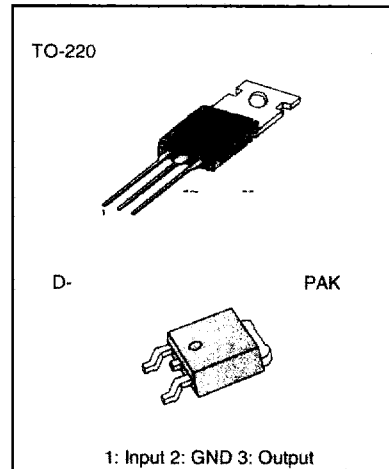


3-TERMINAL 1A POSITIVE VOLTAGE REGULATORS

The KA78XX series of three-terminal positive regulators are available in the TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents

FEATURES

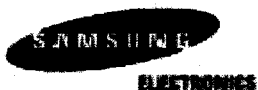
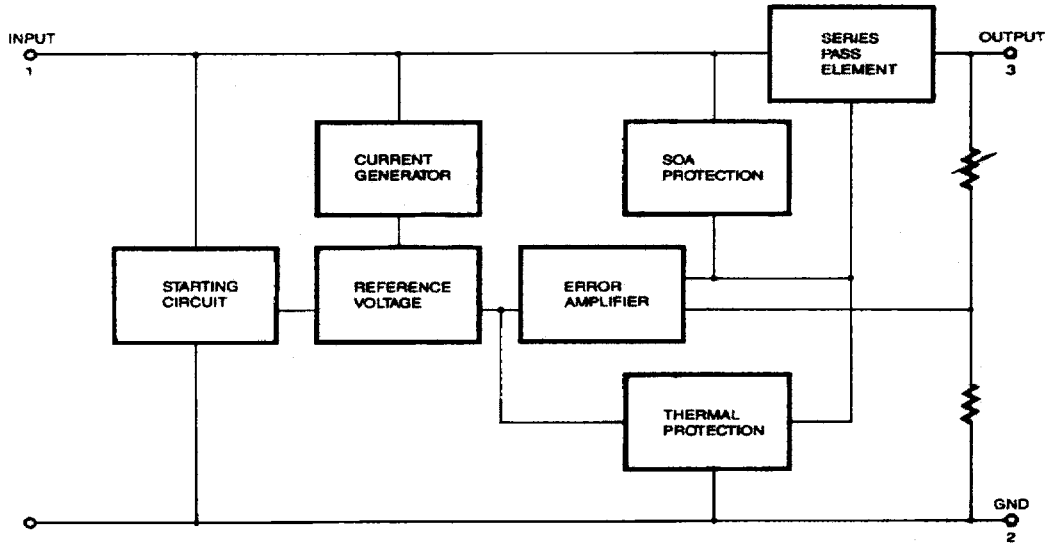
- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 11, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor SOA Protection



ORDERING INFORMATION

| Device | Package | Operating Temperature |
|----------|---------|-----------------------|
| KA78XX | TO-220 | 0 ~ +125°C |
| KA78XXA | TO-220 | |
| KA78XXI | TO-220 | -40 ~ +125°C |
| KA78XXR | D-PAK | 0 ~ +125°C |
| KA78XXRA | D-PAK | |
| KA78XXRI | D-PAK | -40 ~ +125°C |

BLOCK DIAGRAM



SAMSS00092

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

| Characteristic | Symbol | Value | Unit |
|---|-----------------|-----------|---------------------------|
| Input Voltage (for $V_O = 5\text{V}$ to 18V) (for $V_O = 24\text{V}$) | V_I | 35 | V |
| | V_I | 40 | V |
| Thermal Resistance Junction-Cases | $R_{\theta JC}$ | 5 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance Junction-Air | $R_{\theta JA}$ | 65 | $^\circ\text{C}/\text{W}$ |
| Operating Temperature Range KA78XX/A KA78XXI | T_{OPR} | 0~ +125 | $^\circ\text{C}$ |
| | | -40~ +125 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{STG} | -65~ +150 | $^\circ\text{C}$ |

KA7805/I ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500\text{mA}$, $V_I = 10\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7805I | | | KA7805 | | | Unit |
|--------------------------|-------------------------|--|--|------|------|--------|-----|----------------------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 4.8 | 5.0 | 5.2 | 4.8 | 5.0 | 5.2 | V |
| | | $5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_O \leq 15\text{W}$ $V_I = 7\text{V}$ to 20V $V_I = 8\text{V}$ to 20V | 4.75 | 5.0 | 5.25 | 4.75 | 5.0 | 5.25 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $V_O = 7\text{V}$ to 25V | 4.0 | 100 | 4.0 | 100 | mV | |
| | | | $V_I = 8\text{V}$ to 12V | 1.6 | 50 | 1.6 | 50 | | |
| Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $I_O = 5.0\text{mA}$ to 1.5A | 9 | 100 | 9 | 100 | mV | |
| | | | $I_O = 250\text{mA}$ to 750mA | 4 | 50 | 4 | 50 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.0 | 8 | 5.0 | 8 | mA | |
| Quiescent Current Change | ΔI_Q | $I_O = 5\text{mA}$ to 1.0A | | 0.03 | 0.5 | 0.03 | 0.5 | mA | |
| | | $V_I = 7\text{V}$ to 25V | | | | 0.3 | 1.3 | | |
| | | $V_I = 8\text{V}$ to 25V | | 0.3 | 1.3 | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | | -0.8 | | -0.8 | | mV/ $^\circ\text{C}$ | |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100kHz , $T_A = 25^\circ\text{C}$ | | 42 | | 42 | | μV | |
| Ripple Rejection | RR | $f = 120\text{Hz}$ $V_O = 8$ to 18V | 62 | 73 | | 62 | 73 | dB | |
| Dropout Voltage | V_O | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | 2 | | V | |
| Output Resistance | R_O | $f = 1\text{kHz}$ | | 15 | | 15 | | $\text{m}\Omega$ | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 230 | | 230 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | 2.2 | | A | |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI; $T_{MIN} = -40^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ KA78XX; $T_{MIN} = 0^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ * Load and line regulation are specified at constant junction temperature. Changes in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7806/ ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500mA$, $V_I = 11V$, $C_I = 0.33 \mu F$, $C_O = 0.1 \mu F$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7806I | | | KA7806 | | | Unit |
|--------------------------|-------------------------|---|-----------------------|------|------|--------|------|------------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ C$ | 5.75 | 6.0 | 6.25 | 5.75 | 6.0 | 6.25 | V |
| | | $5.0mA \leq I_O \leq 1.0A$, $P_O \leq 15W$ $V_I = 8.0V$ to 21V $V_I = 9.0V$ to 21V | 5.7 | 6.0 | 6.3 | 5.7 | 6.0 | 6.3 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ C$ | $V_I = 8V$ to 25V | 5 | 120 | | 5 | 120 | mV |
| | | | $V_I = 9V$ to 13V | 1.5 | 60 | | 1.5 | 60 | |
| Load Regulation | ΔV_O | $T_J = 25^\circ C$ | $I_O = 5mA$ to 1.5A | 9 | 120 | | 9 | 120 | mV |
| | | | $I_O = 250mA$ to 750A | 3 | 60 | | 3 | 60 | |
| Quiescent Current | I_Q | $T_J = 25^\circ C$ | | 5.0 | 8 | | 5.0 | 8 | mA |
| Quiescent Current Change | ΔI_Q | $T_J = 25^\circ C$ | $I_O = 5mA$ to 1A | | 0.5 | | | 0.5 | mA |
| | | | $V_I = 8V$ to 25V | | | | | 1.3 | |
| | | | $V_I = 9V$ to 25V | | | 1.3 | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5mA$ | | -0.8 | | | -0.8 | mV/°C | |
| Output Noise Voltage | V_N | $f = 10Hz$ to 100KHz, $T_A = 25^\circ C$ | | 45 | | | 45 | μV | |
| Ripple Rejection | RR | $f = 120Hz$ $V_I = 9V$ to 19V | 59 | 75 | | 59 | 75 | dB | |
| Dropout Voltage | V_D | $I_O = 1A$, $T_J = 25^\circ C$ | | 2 | | | 2 | V | |
| Output Resistance | R_O | $f = 1KHz$ | | 19 | | | 19 | m Ω | |
| Short Circuit Current | I_{SC} | $V_I = 35V$, $T_A = 25^\circ C$ | | 250 | | | 250 | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ C$ | | 2.2 | | | 2.2 | A | |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ C$, $T_{MAX} = 125^\circ C$ KA78XX, $T_{MIN} = 0^\circ C$, $T_{MAX} = 125^\circ C$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7808/I ELECTRICAL CHARACTERISTICS(Refer to test Circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500mA$, $V_I = 14V$, $C_I = 0.33 \mu F$, $C_O = 0.1 \mu F$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7808I | | | KA7808 | | | Unit |
|--------------------------|-------------------------|---|--------------------------|------|-----|--------|------|-----|----------------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ C$ | 7.7 | 8.0 | 8.3 | 7.7 | 8.0 | 8.3 | V |
| | | $5.0mA \leq I_O \leq 1.0A$, $P_O \leq 15W$ $V_I = 10.5V$ to $23V$ $V_I = 11.5V$ to $23V$ | 7.6 | 8.0 | 8.4 | 7.6 | 8.0 | 8.4 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ C$ | $V_I = 10.5V$ to $25V$ | 5.0 | 160 | | 5.0 | 160 | mV |
| | | | $V_I = 11.5V$ to $17V$ | 2.0 | 80 | | 2.0 | 80 | |
| Load Regulation | ΔV_O | $T_J = 25^\circ C$ | $I_O = 5.0mA$ to $1.5A$ | 10 | 160 | | 10 | 160 | mV |
| | | | $I_O = 250mA$ to $750mA$ | 5.0 | 80 | | 5.0 | 80 | |
| Quiescent Current | I_O | $T_J = 25^\circ C$ | | 5.0 | 8 | | 5.0 | 8 | mA |
| Quiescent Current Change | ΔI_O | $T_J = 25^\circ C$ | $I_O = 5mA$ to $1.0A$ | 0.05 | 0.5 | | 0.05 | 0.5 | mA |
| | | | $V_I = 10.5A$ to $25V$ | | | | 0.5 | 1.0 | |
| | | | $V_I = 11.5V$ to $25V$ | 0.5 | 1.0 | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5mA$ | | -0.8 | | | -0.8 | | mV/ $^\circ C$ |
| Output Noise Voltage | V_N | $f = 10Hz$ to $100KHz$, $T_A = 25^\circ C$ | | 52 | | | 52 | | μV |
| Ripple Rejection | RR | $f = 120Hz$, $V_I = 11.5V$ to 21.5 | 56 | 73 | | 56 | 73 | | dB |
| Droopout Voltage | V_D | $I_O = 1A$, $T_J = 25^\circ C$ | | 2 | | | 2 | | V |
| Output Resistance | R_O | $f = 1KHz$ | | 17 | | | 17 | | m Ω |
| Short Circuit Current | I_{SC} | $V_I = 35V$, $T_A = 25^\circ C$ | | 230 | | | 230 | | mA |
| Peak Current | I_{PK} | $T_J = 25^\circ C$ | | 2.2 | | | 2.2 | | A |

