

Descriptions

The S1117 series of positive adjustable and fixed regulators are designed to provide 1A with high efficiency. All internal circuitry is designed to operate down to 1.3V input to output differential. On-chip trimming adjusts reference voltage to 2%.

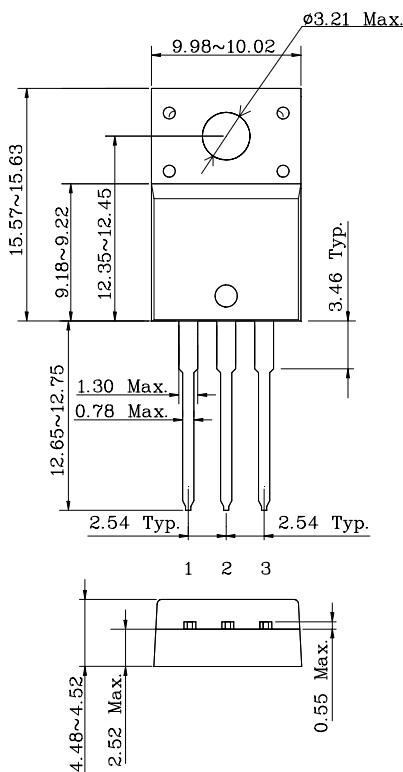
Features

- Adjustable or Fixed output
- Output Current of 1A
- Low Dropout, 1.3V maximum at 1A Output Current
- Thermal Shutdown Protection
- Fast Transient Response

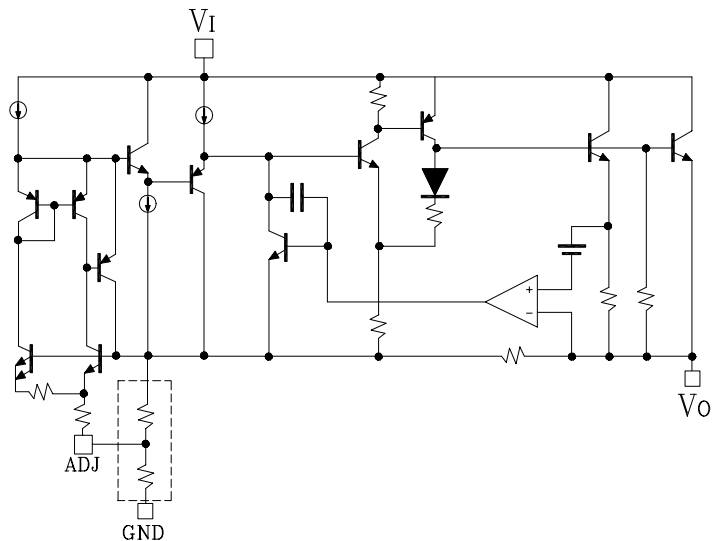
Ordering Information

| Type NO. | Marking | Package Code |
|--|-----------------------|--------------|
| S1117API/S1117xxPI | S1117□□PI/ S1117□□□PI | TO-220F |
| □□:Voltage Code (Aj : 1.25V, 15:1.5V,:18: 1.8V, 25:2.5V, 33:3.3V, 50:5.0V) □□□:Voltage Code (285:2.85V) | | |

Outline Dimensions (Unit : mm)



BLOCK DIAGRAM



PIN Connections

1. GND/Adj
2. Output voltage
3. Input voltage

Absolute Maximum Ratings

Ta=25°C

| Characteristic | Symbol | Rating | Unit |
|---------------------------|------------------|-----------|------|
| Input voltage | V _I | 16 | V |
| Power Dissipation | P _D | 2.0 | W |
| Junction Temperature | T _J | 150 | °C |
| Storage Temperature Range | T _{stg} | -55 ~ 150 | °C |

Device Selection Guide (NOTE1)

| Device | Output Voltage |
|-------------|----------------|
| S1117API | Adjustable |
| S1117-15PI | 1.5V |
| S1117-18PI | 1.8V |
| S1117-25PI | 2.5V |
| S1117-285PI | 2.85V |
| S1117-33PI | 3.3V |
| S1117-50PI | 5.0V |

Note 1 : Other fixed versions are available V_O=1.5V to 5V

Electrical Characteristics

(Electrical Characteristics at $T_J = 25^\circ\text{C}$ and $V_I = (V_O + 1.5\text{V})$, $I_L = 10\text{ mA}$, $C_O = 10\ \mu\text{F}$ unless otherwise specified.)

