

High Current LED Driver

❖ GENERAL DESCRIPTION

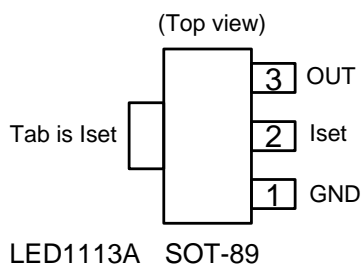
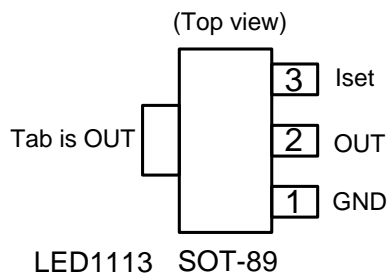
LED1113/A is a low dropout current regulator for high current LED Driver. The output current was decided by external resistor. Build-in thermal shutdown and current limit protection function.

❖ FEATURES

- 500mA Maximum Output Current.
- 2% Output Current Setting Accuracy.
- External Resistor Allows Designer to set Current.
- Output current limiting
- Built-in thermal shutdown
- Packages: SOT89-3L
- High Power LED Driver

❖ PIN ASSIGNMENT

The package of LED1113 is SOT89-3L; the pin assignment is given by:



| Name | Description |
|------|---|
| GND | Ground |
| Iset | Output current set input. Connect a resistor from I _{SET} to GND to set LED current. |
| OUT | Output pin. The LEDs are connected from these pins to VCC. |

❖ ORDER/MARKING INFORMATION

| Order Information | Top Marking |
|--|---|
| <p style="text-align: center;">LED1113 X X X</p> <p style="text-align: center;">Pin Define Package Packing</p> <p>Blank: LED1113 F: SOT89-3L Blank: Bag A: LED1113A A : Taping</p> | <p style="text-align: center;">1 1 1 3 → Part number L Y W X → ID code: internal</p> <p>Output Type F: LED1113 E: LED1113A</p> <p>WW: 01~26(A~Z) 27~52(a~z) Year: A=2010 1=2011</p> |

❖ ABSOLUTE MAXIMUM RATINGS

| Characteristics | Symbol | Rating | Unit |
|--|-----------|-------------|------|
| Output Voltage | V_{OUT} | 28 | V |
| Operating Junction Temperature Range | T_{OP} | 0 to +125 | °C |
| Maximum junction Temperature | T_J | 150 | °C |
| Power Dissipation (PCB=FR4, 2 inch sq.) $T_A=25^{\circ}C, T_J=125^{\circ}C$ (SOT89) | P_D | 1110 | mW |
| Storage Temperature | T_{ST} | -65 to +150 | °C |

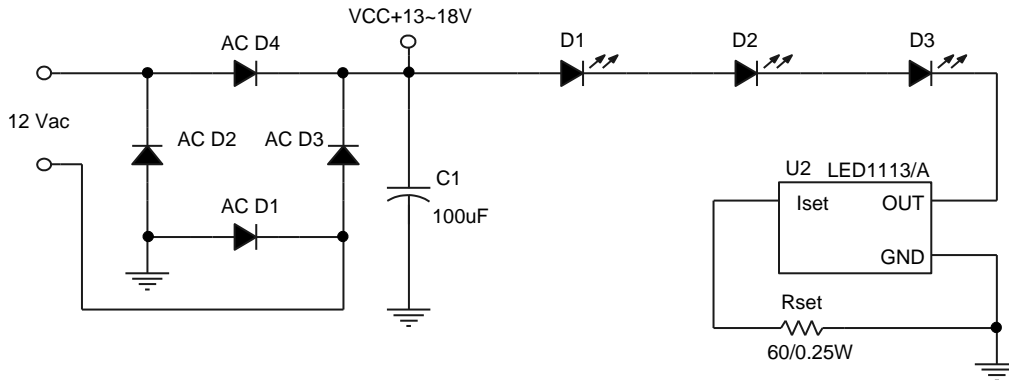
❖ ELECTRICAL CHARACTERISTICS

(Under Operating Conditions, $T_J=25^{\circ}C$)

