

# IR2406/IR2406G 12-Dot LED Display Driver

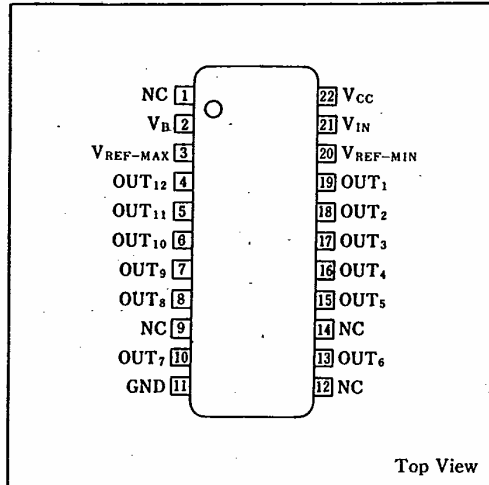
## ■ Description

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.

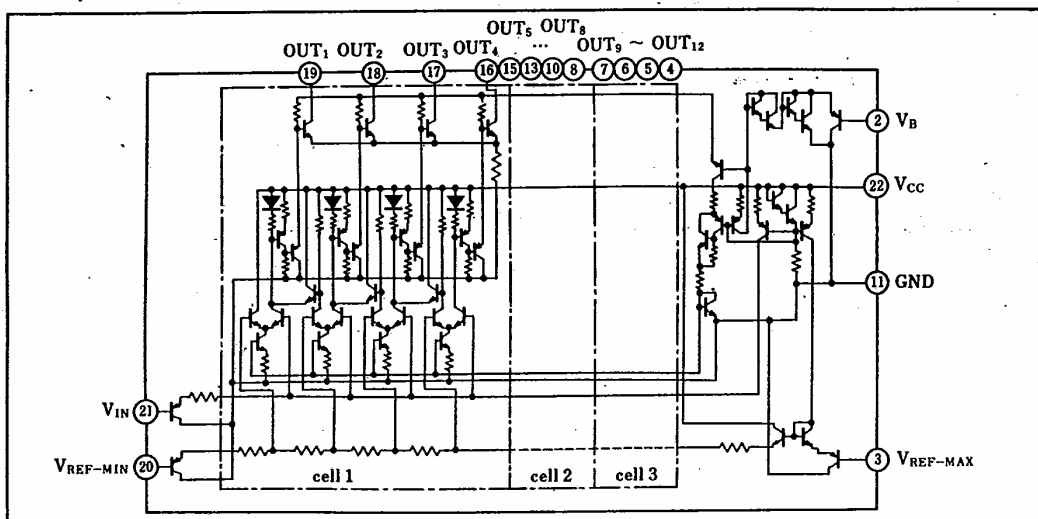
## ■ Features

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



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**Absolute Maximum Ratings**

(Ta=25°C)

Parameter	Symbol	Condition	Rating	Unit
Supply voltage	V <sub>CC</sub>		18	V
Input voltage	V <sub>3</sub>	voltage not to damage the IC	V <sub>CC</sub>	V
	V <sub>20</sub>			
	V <sub>21</sub>			
Power dissipation	P <sub>D</sub>	Ta ≤ 25°C	800	mW
P <sub>D</sub> derating ratio	ΔP <sub>D</sub> /°C	Ta > 25°C	8	mW/°C
Operating temperature	T <sub>opr</sub>		IR2406	-20 ~ +80
			IR2406G	-20 ~ +75
Storage temperature	T <sub>stg</sub>		-25 ~ +125	°C

**Electrical Characteristics**

(V<sub>CC</sub>=12V, Ta=25°C)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit	
Supply voltage	V <sub>CC</sub>		6		18	V	
Supply current	I <sub>CC</sub>			5.5	8.2	mA	
Input voltage	V <sub>IN1</sub>	Applies to 3, 20 and 21 pins			6	V	
	V <sub>IN2</sub>	V <sub>3</sub> - V <sub>20</sub> *	0.9		6		
Input current	I <sub>3</sub>	V <sub>3</sub> - V <sub>20</sub> * = 20V		0.3	1	μA	
	I <sub>20</sub>			0.3	1		
	I <sub>21</sub>			0.3	1		
	I <sub>2</sub>			4	20		
Output current	I <sub>OUT</sub>	Test time 10ms	IR2406	7.5	10	12.5	mA
			IR2406G	17	23	28	
Min. output current	I <sub>O MIN</sub>	Test time 10ns		0.3	0.5	mA	
Output leakage current	I <sub>OL</sub>	V <sub>CC</sub> =18V			10	μA	

\* V<sub>n</sub> 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<sub>IN</sub> 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.

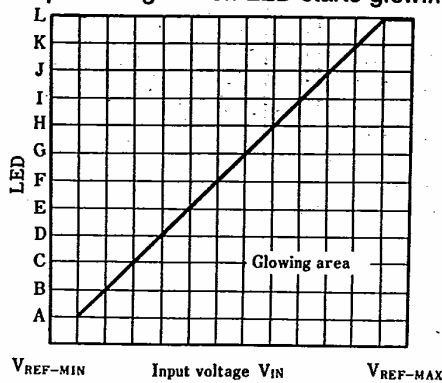
ΔV<sub>IN</sub>(the voltage required to advance the LED by one position) is given by the formula:

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

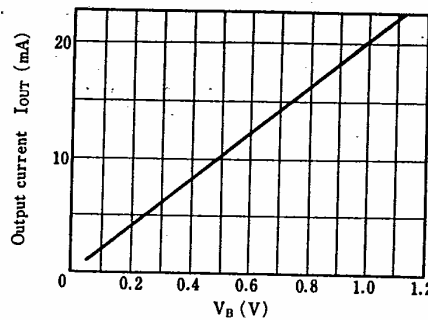
● Sample use of V<sub>B</sub> terminal

The terminal V<sub>B</sub> supplied with a voltage less than about 1.2V can control the current I<sub>OUT</sub>.

Input voltage when LED starts glowing



Output current—V<sub>B</sub> terminal voltage Characteristics



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● 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  $(4V_F + 3)V$ .

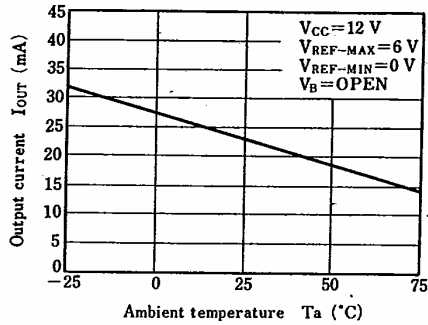
Where  $V_F$ =LED forward voltage.

● Connecting the output pin not to be used

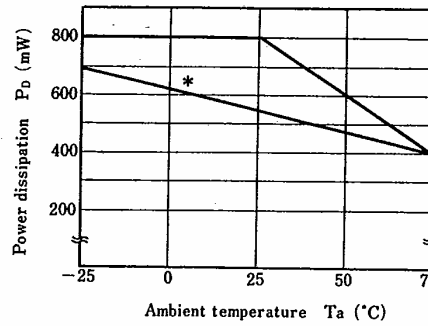
Connect the output pin to the cathode of the last LED connected inside.

■ 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  $I_{out}=26.5mA$  ( $T_a=25°C$ ).

■ Basic Connection Diagram

