

**3-TERMINAL 1.5A POSITIVE ADJUSTABLE REGULATOR**

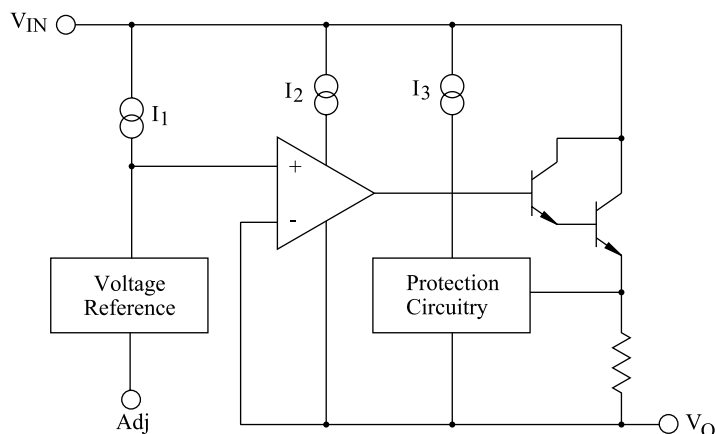
The KIA317F/FP/PI/S is adjustable 3-terminal positive voltage regulator capable of supplying in excess of 1.5A over a 1.25V to 37V output range. This is exceptionally easy to use and require only two external resistors to set the output voltage. Further, both line and load regulation are better than standard fixed regulators.

**FEATURES**

- Adjustable output between 1.25V and 37V
- Guaranteed 1.5A output current
- Line regulation typically 0.001%/V
- Load regulation typically 0.1%
- 80dB ripple rejection (with Cadj)
- Internal thermal overload protection
- Internal short-circuit current limiting
- Output transistor safe-area compensation

**MAXIMUM RATINGS** (Ta=25°C)

| CHARACTERISTIC                     |    |         | SYMBOL       | RATING  | UNIT |
|------------------------------------|----|---------|--------------|---------|------|
| Input-Output Voltage Differential  |    |         | $V_{IN}$     | 40      | V    |
| Output Current                     |    |         | $I_{OUT}$    | 1.5     | A    |
| Power Dissipation<br>(No Heatsink) | F  | DPAK    | $P_D$        | 1.3     | W    |
|                                    | PI | TO-221S |              | 2.0     |      |
| Maximum Junction Temperature       |    |         | $T_{j(max)}$ | 150     | °C   |
| Operating Junction Temperature     |    |         | $T_{opr}$    | -30 125 | °C   |
| Storage Temperature                |    |         | $T_{stg}$    | -65 150 | °C   |
| Lead Temperature                   |    |         | $T_{lead}$   | 230     | °C   |

**BLOCK DIAGRAM**

# KIA317F/PI

## ELECTRICAL CHARACTERISTICS (Ta=25°C)

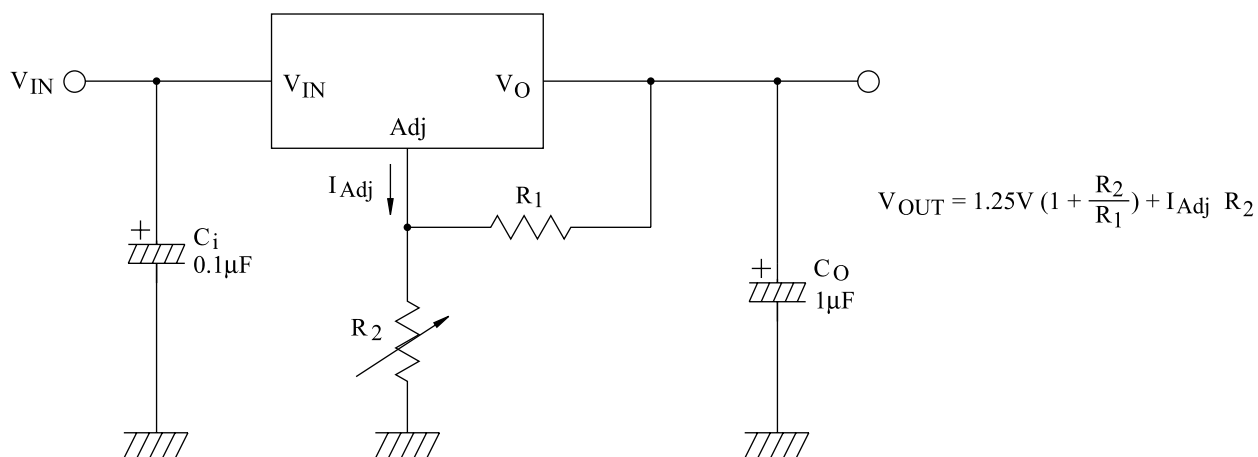
(V<sub>I</sub>-V<sub>O</sub>=5V, I<sub>O</sub>=0.5A, 0°C≤T<sub>j</sub>≤125°C, I<sub>MAX</sub>=1.5A, unless otherwise specified.)

