



High Efficiency 5.5V, 1.2A, 1.5MHz Synchronous Step Down LED Driver

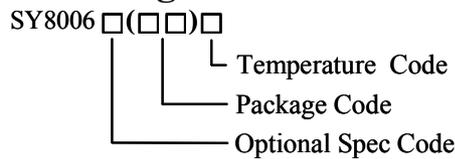
General Description

SY8006 is a high-efficiency 1.5MHz synchronous step-down LED driver capable of delivering 1.2A output current. SY8006 operates over a wide input voltage range from 2.6V to 5.5V and integrates main switch and synchronous switch with very low $R_{DS(ON)}$ to minimize the conduction losses. It also features a 100mV feedback voltage for high efficiency operation.

Features

- Low $R_{DS(ON)}$ for internal switches (top/bottom): 200m Ω /150 m Ω
- 2.6-5.5V input voltage range
- 1.5MHz switching frequency
- Internal softstart limits the inrush current
- 5% 100mV reference
- 100% dropout operation
- RoHS Compliant and Halogen Free
- Compact package: SOT23-5

Ordering Information



| Ordering Number | Package type | Note |
|-----------------|--------------|------|
| SY8006AAC | SOT23-5 | 1.2A |

Applications

- Security System
- Camcorder
- Digital Camera
- Emergency lighting
- Portable Lamp

Typical Applications

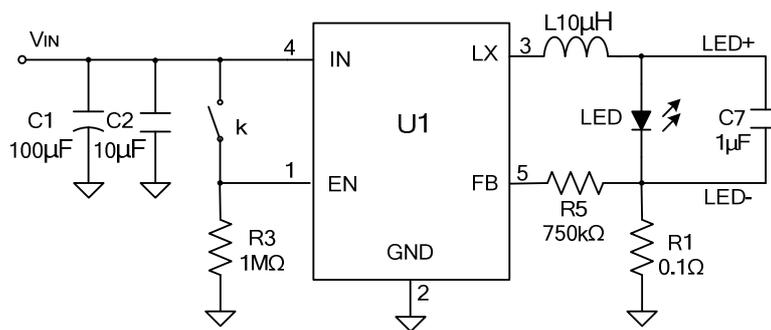
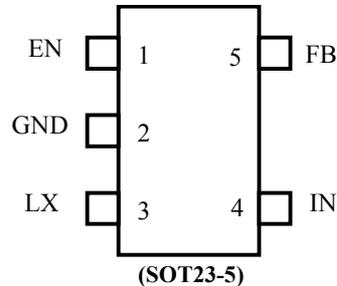


Figure 1.Schematic Diagram for 1A output current application

Pinout (top view)


Top mark: **AHxyz** for SY8006, (Device code: AH, x=*year code*, y=*week code*, z=*lot number code*)

| Pin Name | SOT23-5 | Pin Description |
|----------|---------|---|
| EN | 1 | Enable control. Pull high to turn on. Do not leave it floating. |
| GND | 2 | Ground pin. |
| LX | 3 | Inductor pin. Connect this pin to the switching node of inductor |
| IN | 4 | Input pin. Decouple this pin to GND pin with at least 1 μ F ceramic cap. |
| FB | 5 | Output Feedback Pin. Connect this pin to the cathode of the LED and insert the current sense resistor R1 from this point to ground. $I_{LED}=0.1V/R1$. |
| PG | N/A | LED Current OK Indicator. If LED current is below 90% of regulation level, PG is low; open drain otherwise. |

Absolute Maximum Ratings (Note 1)

| | |
|---|----------------------------------|
| Supply Input Voltage | -0.3V to 6V |
| All Other Pins | -0.3V to $V_{IN} + 0.6V$ |
| Power Dissipation, P_D @ $T_A = 25^\circ C$ SOT23-5 | 0.6W |
| Package Thermal Resistance (Note 2) | |
| SOT23-5, θ_{JA} | 170 $^\circ C/W$ |
| SOT23-5, θ_{JC} | 130 $^\circ C/W$ |
| Junction Temperature Range | -40 $^\circ C$ to 150 $^\circ C$ |
| Lead Temperature (Soldering, 10 sec.) | 260 $^\circ C$ |
| Storage Temperature Range | -65 $^\circ C$ to 150 $^\circ C$ |

