

# FIXED VOLTAGE REGULATOR

# LM79LXX

## 3-TERMINAL 0.1A NEGATIVE VOLTAGE REGULATORS

This series of fixed-voltage monolithic integrated-circuit voltage regulators is designed for a wide range of applications.

These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation.

In addition, they can be used with power-pass elements to make high current voltage regulators.

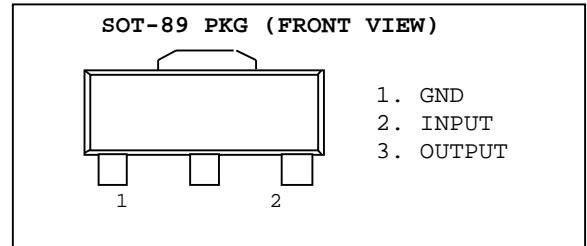
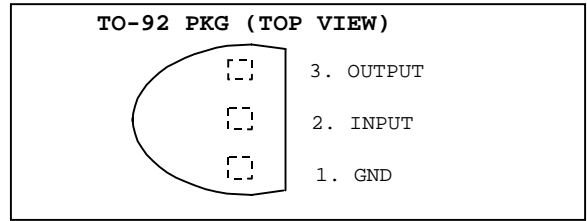
Each of these regulators can deliver up to 100• of output current.

The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload.

When used as a replacement for a zener diode-resistor combination, an effective improvement in output impedance can be obtained together with lower-bias current.

## FEATURES

- Output Current Up to 100•
- No External Components
- Internal Thermal Overload Protection
- Internal Short-Circuit Limiting
- Output Voltage of 5V, 12V, 15V, 18V and 24V.



## ORDERING INFORMATION

Device	Marking	Package
LM79LXX	LM79LXX	TO-92
LM79LXXF	9XX	SOT-89

## ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Input voltage	$V_i$	-30	V
		-35	
		-40	
Operating junction temperature	$T_{opr}$	0 • +150	•
Storage temperature	$T_{stg}$	-65 • +150	
Soldering temperature and time	$T_{sol}$	260/10sec	

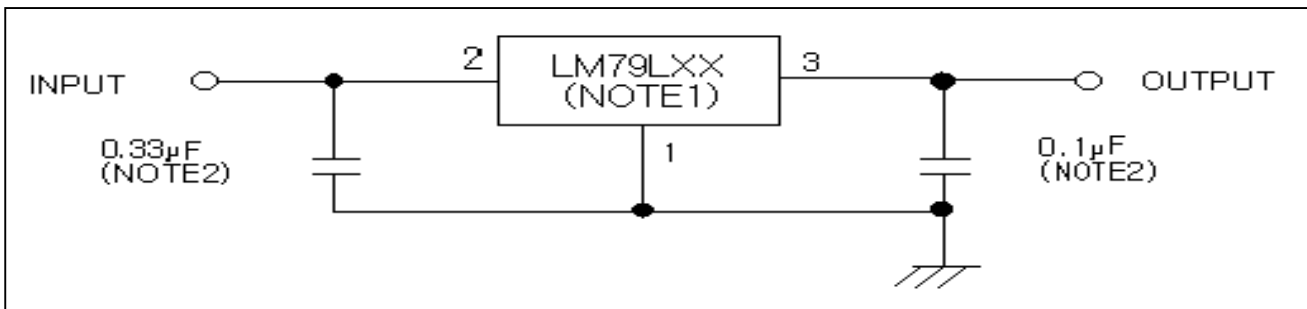
**HTC**

For more information, or to purchase call E.C.C. Inc @ 1-800-214-8769

**RECOMMENDED OPERATING CONDITIONS**

Characteristic		Min.	Max.	Unit
Input voltage, $V_i$	LM79L05	-7	-20	V
	LM79L06	-8	-20	
	LM79L08	-10.5	-23	
	LM79L09	-11.5	-24	
	LM79L12	-14.5	-27	
	LM79L15	-17.5	-30	
	LM79L18	-20.7	-33	
	LM79L24	-27	-38	
Output current, $I_o$			100	•
Operating virtual junction temperature, $T_j$		0	125	•