| CHARACTERISTIC                              | SYMBOL                    | TEST CONDITION                                                                                           | MIN. | TYP.   | MAX. | UNIT  |
|---------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------|------|--------|------|-------|
| Line Regulation                             | $\Delta V_O(\text{Line})$ | Ta=25°C,<br>I <sub>O</sub> =10mA                                                                         | -    | 0.01   | 0.04 | % / V |
|                                             |                           | Ta=0 125°C,<br>I <sub>O</sub> =10mA                                                                      |      | 0.02   | 0.07 |       |
| Load Regulation                             | $\Delta V_O(\text{Load})$ | Ta=25°C,                                                                                                 | -    | 0.1    | 0.5  | %     |
|                                             |                           | Ta=0 125°C,                                                                                              | -    | 0.3    | 1.5  |       |
| Adjustable Pin Current                      | I <sub>Adj</sub>          |                                                                                                          | -    | 50     | 100  | μA    |
| Adjustable Pin Current Change               | $\Delta I_{\text{Adj}}$   | 10mA≤I <sub>O</sub> ≤I <sub>MAX</sub> , 3V≤V <sub>IN</sub> -V <sub>OUT</sub> ≤40V                        | -    | 0.2    | 5    | μA    |
| Reference Voltage                           | V <sub>ref</sub>          | 10mA≤I <sub>O</sub> ≤I <sub>MAX</sub> , 3V≤V <sub>IN</sub> -V <sub>OUT</sub> ≤40V,<br>P≤P <sub>MAX</sub> | 1.20 | 1.25   | 1.30 | V     |
| Temperature Stability                       | ST <sub>T</sub>           | T <sub>Min</sub> ≤T <sub>j</sub> ≤T <sub>MAX</sub>                                                       | -    | 1      | -    | %     |
| Minimum Load Current to Maintain Regulation | I <sub>O(MIN)</sub>       | (V <sub>IN</sub> -V <sub>OUT</sub> )=40V                                                                 | -    | 3.5    | 10   | mA    |
| Current Limit                               | I <sub>O(MAX)</sub>       | (V <sub>IN</sub> -V <sub>OUT</sub> )≤15V, P≤P <sub>MAX</sub>                                             | 1.5  | 2.2    | 3.4  | A     |
|                                             |                           | (V <sub>IN</sub> -V <sub>OUT</sub> )≤40V, P≤P <sub>MAX</sub> , Ta=25°C                                   | 0.15 | 0.4    | -    | A     |
| Output Noise Voltage                        | V <sub>NO</sub>           | Ta=25°C, 10Hz≤f≤10kHz, % of V <sub>OUT</sub>                                                             | -    | 0.0003 | -    | %     |
| Ripple Rejection Ratio                      | RR                        | V <sub>O</sub> =10V, f=120Hz                                                                             | -    | 65     | -    | dB    |
|                                             |                           | C <sub>Adj</sub> =10μF                                                                                   | 66   | 80     | -    |       |
| Long Term Stability                         | ST                        | Ta=25°C for end point measurement,<br>1000 Hr                                                            | -    | 0.3    | 1    | %     |

Note : Load and line regulation are specified at constant junction temperature.

Change in V<sub>O</sub> due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## TYPICAL APPLICATION (PROGRAMMABLE REGULATOR)



C<sub>i</sub> is required when regulator is located an appreciable distance from power supply filter.

C<sub>O</sub> is not needed for stability, however, in the range of 1μF to 100μF of aluminum or tantalum electrolytic are commonly used to provide improved output impedance and rejection of transients.

Since I<sub>Adj</sub> is controlled to less than 100μA, the error associated with this term is negligible in most applications.