Recommended Operating Conditions (Note 3)

| | |
|----------------------------|----------------------------------|
| Supply Input Voltage | 2.6V to 5.5V |
| Junction Temperature Range | -40 $^\circ C$ to 125 $^\circ C$ |
| Ambient Temperature Range | -40 $^\circ C$ to 85 $^\circ C$ |



Electrical Characteristics

($V_{IN} = 5.0V$, $I_{LED} = 0.3A$, $L = 2.2\mu H$, $C_{OUT} = 10\mu F$, $T_A = 25^\circ C$, $I_{MAX} = 1A$ unless otherwise specified)

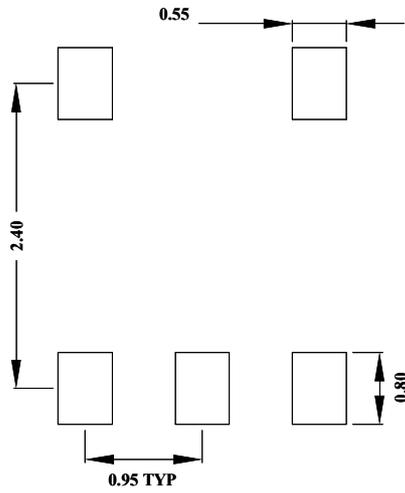
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|------------------------------|----------------|---|-------|------|-------|------------|
| Input Voltage Range | V_{IN} | | 2.6 | | 5.5 | V |
| Shutdown Current | I_{SHDN} | EN=0 | | 0.1 | 1 | μA |
| Quiescent Current | I_Q | $I_{OUT} = 0$, $V_{FB} = V_{REF} \times 105\%$ | | 90 | | μA |
| Feedback Reference Voltage | V_{REF} | | 0.095 | 0.1 | 0.105 | V |
| FB Input Current | I_{FB} | $V_{FB} = V_{IN}$ | -50 | | 50 | nA |
| PFET RON | $R_{DS(ON),P}$ | | | 0.2 | | Ω |
| NFET RON | $R_{DS(ON),N}$ | | | 0.15 | | Ω |
| PFET Current Limit | I_{SW} | | 1.7 | | | A |
| EN rising threshold | V_{ENH} | | 1.5 | | | V |
| EN falling threshold | V_{ENL} | | | | 0.4 | V |
| Input UVLO threshold | V_{UVLO} | | | | 2.6 | V |
| UVLO hysteresis | V_{HYS} | | | 0.1 | | V |
| Oscillator Frequency | F_{OSC} | $I_{OUT} = 100mA$ | | 1.5 | | MHz |
| Min ON Time | | | | 80 | | ns |
| Max Duty Cycle | | | 100 | | | % |
| Thermal Shutdown Temperature | T_{SD} | | | 150 | | $^\circ C$ |

Note 1: Stresses beyond the “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

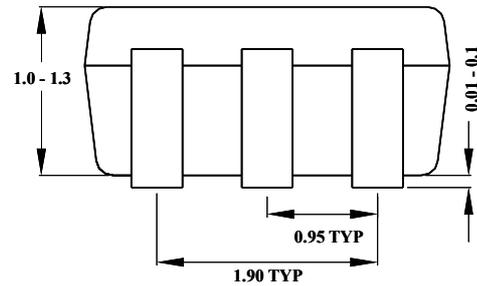
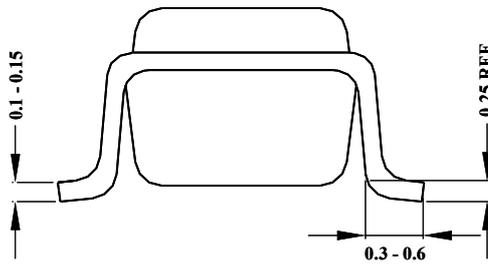
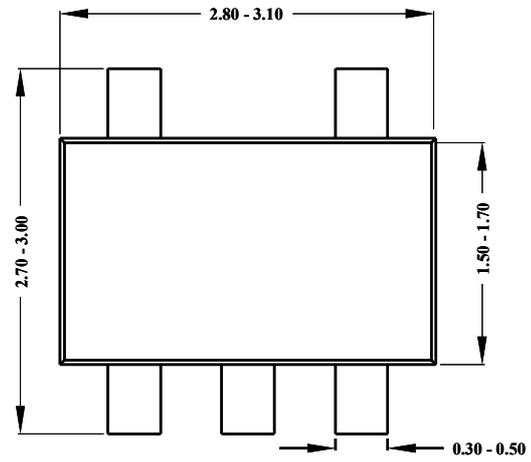
Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^\circ C$ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Pin 2 of SOT23-5 package is the case position for θ_{JC} measurement. Test condition: Device mounted on 2” x 2” FR-4 substrate PCB, 2oz copper, with minimum recommended pad on top layer and thermal vias to bottom layer ground plane.