| Characteristics | Conditions | Min | Typ | Max | Units |
|---|---|-------|-------|-------|-------|
| Output Voltage | $I_{OUT}=5mA$ | 2.45 | - | 26 | V |
| Output Sink Current | $V_{CC}-V_{LED}=V_{OUT}>2.5V,$ $I_{OUT}=5mA$ | 500 | | | mA |
| V_{SET} Voltage | $V_{CC}-V_{LED}=V_{OUT}>2.5V,$ $I_{OUT}=5mA$ | 1.225 | 1.250 | 1.275 | V |
| Dropout Voltage ($V_{OUT}-V_{SET}$) | $I_{OUT} = 500mA, \Delta V_{SET}=2\%V_{SET}$ | - | 1.1 | 1.2 | V |
| Output Current (Note 1,2) | 1W LED $R_{SET}=3.6\Omega/0.5W$ | 340 | 347 | 354 | mA |
| | 0.5W LED $R_{SET}=7.2\Omega$ | 170 | 174 | 177 | mA |
| | 20mA LED $R_{SET}=60\Omega$ | 20.4 | 20.8 | 21.3 | mA |
| Current Limit | $V_{OUT}> 5V$ | 0.8 | - | - | A |
| θ_{JA} Thermal Resistance Junction-to-Ambient | SOT89 | - | 300 | - | °C/W |
| θ_{JC} Thermal Resistance Junction-to-Case | SOT89 (PCB=FR4, 2 inch sq.) | - | 90 | - | °C/W |