| Characteristic | Symbol | Device | Test Condition | Min | Typ | Max | Unit | | | |
|--------------------------|---------------------|-------------------------|--|-----|---|-------|------|---------------|----|----|
| Output Voltage | V_O | S1117A | $V_I = (V_O + 1.5\text{V}), I_O = 10\text{ mA}$ | | 1.225 | 1.275 | V | | | |
| | | | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 0\text{ to }1000\text{ mA}$ | * | 1.200 | 1.300 | | | | |
| | | S1117-15 | $V_I = (V_O + 1.5\text{V}), I_O = 10\text{ mA}$ | | 1.470 | 1.530 | | | | |
| | | | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 0\text{ to }1000\text{ mA}$ | * | 1.440 | 1.560 | | | | |
| | | S1117-18 | $V_I = (V_O + 1.5\text{V}), I_O = 10\text{ mA}$ | | 1.764 | 1.836 | | | | |
| | | | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 0\text{ to }1000\text{ mA}$ | * | 1.728 | 1.872 | | | | |
| | | S1117-25 | $V_I = (V_O + 1.5\text{V}), I_O = 10\text{ mA}$ | | 2.450 | 2.550 | | | | |
| | | | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 0\text{ to }1000\text{ mA}$ | * | 2.400 | 2.600 | | | | |
| | | S1117-285 | $V_I = (V_O + 1.5\text{V}), I_O = 10\text{ mA}$ | | 2.793 | 2.907 | | | | |
| | | | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 0\text{ to }1000\text{ mA}$ | * | 2.736 | 2.964 | | | | |
| | | S1117-33 | $V_I = (V_O + 1.5\text{V}), I_O = 10\text{ mA}$ | | 3.234 | 3.366 | | | | |
| | | | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 0\text{ to }1000\text{ mA}$ | * | 3.168 | 3.432 | | | | |
| | | S1117-50 | $V_I = (V_O + 1.5\text{V}), I_O = 10\text{ mA}$ | | 4.900 | 5.100 | | | | |
| | | | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 0\text{ to }1000\text{ mA}$ | * | 4.800 | 5.200 | | | | |
| | | Line Regulation (Note2) | $\Delta V_{O(\Delta V_I)}$ | All | $1.5\text{V} \leq V_I - V_O \leq 7\text{V}$ $I_O = 10\text{ mA}$ | - | | 5 | 10 | mV |
| | | Load Regulation (Note2) | $\Delta V_{O(\Delta I_L)}$ | All | $V_I = (V_O + 1.5\text{V})$ $I_O = 10\text{ mA} \sim 1000\text{ mA}$ | - | | 10 | 30 | mV |
| Quiescent Current | I_{QC} | All | $V_I = V_O + 1.5\text{V}$ $V_{ADJ} = 0\text{V}$ | * | - | 7 | 13 | mA | | |
| Minimum Load Current | $I_{L(\text{MIN})}$ | S1117A | $V_I = (V_O + 1.5\text{V}), V_O = 0\text{V}$ | * | | 3 | 7 | mA | | |
| Adjust Pin Current | I_{ADJ} | S1117A | $V_I = (V_O + 1.5\text{V})\text{ to }7\text{V}$ $I_O = 10\text{ mA}$ | * | | 55 | 90 | μA | | |
| Dropout Voltage (Note4) | V_{DROPO} | All | $I_O = 1000\text{ mA}$ | * | - | 1.2 | 1.3 | V | | |
| Ripple Rejection (Note3) | RR | All | $V_I - V_O = 1.5\text{V}, I_O = 1000\text{ mA}$ $V_{\text{Ripple}} = 1\text{V}_{\text{P-P}}, f = 120\text{ Hz}$ | | 60 | 72 | - | dB | | |
| Current Limit | I_{LIMIT} | All | $(V_I - V_O) = 1.5\text{V}$ | * | 1 | | | A | | |

The * denotes the specifications which apply over the full temperature range.

Note 2: Low duty pulse testing with Kelvin connections required.

