Bay Linear

Inspire the Linear Power

500mA Positive Voltage Regulator

LM78MXX

Description

The Bay Linear LM78MXX is integrated linear positive regulator with three terminals. The LM78MXX offer several fixed output voltages making them useful in wide range of applications. When used as a zener diode/resistor combination replacement, the LM78MXX usually results in an effective output impedance improvement of two orders of magnitude, lower quiescent current.

The LM78MXX is available in the TO-220, TO-263 & TO-252 packages,

Features

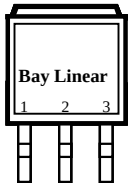
- **Output Current of 500mA**
- **Internal thermal overload protection**
- **Internal Short-Circuit Limited**
- **No External Component**
- **Output Voltage 5.0V, 6V, 8V, 9V, 10V, 12V, 15V**
- **Offer in plastic TO-220 & TO-252**
- **Direct Replacement for LM78MXX**

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.
LM78M05	7 to 20	0 to 125 °C
LM78M06	8 to 20	0 to 125 °C
LM78M08	10.5 to 23	0 to 125 °C
LM78M09	11.5 to 24	0 to 125 °C
LM78M10	12.5 to 25	0 to 125 °C
LM78M12	14.5 to 27	0 to 125 °C
LM78M15	17.5 to 30	0 to 125 °C

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

Absolute Maximum Rating

Parameter	LM78M--	Unit
Input Voltage	35	V
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 (LM78M05)

(V_I=10V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	4.80	5.0	5.2	V
Line Regulation	ΔV_O	V_I = 7V to 25V T_J = 25 °C, I_O=200mA	-	-	100	mV
		V_I = 8V to 25V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	100	mV
		I_O = 5mA to 200mA, 25 °C	-	-	50	
Ripple Rejection	RR	V_I = 8.0V to 18V, f=120Hz, I_O=300mA	62	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		45		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.0	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 8V to 25V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M06)

(V_I=11V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

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, I_O=200mA	-	-	100	mV
		V_I = 9V to 25V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	120	mV
		I_O = 5mA to 200mA, 25 °C	-	-	60	
Ripple Rejection	RR	V_I = 11.5V to 21.5V, f=120Hz, I_O=300mA	59	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		45		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.0	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 9V to 25V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M08)

(V_I=14V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	7.7	8.0	8.30	V
Line Regulation	ΔV_O	V_I = 10.5V to 25V T_J = 25 °C, I_O=200mA	-	-	100	mV
		V_I = 11V to 25V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	160	mV
		I_O = 5mA to 200mA, 25 °C	-	-	80	
Ripple Rejection	RR	V_I = 9.0V to 19V, f=120Hz, I_O=300mA	56	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		52		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.0	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 10.5V to 25V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M10)

(V_I=17V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	9.6	10.0	10.40	V
Line Regulation	ΔV_O	V_I = 12.5V to 25V T_J = 25 °C, I_O=200mA	-	-	100	mV
		V_I = 13V to 25V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	200	mV
		I_O = 5mA to 200mA, 25 °C	-	-	100	
Ripple Rejection	RR	V_I = 9.0V to 19V, f=120Hz, I_O=300mA	55	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		65		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.1	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 10.5V to 25V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M12)

(V_I=19V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	11.5	12.0	12.5	V
Line Regulation	ΔV_O	V_I = 14.5V to 30V T_J = 25 °C, I_O=200mA	-	-	100	mV
		V_I = 16V to 30V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	240	mV
		I_O = 5mA to 200mA, 25 °C	-	-	120	
Ripple Rejection	RR	V_I = 15.0V to 25V, f=120Hz, I_O=300mA	55	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		75		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.1	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 14.5V to 30V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M15)

(V_I=19V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	14.4	15	15.6	V
Line Regulation	ΔV_O	V_I = 17.5V to 30V T_J = 25 °C, I_O=200mA	-	-	100	mV
		V_I = 20V to 30V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	300	mV
		I_O = 5mA to 200mA, 25 °C	-	-	150	
Ripple Rejection	RR	V_I = 15.0V to 25V, f=120Hz, I_O=300mA	54	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		100		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.1	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 17.5V to 30V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M18)

(V_I=26V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	17.3	18	18.7	V
Line Regulation	ΔV_O	V_I = 21V to 33V T_J = 25 °C, I_O=200mA	-	-	100	mV
		V_I = 24V to 33V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	360	mV
		I_O = 5mA to 200mA, 25 °C	-	-	180	
Ripple Rejection	RR	V_I = 18.5V to 28.5V, f=120Hz, I_O=300mA	53	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		100		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.2	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 21V to 33V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M20)

(V_I=29V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	T_J = 25 °C	19.2	20	20.8	V
Line Regulation	ΔV_O	V_I = 23V to 33V T_J = 25 °C, I_O=200mA	-	-	100	mV
		V_I = 24V to 33V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	400	mV
		I_O = 5mA to 200mA, 25 °C	-	-	200	
Ripple Rejection	RR	V_I = 22V to 32V, f=120Hz, I_O=300mA	53	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		110		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.2	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 23V to 35V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, T_J = 25 °C			0.5	

Electrical Characteristics (LM78M24)

(V_I=29V, I_O=350mA, 0°C ≤T_J≤125 °C, unless otherwise specified, C_{IN}=0.33µF, C_D=0.1µF

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, I_O=200mA	-	-	100	mV
		V_I = 28V to 38V T_J = 25 °C, I_O=200mA	-	-	50	
Load Regulation	ΔV_O	I_O = 5mA to 500mA, 25 °C	-	-	480	mV
		I_O = 5mA to 200mA, 25 °C	-	-	240	
Ripple Rejection	RR	V_I = 22V to 32V, f=120Hz, I_O=300mA	50	-	-	dB
Output Noise Voltage	V_N	F= 10Hz to 100Hz T_J = 25 °C		170		µV/V_O
Dropout Voltage	V_D	T_J = 25 °C		2.0		V
Quiescent Current		T_J = 25 °C		4.2	6.0	mA
Quiescent Current Change	ΔI_Q	V_I = 27V to 38V, T_J = 25 °C, I_O=200mA			0.8	mA
		I_O = 5mA to 350mA, 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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