

300 mA LOW DROPOUT POSITIVE ADJUSTABLE REGULATOR PRELIMINARY DATASHEET

FEATURES

- SOT23 package
- Stable with 2.2uF ceramic capacitor
- 1% Voltage Reference Accuracy
- Only 270mV Dropout at 300 mA
170mV Dropout at 150mA
- 10nA Quiescent Current in Shutdown
- Current Limit and Thermal Shutdown
- Logic input Enable pin

DESCRIPTION

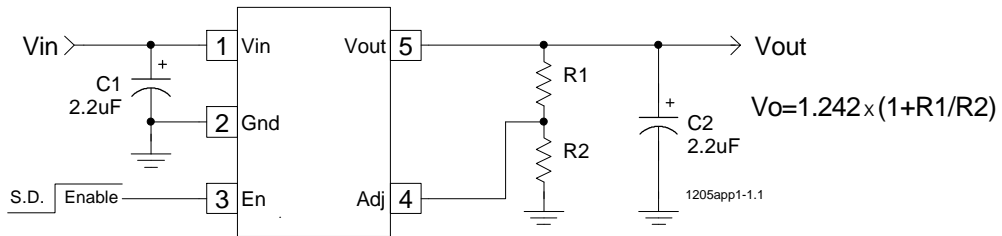
The US1205 device is an efficient linear voltage regulator with better than 1% initial voltage accuracy, very low dropout voltage and very low ground current designed especially for hand held, battery powered applications. Other features of the device are; TTL compatible enable/shutdown control input, current limiting and thermal shutdown.

The US1205 is available in fixed and adjustable output voltage versions in a small SOT23-5 package.

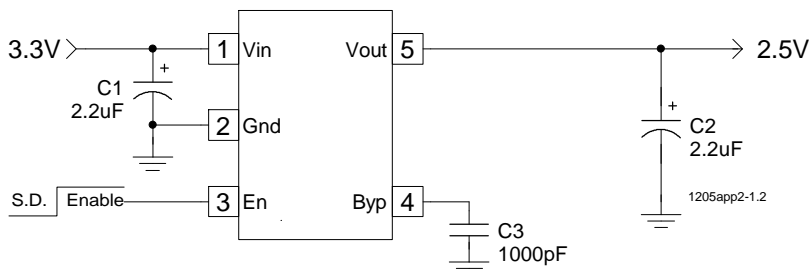
APPLICATIONS

- Laptop, Notebook & Palmtop computers
- Battery powered Equipments
- PCMCIA Vcc & Vpp regulator
- Consumer Electronics
- High Efficiency Linear Power Supplies

TYPICAL APPLICATION



Typical application of the US1205 ajustable.



Typical application of the US1205 Fixed voltage.

PACKAGE ORDER INFORMATION

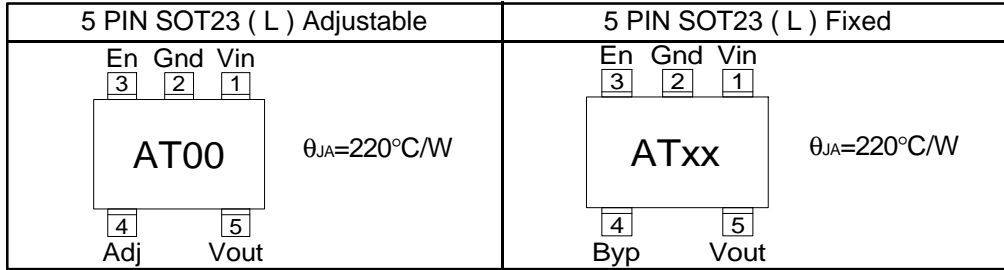
| Tj (°C) | 5 LEAD SOT 23 | SOT23 Marking | Output Voltage |
|----------|------------------|------------------|-------------------|
| 0 TO 125 | US1205CL | AT00 | Adj |
| 0 TO 125 | US1205-25CL | AT25 | 2.5 V |
| 0 TO 125 | US1205-30CL | AT30 | 3.0 V |
| 0 TO 125 | US1205-33CL | AT33 | 3.3 V |
| 0 TO 125 | US1205-36CL | AT36 | 3.6 V |

