AUK Semiconductor

# S1117AQ/S1117-xxQ

**Adjustable and Fixed Voltage Regulator**

## 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

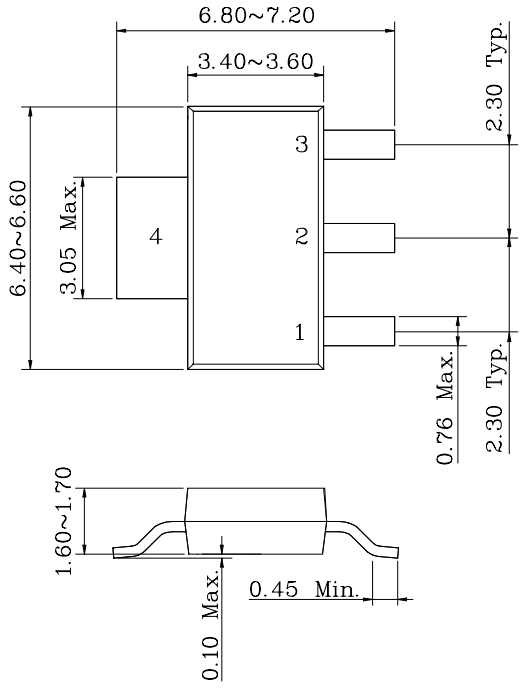
- Adjustable or fixed output
- Output current of 1A
- Low dropout, 1.3V maximum at 1A output current
- Thermal shutdown protection

## Ordering Information

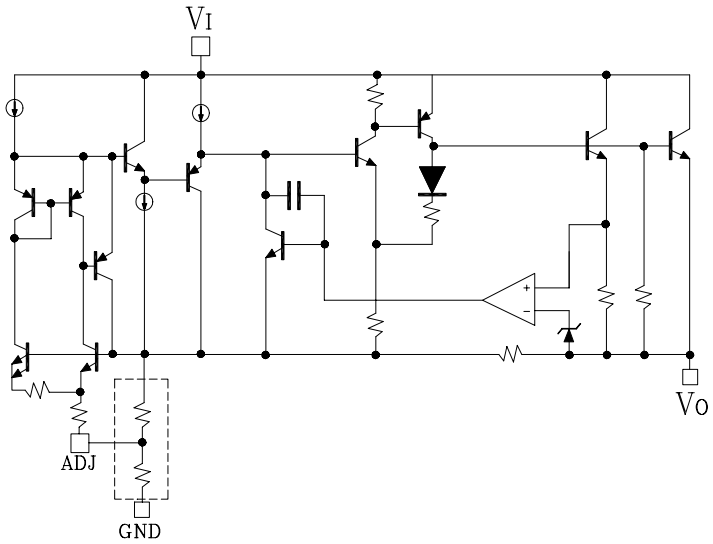
| Type NO. | Marking | Package Code |
|---|---|---|
| S1117AQ/S1117xxQ | S1117□□Q / S1117□□□Q | SOT-223 |

□□: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.
2,4 Output
3. Input

## Absolute Maximum Ratings

[Ta=25°C]

| Characteristic | Symbol | Rating | Unit |
|---|---|---|---|
| Input voltage | $V_I$ | 16 | V |
| Power Dissipation | $P_D1$(Note1) | 2.8 | W |
| | $P_D2$(Note2) | 0.8 | |
| Junction Temperature | $T_J$ | 150 | °C |
| Operating temperature range | $T_{opr}$ | 0 ~ +125 | ℃ |
| Storage temperature range | $T_{stg}$ | -55 ~ +150 | °C |

Note 1 : Mounted on a glass epoxy circuit board of 25.4 × 25.4mm. (at 1oz copper area)

Note 2 : No Heat sink

## Recommended operating conditions

| Characteristic | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Input voltage | $V_I$ | $V_O$+1.5V | $V_O$+7V | V |
| Output current | $I_O$ | 1 | 1000 | mA |

## Device Selection Guide

| Device | Output Voltage |
|---|---|
| S1117AQ | Adjustable |
| S1117-15Q | 1.50V |
| S1117-18Q | 1.80V |
| S1117-25Q | 2.50V |
| S1117-285Q | 2.85V |
| S1117-33Q | 3.30V |
| S1117-50Q | 5.00V |

Note 3 : Other fixed versions are available $V_O$=1.5V ~ 5V

## Electrical Characteristics

(Electrical Characteristics at 0℃≤$T_a$≤125℃ and $V_I$=($V_O$+1.5V), Io=10mA, $C_O$=10μF, unless otherwise specified.)