**TYPICAL APPLICATION**



**Notes**

1. To specify an output voltage, substitute voltage for "XX"
2. Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.

**LM79L05 ELECTRICAL CHARACTERISTICS**

 (At specified virtual junction temperature,  $V_I=10V$ ,  $I_O=40\mu A$  (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	$V_{OUT}$		25	-4.8	-5	-5.2	V
		$1\mu A \leq I_O \leq 40\mu A$ $-7V \leq V_I \leq -20V$	0 • • 125 •	-4.75	-5	-5.25	
		$1\mu A \leq I_O \leq 70\mu A$		-4.75	-5	-5.25	
Line regulation	Reg line	$-7V \leq V_I \leq -20V$	25 •		32	150	•
		$-8V \leq V_I \leq -20V$			26	100	
Load regulation	Reg load	$1\mu A \leq I_O \leq 100\mu A$	25 •		15	60	•
		$1\mu A \leq I_O \leq 40\mu A$			8	30	
Bias current	$I_B$		25 •		3.8	6	•
			125 •			5.5	
Bias current change	$\Delta I_B$	$-8V \leq V_I \leq -20V$	0 • • 125 •			1.5	•
		$1\mu A \leq I_O \leq 40\mu A$				0.1	
Output noise voltage	$V_N$	10Hz • f • 100kHz	25 •		42		•
Ripple rejection	RR	$-8V \leq V_I \leq -18V$ f=120Hz	25 •	41	49		•
Dropout voltage	$V_D$		25 •		1.7		V

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a 0.33 $\mu F$  capacitor across the input and a 0.1 $\mu F$  capacitor across the output.

\*\* This specification applies only for DC power dissipation permitted by absolute maximum ratings.

**LM79L06 ELECTRICAL CHARACTERISTICS**

 (At specified virtual junction temperature,  $V_I=10V$ ,  $I_O=40\mu$  (unless otherwise noted))

Characteristic	Symbol	Test condition *	Min.	Typ.	Max.	Unit	
Output voltage **	$V_{OUT}$	$25\mu$	-5.76	-6	-6.24	V	
		$1\mu \cdot I_O \cdot 40\mu$ $-8.0V \cdot V_I \cdot -21V$	0 • 125 •	-5.7	-6		-6.3
		$1\mu \cdot I_O \cdot 70\mu$		-5.7	-6		-6.3
Line regulation	Reg line	$-8V \cdot V_I \cdot -21V$	25 •	50	150	•	
		$-9V \cdot V_I \cdot -21V$		45	110		
Load regulation	Reg load	$1\mu \cdot I_O \cdot 100\mu$	25 •	12	70	•	
		$1\mu \cdot I_O \cdot 40\mu$		5.5	35		
Bias current	$I_B$	$25\mu$			6	•	
		$125\mu$			5.5		
Bias current change	$\Delta I_B$	$-9V \cdot V_I \cdot -21V$	0 • 125 •		1.5	•	
		$1\mu \cdot I_O \cdot 40\mu$		0.1			
Output noise voltage	$V_N$	$10Hz \cdot f \cdot 100kHz$	25 •	50		•	
Ripple rejection	RR	$-9V \cdot V_I \cdot -19V$ $f=120Hz$	25 •	39	47	•	
Dropout voltage	$V_D$		25 •	1.7		V	

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a  $0.33\mu$  capacitor across the input and a  $0.1\mu$  capacitor across the output.

\*\* This specification applies only for DC power dissipation permitted by absolute maximum ratings.

**LM79L08 ELECTRICAL CHARACTERISTICS**

 (At specified virtual junction temperature,  $V_I=14V$ ,  $I_O=40\mu$  (unless otherwise noted))