US1205

ABSOLUTE MAXIMUM RATINGS

| | |
|--|----------------|
| Input Voltage (Vin) | 10V |
| Enable Input Voltage | 10V |
| Storage Temperature Range | -65°C TO 150°C |
| Operating Junction Temperature Range | 0°C TO 150°C |

PACKAGE INFORMATION



ELECTRICAL SPECIFICATIONS

Unless otherwise specified, these specifications apply over, $C_{in}=C_{o}=22\mu F$, $I_o=100\mu A$, $V_{inmin}=2.5V$ (Adjustable devices) $V_{in}=V_o+1V$ (for fixed voltage devices), $V_{out}=V_{fb}$ (for adjustable version only), $C_{byp}=470pF$ (for fixed output versions only), $V_{enb}=2V$ and $T_a=25^\circ C$. Typical values refer to $T_a=25^\circ C$. Low duty cycle pulse testing are used which keeps junction and case temperatures equal to the ambient temperature.

| PARAMETER | SYM | TEST CONDITION | MIN | TYP | MAX | UNITS |
|---|-------|---|----------|-------|--------|---------|
| Reference Voltage See Table 1 for typical values | V_o | (Note 4) | -1 -2 | | 1 2 | % |
| Line Regulation | dVi | $V_o+1V < V_{in} < 10$ | | 0.005 | | %/V |
| Load Regulation (note 1) | dVL | $1mA < I_o < 100mA$ | | 0.8 | | % |
| | | $100mA < I_o < 300mA$ | | 0.1 | | % |
| Dropout Voltage (note 2) | dVio | $I_o=100\mu A$ | | 10 | 50 | mV |
| | | $I_o=100\mu A$ (Note 4) | | 13 | 70 | mV |
| | | $I_o=50mA$ | | 85 | 110 | mV |
| | | $I_o=50mA$ (Note 4) | | 100 | 140 | mV |
| | | $I_o=150mA$ | | 170 | 220 | mV |
| | | $I_o=150mA$ (Note 4) | | 204 | 260 | mV |
| | | $I_o=300mA$ | | 270 | 350 | mV |
| | | $I_o=300mA$ (Note 4) | | 324 | 400 | mV |
| Ground Current (Note 3) | Iq | $V_{en}=2V, I_o=100\mu A$ | | 120 | 160 | μA |
| | | $I_o=100\mu A$ (Note 4) | | 240 | | μA |
| | | $I_o=50mA$ | | 420 | 600 | μA |
| | | $I_o=50mA$ (Note 4) | | 540 | | μA |
| | | $I_o=150mA$ | | 2200 | 2900 | μA |
| | | $I_o=150mA$ (Note 4) | | 2900 | | μA |
| | | $I_o=300mA$ | | 7200 | 9500 | μA |
| | | $I_o=300mA$ (Note 4) | | 9300 | | μA |
| Ground Current-S.D Activated | Iqsd | S.D pin<0.1V | | 0.1 | | μA |
| | | S.D pin=0.8V | | 8 | | |
| Current Limit | Icl | $V_o=0V$ | 320 | 420 | | mA |
| Thermal Regulation | dVp | $V_{in}=10V, I_o=150mA, 10\text{ mS PULSE}$ | | 0.05 | | %/W |
| Adjust Pin Current | Iadj | $V_{in}=2.5V, V_o=V_{adj}$ | | 0.1 | | μA |
| Enable pin input LO voltage | Venl | Regulator OFF | | | 0.8 | V |
| Enable pin input HI voltage | Venh | Regulator ON | 2 | | | V |
| Enable pin input LO current | | $V_{enl}=0V\text{ to }0.8V$ | | 0.01 | | μA |
| Enable pin input HI current | | $V_{enh}=2V\text{ to }V_{in}$ | | 20 | | μA |

Note 1 : Low duty cycle pulse testing with Kelvin connections are required in order to maintain accurate data.

