

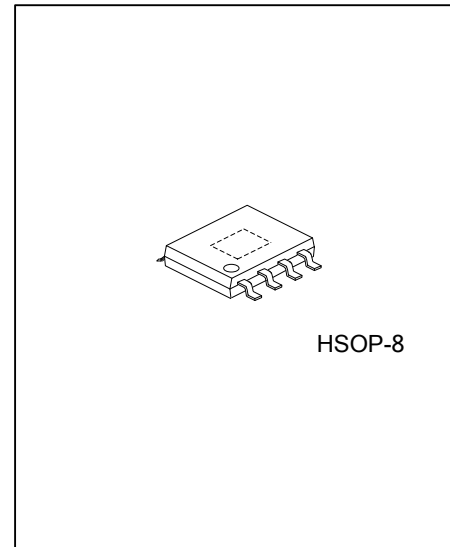


UL51A

Preliminary

CMOS IC

HIGH POWER FACTOR LINEAR CONSTANT CURRENT LED DRIVER



DESCRIPTION

UTC **UL51A** is a high power factor linear constant current LED driver which is applied to LED lighting. Through the distinctive constant current control technology, it realizes that constant current accuracy is less than $\pm 5\%$ and output current is adjustable through external resistor. High power factor and low harmonic distortion are the particular features.

The system is simple without transformer and electrolysis capacitor. Therefore, LED lighting batch job can be realized.

FEATURES

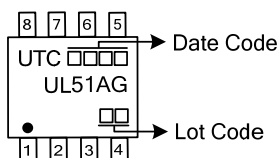
- * No transformer and high voltage electrolysis capacitor
- * Integrated high voltage startup power supply circuit
- * Adjustable output current, max 100mA
- * Inter-chip current deviation $< \pm 5\%$
- * Efficiency: $> 90\%$
- * Power factor: > 0.95
- * THD $< 20\%$
- * Over temperature protection
- * Application system no EMI problems

ORDERING INFORMATION

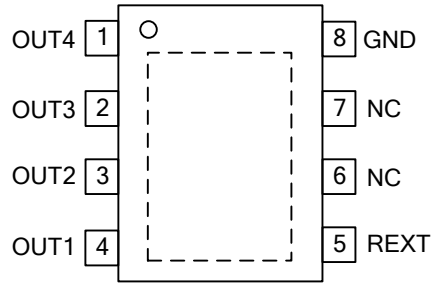
| Ordering Number | Package | Packing |
|-----------------|---------|-----------|
| UL51AG-SH2-R | HSOP-8 | Tape Reel |

| | |
|---|---|
| <p>UL51AG-SH2-R</p> <p>(1)Packing Type (2)Package Type (3)Green Package</p> | <p>(1) R: Tape Reel (2) SH2: HSOP-8 (3) G: Halogen Free and Lead Free</p> |
|---|---|

MARKING



■ PIN CONFIGURATION



■ PIN DESCRIPTION

| PIN NO. | PIN NAME | DESCRIPTION |
|---------|----------|--|
| 1 | OUT4 | current output port 4 |
| 2 | OUT3 | current output port 3 |
| 3 | OUT2 | current output port 4 |
| 4 | OUT1 | Power input and constant current output port 1 |
| 5 | REXT | Output current setting port |
| 6~7 | NC | |
| 8 | GND | GND |

■ ABSOLUTE MAXIMUM RATING (Ambient temperature is 27°C if there is no special instruction)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------|-----------|------------|------|
| ESD Voltage Withstand | V_{ESD} | >2000 | V |
| Operating Temperature | T_{OPR} | -20 ~ +125 | °C |
| Storage Temperature | T_{STG} | -40 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS (Ambient temperature is 27°C if there is no special instruction)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|-----------------|-------------------------|-----|-----|-----|------|
| OUT1 Input Voltage | V_{OUT1} | | | | 6.5 | V |
| Output Current | I_{OUT} | | 10 | | 100 | mA |
| REXT Port Voltage | V_{REXT} | $V_{OUT1}=V_{OUT4}=10V$ | | 0.9 | | V |
| OUT1/ OUT2 Port Withstand Voltage | V_{DS_BV1} | $I_{OUT1}=I_{OUT2}=0$ | 250 | | | V |
| OUT3/ OUT4 Port Withstand Voltage | V_{DS_BV2-4} | $I_{OUT3}=I_{OUT4}=0$ | 150 | | | V |
| IOUT Accuracy | dI_{OUT} | $I_{OUT}=10\sim 50mA$ | | ±5 | | % |
| Over-Temperature Protection Point (Note 1) | TSC | | | 110 | | °C |

Note: When the junction temperature is over 110°C, the output current of **UL51A** will be reduced.

■ FUNCTIONAL DESCRIPTION

UTC **UL51A** is constant current drive which integrates the functional module such as LED constant current control and OUT port high voltage drive. OUT1 port minimum input voltage is 6V ($I_{OUT}=20\text{mA}$) and it can reach output current 10mA ~ 60mA by external REXT resistor. Built-in LED constant current drive maintains LED current a high precision without impact of ambient temperature. The chip can achieve high efficiency and high power factor by opening four switches one by one.

