



## 4-Channel Constant Current LED Driver

**SM6704A**

### GENERAL DESCRIPTION

The SM6704A is a 4-channel constant current LED Driver that has a wide range of output current from 10mA up to 180mA per channel and through an external resistor ( $R_{ext}$ ) to set the maximum sink current which gives users flexibility in controlling the light intensity of LEDs. In addition, users can precisely adjust LED brightness from 0% to 100% via OE control pin using popular Pulse Width Modulation (PWM) signal. Low output voltage drop operation of 0.6V at 180mA allows for more power efficient designs across wider supply voltage range, The 4 LED pins are compatible with high voltage up to 50V supporting applications with long strings of LEDs. Additionally, to ensure the system reliability, the SM6704A is contained with LED string short circuit detection and thermal shutdown function to protect IC from over temperature 150°C. Also, the thermal pad enhances the power dissipation. As a result, a large amount of current can be handled safely in one package.

### FEATURES

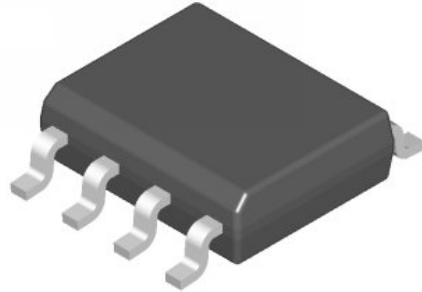
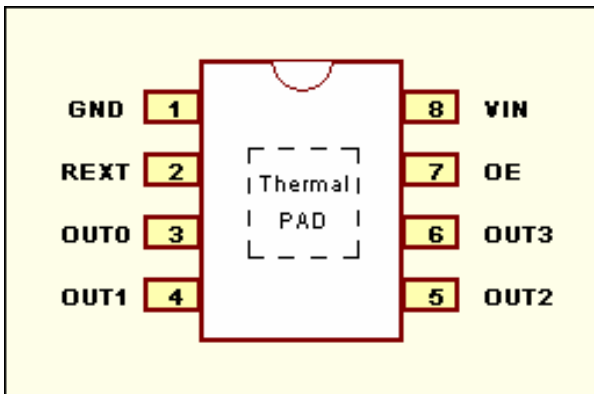
- Supply voltage range from 9V to 50V
- 4-channel constant sink current
- Constant output current invariant to load voltage change
- Maximum output current per channel up to 180mA
- Output current adjusted through an external resistor
- Excellent output current accuracy
  - Between channels -  $\pm 3\%$  , and
  - Between ICs -  $\pm 6\%$  (Max.)
- Protections
  - Over-temperature (150°C shutdown IC)
  - String short circuit detection ( only shutdown short channel when over 5V dropout)
- Low dropout current source (0.6V at 180mA)
- LED output voltage up to 50V
- Package SOP-8 with thermal pad

### APPLICATIONS

- High-flux LED lighting, architectural lighting
- LCD backlight, LED signs and displays
- Automotive interior lighting