Note 2 : Drop-out voltage is defined as the minimum differential voltage between V_{in} and V_{out} required to maintain regulation at V_{out} . It is measured when the output voltage drops 1% below its nominal value.

Note 3 : Ground current is the the regulator quiescent current plus the pass transistor current. The total current from the supply is the sum of the load current plus the ground pin current.

Note 4 : The specification applies for the junction temperature of 0 to +125°C.

Pin DESCRIPTIONS

| PIN # | PIN SYMBOL | PIN DESCRIPTION |
|-------|----------------------------|---|
| 4 | Adj (Adjustable only) | A resistor divider from this pin to the V_{out} pin and ground sets the output voltage. |
| 4 | Byp (Fixed output only) | A 470 to 1000pF bypass capacitor connected to this pin reduces the output noise. |
| 5 | V_{out} | The output of the regulator .A minimum of 2.2uF with max ESR of 1 ohm capacitor must be connected from this pin to ground to insure stability. |
| 2 | GND | Ground pin. This pin must be connected to the lowest potential in the system & all other pins must be at higher potential with respect to this pin. |
| 3 | En | Enable pin. A low signal or left open on this pin shuts down the output.This pin must be tied HI or to V_{in} for normal operation. |
| 1 | V_{in} | The input pin of the regulator. Typically a large storage capacitor is connected from this pin to ground to insure that the input voltage does not sag below the minimum drop out voltage during the load transient response. This pin must always be higher than V_{out} by at least the amount of the dropout voltage and some margin in order for the device to regulate properly. |

| 5 LEAD SOT 23 | Output Voltage |
|---------------|----------------|
| US1205 | 1.242V |
| US1205-25 | 2.5 V |
| US1205-30 | 3.0 V |
| US1205-33 | 3.3 V |
| US1205-36 | 3.6 V |

The output voltage of the adjustable device can be set using:

$$V_o = 1.242 \times (1 + R_1/R_2)$$

Where;

R1=Resistor connected from output to the Adj pin

R2=Resistor connected from Adj pin to GND

Table 1- Nominal output voltage v.s. part number

BLOCK DIAGRAM

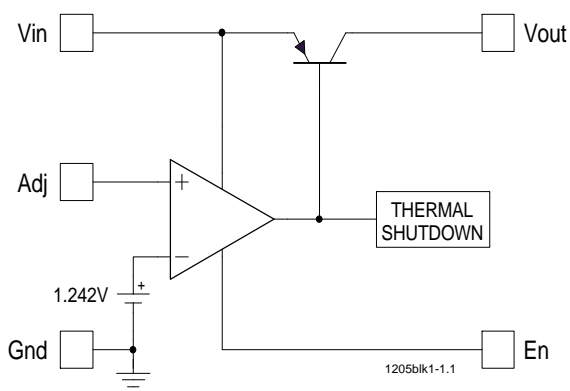


Figure 1- US1205 Adjustable block diagram

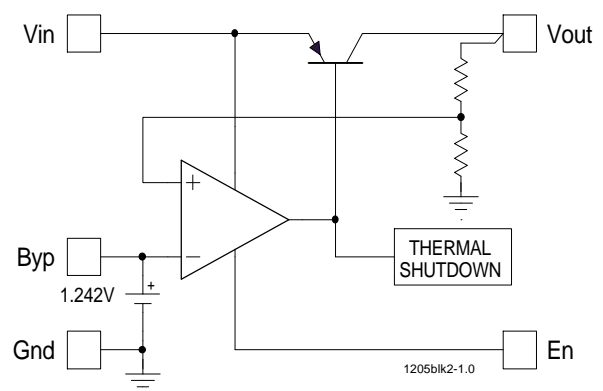


Figure 2- US1205 Fixed output block diagram