 $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ C$, $T_{MAX} = 125^\circ C$ KA78XX: $T_{MIN} = 0^\circ C$, $T_{MAX} = 125^\circ C$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7809/I ELECTRICAL CHARACTERISTICS

(Refer to test circuit. $T_{MIN} < T_J < T_{MAX}$, $I_O = 500mA$, $V_I = 15V$, $C_I = 0.33 \mu F$, $C_O = 0.1 \mu F$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7809I | | | KA7809 | | | Unit |
|--------------------------|-------------------------|---|--------------------------|-----|------|--------|-----|-----------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ C$ | 8.65 | 9 | 9.35 | 8.65 | 9 | 9.35 | V |
| | | $5.0mA \leq I_O \leq 1.0A$, $P_D \leq 15W$ $V_I = 11.5V$ to $24V$ $V_I = 12.5V$ to $24V$ | 8.6 | 9 | 9.4 | 8.6 | 9 | 9.4 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ C$ | $V_I = 11.5V$ to $25V$ | 6 | 180 | 6 | 180 | mV | |
| | | | $V_I = 12V$ to $25V$ | 2 | 90 | 2 | 90 | | |
| Load Regulation | ΔV_O | $T_J = 25^\circ C$ | $I_O = 5mA$ to $1.5A$ | 12 | 180 | 12 | 180 | mV | |
| | | | $I_O = 250mA$ to $750mA$ | 4 | 90 | 4 | 90 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ C$ | | 5.0 | 8 | 5.0 | 8 | mA | |
| Quiescent Current Change | ΔI_Q | $T_J = 25^\circ C$ | $I_O = 5mA$ to $1.0A$ | | 0.5 | | 0.5 | mA | |
| | | | $V_I = 11.5V$ to $26V$ | | | | 1.3 | | |
| | | | $V_I = 12.5V$ to $26V$ | | 1.3 | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5mA$ | | -1 | | -1 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10Hz$ to $100KHz$, $T_A = 25^\circ C$ | | 58 | | 58 | | μV | |
| Ripple Rejection | RR | $f = 120Hz$ $V_I = 13V$ to $23V$ | 56 | 71 | | 56 | 71 | dB | |
| Dropout Voltage | V_D | $I_O = 1A$, $T_J = 25^\circ C$ | | 2 | | 2 | | V | |
| Output Resistance | R_O | $f = 1KHz$ | | 17 | | 17 | | $m\Omega$ | |
| Short Circuit Current | I_{SC} | $V_I = 35V$, $T_A = 25^\circ C$ | | 250 | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ C$ | | 2.2 | | 2.2 | | A | |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ C$, $T_{MAX} = 125^\circ C$ KA78XX, $T_{MIN} = 0^\circ C$, $T_{MAX} = 125^\circ C$ * Load and line regulation are specified at constant, junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7810/I ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500\text{mA}$, $V_I = 16\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7810I | | | KA7810 | | | Unit |
|--------------------------|-------------------------|--|---------------------------------------|-----|------|--------|------------------|------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 9.6 | 10 | 10.4 | 9.6 | 10 | 10.4 | V |
| | | $5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 12.5\text{V to } 25\text{V}$ $V_I = 13.5\text{V to } 25\text{V}$ | 9.5 | 10 | 10.5 | 9.5 | 10 | 10.5 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $V_I = 12.5\text{V to } 25\text{V}$ | 10 | 200 | 10 | 200 | mV | |
| | | | $V_I = 13\text{V to } 25\text{V}$ | 3 | 100 | 3 | 100 | | |
| Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $I_O = 5\text{mA to } 1.5\text{A}$ | 12 | 200 | 12 | 200 | mV | |
| | | | $I_O = 250\text{mA to } 750\text{mA}$ | 4 | 400 | 4 | 400 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | 5.1 | 8 | 5.1 | 8 | mA | | |
| Quiescent Current Change | ΔI_Q | $I_O = 5\text{mA to } 1.0\text{A}$ | | 0.5 | | 0.5 | mA | | |
| | | $V_I = 12.5\text{V to } 29\text{V}$ | | | | 1.0 | | | |
| | | $V_I = 13.5\text{V to } 29\text{V}$ | | 1.0 | | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | | -1 | | -1 | mV/°C | | |
| Output Noise Voltage | V_N | $f = 10\text{Hz to } 100\text{kHz}$, $T_A = 25^\circ\text{C}$ | | 58 | | 58 | μV | | |
| Ripple Rejection | RR | $f = 120\text{Hz}$ $V_I = 13\text{V to } 23\text{V}$ | 56 | 71 | 56 | 71 | dB | | |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | 2 | V | | |
| Output Resistance | R_O | $f = 1\text{kHz}$ | | 17 | | 17 | $\text{m}\Omega$ | | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | 250 | mA | | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | 2.2 | A | | |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ KA78XX: $T_{MIN} = 0^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7811/ ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500\text{mA}$, $V_I = 18\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7811I | | | KA7811 | | | Unit |
|--------------------------|-------------------------|--|---------------------------------------|-----|------|--------|------------------|------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 10.6 | 11 | 11.4 | 10.6 | 11 | 11.4 | V |
| | | $5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 13.5\text{V to } 26\text{V}$ $V_I = 14.5\text{V to } 26\text{V}$ | 10.5 | 11 | 11.5 | 10.5 | 11 | 11.5 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $V_I = 13.5\text{V to } 25\text{V}$ | 10 | 220 | 10 | 220 | mV | |
| | | | $V_I = 14\text{V to } 21\text{V}$ | 3.0 | 110 | 3 | 110 | | |
| Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $I_O = 5.0\text{mA to } 1.5\text{A}$ | 12 | 220 | 12 | 220 | mV | |
| | | | $I_O = 250\text{mA to } 750\text{mA}$ | 4 | 110 | 4 | 110 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | 5.1 | 8 | 5.1 | 8 | mA | | |
| Quiescent Current Change | ΔI_Q | $T_J = 25^\circ\text{C}$ | $I_O = 5\text{mA to } 1.0\text{A}$ | | 0.5 | | 0.5 | mA | |
| | | | $V_I = 13.5\text{V to } 29\text{V}$ | | | | 1.0 | | |
| | | | $V_I = 14.5\text{V to } 29\text{V}$ | | 1.0 | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | -1 | | -1 | | mV/°C | | |
| Output Noise Voltage | V_N | $f = 10\text{Hz to } 100\text{kHz}$, $T_A = 25^\circ\text{C}$ | 70 | | 70 | | μV | | |
| Ripple Rejection | RR | $f = 120\text{Hz}$ $V_I = 14\text{V to } 24\text{V}$ | 55 | 71 | 55 | 71 | dB | | |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | 2 | | 2 | | V | | |