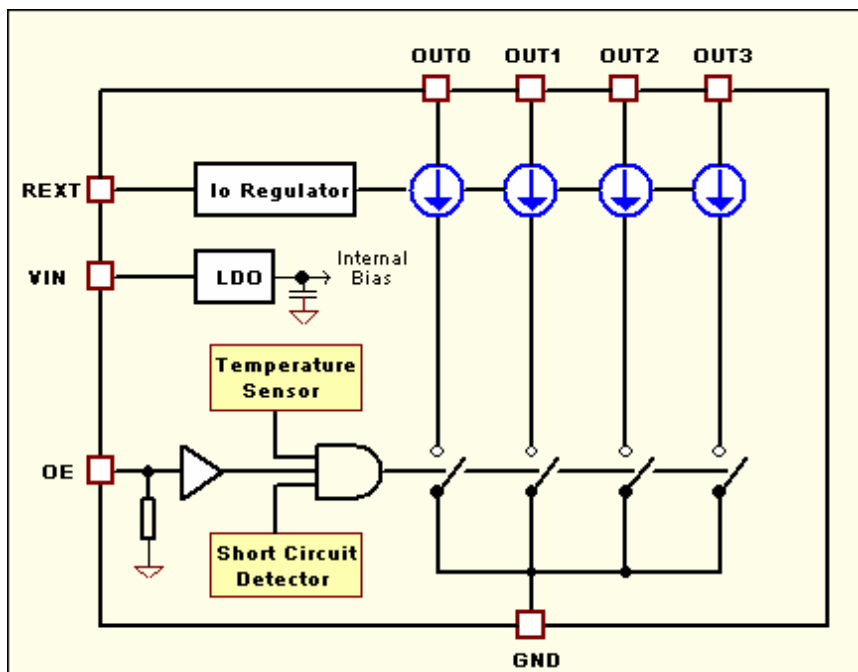
## PIN ASSIGNMENTS



## PIN DESCRIPTIONS

Pin No.	Name	I/O	Description
1	GND	O	Ground terminal for control logic and current sink
2	REXT	I	Reference current terminal used to connect an external resistor (Rext) for setting up output current for all output channels
3, 4, 5, 6	OUT0 ~ OUT3	O	Constant sink current output terminals
7	OE	I	Output enable pin When OE is applied logic High, the output pins are enabled. When OE is applied logic Low, all output pins are turned off (blanked).
8	VIN	I	9V to 50V supply voltage terminal

