Bay Linear
Inspire the Linear Power

1.5A Positive Voltage Regulator

LM78XX

Description

The Bay Linear LM78XX is integrated linear positive regulator with three terminals. The LM78XX offer several fixed output voltages making them useful in wide range of applications. When used as a zener diode/resistor combination replacement, the LM78XX usually results in an effective output impedance improvement of two orders of magnitude, lower quiescent current.

The LM78XX is available in the TO-252, TO-220 & TO-263 packages,

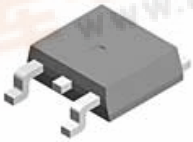
Features

- **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 LM78XX**

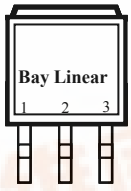
Applications

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

Packaging Information



TO-263-3 (S)



Top View

1. Input
2. GND
3. Output

Ordering Information

Device	Operating Voltage	Temp.
LM7805	7 to 20	0 to 125 °C
LM7806	8 to 20	0 to 125 °C
LM7808	10.5 to 23	0 to 125 °C
LM7809	11.5 to 24	0 to 125 °C
LM7810	12.5 to 25	0 to 125 °C
LM7812	14.5 to 27	0 to 125 °C
LM7815	17.5 to 30	0 to 125 °C
LM7818	20.5 to 33	0 to 125 °C
LM7824	26.5 to 39	0 to 125 °C

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

Absolute Maximum Rating

Parameter		LM78--	Unit
Input Voltage	LM7824, LM7827	40	V
	All Others	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 (LM7805)

(V_I=10V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	4.8	5.0	5.2	V
Line Regulation	ΔV_O	V_I = 7V to 25V T_J = 25 °C		3	100	mV
		V_I = 8V to 12V T_J = 25 °C		1	50	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		15	100	mV
		I_O = 250mA to 750mA, 25 °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 °C		40		μV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.2	8	mA
Quiescent Current Change	ΔI_Q	V_I = 7V to 25V, T_J = 25 °C			1.3	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7806)

(V_I=11V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	5.75	6.0	6.25	V
Line Regulation	ΔV_O	V_I = 8V to 25V T_J = 25 °C		5	120	mV
		V_I = 9V to 25V T_J = 25 °C		1.5	60	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		14	120	mV
		I_O = 250mA to 750mA, 25 °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 °C		45		μV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.3	8.0	mA
Quiescent Current Change	ΔI_Q	V_I = 8V to 25V, T_J = 25 °C			1.3	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7808)

(V_I=14V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	7.7	8.0	8.3	V
Line Regulation	ΔV_O	V_I = 10.5V to 25V T_J = 25 °C		6	160	mV
		V_I = 11V to 17V T_J = 25 °C		2	80	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		12	160	mV
		I_O = 250mA to 750mA, 25 °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 °C		52		µV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.3	8	mA
Quiescent Current Change	ΔI_Q	V_I = 10.5V to 25V, T_J = 25 °C			1	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7809)

(V_I=16V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	8.6	9.0	9.40	V
Line Regulation	ΔV_O	V_I = 11.5V to 27V T_J = 25 °C		7	180	mV
		V_I = 13V to 19V T_J = 25 °C		2	90	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		12	180	mV
		I_O = 250mA to 750mA, 25 °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 TJ = 25 °C		60		µV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.3	8	mA
Quiescent Current Change	ΔI_Q	V_I = 11.5V to 27V, T_J = 25 °C			1.0	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7810)

(V_I=17V, I_O=500mA, 0°C ≤T_J≤125 °C, , unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	9.6	10	10.4	V
Line Regulation	ΔV_O	V_I = 12.5V to 28V T_J = 25 °C		7	200	mV
		V_I = 14V to 20V T_J = 25 °C		2	100	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		12	200	mV
		I_O = 250mA to 750mA, 25 °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 TJ = 25 °C		70		μV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.3	8	mA
Quiescent Current Change	ΔI_Q	V_I = 12.5V to 28V, T_J = 25 °C			1.0	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7812)

(V_I=19V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	11.50	12	12.5	V
Line Regulation	ΔV_O	V_I = 14.5V to 30V T_J = 25 °C		10	240	mV
		V_I = 16V to 22V T_J = 25 °C		3.0	120	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		12	240	mV
		I_O = 250mA to 750mA, 25 °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 TJ = 25 °C		75		μV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.3	8.0	mA
Quiescent Current Change	ΔI_Q	V_I = 14.5V to 30V, T_J = 25 °C			1.0	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7815)

(V_I=23V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	14.40	15	15.60	V
Line Regulation	ΔV_O	V_I = 17.5V to 30V T_J = 25 °C		12	300	mV
		V_I = 20V to 26V T_J = 25 °C		3	150	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		12	300	mV
		I_O = 250mA to 750mA, 25 °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 TJ = 25 °C		90		μV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.3	8.0	mA
Quiescent Current Change	ΔI_Q	V_I = 17.5V to 30V, T_J = 25 °C			1.0	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7818)

(V_I=27V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	17.30	18	18.7	V
Line Regulation	ΔV_O	V_I = 21V to 33V T_J = 25 °C		15	360	mV
		V_I = 24V to 33V T_J = 25 °C		5	180	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		12	360	mV
		I_O = 250mA to 750mA, 25 °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 TJ = 25 °C		110		μV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.5	8.0	mA
Quiescent Current Change	ΔI_Q	V_I = 21V to 33V, T_J = 25 °C			1.0	mA
		I_O = 5mA to 1A, T_J = 25 °C			0.5	

Electrical Characteristics (LM7824)

(V_I=33V, I_O=500mA, 0°C ≤T_J≤125 °C, unless otherwise specified. (Note 1)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	23	24	25	V
Line Regulation	ΔV_O	V_I = 27V to 38V T_J = 25 °C		18	480	mV
		V_I = 30V to 36V T_J = 25 °C		6	240	
Load Regulation	ΔV_O	I_O = 5mA to 1.5A, 25 °C		12	480	mV
		I_O = 250mA to 750mA, 25 °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 TJ = 25 °C		170		μV
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.6	8.0	mA
Quiescent Current Change	ΔI_Q	V_I = 27V to 38V, T_J = 25 °C			1.0	mA
		I_O = 5mA to 1.0A, T_J = 25 °C			0.5	

Advance Information- These data sheets contain descriptions of products that are in development. The specifications are based on the engineering calculations, computer simulations and/ or initial prototype evaluation.

Preliminary Information- These data sheets contain minimum and maximum specifications that are based on the initial device characterizations. These limits are subject to change upon the completion of the full characterization over the specified temperature and supply voltage ranges.

The application circuit examples are only to explain the representative applications of the devices and are not intended to guarantee any circuit design or permit any industrial property right to other rights to execute. Bay Linear takes no responsibility for any problems related to any industrial property right resulting from the use of the contents shown in the data book. Typical parameters can and do vary in different applications. Customer's technical experts must validate all operating parameters including " Typical" for each customer application.

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