| Output Resistance | R_O | $f = 1\text{KHz}$ | 18 | | 18 | | $\text{m}\Omega$ | | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | 250 | | 250 | | mA | | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | 2.2 | | 2.2 | | A | | |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ KA78XX: $T_{MIN} = 0^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7812/I ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500\text{mA}$, $V_I = 19\text{V}$, $C_I = 0.33 \mu\text{F}$, $C_O = 0.1 \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7812I | | | KA7812 | | | Unit |
|--------------------------|-------------------------|--|---------------------------------------|-----|------|--------|-----|------|------------------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 11.5 | 12 | 12.5 | 11.5 | 12 | 12.5 | V |
| | | $5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 14.5\text{V to } 27\text{V}$ $V_I = 15.5\text{V to } 27\text{V}$ | 11.4 | 12 | 12.6 | 11.4 | 12 | 12.6 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $V_I = 14.5\text{V to } 30\text{V}$ | | 10 | 240 | 10 | 240 | mV |
| | | | $V_I = 16\text{V to } 22\text{V}$ | | 3.0 | 120 | 3.0 | 120 | |
| Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $I_O = 5\text{mA to } 1.5\text{A}$ | | .11 | 240 | 11 | 240 | mV |
| | | | $I_O = 250\text{mA to } 750\text{mA}$ | | 5.0 | 120 | 5.0 | 120 | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.1 | 8 | | 5.1 | 8 | mA |
| Quiescent Current Change | ΔI_Q | $I_O = 5\text{mA to } 1.0\text{A}$ | | 0.1 | 0.5 | | 0.1 | 0.5 | mA |
| | | $V_I = 14.5\text{V to } 30\text{V}$ | | | | | 0.5 | 1.0 | |
| | | $V_I = 15\text{V to } 30\text{V}$ | | | 1.0 | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | 0.5 | -1 | | | -1 | | mV/°C |
| Output Noise Voltage | V_N | $f = 10\text{Hz to } 100\text{KHz}$, $T_A = 25^\circ\text{C}$ | | 76 | | | 76 | | μV |
| Ripple Rejection | RR | $f = 120\text{Hz}$ $V_I = 15\text{V to } 25\text{V}$ | 55 | 71 | | 55 | 71 | | dB |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | | 2 | | V |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 18 | | | 18 | | $\text{m}\Omega$ |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 230 | | | 230 | | mA |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | | 2.2 | | A |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ KA78XX, $T_{MIN} = 0^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7815/I ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500mA$, $V_I = 23V$, $C_I = 0.33 \mu F$, $C_O = 0.1 \mu F$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7815I | | | KA7815 | | | Unit |
|--------------------------|-------------------------|---|--------------------------|-----|-------|--------|-----|-----------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ C$ | 14.4 | 15 | 15.6 | 14.4 | 15 | 15.6 | V |
| | | $5.0mA \leq I_O \leq 1.0A$, $P_D \leq 15W$ $V_I = 17.5V$ to $30V$ $V_I = 18.5V$ to $30V$ | 14.25 | 15 | 15.75 | 14.25 | 15 | 15.75 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ C$ | $V_I = 17.5V$ to $30V$ | 11 | 300 | 11 | 300 | mV | |
| | | | $V_I = 20V$ to $26V$ | 3 | 150 | 3 | 150 | | |
| Load Regulation | ΔV_O | $T_J = 25^\circ C$ | $I_O = 5mA$ to $1.5A$ | 12 | 300 | 12 | 300 | mV | |
| | | | $I_O = 250mA$ to $750mA$ | 4 | 150 | 4 | 150 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ C$ | | 5.2 | 8 | 5.2 | 8 | mA | |
| Quiescent Current Change | ΔI_Q | $I_O = 5mA$ to $1.0A$ | | | 0.5 | | 0.5 | mA | |
| | | $V_I = 17.5V$ to $30V$ | | | | | 1.0 | | |
| | | $V_I = 18.5V$ to $30V$ | | | 1.0 | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5mA$ | | -1 | | -1 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10Hz$ to $100kHz$, $T_A = 25^\circ C$ | | 90 | | 90 | | μV | |
| Ripple Rejection | RR | $f = 120Hz$ $V_I = 18.5V$ to $28.5V$ | 54 | 70 | | 54 | 70 | dB | |
| Dropout Voltage | V_D | $I_O = 1A$, $T_J = 25^\circ C$ | | 2 | | 2 | | V | |
| Output Resistance | R_O | $f = 1KHz$ | | 19 | | 19 | | $m\Omega$ | |
| Short Circuit Current | I_{SC} | $V_I = 35V$, $T_A = 25^\circ C$ | | 250 | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ C$ | | 2.2 | | 2.2 | | A | |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ C$, $T_{MAX} = 125^\circ C$ KA78XX: $T_{MIN} = 0^\circ C$, $T_{MAX} = 125^\circ C$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7818/I ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500\text{mA}$, $V_I = 27\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7818I | | | KA7818 | | | Unit |
|--------------------------|-------------------------|--|---------------------------------------|-----|------|--------|-----|------|------------------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 17.3 | 18 | 18.7 | 17.3 | 18 | 18.7 | V |
| | | $5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 21\text{V to } 33\text{V}$ $V_I = 22\text{V to } 33\text{V}$ | 17.1 | 18 | 18.9 | 17.1 | 18 | 18.9 | |
| Line Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $V_I = 21\text{V to } 33\text{V}$ | 15 | 360 | | 15 | 360 | mV |
| | | | $V_I = 24\text{V to } 30\text{V}$ | 5 | 180 | | 5 | 180 | |
| Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $I_O = 5\text{mA to } 1.5\text{A}$ | 15 | 360 | | 15 | 360 | mV |
| | | | $I_O = 250\text{mA to } 750\text{mA}$ | 5.0 | 180 | | 5.0 | 180 | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.2 | 8 | | 5.2 | 8 | mA |
| Quiescent Current Change | ΔI_Q | $T_J = 25^\circ\text{C}$ | $I_O = 5\text{mA to } 1.0\text{A}$ | | 0.5 | | | 0.5 | mA |
| | | | $V_I = 21\text{V to } 33\text{V}$ | | | | | 1 | |
| | | | $V_I = 22\text{V to } 33\text{V}$ | | 1.0 | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | | -1 | | | -1 | | mV/°C |
| Output Noise Voltage | V_N | $f = 10\text{Hz to } 100\text{KHz}$, $T_A = 25^\circ\text{C}$ | | 110 | | | 110 | | μV |
| Ripple Rejection | RR | $f = 120\text{Hz}$ $V_I = 22\text{V to } 32\text{V}$ | 53 | 69 | | 53 | 69 | | dB |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | | 2 | | V |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 22 | | | 22 | | $\text{m}\Omega$ |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | | 250 | | mA |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | | 2.2 | | A |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ KA78XX: $T_{MIN} = 0^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7824I ELECTRICAL CHARACTERISTICS