The chip output current is adjustable by REXT resistor $I_{OUT}=V_{REXT}/R$. Output current generated by four switches opening one by one is shown below:

$$I_{OUT1}=0.56\text{V}/R$$

$$I_{OUT2}=0.73\text{V}/R$$

$$I_{OUT3}=0.87\text{V}/R$$

$$I_{OUT4}=0.94\text{V}/R$$

■ TYPICAL APPLICATION CIRCUIT

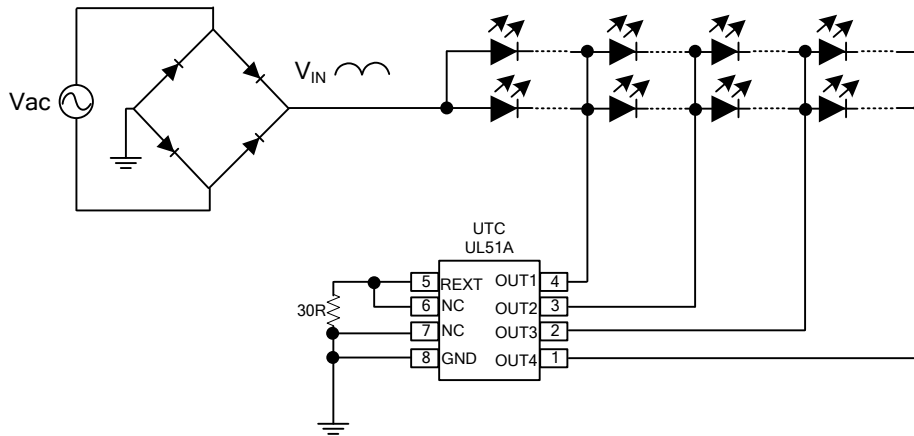


Figure 1. UTC UL51A Typical Application Circuit

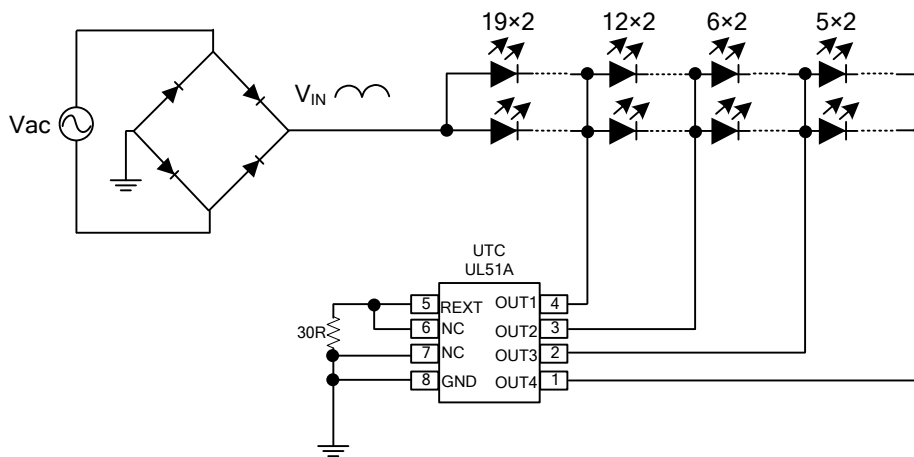


Figure 1. UTC UL51A Typical Application Circuit

■ TYPICAL APPLICATION CIRCUIT (Cont.)

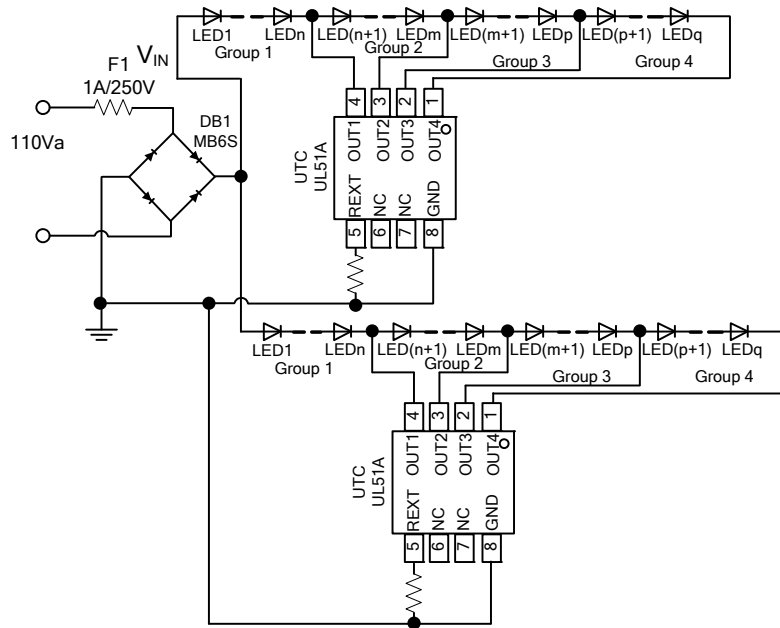


Figure 2. UTC UL51A Parallel Application Circuit

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