Note 3: 120 Hz input ripple (C_{ADJ} for ADJ=25 μF)

Note 4: $\Delta V_O = 1\%$

■ Typical Applications

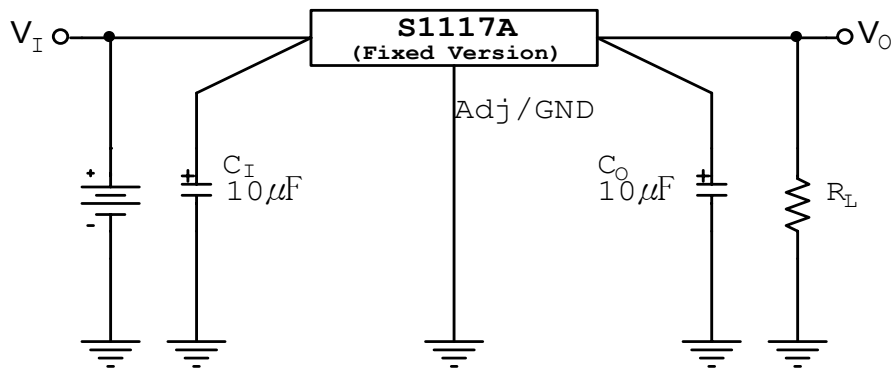
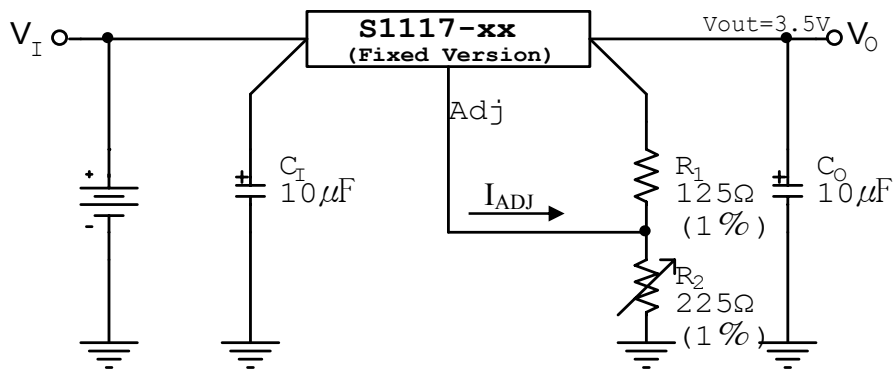


Fig. 1 Fixed Voltage Regulator



$$V_O = V_{ADJ} * (1 + R_2/R_1) + I_{ADJ} * R_2$$

Fig. 2 Adjustable Voltage Regulator

Notes:

- 1) C_I needed if device is far from filter capacitors
- 2) C_O minimum value required for stability