(Refer to test circuit, $T_{MIN} < T_J < T_{MAX}$, $I_O = 500\text{mA}$, $V_I = 33\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | KA7824I | | | KA7824 | | | Unit | |
|--------------------------|-------------------------|--|---------------------------------------|------|------|--------|------|-------|------------------|----|
| | | | Min | Typ | Max | Min | Typ | Max | | |
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 23 | 24 | 25 | 23 | 24 | 25 | V | |
| | | $5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 27\text{V to } 38\text{V}$ $V_I = 28\text{V to } 38\text{V}$ | 22.8 | 24 | 25.2 | 22.8 | 24 | 25.25 | | |
| Line Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $V_I = 27\text{V to } 38\text{V}$ | | | 17 | 480 | 17 | 480 | mV |
| | | | $V_I = 30\text{V to } 36\text{V}$ | | | 6 | 240 | 6 | 240 | |
| Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ | $I_O = 5\text{mA to } 1.5\text{A}$ | | | 15 | 480 | 15 | 480 | mV |
| | | | $I_O = 250\text{mA to } 750\text{mA}$ | | | 5.0 | 240 | 5.0 | 240 | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.2 | 8 | | 5.2 | 8 | mA | |
| Quiescent Current Change | ΔI_Q | $I_O = 5\text{mA to } 1.0\text{A}$ | | 0.1 | 0.5 | | 0.1 | 0.5 | mA | |
| | | $V_I = 27\text{V to } 38\text{V}$ | | | | | 0.5 | 1 | | |
| | | $V_I = 28\text{V to } 38\text{V}$ | | 0.5 | 1 | | | | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | | -1.5 | | | -1.5 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10\text{Hz to } 100\text{KHz}$, $T_A = 25^\circ\text{C}$ | | 160 | | | 60 | | μV | |
| Ripple Rejection | RR | $f = 120\text{Hz}$ $V_I = 28\text{V to } 38\text{V}$ | 50 | 67 | | 50 | 67 | | dB | |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | | 2 | | V | |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 28 | | | 28 | | $\text{m}\Omega$ | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 230 | | | 230 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | | 2.2 | | A | |

* $T_{MIN} < T_J < T_{MAX}$ KA78XXI: $T_{MIN} = -40^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ KA78XX: $T_{MIN} = 0^\circ\text{C}$, $T_{MAX} = 125^\circ\text{C}$ * Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7805A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 125°C , $I_o = 1\text{A}$, $V_i = 10\text{V}$, $C_i = 0.33\ \mu\text{F}$, $C_o = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--------------------------|-------------------------------|--|--|------|----------|---------------------------|
| Output Voltage | V_o | $T_J = 25^\circ\text{C}$ | 4.9 | 5 | 5.1 | V |
| | | $I_o = 5\text{mA}$ to 1A , $P_o \leq 15\text{W}$ $V_i = 7.5$ to 20V | 4.8 | 5 | 5.2 | |
| * Line Regulation | ΔV_o | $V_i = 7.5$ to 25V $I_o = 500\text{mA}$ | | 5 | 50 | V |
| | | $V_i = 8\text{V}$ to 12V | | 3 | 50 | |
| | | $T_J = 25^\circ\text{C}$ | $V_i = 7.3\text{V}$ to 25V $V_i = 8\text{V}$ to 12V | | 5 1.5 | |
| * Load Regulation | ΔV_o | $T_J = 25^\circ\text{C}$ $I_o = 5\text{mA}$ to 1.5A | | 9 | 100 | V |
| | | $I_o = 5\text{mA}$ to 1A | | 9 | 100 | |
| | | $I_o = 250$ to 750mA | | 4 | 50 | |
| Quiescent Current | I_o | $T_J = 25^\circ\text{C}$ | | 5.0 | 6 | mA |
| Quiescent Current Change | ΔI_o | $I_o = 5\text{mA}$ to 1A | | | 0.5 | mA |
| | | $V_i = 8\text{V}$ to 25V , $I_o = 500\text{mA}$ | | | 0.8 | |
| | | $V_i = 7.5\text{V}$ to 20V , $T_J = 25^\circ\text{C}$ | | | 0.8 | |
| Output Voltage Drift | $\frac{\Delta V_o}{\Delta T}$ | $I_o = 5\text{mA}$ | | -0.8 | | mV/ $^\circ\text{C}$ |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100KHz $T_A = 25^\circ\text{C}$ | | 10 | | $\frac{\mu\text{V}}{V_o}$ |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_o = 500\text{mA}$ $V_i = 8\text{V}$ to 18V | | 68 | | dB |
| Dropout Voltage | V_D | $I_o = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | V |
| Output Resistance | R_o | $f = 1\text{KHz}$ | | 17 | | $\text{m}\Omega$ |
| Short Circuit Current | I_{SC} | $V_i = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A |

* Load and line regulation are specified at constant, junction temperature. Change in V_o due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7806A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 150°C , $I_O = 1\text{A}$, $V_I = 11\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--------------------------|-------------------------------|--|-------------------------------------|------|------|---------------------------|----|
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 5.58 | 6 | 6.12 | V | |
| | | $I_O = 5\text{mA}$ to 1A , $P_D \leq 15\text{W}$ $V_I = 8.6$ to 21V | 5.76 | 6 | 6.24 | | |
| * Line Regulation | ΔV_O | $V_I = 8.6$ to 25V $I_O = 500\text{mA}$ | | 5 | 60 | mV | |
| | | $V_I = 9\text{V}$ to 13V | | 3 | 60 | | |
| | | $T_J = 25^\circ\text{C}$ | $V_I = 8.3\text{V}$ to 21V | | 5 | | 60 |
| | | | $V_I = 9\text{V}$ to 13V | | 1.5 | | 30 |
| * Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A | | 9 | 100 | mV | |
| | | $I_O = 5\text{mA}$ to 1A | | 4 | 100 | | |
| | | $I_O = 250$ to 750mA | | 5.0 | 50 | | |
| | | | | | | | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 4.3 | 6 | mA | |
| Quiescent Current Change | ΔI_Q | $I_O = 5\text{mA}$ to 1A | | | 0.5 | mA | |
| | | $V_I = 9\text{V}$ to 25V , $I_O = 500\text{mA}$ | | | 0.8 | | |
| | | $V_I = 8.5\text{V}$ to 21V , $T_J = 25^\circ\text{C}$ | | | 0.8 | | |
| Output Voltage Drift | $\frac{\Delta V_O}{\Delta T}$ | $I_O = 5\text{mA}$ | | -0.8 | | mV/ $^\circ\text{C}$ | |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100KHz $T_A = 25^\circ\text{C}$ | | 10 | | $\frac{\mu\text{V}}{V_O}$ | |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 9\text{V}$ to 19V | | 65 | | dB | |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | V | |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 17 | | $\text{m}\Omega$ | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A | |

