## General Description

The EST1M301 is higher integrated circuit incorporates all advanced sensing function to control the output current. The EST1M301 integrates three groups of the OCP (Over Current Protection) which has a OVP (Over Voltage Protection), UVP (Under Voltage Protection) functions with related lockout to protect system. If there is no power input to VCC pin , all the state of protection functions will reset and the system will auto-recovery.

The EST1M301 also provides a voltage control function which could regulate the output voltage easily.

## Features

- SPS CCCV controller
- Open drain output stage
- 3-OCPs/UVP/OVP latch/auto-recovery function
- Low operation current

## Application

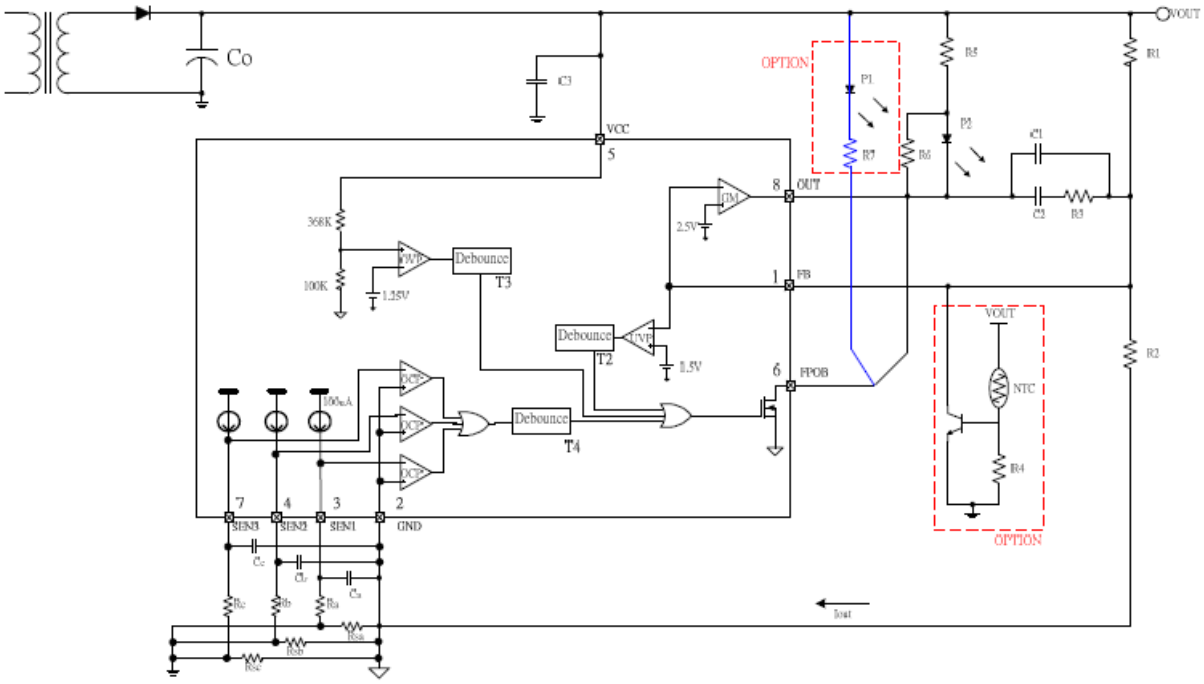
- Battery chargers
- AC-DC adaptor

## Ordering Information

| Order Number | Package | Packaging | Note |
|---|---|---|---|
| EST1M301 | DIP-8 | Tube | Green |
| EST1M301 | SOP-8 | Tube | Tube or Tape&Reel |

Note: Infinno lead-free products contain molding compounds/die attach materials and 100% matte tin plate termination finish; which are fully compliant with RoHS. Infinno lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020C for MSL classification at lead-free peak reflow temperature. Infinno defines “Green” to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

## Application Circuit



## Pin Assignments and Package Type

| Designation | No. | I/O | Description |
|---|---|---|---|
| FB | 1 | I | Feedback control of TL431 |
| GND | 2 | I | IC Ground, OCP positive and comparator positive terminal input |
| SEN1 | 3 | I | OCP negative and comparator negative terminal input 1 |
| SEN2 | 4 | I | OCP negative and comparator negative terminal input 2 |
| VCC | 5 | I | Power supply input pin |
| FPOB | 6 | O | Inverted fault protection output, open drain output stage |
| SEN3 | 7 | I | OCP negative and comparator negative terminal input 3 |
| OUT | 8 | O | Photo coupler control pin |

## Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Storage Temperature (Tstg) | --- | -40 to 140 | ℃ |
| Operating Temperature (Topr) | --- | -25 to 125 | ℃ |
| Junction Temperature (Tj) | --- | 150 | ℃ |
| Supply Voltage (VCC) | VCC | -0.5 to 20 | V |
| Input Voltage Range (VI) | GND, SEN1, SEN2, SEN3 | -0.5 to 8 | V |
| Input Voltage Range (VI) | FB | -0.5 to 18 | V |
| Output Voltage Range (VO) | FPOB, OUT | -0.5 to 18 | V |
| Power Dissipation | PD | 800 | mW |
| Thermal Resistance | θJA | 85/DIP, 150/SOP | ℃/W |
| ESD | VESD | 2000 | V |

Stress beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and 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 reliablity

## DC Electrical Characteristics (VCC =12V, Ta=25°C)

**Input Power Supply:**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Supply Voltage | VCC | 3.0 | 12 | 18 | V | |
| Supply Current | Icc | | 0.5 | 0.6 | mA | Standby mode |
| Reset Threshold Voltage | VIH | 2.6 | 2.8 | 3.1 | V | HIGH □ LOW |

**Over-current protection:**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Offset Voltage | VOS | -2 | 0 | 2 | mV | |
| SENx Pin Drive Current | IS | 99 | 100 | 101 | uA | |

**Output Voltage Protection:**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Over Volatge Protection | OVP | 5.6 | 5.85 | 6.1 | V | Pin-VCC Voltage |
| Under Volatge Protection | UVP | 1.38 | 1.5 | 1.62 | V | Pin-FB Voltage |

**Constant-voltage function:**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Reference Voltage | VREF | 2.480 | 2.5 | 2.520 | V | |

**FPOB, Open Drain Output:**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Leakage Current | ILKG | | | 5 | uA | VFPOB = 12V |
| Low Level Output Voltage | VOL | | | 0.3 | V | ISINK = 5mA |

**OUT, Open Drain Output:**

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Leakage Current | ILKG | | | 5 | uA | VPGO=12V |
| Low Level Output Voltage | VOL | | | 0.3 | V | ISINK = 5mA |

## AC Electrical Characteristics (Vcc=12V, Ta=25℃)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Under Voltage mask time | T1 | 9 | 12 | 15 | mS | VCC rise |
| Under Voltage Protection de-bounce | T2 | 2 | 3 | 4 | mS | |
| Over Voltage Protection de-bounce | T3 | 16 | 24 | 32 | uS | |
| Over Current Protection delay time | T4 | 25 | 40 | 55 | mS | |

## Time Chart

Output voltage section, the output voltage is follow equation1:

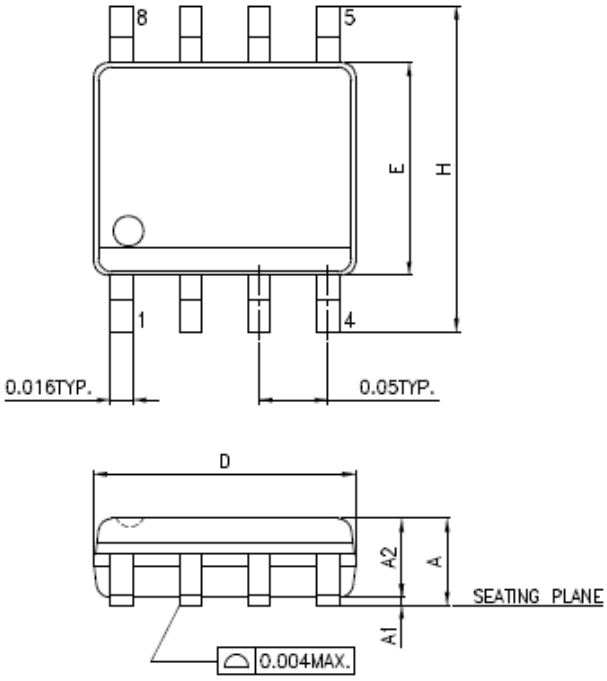
$$V_{OUT} = 2.5 * \frac{R1 + R2}{R2} \quad (V) \qquad .....(1)$$