| Characteristic | Symbol | Device | Test Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|---|
| Output voltage | $V_O$ | S1117A | | * | 1.23 | 1.25 | 1.28 | V |
| | | | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 0 to 1000mA | | 1.20 | | 1.30 | |
| | | S1117-15 | | * | 1.47 | 1.50 | 1.53 | |
| | | | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 0 to 1000mA | | 1.44 | | 1.56 | |
| | | S1117-18 | | * | 1.76 | 1.80 | 1.84 | |
| | | | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 0 to 1000mA | | 1.73 | | 1.87 | |
| | | S1117-25 | | * | 2.45 | 2.50 | 2.55 | |
| | | | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 0 to 1000mA | | 2.40 | | 2.60 | |
| | | S1117-285 | | * | 2.79 | 2.85 | 2.91 | |
| | | | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 0 to 1000mA | | 2.74 | | 2.96 | |
| | | S1117-33 | | * | 3.23 | 3.30 | 3.37 | |
| | | | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 0 to 1000mA | | 3.17 | | 3.43 | |
| | | S1117-50 | | * | 4.90 | 5.00 | 5.10 | |
| | | | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 0 to 1000mA | | 4.80 | | 5.20 | |
| Line regulation (Note4) | $\lvert \triangle V_{O(\triangle VI)} \rvert$ | All | 1.5V≤ $V_I$-$V_O$≤7V<br>$I_O$=10mA | * | - | 5 | 10 | mV |
| Load regulation (Note4) | $\lvert \triangle V_{O(\triangle IL)} \rvert$ | All | 1.5V≤ $V_I$-$V_O$≤7V<br>$I_O$=10mA ~ 1000mA | * | - | 10 | 30 | mV |
| Quiescent current | $I_{QC}$ | All | $I_O$=0 | | - | 7 | 13 | mA |
| Minimum load current | $I_{L(MIN)}$ | S1117A | $V_{Adj}$=0V | | | 3 | 7 | mA |
| Adjust pin current | $I_{ADJ}$ | S1117A | $V_I$ = ($V_O$+1.5V) to 7V<br>$I_O$ = 100mA | | | 55 | 90 | μA |
| Adjust pin current change | $\lvert \Delta I_{ADJ} \rvert$ | S1117A | 1.5V ≤ $V_I$ - $V_O$ ≤ 7V<br>$I_O$=10mA ~ 1000mA | | | 1 | 5 | μA |
| Dropout voltage | $V_{DROP}$ | All | $I_O$ =1000mA | * | - | 1.2 | 1.3 | V |
| Ripple rejection ratio | RR | All | $I_O$=1000mA<br>$V_{Ripple}$=1$V_{P-P}$ , f=120 Hz | * | 60 | 72 | - | dB |
| Current limit | $I_{LIMIT}$ | All | $I_O$≥1000mA | * | 1.1 | | | A |

[ * ] Ta=25℃

Note 4: Low duty pulse testing with Kelvin connections required.

## ■ Typical Applications

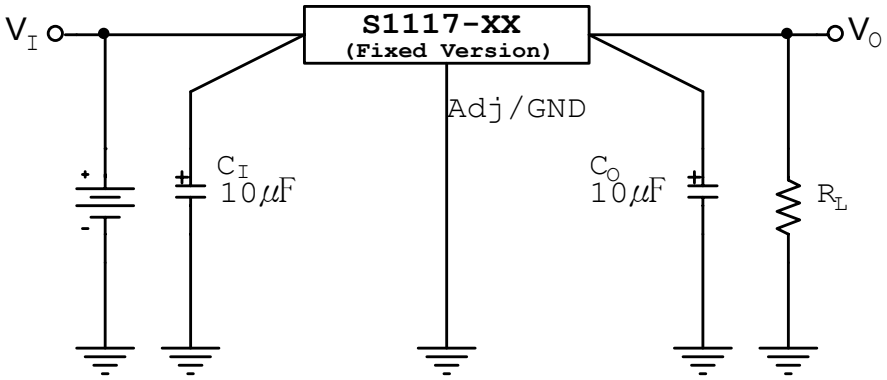
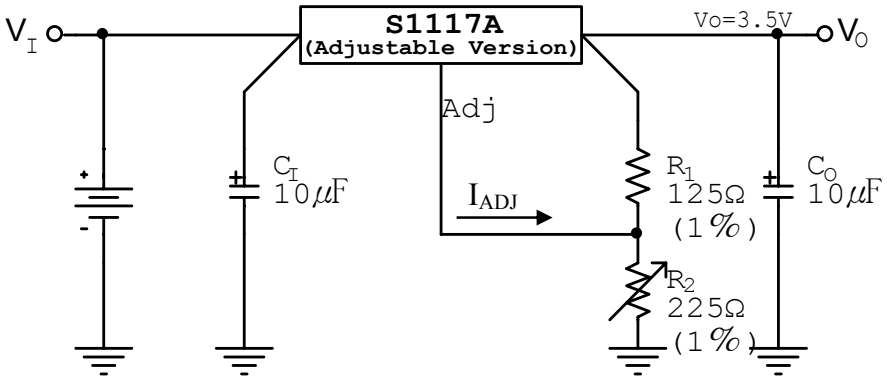



Fig. 1 Fixed Voltage Regulator




$$Vo = V_{ADJ} \times (1 + \frac{R_2}{R_1}) + I_{ADJ} \times R_2$$

Fig. 2 Adjustable Voltage Regulator

Notes 5:

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 $I_O$**

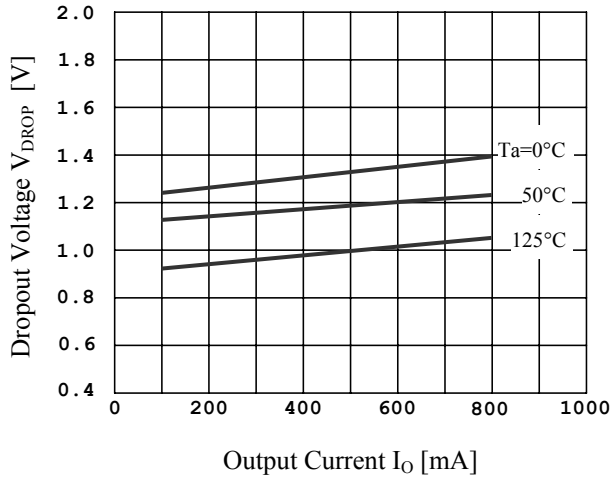



**Fig.4 Vo vs $T_a$**

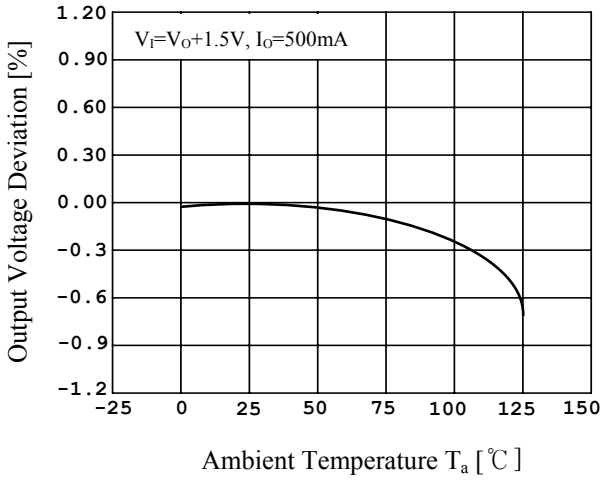



**Fig.5 $I_{L(MIN)}$ vs $V_I$-$V_O$**

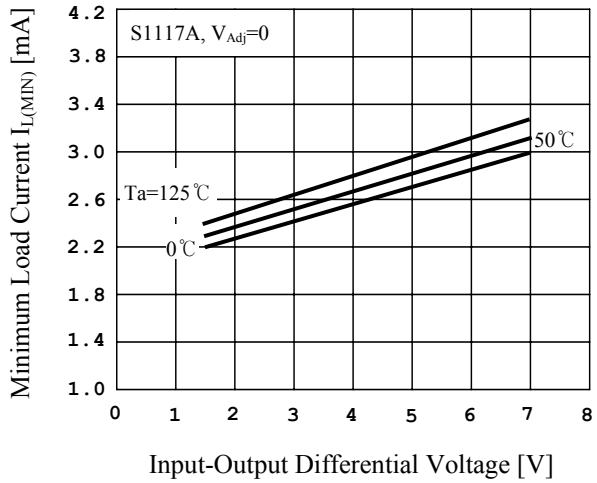



**Fig.6 $I_{Adj}$ vs Ta**

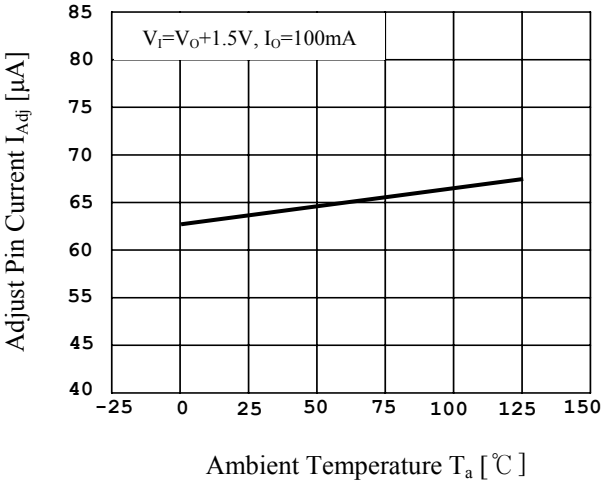
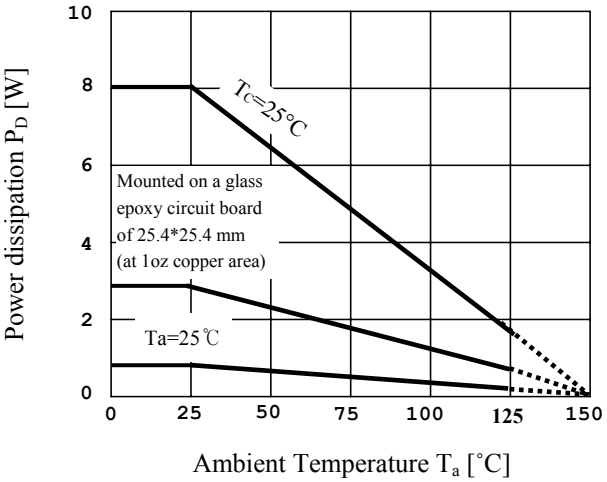



**Fig.7 $P_D$ vs $T_a$**



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