* Load and line regulation are specified at constant, junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7808A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 150°C , $I_o = 1\text{A}$, $V_i = 14\text{V}$, $C_1 = 0.33\ \mu\text{F}$, $C_o = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--------------------------|-------------------------------|--|--------------------------------------|------|------|---------------------------|----|
| Output Voltage | V_o | $T_J = 25^\circ\text{C}$ | 7.84 | 8 | 8.16 | V | |
| | | $I_o = 5\text{mA}$ to 1A , $P_D \leq 15\text{W}$ $V_i = 8.6$ to 21V | 7.7 | 8 | 8.3 | | |
| * Line Regulation | ΔV_o | $V_i = 10.6$ to 25V $I_o = 500\text{mA}$ | | 6 | 80 | mV | |
| | | $V_i = 11$ to 17V | | 3 | 80 | | |
| | | $T_J = 25^\circ\text{C}$ | $V_i = 10.4\text{V}$ to 23V | | 6 | | 80 |
| | | | $V_i = 11\text{V}$ to 17V | | 2 | | 40 |
| * Load Regulation | ΔV_o | $T_J = 25^\circ\text{C}$ $I_o = 5\text{mA}$ to 1.5A | | 12 | 100 | mV | |
| | | $I_o = 5\text{mA}$ to 1A | | 12 | 100 | | |
| | | $I_o = 250$ to 750mA | | 5 | 50 | | |
| Quiescent Current | I_o | $T_J = 25^\circ\text{C}$ | | 5.0 | 6 | mA | |
| Quiescent Current Change | ΔI_o | $I_o = 5\text{mA}$ to 1A | | | 0.5 | mA | |
| | | $V_i = 11\text{V}$ to 25V , $I_o = 500\text{mA}$ | | | 0.8 | | |
| | | $V_i = 10.6\text{V}$ to 23V , $T_J = 25^\circ\text{C}$ | | | 0.8 | | |
| Output Voltage Drift | $\frac{\Delta V_o}{\Delta T}$ | $I_o = 5\text{mA}$ | | -0.8 | | mV/ $^\circ\text{C}$ | |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100KHz $T_A = 25^\circ\text{C}$ | | 10 | | $\frac{\mu\text{V}}{V_o}$ | |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_o = 500\text{mA}$ $V_i = 11.5\text{V}$ to 21.5V | | 62 | | dB | |
| Dropout Voltage | V_D | $I_o = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2 | | V | |
| Output Resistance | R_o | $f = 1\text{KHz}$ | | 18 | | $\text{m}\Omega$ | |
| Short Circuit Current | I_{SC} | $V_i = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A | |

* Load and line regulation are specified at constant, junction temperature. Change in V_o due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7809A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 125°C , $I_O = 1\text{A}$, $V_I = 15\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--------------------------|-------------------------------|--|-------------------------------------|------|------|---------------------------|----|
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 8.82 | 9.0 | 9.18 | V | |
| | | $I_O = 5\text{mA to } 1\text{A}$, $P_D \leq 15\text{W}$ $V_I = 11.2\text{ to } 24\text{V}$ | 8.65 | 9.0 | 9.35 | | |
| * Line Regulation | ΔV_O | $V_I = 11.7\text{ to } 25\text{V}$ $I_O = 500\text{mA}$ | | 6 | 90 | mV | |
| | | $V_I = 12.5\text{ to } 19\text{V}$ | | 4 | 45 | | |
| | | $T_J = 25^\circ\text{C}$ | $V_I = 11.5\text{V to } 24\text{V}$ | | 6 | | 90 |
| | | | $V_I = 12.5\text{V to } 19\text{V}$ | | 2 | | 45 |
| * Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ $I_O = 5\text{mA to } 1.0\text{A}$ | | 12 | 100 | mV | |
| | | $I_O = 5\text{mA to } 1.0\text{A}$ | | 12 | 100 | | |
| | | $I_O = 250\text{ to } 750\text{mA}$ | | 5 | 50 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.0 | 6.0 | mA | |
| Quiescent Current Change | ΔI_Q | $V_I = 11.7\text{V to } 25\text{V}$, $T_J = 25^\circ\text{C}$ | | | 0.8 | mA | |
| | | $V_I = 12\text{V to } 25\text{V}$, $I_O = 500\text{mA}$ | | | 0.8 | | |
| | | $I_O = 5\text{mA to } 1.0\text{A}$ | | | 0.5 | | |
| Output Voltage Drift | $\frac{\Delta V_O}{\Delta T}$ | $I_O = 5\text{mA}$ | | -1.0 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10\text{Hz to } 100\text{KHz}$ $T_A = 25^\circ\text{C}$ | | 10 | | $\frac{\mu\text{V}}{V_O}$ | |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 12\text{V to } 22\text{V}$ | | 62 | | dB | |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2.0 | | V | |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 17 | | m Ω | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A | |

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7810A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 125°C , $I_O = 1\text{A}$, $V_I = 16\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--------------------------|-------------------------------|---|-----|------|------|---------------------------|
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 9.8 | 10 | 10.2 | V |
| | | $I_O = 5\text{mA}$ to 1A , $P_D \leq 15\text{W}$ $V_I = 12.8$ to 25V | 9.6 | 10 | 10.4 | |
| * Line Regulation | ΔV_O | $V_I = 12.8$ to 26V $I_O = 500\text{mA}$ | | 8 | 100 | mV |
| | | $V_I = 13$ to 20V | | 4 | 50 | |
| | | $T_J = 25^\circ\text{C}$ $V_I = 12.5\text{V}$ to 25V | | 8 | 100 | |
| | | $T_J = 25^\circ\text{C}$ $V_I = 13\text{V}$ to 20V | | 3 | 50 | |
| * Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A | | 12 | 100 | mV |
| | | $I_O = 5\text{mA}$ to 1.0A | | 12 | 100 | |
| | | $I_O = 250$ to 750mA | | 5 | 50 | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.0 | 6.0 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 13\text{V}$ to 26V , $T_J = 25^\circ\text{C}$ | | | 0.5 | mA |
| | | $V_I = 12.8\text{V}$ to 25V , $I_O = 500\text{mA}$ | | | 0.8 | |
| | | $I_O = 5\text{mA}$ to 1.0A | | | 0.5 | |
| Output Voltage Drift | $\frac{\Delta V_O}{\Delta T}$ | $I_O = 5\text{mA}$ | | -1.0 | | mV/°C |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100KHz $T_A = 25^\circ\text{C}$ | | 10 | | $\frac{\mu\text{V}}{V_O}$ |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 14\text{V}$ to 24V | | 62 | | dB |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2.0 | | V |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 17 | | m Ω |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A |