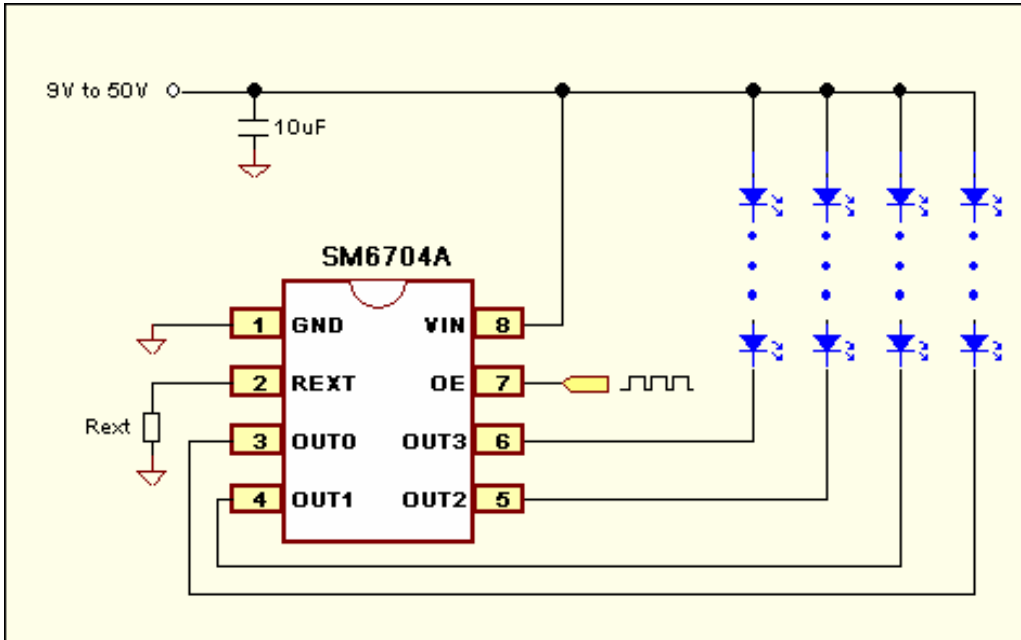
## FUNCTIONAL BLOCK DIAGRAM





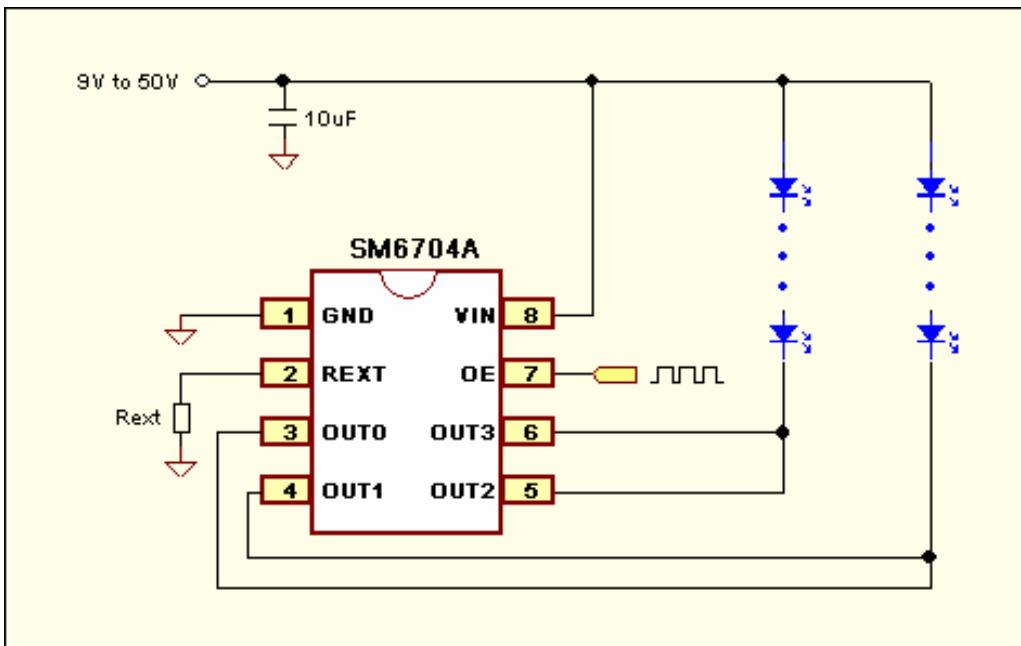
## TYPICAL APPLICATION CIRCUITS

(a) SM6704A application circuit, using PWM signal to control LEDs brightness with single voltage source.



\*\*  $V_{IN} = V_f * N + V_{SOURCE-DROPOUT}$ ,  $V_f$  is LED's forward voltage; N is LED count

(b) SM6704A application circuit, where grouping multiple channels for high current applications.



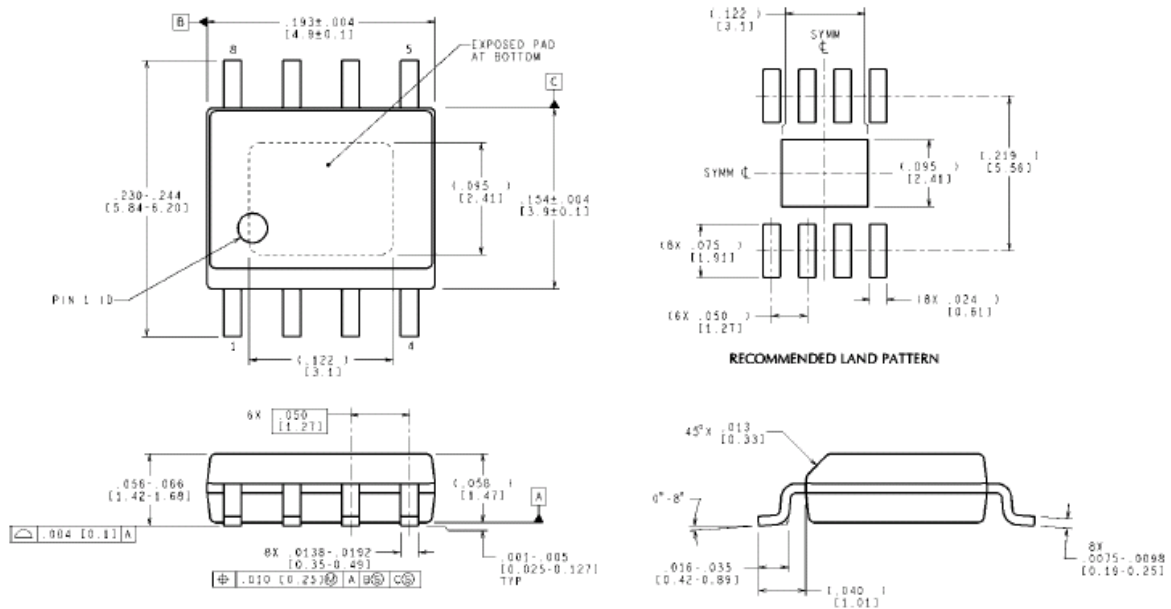


## MAXIMUM RATINGS

Characteristic	Symbol	Rating	Units
Supply Voltage	V <sub>IN</sub>	9 ~ 55V	V
PWM control Voltage	OE	-0.4V~VCC~+0.4V	V
Output Current	I <sub>LED</sub>	240 (Note1)	m A
Output Voltage	V <sub>OUT</sub>	-0.5V~+50V	V
GND Terminal Current	I <sub>GND</sub>	1000	m A
Power Dissipation	PD	0.8	W
Thermal Resistance (4 - Layer PCB based on JEDEC standard)	SOP-8 R <sub>θJA</sub>	35	°C / W
Operating Junction Temperature	T <sub>j,max</sub>	125	°C
Operating Temperature	T <sub>op</sub>	-40 to 85	°C
Storage Temperature	T <sub>stg</sub>	-55 to 150	°C

Note1: Users must notice that the power dissipation (almost equaling to I<sub>OUT</sub> \* V<sub>SOURCE-DROPOUT</sub>) should be within the safe operation area.

## Physical Dimensions inches (millimeters) unless otherwise noted



CONTROLLING DIMENSION IS INCH  
VALUES IN [ ] ARE MILLIMETERS  
DIMENSIONS IN 1:1 FOR REFERENCE ONLY

8-Lead PSOP Package

MRA08B (Rev B)