Output current section, the over current protection is follow equation2

$$I_{OUT} = \frac{R_x * 0.0001}{R_{sx}} \quad (A) \qquad .....(2)$$

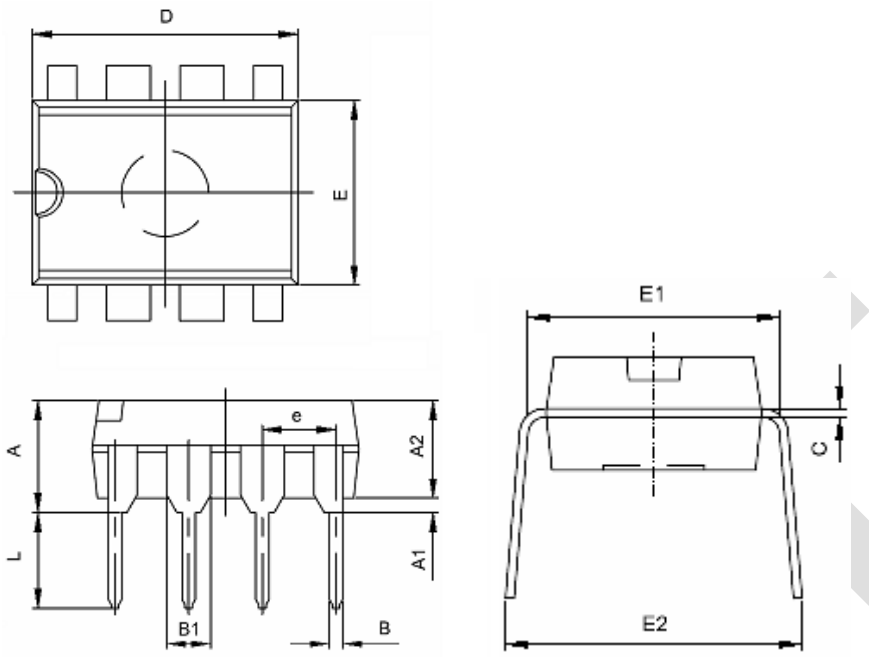
## Package Information

**SOP-8 Package （mm）**




| Symbols | Dimensions In Inches | | | Dimensions In millimeters | | |
|---|---|---|---|---|---|---|
| | MIN. | NOR. | MAX. | MIN. | NOR. | MAX. |
| A | 0.050 | 0.061 | 0.072 | 1.270 | 1.549 | 1.829 |
| A1 | 0.000 | ------ | 0.010 | 0.000 | ------ | 0.254 |
| A2 | ------ | ------ | 0.062 | ------ | ------ | 1.575 |
| D | 0.185 | 0.193 | 0.200 | 4.699 | 4.902 | 5.080 |
| E | 0.147 | 0.154 | 0.160 | 3.734 | 3.912 | 4.064 |
| H | 0.225 | 0.237 | 0.249 | 5.715 | 6.020 | 6.325 |
| L | 0.013 | 0.033 | 0.053 | 0.330 | 0.838 | 1.346 |
| θ | 0° | 4° | 8° | 0° | 4° | 8° |

**DIP-8L Package**




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 3.710 | 4.310 | 0.146 | 0.170 |
| A1 | 0.510 | | 0.020 | |
| A2 | 3.200 | 3.600 | 0.126 | 0.142 |
| B | 0.360 | 0.560 | 0.014 | 0.022 |
| B1 | 1.524(TYP) | | 0.060(TYP) | |
| C | 0.204 | 0.360 | 0.008 | 0.014 |
| D | 9.000 | 9.400 | 0.354 | 0.370 |
| E | 6.200 | 6.600 | 0.244 | 0.260 |
| E1 | 7.620(TYP) | | 0.300(TYP) | |
| e | 2.540(TYP) | | 0.100(TYP) | |
| L | 3.000 | 3.600 | 0.118 | 0.142 |
| E2 | 8.200 | 9.400 | 0.323 | 0.370 |

## Update History

| Revision | Date | Update |
|---|---|---|
| 1.00 | 2013-6-7 | Preliminary version |
| | | |
| | | |