Note 3: The device is not guaranteed to function outside its operating conditions.

SOT23-5 Package outline & PCB layout design



Recommended Pad Layout

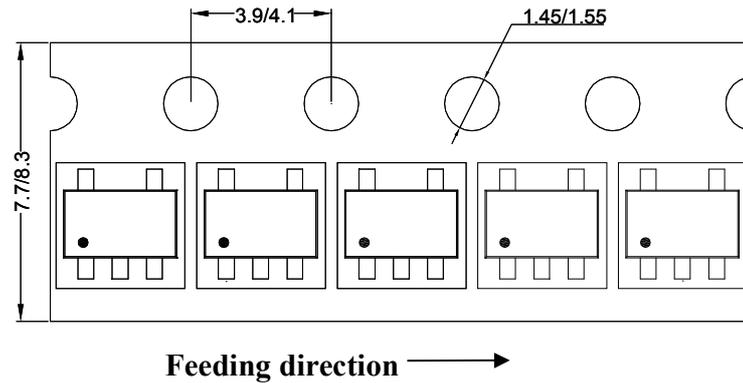


**Notes: All dimensions are in millimeters.
All dimensions don't include mold flash & metal burr.**

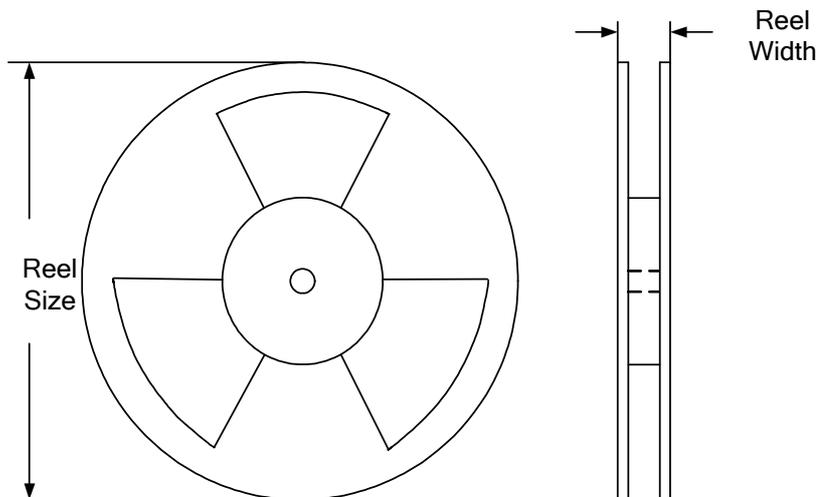
Taping & Reel Specification

1. Taping orientation

SOT23-5



2. Carrier Tape & Reel specification for packages



| Package types | Tape width (mm) | Pocket pitch(mm) | Reel size (Inch) | Reel width(mm) | Trailer length(mm) | Leader length (mm) | Qty per reel |
|---------------|-----------------|------------------|------------------|----------------|--------------------|--------------------|--------------|
| SOT23-5 | 8 | 4 | 7" | 8.4 | 280 | 160 | 3000 |

3. Others: NA