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7811A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 125°C , $I_O = 1\text{A}$, $V_I = 18\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--------------------------|-------------------------|---|--------------------------------------|------|------|---------------------|-----|
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 10.8 | 11.0 | 11.2 | V | |
| | | $I_O = 5\text{mA}$ to 1A , $P_D \leq 15\text{W}$ $V_I = 13.8$ to 26V | 10.6 | 11.0 | 11.4 | | |
| * Line Regulation | ΔV_O | $V_I = 12.8$ to 26V $I_O = 500\text{mA}$ | | 10 | 110 | mV | |
| | | $V_I = 15$ to 21V | | 4 | 55 | | |
| | | $T_J = 25^\circ\text{C}$ | $V_I = 13.5\text{V}$ to 26V | | 10 | | 110 |
| | | | $V_I = 15\text{V}$ to 21V | | 3 | | 55 |
| * Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A | | 12 | 100 | mV | |
| | | $I_O = 5\text{mA}$ to 1.0A | | 12 | 100 | | |
| | | $I_O = 250$ to 750mA | | 5 | 50 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.1 | 6.0 | mA | |
| Quiescent Current Change | ΔI_Q | $V_I = 13.8\text{V}$ to 26V , $T_J = 25^\circ\text{C}$ | | | 0.8 | mA | |
| | | $V_I = 14\text{V}$ to 27V , $I_O = 500\text{mA}$ | | | 0.8 | | |
| | | $I_O = 5\text{mA}$ to 1.0A | | | 0.5 | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | | -1.0 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100kHz $T_A = 25^\circ\text{C}$ | | 10 | | $\mu\text{V} / V_O$ | |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 14\text{V}$ to 24V | | 61 | | dB | |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2.0 | | V | |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 18 | | m Ω | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A | |

* Load and line regulation are specified at constant, junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7812A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 125°C , $I_o = 1\text{A}$, $V_i = 19\text{V}$, $C_i = 0.33\ \mu\text{F}$, $C_o = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--------------------------|-------------------------|---|--------------------------------------|------|-------|---------------------|-----|
| Output Voltage | V_o | $T_J = 25^\circ\text{C}$ | 11.75 | 12 | 12.25 | V | |
| | | $I_o = 5\text{mA}$ to 1A , $P_o \leq 15\text{W}$ $V_i = 14.8$ to 27V | 11.5 | 12 | 12.5 | | |
| * Line Regulation | ΔV_o | $V_i = 14.8$ to 30V $I_o = 500\text{mA}$ | | 10 | 120 | mV | |
| | | $V_i = 16$ to 22V | | 4 | 120 | | |
| | | $T_J = 25^\circ\text{C}$ | $V_i = 14.5\text{V}$ to 27V | | 10 | | 120 |
| | | | $V_i = 16\text{V}$ to 22V | | 3 | | 60 |
| * Load Regulation | ΔV_o | $T_J = 25^\circ\text{C}$ $I_o = 5\text{mA}$ to 1.5A | | 12 | 100 | mV | |
| | | $I_o = 5\text{mA}$ to 1.0A | | 12 | 100 | | |
| | | $I_o = 250$ to 750mA | | 5 | 50 | | |
| | | $T_J = 25^\circ\text{C}$ | | 5.1 | 6.0 | | |
| Quiescent Current | I_o | $T_J = 25^\circ\text{C}$ | | | | mA | |
| Quiescent Current Change | ΔI_o | $V_i = 15\text{V}$ to 30V , $T_J = 25^\circ\text{C}$ | | | 0.5 | mA | |
| | | $V_i = 14\text{V}$ to 27V , $I_o = 500\text{mA}$ | | | 0.8 | | |
| | | $I_o = 5\text{mA}$ to 1.0A | | | 0.8 | | |
| Output Voltage Drift | $\Delta V_o / \Delta T$ | $I_o = 5\text{mA}$ | | -1.0 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100KHz $T_A = 25^\circ\text{C}$ | | 10 | | $\mu\text{V} / V_o$ | |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_o = 500\text{mA}$ $V_i = 14\text{V}$ to 24V | | 60 | | dB | |
| Dropout Voltage | V_o | $I_o = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2.0 | | V | |
| Output Resistance | R_o | $f = 1\text{KHz}$ | | 18 | | $\text{m}\Omega$ | |
| Short Circuit Current | I_{sc} | $V_i = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A | |

* Load and line regulation are specified at constant, junction temperature. Change in V_o due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7815A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 150°C , $I_O = 1\text{A}$, $V_I = 23\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--------------------------|-------------------------|---|------|------|------|---------------------|
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 14.7 | 15 | 15.3 | V |
| | | $I_O = 5\text{mA}$ to 1A , $P_D \leq 15\text{W}$ $V_I = 17.7$ to 30V | 14.4 | 15 | 15.6 | |
| * Line Regulation | ΔV_O | $V_I = 17.9$ to 30V $I_O = 500\text{mA}$ | | 10 | 150 | mV |
| | | $V_I = 20$ to 26V | | 5 | 150 | |
| | | $T_J = 25^\circ\text{C}$ $V_I = 17.5\text{V}$ to 30V | | 11 | 150 | |
| | | $V_I = 20\text{V}$ to 26V | | 3 | 75 | |
| * Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A | | 12 | 100 | mV |
| | | $I_O = 5\text{mA}$ to 1.0A | | 12 | 100 | |
| | | $I_O = 250$ to 750mA | | 5 | 50 | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.2 | 6.0 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 17.5\text{V}$ to 30V , $T_J = 25^\circ\text{C}$ | | | 0.5 | mA |
| | | $V_I = 17.5\text{V}$ to 30V , $I_O = 500\text{mA}$ | | | 0.8 | |
| | | $I_O = 5\text{mA}$ to 1.0A | | | 0.8 | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | | -1.0 | | mV/°C |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100KHz $T_A = 25^\circ\text{C}$ | | 10 | | $\mu\text{V} / V_O$ |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 18.5\text{V}$ to 28.5V | | 58 | | dB |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2.0 | | V |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 19 | | $\text{m}\Omega$ |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A |

* Load and line regulation are specified at constant, junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7818A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 150°C , $I_o = 1\text{A}$, $V_i = 27\text{V}$, $C_i = 0.33\ \mu\text{F}$, $C_o = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--------------------------|-------------------------|---|--------------------------------------|------|-------|---------------------|-----|
| Output Voltage | V_o | $T_J = 25^\circ\text{C}$ | 17.64 | 18 | 18.36 | V | |
| | | $I_o = 5\text{mA}$ to 1A , $P_D \leq 15\text{W}$ $V_i = 21$ to 33V | 17.3 | 18 | 18.7 | | |
| * Line Regulation | ΔV_o | $V_i = 21$ to 33V $I_o = 500\text{mA}$ | | 15 | 180 | mV | |
| | | $V_i = 21$ to 33V | | 5 | 180 | | |
| | | $T_J = 25^\circ\text{C}$ | $V_i = 20.6\text{V}$ to 33V | | 15 | | 180 |
| | | | $V_i = 24\text{V}$ to 30V | | 5 | | 90 |
| * Load Regulation | ΔV_o | $T_J = 25^\circ\text{C}$ $I_o = 5\text{mA}$ to 1.5A | | 15 | 100 | mV | |
| | | $I_o = 5\text{mA}$ to 1.0A | | 15 | 100 | | |
| | | $I_o = 250$ to 750mA | | 7 | 50 | | |
| | | | | | | | |
| Quiescent Current | I_q | $T_J = 25^\circ\text{C}$ | | 5.2 | 6.0 | mA | |
| Quiescent Current Change | ΔI_q | $V_i = 21\text{V}$ to 33V , $T_J = 25^\circ\text{C}$ | | | 0.5 | mA | |
| | | $V_i = 21\text{V}$ to 33V , $I_o = 500\text{mA}$ | | | 0.8 | | |
| | | $I_o = 5\text{mA}$ to 1.0A | | | 0.8 | | |
| Output Voltage Drift | $\Delta V_o / \Delta T$ | $I_o = 5\text{mA}$ | | -1.0 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100KHz $T_A = 25^\circ\text{C}$ | | 10 | | $\mu\text{V} / V_o$ | |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_o = 500\text{mA}$ $V_i = 18.5\text{V}$ to 28.5V | | 57 | | dB | |
| Dropout Voltage | V_D | $I_o = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2.0 | | V | |
| Output Resistance | R_o | $f = 1\text{KHz}$ | | 19 | | $\text{m}\Omega$ | |
| Short Circuit Current | I_{sc} | $V_i = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A | |

* Load and line regulation are specified at constant, junction temperature. Change in V_o due to heating effects must be taken into account separately. Pulse testing with low duty is used.

