

POSITIVE VOLTAGE REGULATOR

Description

The HT78XX is integrated linear positive regulator with three terminals. The HT78XX offer several fixed output voltages making them useful in wide range of applications. When used as a zener diode/resistor combination replacement, the HT78XX usually results in an effective output impedance improvement of two orders of magnitude, lower quiescent current.

The HT78XX is available in the TO-252, TO-220 & TO-263 packages,

Features

- **Output Current of 1.5A**
- **Output Voltage Tolerance of 5%**
- **Internal thermal overload protection**
- **Internal Short-Circuit Limited**
- **No External Component**
- **Output Voltage 5.0V, 6V, 8V, 9V, 10V, 12V, 15V, 18V, 24V**
- **Offer in plastic TO-252, TO-220 & TO-263**
- **Direct Replacement for HT78XX**

Applications

- **Post regulator for switching DC/DC converter**
- **Bias supply for analog circuits**

Packaging Information



Top View

1. Input
2. GND
3. Output

Ordering Information

| Device | Operating Voltage | Temp. |
|--------|-------------------|-------------|
| HT7805 | 7 to 20 | 0 to 125 °C |
| HT7806 | 8 to 20 | 0 to 125 °C |
| HT7808 | 10.5 to 23 | 0 to 125 °C |
| HT7809 | 11.5 to 24 | 0 to 125 °C |
| HT7810 | 12.5 to 25 | 0 to 125 °C |
| HT7812 | 14.5 to 27 | 0 to 125 °C |
| HT7815 | 17.5 to 30 | 0 to 125 °C |
| HT7818 | 20.5 to 33 | 0 to 125 °C |
| HT7824 | 26.5 to 39 | 0 to 125 °C |

TO-220 (T)
 TO-263 (S)
 TO-252 (D)

Absolute Maximum Rating

| Parameter | HT78-- | Unit |
|--|------------------------------|----------|
| Input Voltage | HT7824, HT7827 All Others | 40 35 |
| Operating Free-Air, Case, Virtual Junction Temp. | 0 to 150 | °C |
| Storage Temperature Range | -65 to 150 | |
| Lead temperature 1.6 mm from case for sec. | 260 | |

Electrical Characteristics (HT7805)

($V_I=10V$, $I_O=500mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified. (Note 1))

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|--|-----|-----|-----|---------|
| Output Voltage | V_O | $T_J = 25^\circ C$ | 4.8 | 5.0 | 5.2 | V |
| Line Regulation | ΔV_O | $V_I = 7V$ to $25V$ $T_J = 25^\circ C$ | | 3 | 100 | mV |
| | | $V_I = 8V$ to $12V$ $T_J = 25^\circ C$ | | 1 | 50 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^\circ C$ | | 15 | 100 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^\circ C$ | | 5 | 50 | |
| Ripple Rejection | RR | $V_I = 8V$ to $18V$, $f=120Hz$ | 62 | 78 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^\circ C$ | | 40 | | μV |
| Dropout Voltage | V_D | $T_J = 25^\circ C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^\circ C$ | | 4.2 | 8 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 7V$ to $25V$, $T_J = 25^\circ C$ | | | 1.3 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^\circ C$ | | | 0.5 | |

Electrical Characteristics (HT7806)

($V_I=11V$, $I_O=500mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified. (Note 1))

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|--|------|-----|------|---------|
| Output Voltage | V_O | $T_J = 25^\circ C$ | 5.75 | 6.0 | 6.25 | V |
| Line Regulation | ΔV_O | $V_I = 8V$ to $25V$ $T_J = 25^\circ C$ | | 5 | 120 | mV |
| | | $V_I = 9V$ to $25V$ $T_J = 25^\circ C$ | | 1.5 | 60 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^\circ C$ | | 14 | 120 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^\circ C$ | | 4 | 60 | |
| Ripple Rejection | RR | $V_I = 9V$ to $19V$, $f=120Hz$ | 59 | 75 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^\circ C$ | | 45 | | μV |
| Dropout Voltage | V_D | $T_J = 25^\circ C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^\circ C$ | | 4.3 | 8.0 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 8V$ to $25V$, $T_J = 25^\circ C$ | | | 1.3 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^\circ C$ | | | 0.5 | |