Characteristic	Symbol	Test condition *	Min.	Typ.	Max.	Unit	
Output voltage **	$V_{OUT}$	$25\mu$	-8.3	-8	-7.7	V	
		$1\mu \cdot I_O \cdot 40\mu$ $-10.5V \cdot V_I \cdot -23V$	0 • 125 •	-8.4	-8		-7.6
		$1\mu \cdot I_O \cdot 70\mu$		-8.4	-8		-7.6
Line regulation	Reg line	$-10.5V \cdot V_I \cdot -23V$	25 •		20	175	•
		$-11V \cdot V_I \cdot -23V$			12	125	
Load regulation	Reg load	$1\mu \cdot I_O \cdot 100\mu$	25 •		18	80	•
		$1\mu \cdot I_O \cdot 40\mu$			9	42	
Bias current	$I_B$		25 •			6.5	•
			125 •			6	
Bias current change	$\Delta I_B$	$-11V \cdot V_I \cdot -23V$	0 • 125 •			1.5	•
		$1\mu \cdot I_O \cdot 40\mu$				0.1	
Output noise voltage	$V_N$	$10Hz \cdot f \cdot 100kHz$	25 •	60		•	
Ripple rejection	RR	$-12V \cdot V_I \cdot -23V$ $f=120Hz$	25 •	42	49	•	
Dropout voltage	$V_D$		25 •	1.7		V	

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a  $0.33\mu$  capacitor across the input and a  $0.1\mu$  capacitor across the output.

\*\* This specification applies only for DC power dissipation permitted by absolute maximum ratings.

**LM79L09 ELECTRICAL CHARACTERISTICS**

 (At specified virtual junction temperature,  $V_I = -15V$ ,  $I_O = 40\mu A$  (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	$V_{OUT}$		25	-8.64	-9	-9.36	V
		$1\mu A \leq I_O \leq 40\mu A$ $-11.4V \leq V_I \leq -24V$	0 • 125	-8.55		-9.45	
		$1\mu A \leq I_O \leq 70\mu A$		-8.55		-9.45	
Line regulation	Reg line	$-11.4V \leq V_I \leq -24V$	25		80	200	•
		$-12V \leq V_I \leq -24V$			20	160	
Load regulation	Reg load	$1\mu A \leq I_O \leq 100\mu A$	25		17	90	•
		$1\mu A \leq I_O \leq 40\mu A$			8	45	
Bias current	$I_B$		25		3.8	6.5	•
			125			6	
Bias current change	$\Delta I_B$	$-12V \leq V_I \leq -24V$	0 • 125			1.5	•
		$1\mu A \leq I_O \leq 40\mu A$				0.1	
Output noise voltage	$V_N$	$10Hz \leq f \leq 100kHz$	25		64		•
Ripple rejection	RR	$-8V \leq V_I \leq -18V$ $f = 120Hz$	25	35	43		•
Dropout voltage	$V_D$		25		1.7		V

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a  $0.33\mu F$  capacitor across the input and a  $0.1\mu F$  capacitor across the output.

\*\* This specification applies only for DC power dissipation permitted by absolute maximum ratings.

**LM79L12 ELECTRICAL CHARACTERISTICS**

(At specified virtual junction temperature,  $V_I=19V$ ,  $I_O=40\mu A$  (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	$V_{OUT}$		25	-11.5	-12	-12.5	V
		$1\mu A \leq I_O \leq 40\mu A$ $-14.5V \leq V_I \leq -27V$	0 $\leq$ 125	-11.4	-12	-12.6	
		$1\mu A \leq I_O \leq 70\mu A$		-11.4	-12	-12.6	
Line regulation	Reg line	$-14.5V \leq V_I \leq -27V$	25		50	250	%
		$-16V \leq V_I \leq -27V$			40	200	
Load regulation	Reg load	$1\mu A \leq I_O \leq 100\mu A$	25		24	100	%
		$1\mu A \leq I_O \leq 40\mu A$			15	50	
Bias current	$I_B$		25			6.5	%
			125			6	
Bias current change	$\Delta I_B$	$-16V \leq V_I \leq -27V$	0 $\leq$ 125			1.5	%
		$1\mu A \leq I_O \leq 40\mu A$				0.1	
Output noise voltage	$V_N$	10Hz $\leq$ f $\leq$ 100kHz	25		70		%
Ripple rejection	RR	$-15V \leq V_I \leq -25V$ f=120Hz	25	37	42		%
Dropout voltage	$V_D$		25		1.7		V

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a 0.33 $\mu F$  capacitor across the input and a 0.1 $\mu F$  capacitor across the output.