Fig1. Load Regulation

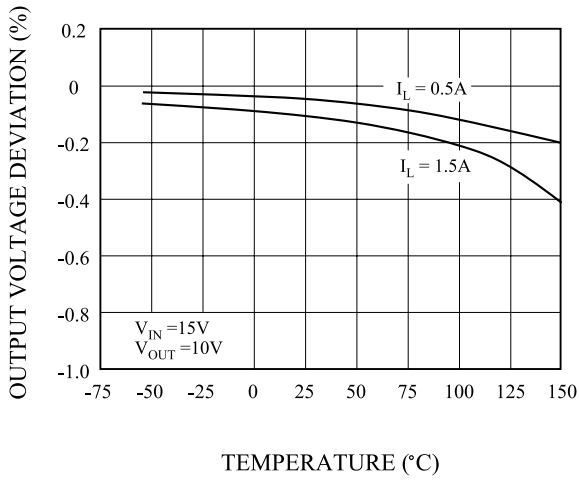


Fig2. Current Limit

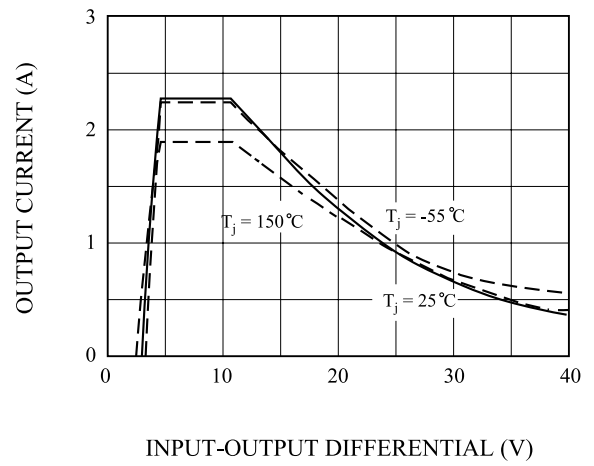


Fig3. Adjustment Current

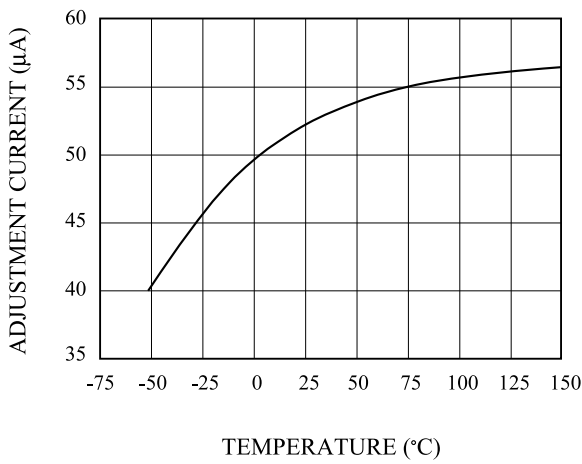


Fig4. Dropout Voltage

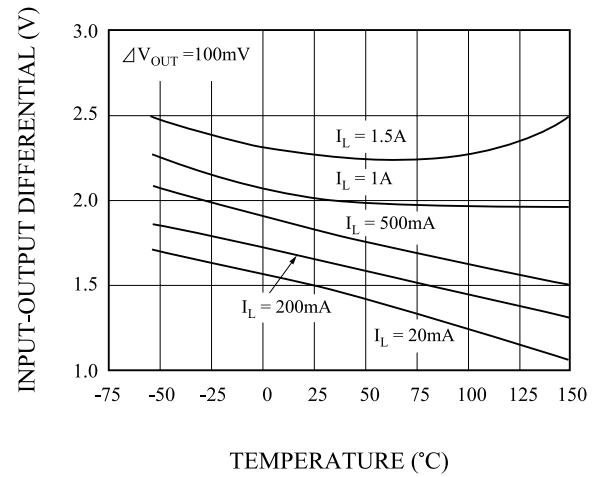


Fig5. Temperature Stability

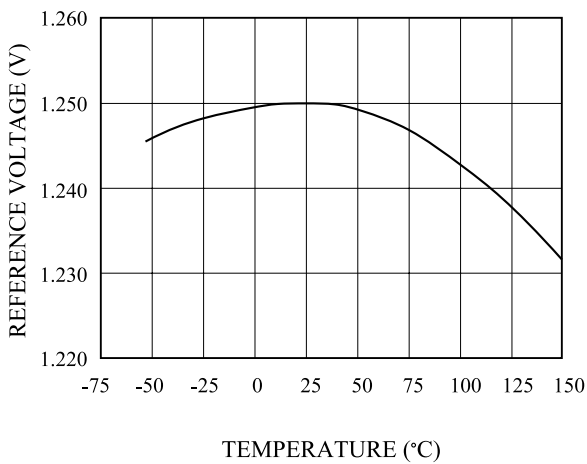