Electrical Characteristics (HT7808)

 ($V_I=14V$, $I_O=500mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified. (Note 1))

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|-----|-----|-----|---------|
| Output Voltage | V_O | $T_J = 25^\circ C$ | 7.7 | 8.0 | 8.3 | V |
| Line Regulation | ΔV_O | $V_I = 10.5V$ to $25V$ $T_J = 25^\circ C$ | | 6 | 160 | mV |
| | | $V_I = 11V$ to $17V$ $T_J = 25^\circ C$ | | 2 | 80 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^\circ C$ | | 12 | 160 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^\circ C$ | | 4 | 80 | |
| Ripple Rejection | RR | $V_I = 11.5V$ to $21.5V$, $f=120Hz$ | 55 | 72 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^\circ C$ | | 52 | | μV |
| Dropout Voltage | V_D | $T_J = 25^\circ C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^\circ C$ | | 4.3 | 8 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 10.5V$ to $25V$, $T_J = 25^\circ C$ | | | 1 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^\circ C$ | | | 0.5 | |

Electrical Characteristics (HT7809)

 ($V_I=16V$, $I_O=500mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified. (Note 1))

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|-----|-----|------|---------|
| Output Voltage | V_O | $T_J = 25^\circ C$ | 8.6 | 9.0 | 9.40 | V |
| Line Regulation | ΔV_O | $V_I = 11.5V$ to $27V$ $T_J = 25^\circ C$ | | 7 | 180 | mV |
| | | $V_I = 13V$ to $19V$ $T_J = 25^\circ C$ | | 2 | 90 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^\circ C$ | | 12 | 180 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^\circ C$ | | 4 | 90 | |
| Ripple Rejection | RR | $V_I = 12V$ to $19V$, $f=120Hz$ | 55 | 70 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^\circ C$ | | 60 | | μV |
| Dropout Voltage | V_D | $T_J = 25^\circ C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^\circ C$ | | 4.3 | 8 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 11.5V$ to $27V$, $T_J = 25^\circ C$ | | | 1.0 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^\circ C$ | | | 0.5 | |

Electrical Characteristics (HT7810)

 ($V_I=17V$, $I_O=500mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, , unless otherwise specified. (Note 1)

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|--|-----|-----|------|---------|
| Output Voltage | V_O | $T_J = 25^{\circ}C$ | 9.6 | 10 | 10.4 | V |
| Line Regulation | ΔV_O | $V_I = 12.5V$ to $28V$ $T_J = 25^{\circ}C$ | | 7 | 200 | mV |
| | | $V_I = 14V$ to $20V$ $T_J = 25^{\circ}C$ | | 2 | 100 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^{\circ}C$ | | 12 | 200 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^{\circ}C$ | | 4 | 100 | |
| Ripple Rejection | RR | $V_I = 13V$ to $23V$, $f=120Hz$ | 55 | 71 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^{\circ}C$ | | 70 | | μV |
| Dropout Voltage | V_D | $T_J = 25^{\circ}C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^{\circ}C$ | | 4.3 | 8 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 12.5V$ to $28V$, $T_J = 25^{\circ}C$ | | | 1.0 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^{\circ}C$ | | | 0.5 | |

Electrical Characteristics (HT7812)

 ($V_I=19V$, $I_O=500mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified. (Note 1)

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|--|-------|-----|------|---------|
| Output Voltage | V_O | $T_J = 25^{\circ}C$ | 11.50 | 12 | 12.5 | V |
| Line Regulation | ΔV_O | $V_I = 14.5V$ to $30V$ $T_J = 25^{\circ}C$ | | 10 | 240 | mV |
| | | $V_I = 16V$ to $22V$ $T_J = 25^{\circ}C$ | | 3.0 | 120 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^{\circ}C$ | | 12 | 240 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^{\circ}C$ | | 4 | 120 | |
| Ripple Rejection | RR | $V_I = 15V$ to $25V$, $f=120Hz$ | 55 | 71 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^{\circ}C$ | | 75 | | μV |
| Dropout Voltage | V_D | $T_J = 25^{\circ}C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^{\circ}C$ | | 4.3 | 8.0 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 14.5V$ to $30V$, $T_J = 25^{\circ}C$ | | | 1.0 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^{\circ}C$ | | | 0.5 | |

