

IR2406/IR2406G 12-Dot LED Display Driver

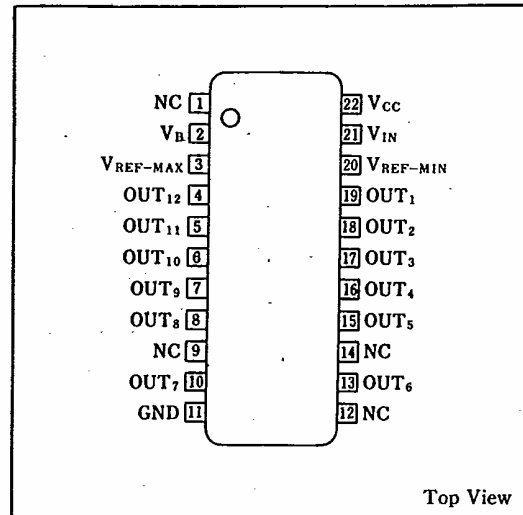
Description

The IR2406/IR2406G is suitable for driving 12-dot LED level meters, the IR2406 is for red LEDs and the IR2406G is for green LEDs.

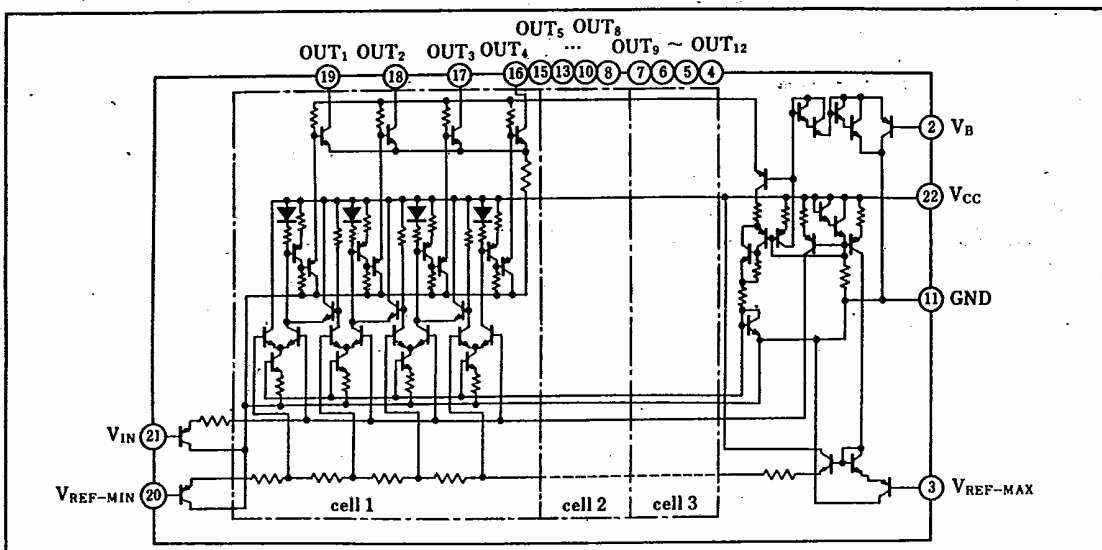
Features

1. Linear-scale display
2. Series connection is possible
3. LED current is adjustable
4. 22-pin dual-in-line package

Pin Connections



Equivalent Circuit



SHARP

Absolute Maximum Ratings

(Ta=25°C)

Parameter	Symbol	Condition	Rating	Unit
Supply voltage	V_{CC}		18	V
Input voltage	V_3	voltage not to damage the IC	V_{CC}	V
	V_{20}			
	V_{21}			
Power dissipation	P_D	$T_a \leq 25^\circ\text{C}$	800	mW
P_D derating ratio	$\Delta P_D/^\circ\text{C}$	$T_a > 25^\circ\text{C}$	8	mW/°C
Operating temperature	T_{opr}	IR2406	-20 ~ +80	°C
		IR2406G	-20 ~ +75	
Storage temperature	T_{stg}		-25 ~ +125	°C

Electrical Characteristics

(V_{CC}=12V, Ta=25°C)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Supply voltage	V_{CC}		6		18	V
Supply current	I_{CC}			5.5	8.2	mA
Input voltage	V_{IN1}	Applies to 3, 20 and 21 pins			6	V
	V_{IN2}	$V_3 - V_{20}^*$	0.9		6	
Input current	I_3	$V_3 - V_{20}^* = 20\text{V}$		0.3	1	μA
	I_{20}			0.3	1	
	I_{21}			0.3	1	
	I_2			4	20	
Output current	I_{OUT}	Test time 10ms	IR2406	7.5	10	mA
			IR2406G	17	23	
Min. output current	$I_{O\ MIN}$	Test time 10ms		0.3	0.5	mA
Output leakage current	I_{OL}	$V_{CC}=18\text{V}$			10	μA

* V_n shows the voltage of the n-th pin.