Fig6. Minimum Operating Current

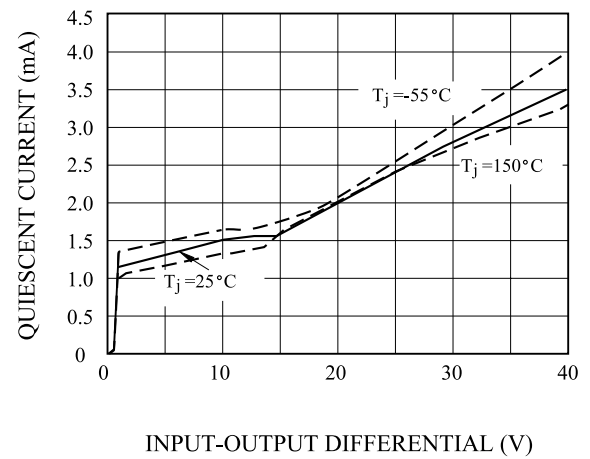


Fig7. Ripple Rejection

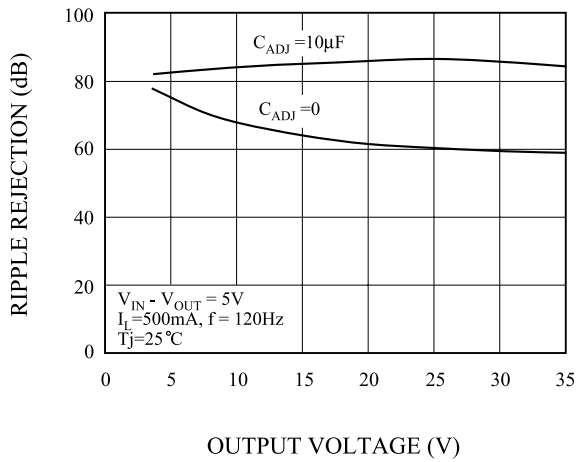


Fig8. Ripple Rejection

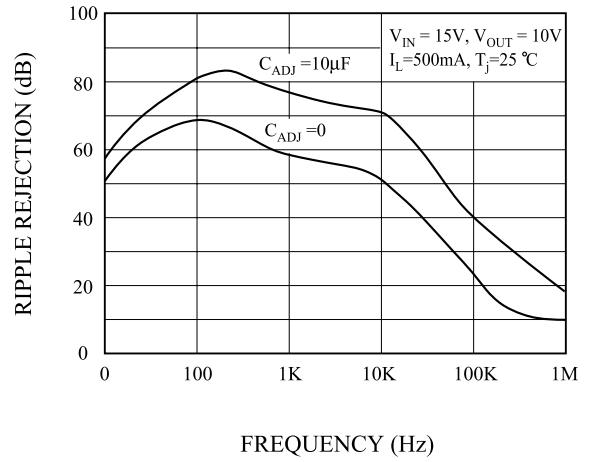


Fig9. Ripple Rejection

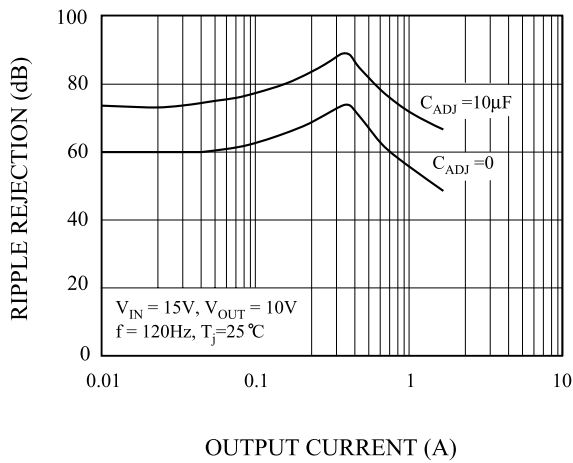


Fig10. Output Impedance

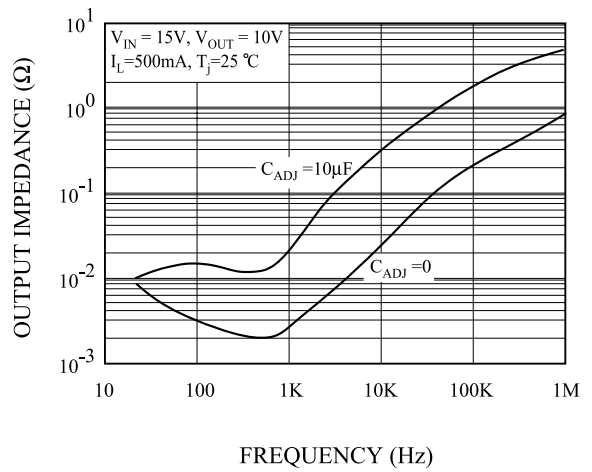