Electrical Characteristics (HT7815)

 ($V_I=23V$, $I_O=500mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified. (Note 1))

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|--|-------|-----|-------|---------|
| Output Voltage | V_O | $T_J = 25^{\circ}C$ | 14.40 | 15 | 15.60 | V |
| Line Regulation | ΔV_O | $V_I = 17.5V$ to $30V$ $T_J = 25^{\circ}C$ | | 12 | 300 | mV |
| | | $V_I = 20V$ to $26V$ $T_J = 25^{\circ}C$ | | 3 | 150 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^{\circ}C$ | | 12 | 300 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^{\circ}C$ | | 4 | 150 | |
| Ripple Rejection | RR | $V_I = 18.5V$ to $28.5V$, $f=120Hz$ | 54 | 70 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^{\circ}C$ | | 90 | | μV |
| Dropout Voltage | V_D | $T_J = 25^{\circ}C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^{\circ}C$ | | 4.3 | 8.0 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 17.5V$ to $30V$, $T_J = 25^{\circ}C$ | | | 1.0 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^{\circ}C$ | | | 0.5 | |

Electrical Characteristics (HT7818)

 ($V_I=27V$, $I_O=500mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified. (Note 1))

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|--|-------|-----|------|---------|
| Output Voltage | V_O | $T_J = 25^{\circ}C$ | 17.30 | 18 | 18.7 | V |
| Line Regulation | ΔV_O | $V_I = 21V$ to $33V$ $T_J = 25^{\circ}C$ | | 15 | 360 | mV |
| | | $V_I = 24V$ to $33V$ $T_J = 25^{\circ}C$ | | 5 | 180 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^{\circ}C$ | | 12 | 360 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^{\circ}C$ | | 4 | 180 | |
| Ripple Rejection | RR | $V_I = 22V$ to $32V$, $f=120Hz$ | 53 | 69 | | dB |
| Output Noise Voltage | V_N | $F=10Hz$ to $100Hz$ $T_J = 25^{\circ}C$ | | 110 | | μV |
| Dropout Voltage | V_D | $T_J = 25^{\circ}C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^{\circ}C$ | | 4.5 | 8.0 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 21V$ to $33V$, $T_J = 25^{\circ}C$ | | | 1.0 | mA |
| | | $I_O = 5mA$ to $1A$, $T_J = 25^{\circ}C$ | | | 0.5 | |

Electrical Characteristics (HT7824)

 ($V_I=33V$, $I_O=500mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified. (Note 1))

| Parameter | Symbol | Conditions | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|-----|-----|-----|---------|
| Output Voltage | V_O | $T_J = 25^{\circ}C$ | 23 | 24 | 25 | V |
| Line Regulation | ΔV_O | $V_I = 27V$ to $38V$, $T_J = 25^{\circ}C$ | | 18 | 480 | mV |
| | | $V_I = 30V$ to $36V$, $T_J = 25^{\circ}C$ | | 6 | 240 | |
| Load Regulation | ΔV_O | $I_O = 5mA$ to $1.5A$, $25^{\circ}C$ | | 12 | 480 | mV |
| | | $I_O = 250mA$ to $750mA$, $25^{\circ}C$ | | 4 | 240 | |
| Ripple Rejection | RR | $V_I = 28V$ to $38V$, $f=120Hz$ | 50 | 66 | | dB |
| Output Noise Voltage | V_N | $F= 10Hz$ to $100Hz$, $T_J = 25^{\circ}C$ | | 170 | | μV |
| Dropout Voltage | V_D | $T_J = 25^{\circ}C$ | | 2.0 | | V |
| Quiescent Current | | $T_J = 25^{\circ}C$ | | 4.6 | 8.0 | mA |
| Quiescent Current Change | ΔI_Q | $V_I = 27V$ to $38V$, $T_J = 25^{\circ}C$ | | | 1.0 | mA |
| | | $I_O = 5mA$ to $1.0A$, $T_J = 25^{\circ}C$ | | | 0.5 | |

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