KA7824A ELECTRICAL CHARACTERISTICS

(Refer to the test circuits. $T_J = 0$ to 150°C , $I_O = 1\text{A}$, $V_I = 33\text{V}$, $C_I = 0.33\ \mu\text{F}$, $C_O = 0.1\ \mu\text{F}$, unless otherwise specified)

| Characteristic | Symbol | Test Conditions | Min | Typ | Max | Unit | |
|--------------------------|-------------------------|---|--------------------------------------|------|------|---------------------|-----|
| Output Voltage | V_O | $T_J = 25^\circ\text{C}$ | 23.5 | 24 | 24.5 | V | |
| | | $I_O = 5\text{mA}$ to 1A , $P_D \leq 15\text{W}$ $V_I = 27.3$ to 38V | 23 | 24 | 25 | | |
| * Line Regulation | ΔV_O | $V_I = 27$ to 38V $I_O = 500\text{mA}$ | | 18 | 240 | mV | |
| | | $V_I = 21$ to 33V | | 6 | 240 | | |
| | | $T_J = 25^\circ\text{C}$ | $V_I = 26.7\text{V}$ to 38V | | 18 | | 240 |
| | | | $V_I = 30\text{V}$ to 36V | | 6 | | 120 |
| * Load Regulation | ΔV_O | $T_J = 25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A | | 15 | 100 | mV | |
| | | $I_O = 5\text{mA}$ to 1.0A | | 15 | 100 | | |
| | | $I_O = 250$ to 750mA | | 7 | 50 | | |
| Quiescent Current | I_Q | $T_J = 25^\circ\text{C}$ | | 5.2 | 6.0 | mA | |
| Quiescent Current Change | ΔI_Q | $V_I = 27.3\text{V}$ to 38V , $T_J = 25^\circ\text{C}$ | | | 0.5 | mA | |
| | | $V_I = 27.3\text{V}$ to 38V , $I_O = 500\text{mA}$ | | | 0.8 | | |
| | | $I_O = 5\text{mA}$ to 1.0A | | | 0.8 | | |
| Output Voltage Drift | $\Delta V_O / \Delta T$ | $I_O = 5\text{mA}$ | | -1.5 | | mV/°C | |
| Output Noise Voltage | V_N | $f = 10\text{Hz}$ to 100kHz $T_A = 25^\circ\text{C}$ | | 10 | | $\mu\text{V} / V_O$ | |
| Ripple Rejection | RR | $f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 18.5\text{V}$ to 28.5V | | 54 | | dB | |
| Dropout Voltage | V_D | $I_O = 1\text{A}$, $T_J = 25^\circ\text{C}$ | | 2.0 | | V | |
| Output Resistance | R_O | $f = 1\text{KHz}$ | | 20 | | $\text{m}\Omega$ | |
| Short Circuit Current | I_{SC} | $V_I = 35\text{V}$, $T_A = 25^\circ\text{C}$ | | 250 | | mA | |
| Peak Current | I_{PK} | $T_J = 25^\circ\text{C}$ | | 2.2 | | A | |

* Load and line regulation are specified at constant, junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

TEST CIRCUITS

Fig. 1 DC Parameters

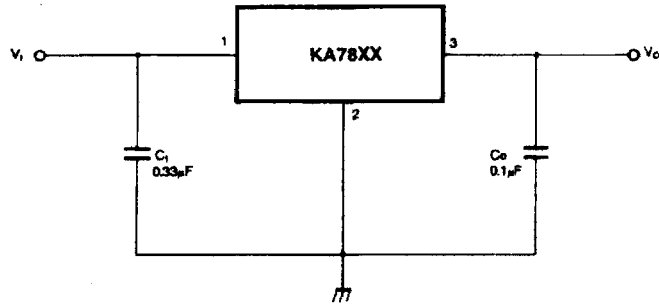


Fig. 2 Load Regulation

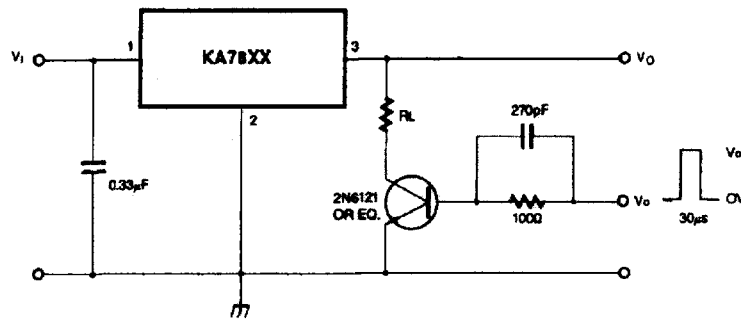
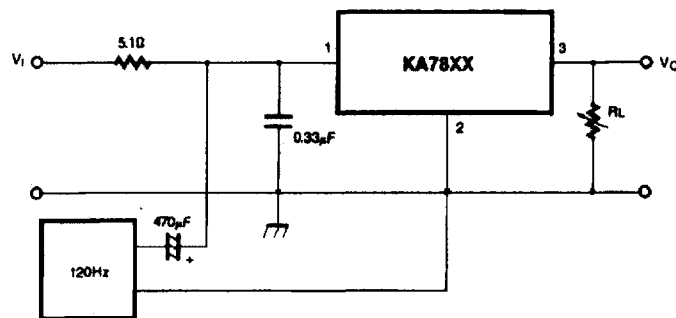


Fig. 3 Ripple Rejection



APPLICATION CIRCUITS

Fig. 4 Fixed Output Regulator

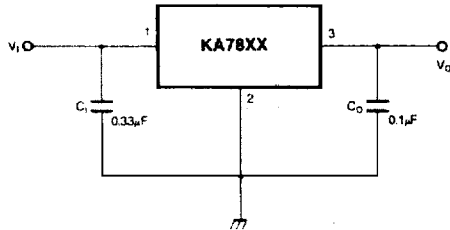
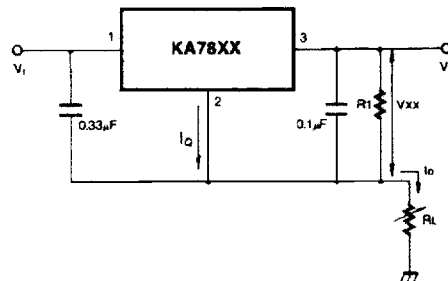


Fig. 5 Constant Current Regulator

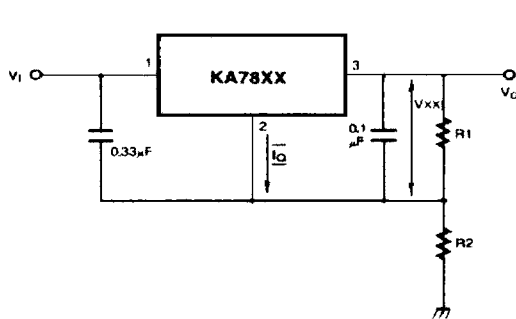


$$I_o = \frac{V_{XX}}{R_1} + I_Q$$

Notes:

- (1) To specify an output voltage, substitute voltage value for "XX."
A common ground is required between the input and the Output voltage. The input voltage must remain typically 2.0V above the output voltage even during the low point on the input ripple voltage.
- (2) C₁ is required if regulator is located an appreciable distance from power Supply filter.
- (3) C₀ improves stability and transient response.