Description of Operation

Given the maximum reference voltage and the minimum reference voltage, the reference voltage is 12-divided. The comparison of this and the input voltage V_{IN} is made by the comparator circuits. And the "High" or "Low" output of the AND gate turns on the corresponding transistor and causes the LED to glow.

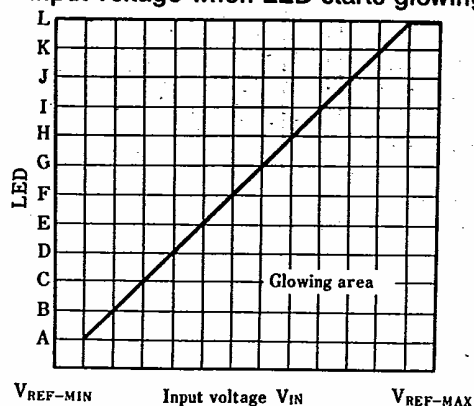
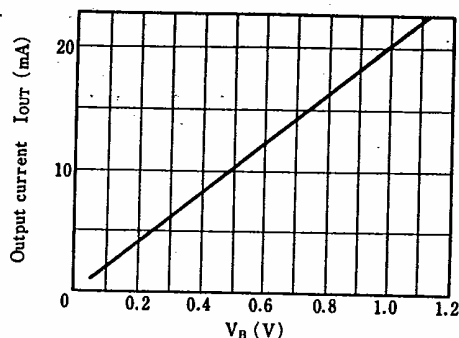
ΔV_{IN} (the voltage required to advance the LED by one position) is given by the formula:

$$\Delta V_{IN} = (V_{REF-MAX} - V_{REF-MIN}) / 13$$

● Sample use of V_B terminal

The terminal V_B supplied with a voltage less than about 1.2V can control the current I_{OUT} .

Input voltage when LED starts glowing

Output current— V_B terminal voltage Characteristics

SHARP

- Operating voltage range

The operating voltage range given in the electrical characteristics is the one only for operating IR2406/IR2406G. If it is used in connecting the anode of LED to the power supply pin (see Basic Connection Diagram), be sure to operate it on the voltage higher than $(4V_F + 3)V$.

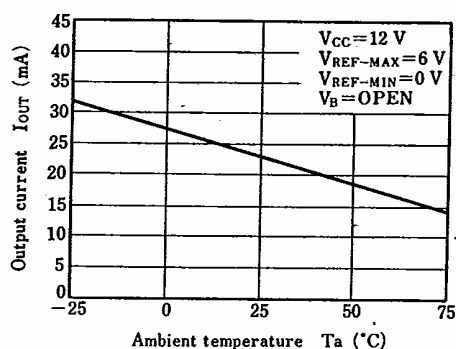
Where V_F = LED forward voltage.

- Connecting the output pin not to be used

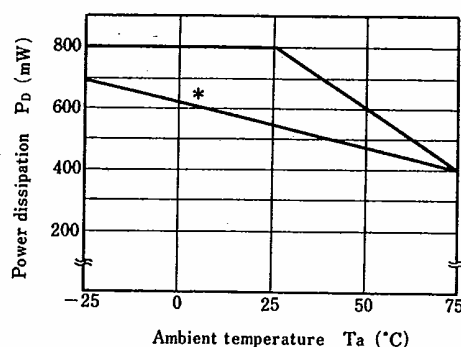
Connect the output pin to the cathode of the last LED connected inside.

Electrical Characteristic Curves

Output current—Ambient temperature Characteristics



Power dissipation—Ambient temperature Characteristics



* Power dissipation when 9 LEDs are ON under conditions that $V_{CC}=12V$, $I_{CC}=6mA$, $V_F=2V$ and $I_{OUT}=26.5mA$ ($T_a=25^\circ C$).

Basic Connection Diagram