Fig11. Line Transient Response

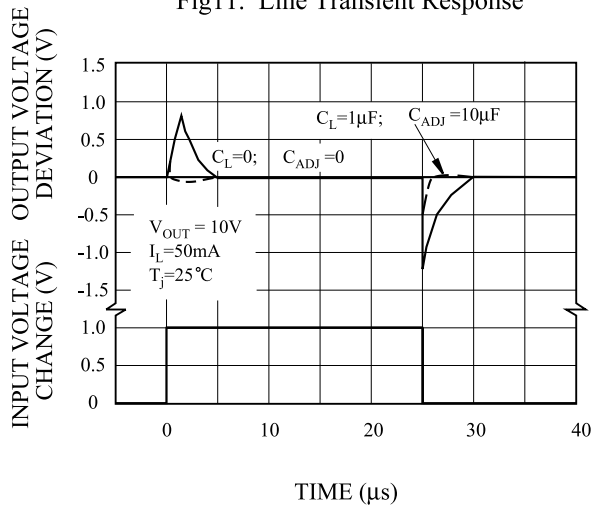


Fig12. Line Transient Response

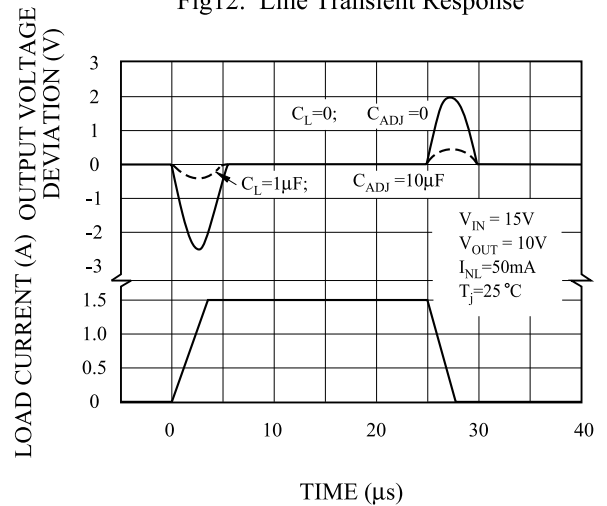


Fig13. Power Dissipation-2 (DPAK)

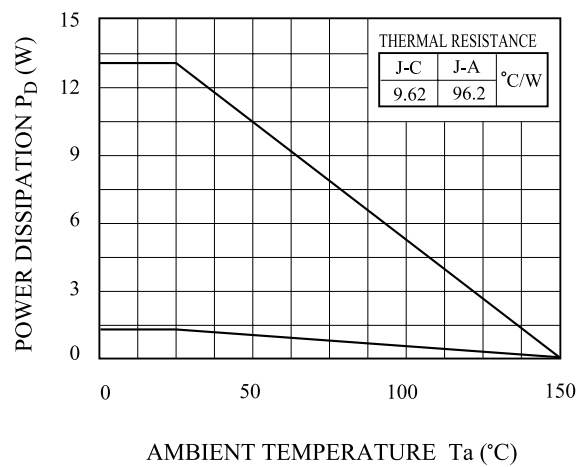
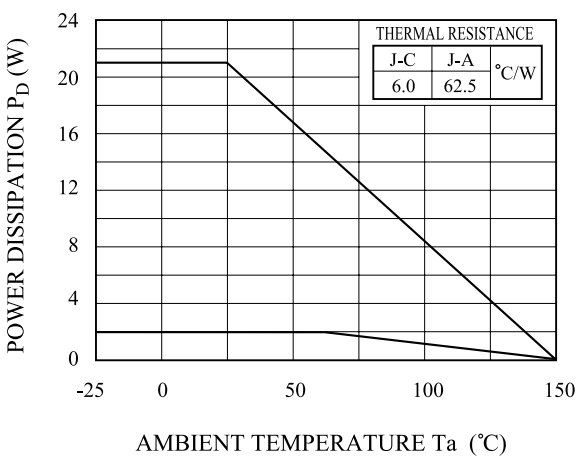


Fig14. Power Dissipation-1 (TO-220IS)



# KIA317F/PI