❖ APPLICATION CIRCUIT

(1) AC Input



$$I_{OUT} = 1.25V / 60 = 21mA$$

$$V_{OUT} \geq 2.5V$$

$$1. 13V - V_{LED} - V_{SET} = 1.25V$$

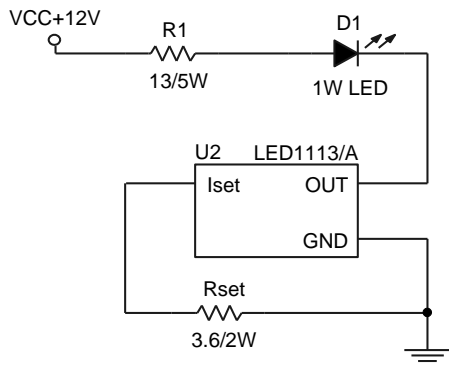
$$IC's PD = (1.25 * 0.02) = 0.03W$$

$$2. 18V - V_{LED} - V_{SET} = 6.25V$$

$$IC's PD = (6.25 * 0.02) = 0.13W$$

$$V_{LED} = 10.5V (3.5V * 3LED)$$

(2) DC Input



$$I_{OUT} = 1.25V / 3.6 = 347mA$$

$$V_{OUT} = 2.5V$$

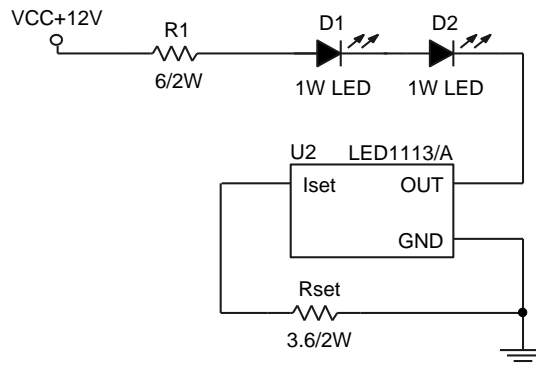
$$1. R1 = 13, VR1 = 4.51V$$

$$R1 PC = 4.51 * 0.347 = 1.57W$$

$$2. 12V - VR1 - V_{LED} - V_{SET} = 2.74V$$

$$IC PD = (2.74 * 0.347) = 0.95W$$

$$V_{LED} = 3.5V$$



$$I_{OUT} = 1.25V / 3.6 = 347mA$$

$$V_{OUT} = 2.5V$$

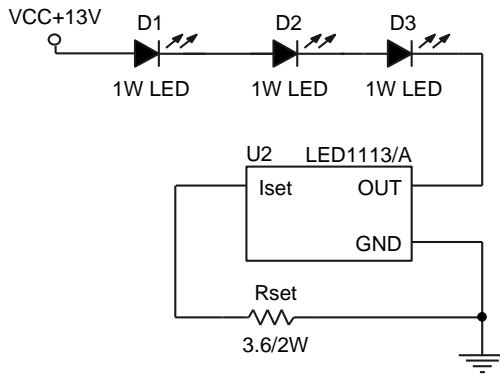
$$1. R1 = 6, VR1 = 2.08V$$

$$R1 PC = 2.08 * 0.347 = 0.73W$$

$$2. 12V - VR1 - V_{LED} - V_{SET} = 1.67V$$

$$IC PC = 1.67 * 0.347 = 0.58W$$

$$V_{LED} = 7V$$



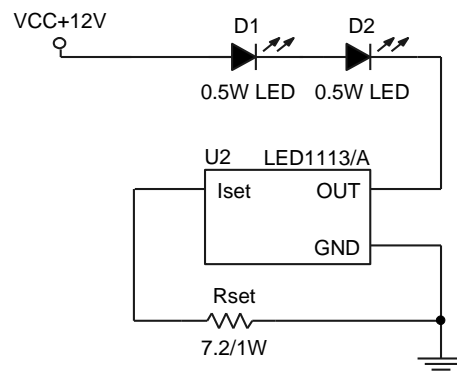
$$I_{OUT} = 1.25V / 3.6 = 347mA$$

$$V_{OUT} = 2.5V$$

$$13V - V_{LED} - V_{SET} = 2.02V$$

$$IC\ PC = 1.25 * 0.347 = 0.4W$$

$$V_{LED} = 10.5V\ (3.5V * 3LED)$$



$$I_{OUT} = 1.25V / 7.2 = 174mA$$

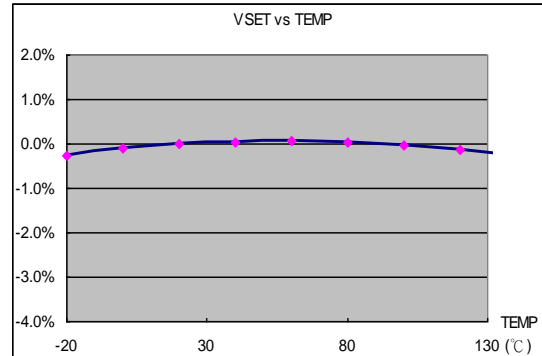
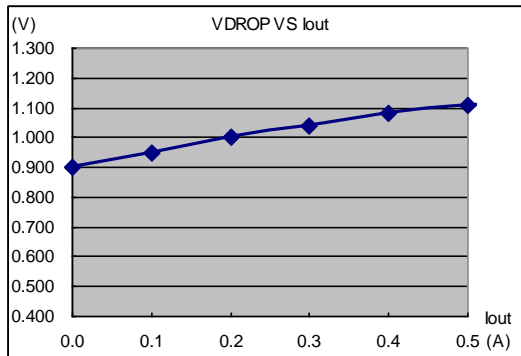
$$V_{OUT} = 2.5V$$

