

# 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	$\Delta V_O$	$V_I = 7V$ to $25V$ $T_J = 25^\circ C$		3	100	mV
		$V_I = 8V$ to $12V$ $T_J = 25^\circ C$		1	50	
Load Regulation	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 7V$ 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	$\Delta V_O$	$V_I = 8V$ 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	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 8V$ 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	$\Delta V_O$	$V_I = 10.5V$ to $25V$ $T_J = 25^\circ C$		6	160	mV
		$V_I = 11V$ to $17V$ $T_J = 25^\circ C$		2	80	
Load Regulation	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 10.5V$ 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	$\Delta V_O$	$V_I = 11.5V$ to $27V$ $T_J = 25^\circ C$		7	180	mV
		$V_I = 13V$ to $19V$ $T_J = 25^\circ C$		2	90	
Load Regulation	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 11.5V$ 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	$\Delta V_O$	$V_I = 12.5V$ to $28V$ $T_J = 25^\circ C$		7	200	mV
		$V_I = 14V$ to $20V$ $T_J = 25^\circ C$		2	100	
Load Regulation	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 12.5V$ 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	$\Delta V_O$	$V_I = 14.5V$ 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	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 14.5V$ 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	$\Delta V_O$	$V_I = 17.5V$ to $30V$ $T_J = 25^{\circ}C$		12	300	mV
		$V_I = 20V$ to $26V$ $T_J = 25^{\circ}C$		3	150	
Load Regulation	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 17.5V$ 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	$\Delta V_O$	$V_I = 21V$ to $33V$ $T_J = 25^{\circ}C$		15	360	mV
		$V_I = 24V$ to $33V$ $T_J = 25^{\circ}C$		5	180	
Load Regulation	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 21V$ 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	$\Delta V_O$	$V_I = 27V$ to $38V$ , $T_J = 25^{\circ}C$		18	480	mV
		$V_I = 30V$ to $36V$ , $T_J = 25^{\circ}C$		6	240	
Load Regulation	$\Delta V_O$	$I_O = 5mA$ 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		$\mu V$
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	$\Delta I_Q$	$V_I = 27V$ to $38V$ , $T_J = 25^{\circ}C$			1.0	mA
		$I_O = 5mA$ to $1.0A$ , $T_J = 25^{\circ}C$			0.5	