

IR2406/IR2406G 12-Dot LED Display Driver

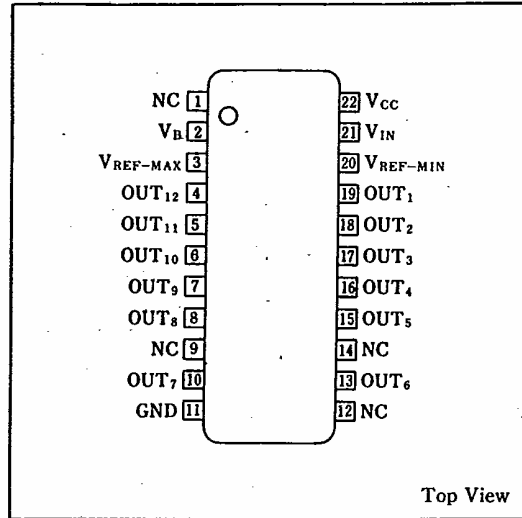
■ Description

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.

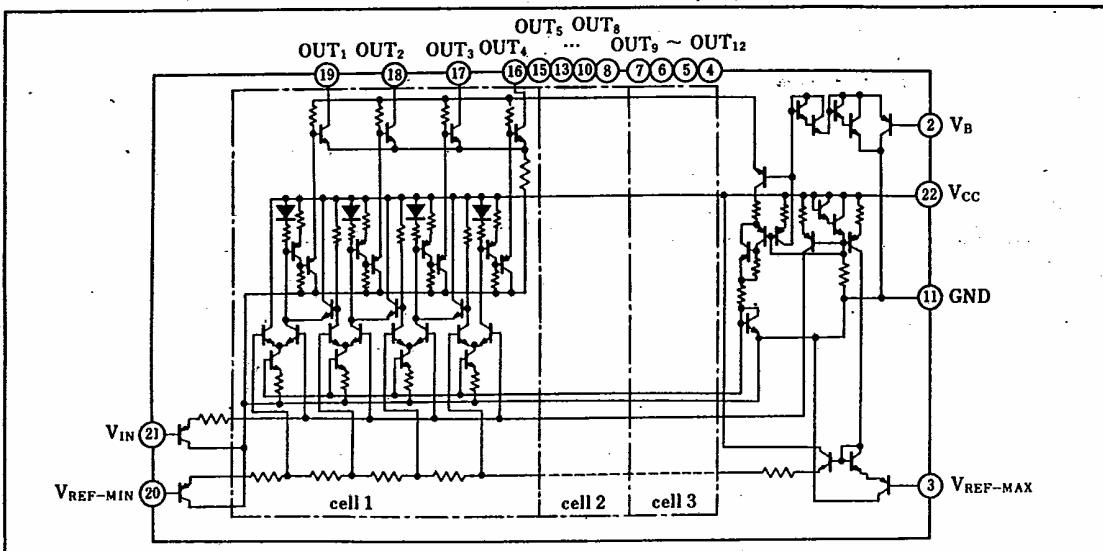
■ Features

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



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	Ta ≤ 25°C	800	mW
P _D derating ratio	ΔP _D /°C	Ta > 25°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 * = 20V		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	12.5	mA
			IR2406G	17	23	28	
Min. output current	I _{O MIN}	Test time 10ms		0.3	0.5	mA	
Output leakage current	I _{OL}	V _{CC} =18V			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.

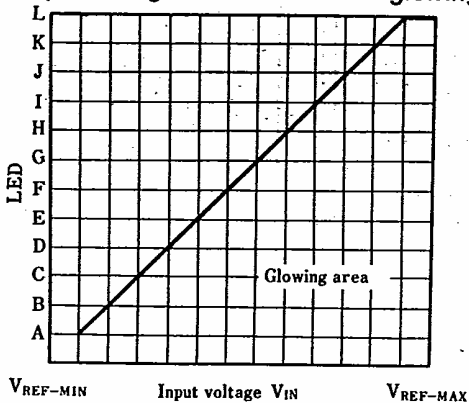
ΔV_{IN}(the voltage required to advance the LED by one position) is given by the formula:

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

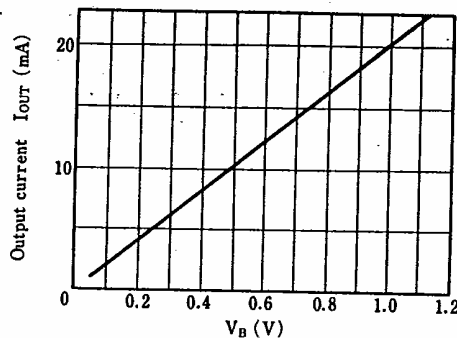
● Sample use of V_B terminal

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—I_{OUT} terminal voltage Characteristics



● 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 $(4V_F + 3)V$.

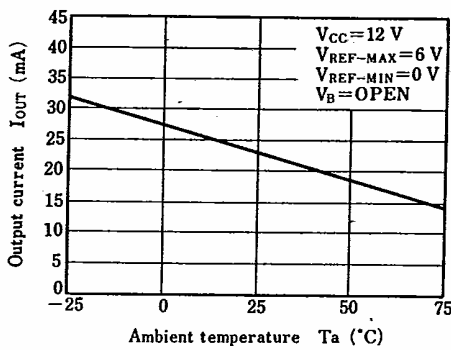
Where V_F =LED forward voltage.

● Connecting the output pin not to be used

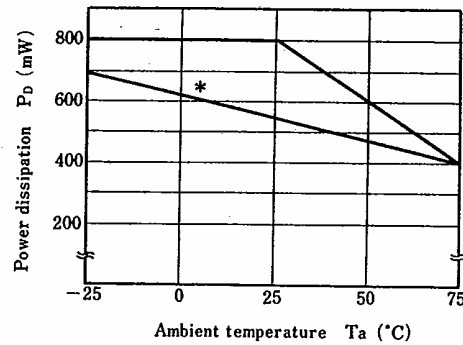
Connect the output pin to the cathode of the last LED connected inside.

■ 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