Electrical Characteristic Curves

Fig. 3 V_{DROP} vs. I_O

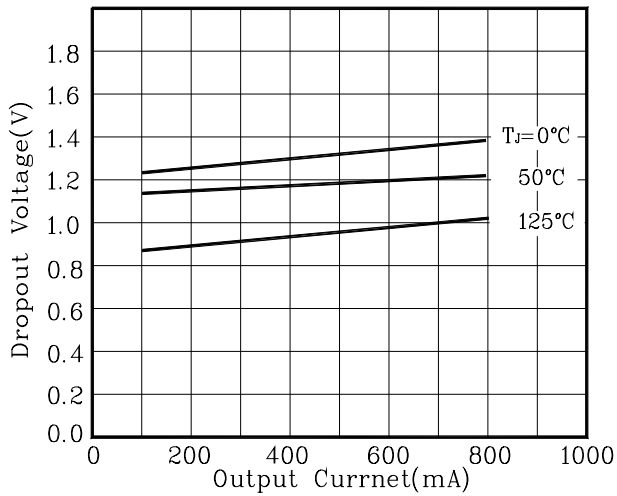


Fig. 4 ΔV_O vs. T_a

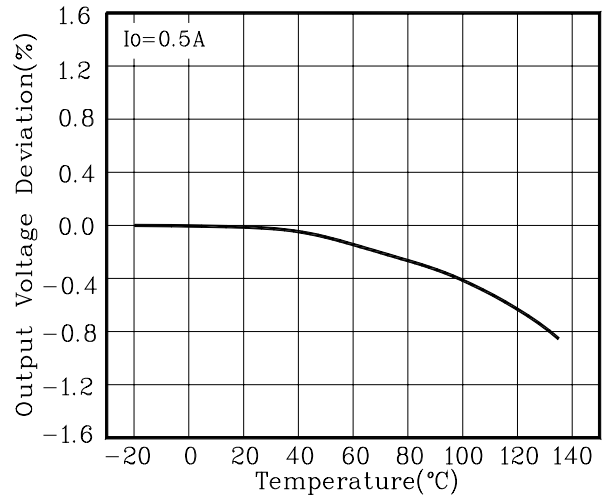


Fig. 5 RR vs. Frequency

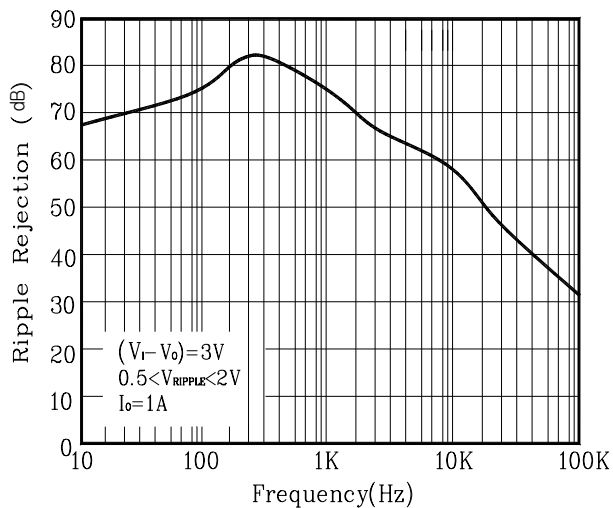


Fig. 6 Temperature Stability

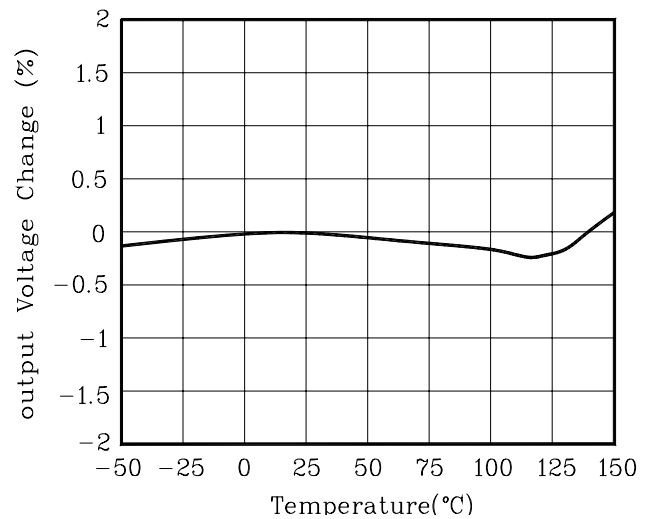


Fig. 7 I_{ADJ} vs. T_a

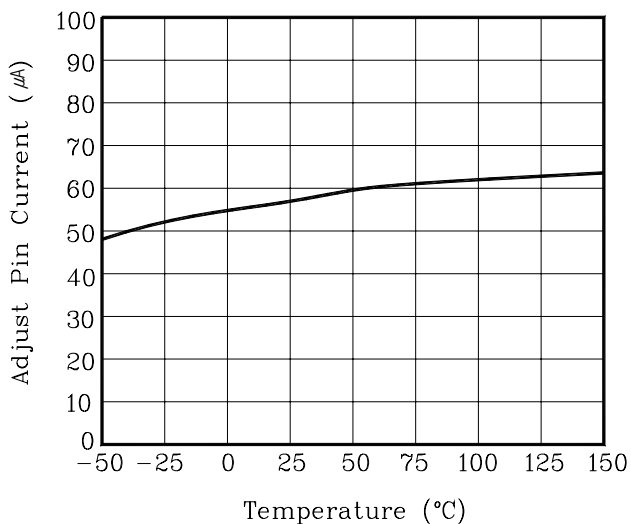
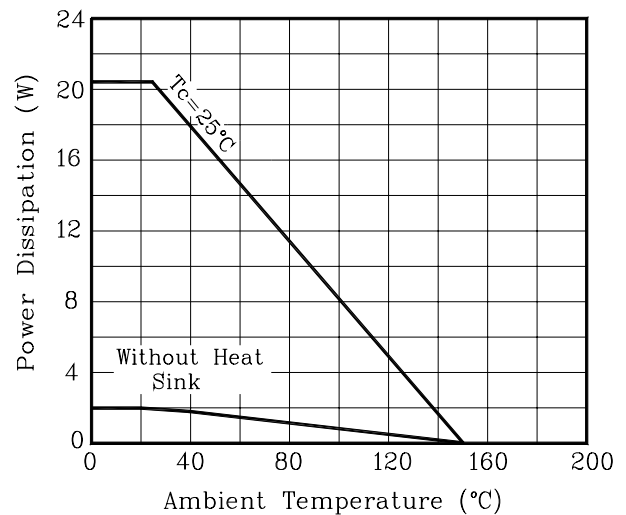


Fig. 8 P_D vs. T_a



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