$$12V - V_{LED} - V_{SET} = 3.75V$$

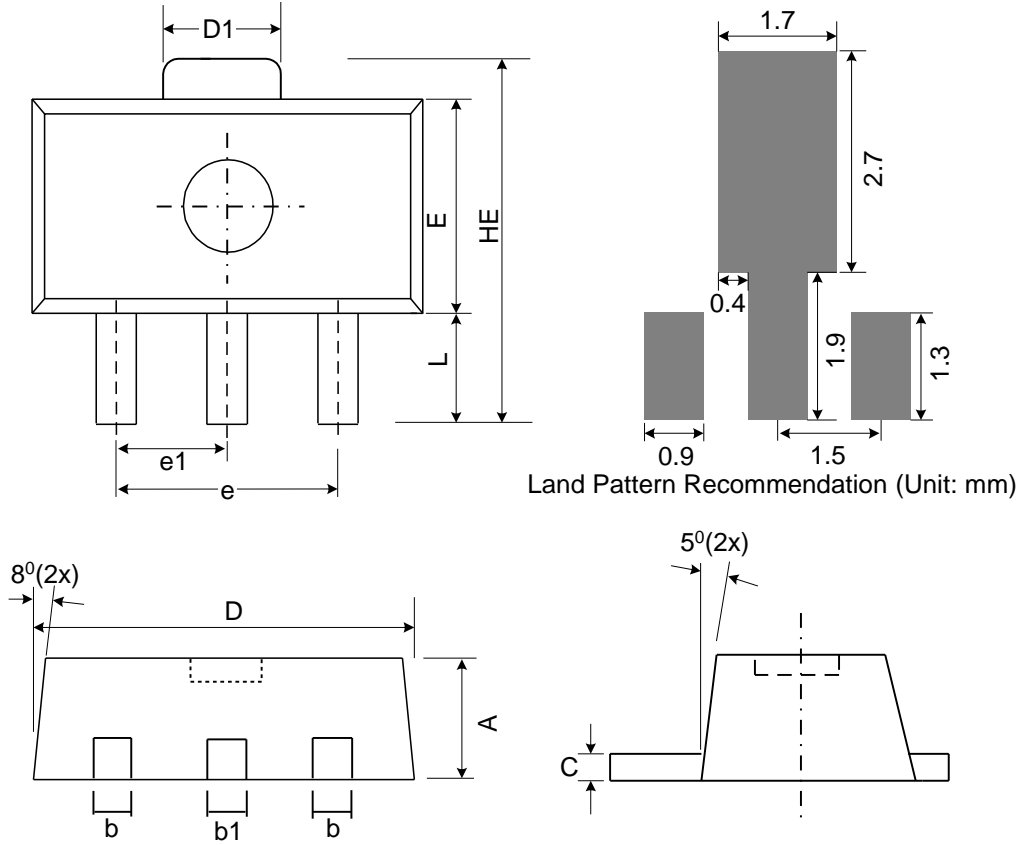
$$IC\ PC = 3.75 * 0.174 = 0.65W$$

$$V_{LED} = 7V$$

❖ TYPICAL CHARACTERISTICS



❖ PACKAGE OUTLINES



| Symbol | Dimensions in Millimeters | | | Dimensions in Inches | | |
|--------|---------------------------|------|------|----------------------|-------|-------|
| | Min. | Nom. | Max. | Min. | Nom. | Max. |
| A | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| b | 0.36 | 0.42 | 0.48 | 0.014 | 0.017 | 0.019 |
| b1 | 0.44 | 0.50 | 0.56 | 0.017 | 0.02 | 0.022 |
| C | 0.35 | 0.40 | 0.44 | 0.014 | 0.016 | 0.017 |
| D | 4.40 | 4.50 | 4.60 | 0.173 | 0.177 | 0.181 |
| D1 | 1.35 | 1.59 | 1.83 | 0.053 | 0.063 | 0.072 |
| e | 3.0 BSC | | | 0.118 BSC | | |
| e1 | 1.5 BSC | | | 0.059 BSC | | |
| E | 2.29 | 2.45 | 2.60 | 0.09 | 0.097 | 0.102 |
| HE | 3.94 | 4.10 | 4.25 | 0.155 | 0.161 | 0.167 |
| L | 0.80 | 1.00 | 1.20 | 0.031 | 0.04 | 0.047 |

JEDEC outline: TO-243 AB