



ACL406AS - Direct AC Line LED Driver

UP TO 6W OUTPUT

ACL406AS-Zero Flicker - AN-V1.3 – JUNE 2021

Application Notes



MATURITY
In Production

1. FEATURES

ACL406AS up to 6W output,

- Direct AC Line LED Driver requiring few external components,
- Wide AC Input Range: 50 to 280V AC,
- High Power Factor: > 0.98 with optimized LED configuration,
- Low harmonic content : THD < 15% (typ.),
- Low quiescent current: 120µA,
- High Efficiency: 85% typical,
- Ultra-Flexible LED Forward Voltage Configuration,
- Up to 4 LED stages capability,
- Low Flicker : according to applications (need to external components: see application note for more information),
- Percentage flicker: 25%,
- Flicker index: 10%,
- Over Temperature Power derating

2. APPLICATIONS

- General Solid State Lighting,
- Medium Power LED Lamp,
- Connected Medium Power Led Lamp,
- Industrial High power LED Lamp.

3. DESCRIPTION

The ACL406AS is an AC direct LED driver requiring few external components: a diode bridge to rectify the AC voltage and a resistor to tune the LED current.

Multiple ACL406AS AC line drivers can be used in parallel to drive high power LED systems for industrial applications.

4. PIN CONNECTIONS

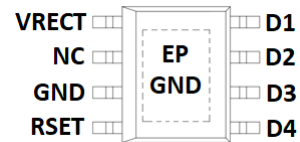


Figure 1: SO8 with Exposed Pad (TOP VIEW)

5. TYPICAL APPLICATION: ZERO FLICKER, ENTRY-LEVEL DESIGN

Schematic:

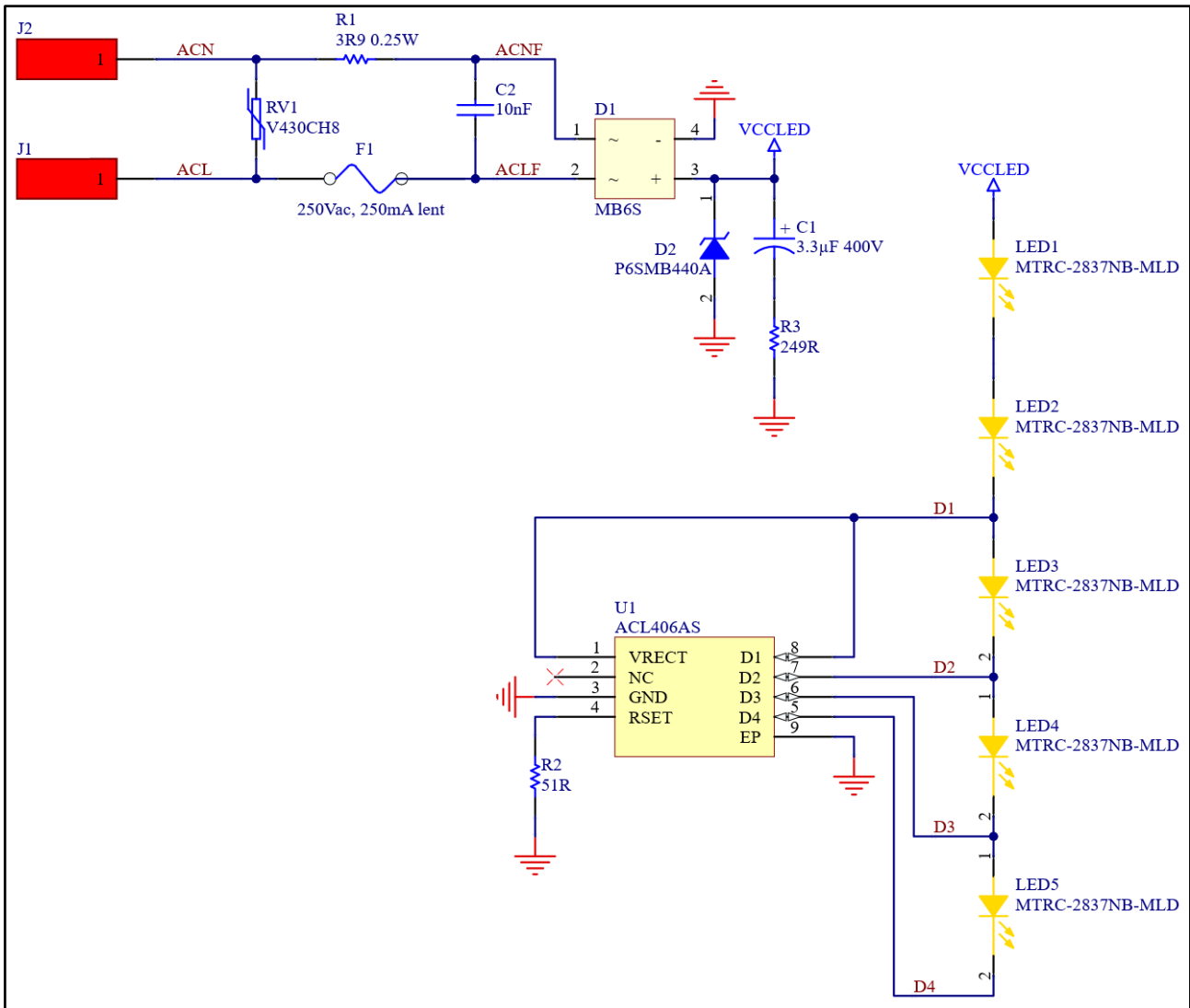


Figure 2: Zero Flicker application schematic for 230V_{AC} - entry-level design.

In this case, it's only 10 components on the PCB and 5 LED.

BOM:

Item	QTY	Designator	Description
1	1	C1	3.3µF 400V Aluminum Electrolytic Capacitors Radial, Can 1000 Hrs @ 105°C
2	1	C2	10nF / 450V X7T 1206
3	1	D1	Bridge Rectifier 500mA 600V SMD TO-269AA
4	1	D2	DIODE TVS 376V / 602V / DO214AA
5	1	F1	FUSE, SMD, 250mA, Slow, 250vac
6	5	LED1 to LED5	LED 48V, 20mA, 4000K, BIN=5, 120Lm, code 40M, case 2835
7	1	R1	Resistor, Thin Film, 3R9, 5%, 0.25W, 1206
8	1	R2	RES SMD 51 OHM 1% 1/4W 0603
9	1	R3	RES SMD 249 OHM 1% 3/4W 400V 2010
10	1	RV1	VARISTOR 430V 250A 2SMD
11	1	U1	ACL406AS Direct AC line LED driver Full range SO8 package

Table 1: BOM for reference only

Without optical filter, a transparent or translucent bulb cover, the light is at 600 lm with SVM < 0.02, Flicker percent at 7% and Flicker index at 0.008.

6. TYPICAL APPLICATION: ZERO FLICKER WITHOUT ELECTRIC PROTECTION

Schematic:

