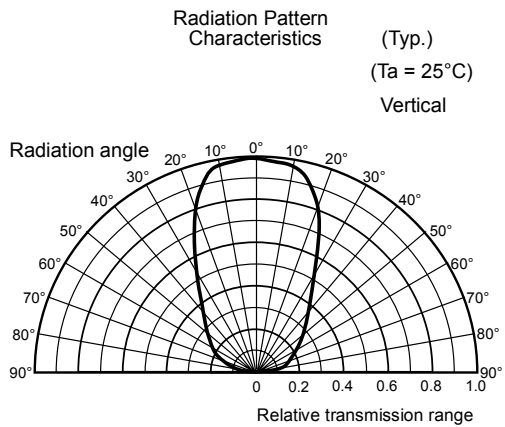
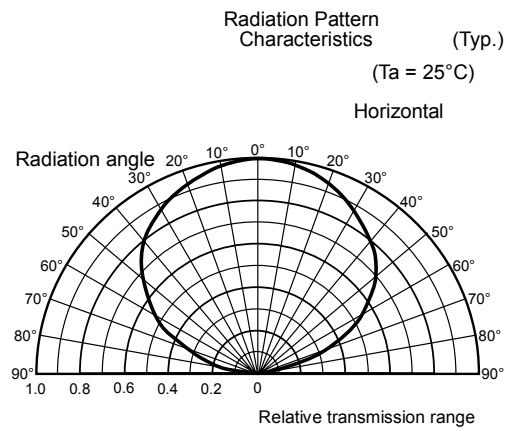
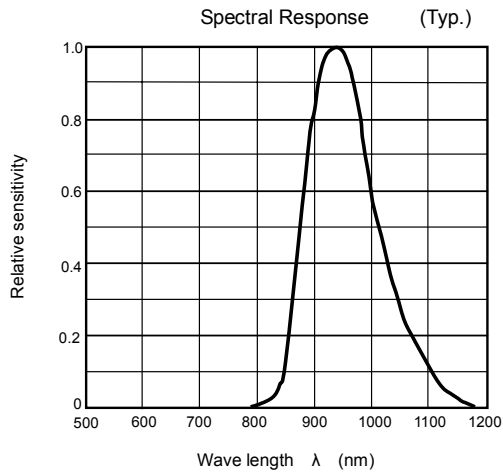
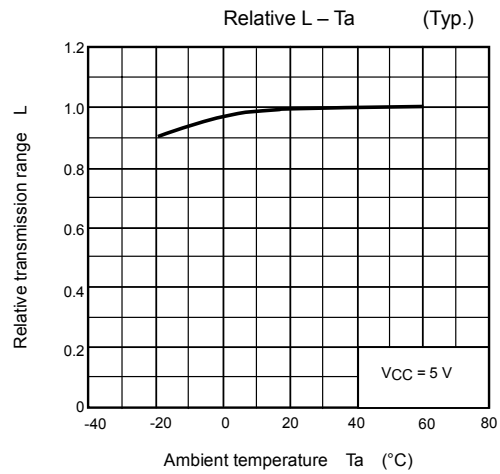
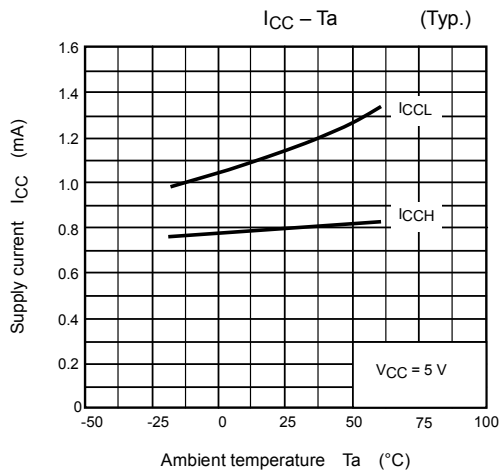
<Conversion example>		
Code signal		LED signal
0	→	00
1	→	10

<Pattern example>



Precautions

1. To stabilize the power line, insert a bypass capacitor of up to 0.01 μ F between VCC and GND, close to the device.
2. At power-on the internal circuit takes about 100 μ s to stabilize. During this period the output signal is unstable and may change.
3. To avoid unnecessary oscillation, insert a bypass capacitor of 1000pF between VCC and GND.
4. When using the device, please take the device's characteristics, the operating environment and the characteristics of pairing LED device into considerations.
5. Soldering temperature: $\leq 260^{\circ}\text{C}$, soldering time: $\leq 5\text{s}$ (soldering must be performed under the 2mm from the body of the device.)
6. When forming the leads, bend each lead under the 2mm from the body of the device. Soldering must be performed after the leads have been formed.



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