Fig. 6 Circuit for Increasing Output Voltage



$$I_{R1} \geq 5 I_Q$$

$$V_o = V_{XX}(1 + R_2/R_1) + I_Q R_2$$

Fig. 7 Adjustable Output Regulator (7 to 30V)

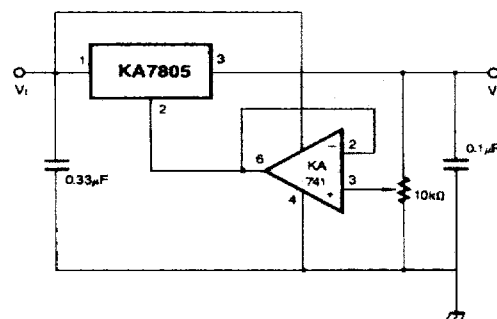
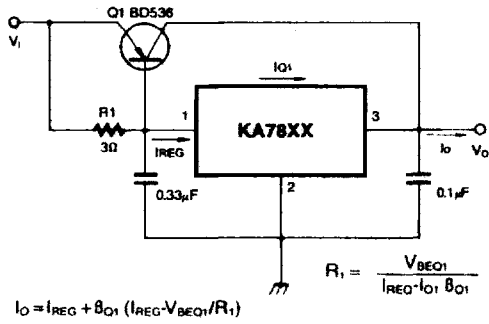


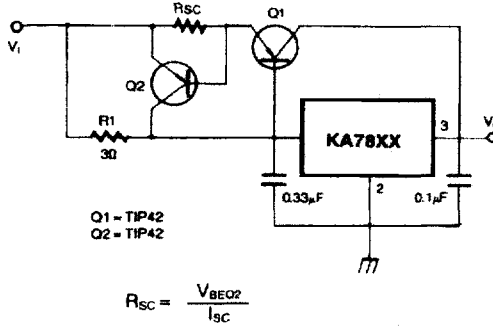
Fig. 8 High Current Voltage Regulator



$$I_O = I_{REG} + \beta_{O1} (I_{REG} - V_{BEQ1}/R_1)$$

$$R_1 = \frac{V_{BEQ1}}{I_{REG} - I_{O1} \beta_{O1}}$$

Fig. 9. High Output Current with Short Circuit Protection



Q1 - TIP42
Q2 - TIP42

$$R_{sc} = \frac{V_{BEQ2}}{I_{sc}}$$

Fig. 10 Tracking Voltage Regulator

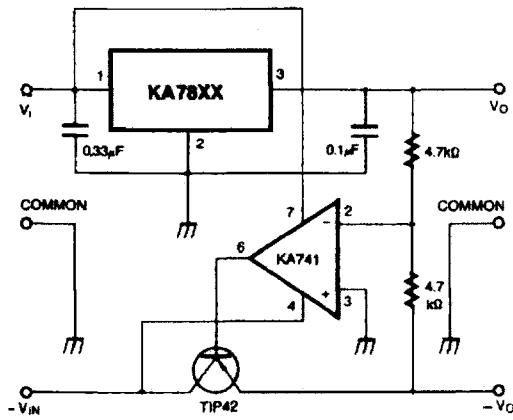


Fig. 11 Split Power Supply ($\pm 15V-1A$)

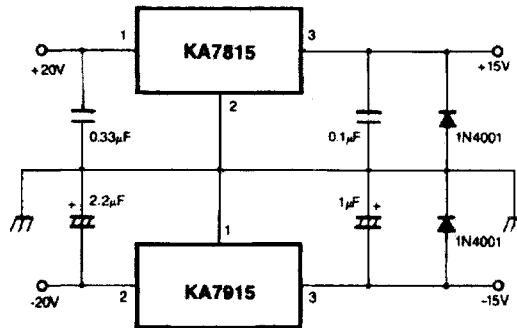


Fig. 12 Negative Output Voltage Circuit

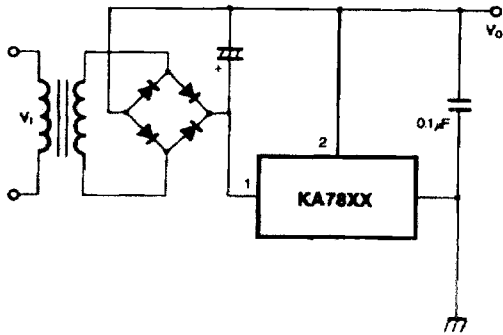
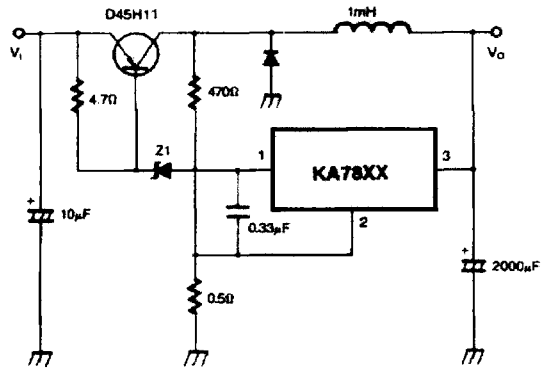


Fig. 13 switching Regulator



TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 14 QUIESCENT CURRENT

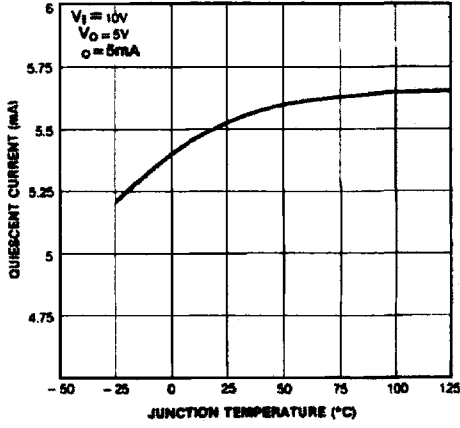


Fig. 15 PEAK OUTPUT CURRENT

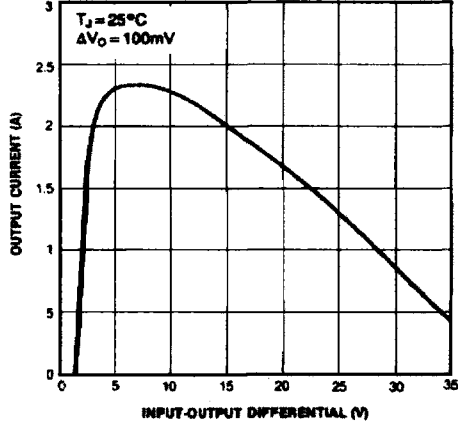


Fig. 16 OUTPUT VOLTAGE

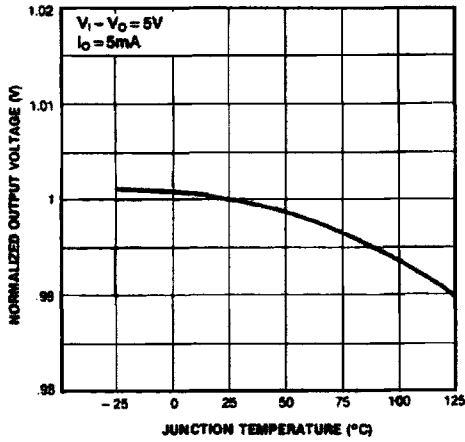


Fig. 17 QUIESCENT CURRENT