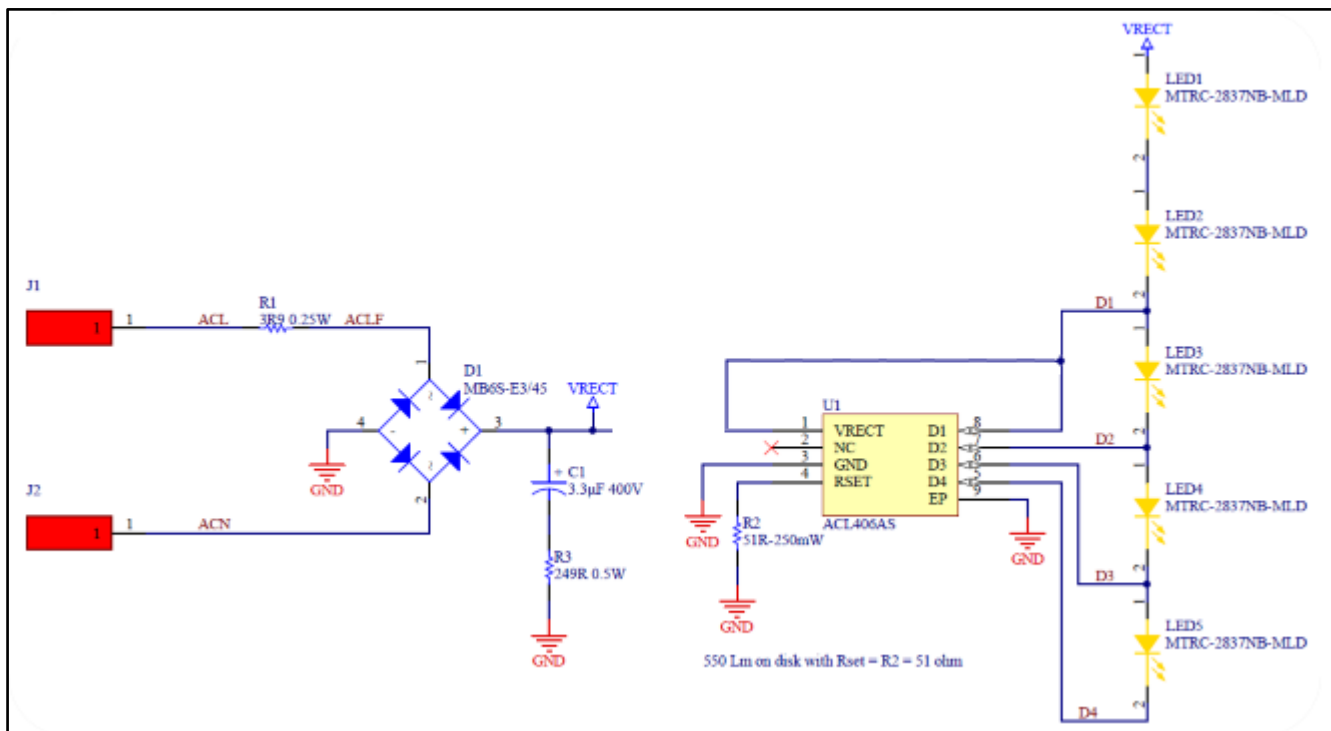


Figure 3: Zero Flicker application schematic for 230V_{AC} without Electric protection.

In this case, it's only 6 components on the PCB and 5 LED.

BOM:

Item	QTY	Designator	Description
1	1	C1	3.3µF 400V Aluminum Electrolytic Capacitors Radial, Can 1000 Hrs @ 105°C
2	1	D1	Bridge Rectifier 500mA 600V SMD TO-269AA
3	5	LED1 to LED5	LED 48V, 20mA, 4000K, BIN=5, 120Lm, code 40M, case 2835
4	1	R1	Resistor, Thin Film, 3R9, 5%, 0.25W, 1206
5	1	R2	RES SMD 51 OHM 1% 1/4W 0603
6	1	R3	RES SMD 249 OHM 1% 3/4W 400V 2010
7	1	U1	ACL406AS Direct AC line LED driver Full range SO8 package

Table 2: BOM for reference only

Without optical filter, a transparent or translucent bulb cover, the light is at 600 lm with SVM < 0.02, Flicker percent at 7% and Flicker index at 0.008.

It's recommended to use the entry level design as the protection helps to pass the standards even though the electrical protection components add a cost.

Example of PCBA:



Figure 4: PCBA with Zero Flicker for the ACL406AS at 230V_{AC} IMS PCB, diameter 40 mm, thickness 1.6mm.

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