



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,

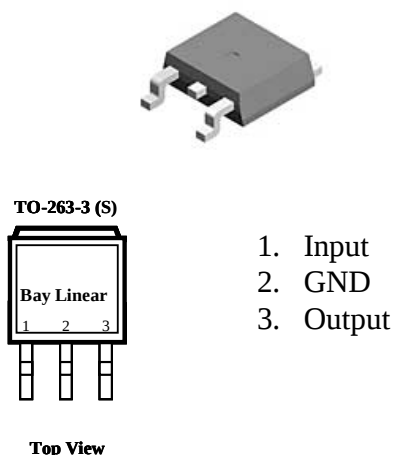
Features

- **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



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)

($V_I=10V$, $I_O=350mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

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

Electrical Characteristics (LM78M06)

($V_I=11V$, $I_O=350mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

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	$V_I = 8V \text{ to } 25V$ $T_J = 25^\circ C$, $I_O=200mA$	-	-	100	mV
		$V_I = 9V \text{ to } 25V$ $T_J = 25^\circ C$, $I_O=200mA$	-	-	50	
Load Regulation	ΔV_O	$I_O = 5mA \text{ to } 500mA$, $25^\circ C$	-	-	120	mV
		$I_O = 5mA \text{ to } 200mA$, $25^\circ C$	-	-	60	
Ripple Rejection	RR	$V_I = 11.5V \text{ to } 21.5V$, $f=120Hz$, $I_O=300mA$	59	-	-	dB
Output Noise Voltage	V_N	$F= 10Hz \text{ to } 100Hz$ $T_J = 25^\circ C$		45		$\mu V/V_O$
Dropout Voltage	V_D	$T_J = 25^\circ C$		2.0		V
Quiescent Current		$T_J = 25^\circ C$		4.0	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 9V \text{ to } 25V$, $T_J = 25^\circ C$, $I_O=200mA$			0.8	mA
		$I_O = 5mA \text{ to } 350mA$, $T_J = 25^\circ C$			0.5	

Electrical Characteristics (LM78M08)

($V_I=14V$, $I_O=350mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^{\circ}C$	7.7	8.0	8.30	V
Line Regulation	ΔV_O	$V_I = 10.5V$ to $25V$ $T_J = 25^{\circ}C$, $I_O=200mA$	-	-	100	mV
		$V_I = 11V$ to $25V$ $T_J = 25^{\circ}C$, $I_O=200mA$	-	-	50	
Load Regulation	ΔV_O	$I_O = 5mA$ to $500mA$, $25^{\circ}C$	-	-	160	mV
		$I_O = 5mA$ to $200mA$, $25^{\circ}C$	-	-	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 $100Hz$ $T_J = 25^{\circ}C$		52		$\mu V/V_O$
Dropout Voltage	V_D	$T_J = 25^{\circ}C$		2.0		V
Quiescent Current		$T_J = 25^{\circ}C$		4.0	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 10.5V$ to $25V$, $T_J = 25^{\circ}C$, $I_O=200mA$			0.8	mA
		$I_O = 5mA$ to $350mA$, $T_J = 25^{\circ}C$			0.5	

Electrical Characteristics (LM78M10)

($V_I=17V$, $I_O=350mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^{\circ}C$	9.6	10.0	10.40	V
Line Regulation	ΔV_O	$V_I = 12.5V$ to $25V$ $T_J = 25^{\circ}C$, $I_O=200mA$	-	-	100	mV
		$V_I = 13V$ to $25V$ $T_J = 25^{\circ}C$, $I_O=200mA$	-	-	50	
Load Regulation	ΔV_O	$I_O = 5mA$ to $500mA$, $25^{\circ}C$	-	-	200	mV
		$I_O = 5mA$ to $200mA$, $25^{\circ}C$	-	-	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 $100Hz$ $T_J = 25^{\circ}C$		65		$\mu V/V_O$
Dropout Voltage	V_D	$T_J = 25^{\circ}C$		2.0		V
Quiescent Current		$T_J = 25^{\circ}C$		4.1	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 10.5V$ to $25V$, $T_J = 25^{\circ}C$, $I_O=200mA$			0.8	mA
		$I_O = 5mA$ to $350mA$, $T_J = 25^{\circ}C$			0.5	

Electrical Characteristics (LM78M12)

($V_I=19V$, $I_O=350mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

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

Electrical Characteristics (LM78M15)

($V_I=19V$, $I_O=350mA$, $0^\circ C \leq T_J \leq 125^\circ C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

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

Electrical Characteristics (LM78M18)

($V_I=26V$, $I_O=350mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

Parameter	Symbol	Conditions	MIN	TYP	MAX	UNIT
Output Voltage	V_O	$T_J = 25^{\circ}C$	17.3	18	18.7	V
Line Regulation	ΔV_O	$V_I = 21V$ to $33V$ $T_J = 25^{\circ}C$, $I_O=200mA$	-	-	100	mV
		$V_I = 24V$ to $33V$ $T_J = 25^{\circ}C$, $I_O=200mA$	-	-	50	
Load Regulation	ΔV_O	$I_O = 5mA$ to $500mA$, $25^{\circ}C$	-	-	360	mV
		$I_O = 5mA$ to $200mA$, $25^{\circ}C$	-	-	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 $100Hz$ $T_J = 25^{\circ}C$		100		$\mu V/V_O$
Dropout Voltage	V_D	$T_J = 25^{\circ}C$		2.0		V
Quiescent Current		$T_J = 25^{\circ}C$		4.2	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 21V$ to $33V$, $T_J = 25^{\circ}C$, $I_O=200mA$			0.8	mA
		$I_O = 5mA$ to $350mA$, $T_J = 25^{\circ}C$			0.5	

Electrical Characteristics (LM78M20)

($V_I=29V$, $I_O=350mA$, $0^{\circ}C \leq T_J \leq 125^{\circ}C$, unless otherwise specified, $C_{IN}=0.33\mu F$, $C_D=0.1\mu F$)

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

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