\*\*. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

**LM79L15 ELECTRICAL CHARACTERISTICS**

(At specified virtual junction temperature,  $V_I=23V$ ,  $I_O=40\mu A$  (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	$V_{OUT}$		25	-14.4	-15	-15.6	V
		$1\mu A \leq I_O \leq 40\mu A$ $-17.5V \leq V_I \leq -30V$	0 $\leq$ 125	-14.25	-15	-15.75	
		$1\mu A \leq I_O \leq 70\mu A$		-14.25	-15	-15.75	
Line regulation	Reg line	$-17.5V \leq V_I \leq -30V$	25		65	300	%
		$-27V \leq V_I \leq -30V$			58	250	
Load regulation	Reg load	$1\mu A \leq I_O \leq 100\mu A$	25		25	150	%
		$1\mu A \leq I_O \leq 40\mu A$			15	75	
Bias current	$I_B$		25		4.2	6.5	%
			125			6	
Bias current change	$\Delta I_B$	$-20V \leq V_I \leq -30V$	0 $\leq$ 125			1.5	%
		$1\mu A \leq I_O \leq 40\mu A$				0.1	
Output noise voltage	$V_N$	10Hz $\leq$ f $\leq$ 100kHz	25		82		%
Ripple rejection	RR	$-18.5V \leq V_I \leq -28.5V$ f=120Hz	25	37	44		%
Dropout voltage	$V_D$		25		1.7		V

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a 0.33  $\mu F$  capacitor across the input and a 0.1  $\mu F$  capacitor across the output.

\*\*. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

**LM79L18 ELECTRICAL CHARACTERISTICS**

 (At specified virtual junction temperature,  $V_I=26V$ ,  $I_O=40\mu$  (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	$V_{OUT}$		25	-17.3	-18	-18.7	V
		$1\mu \cdot I_O \cdot 40\mu$ -20.7V $\cdot V_I$ -33V	0 $\cdot$ 125	-17.1	-18	-18.9	
		$1\mu \cdot I_O \cdot 70\mu$		-17.1	-18	-18.9	
Line regulation	Reg line	-20.7V $\cdot V_I$ -33V	25		70	360	%
		-21V $\cdot V_I$ -33V			64	300	
Load regulation	Reg load	$1\mu \cdot I_O \cdot 100\mu$	25		27	180	%
		$1\mu \cdot I_O \cdot 40\mu$			19	90	
Bias current	$I_B$		25		4.7	6.5	%
			125			6	
Bias current change	$\Delta I_B$	-21V $\cdot V_I$ -33V	0 $\cdot$ 125			1.5	%
		$1\mu \cdot I_O \cdot 40\mu$				0.1	
Output noise voltage	$V_N$	10Hz $\cdot f$ $\cdot$ 100kHz	25		82		%
Ripple rejection	RR	-23V $\cdot V_I$ -33V $f=120Hz$	25	32	36		%
Dropout voltage	$V_D$		25		1.7		V

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a  $0.33\mu$  capacitor across the input and a  $0.1\mu$  capacitor across the output.

\*\*. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

**LM79L24 ELECTRICAL CHARACTERISTICS**

 (At specified virtual junction temperature,  $V_I=32V$ ,  $I_O=40\mu A$  (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	$V_{OUT}$		25	-23	-24	-25	V
		$1\mu A \leq I_O \leq 40\mu A$ $-27V \leq V_I \leq -38V$	0 • 125	-22.8	-24	-25.2	
		$1\mu A \leq I_O \leq 70\mu A$		-22.8	-24	-25.2	
Line regulation	Reg line	$-27V \leq V_I \leq -38V$	25		95	480	•
		$-28V \leq V_I \leq -38V$			78	400	
Load regulation	Reg load	$1\mu A \leq I_O \leq 100\mu A$	25		41	240	•
		$1\mu A \leq I_O \leq 40\mu A$			28	120	
Bias current	$I_B$		25		4.8	6.5	•
			125			6	
Bias current change	$\Delta I_B$	$-21V \leq V_I \leq -38V$	0 • 125			1.5	•
		$1\mu A \leq I_O \leq 40\mu A$				0.1	
Output noise voltage	$V_N$	$10Hz \leq f \leq 100kHz$	25		82		•
Ripple rejection	RR	$-29V \leq V_I \leq -35V$ $f=120Hz$	25	30	33		•
Dropout voltage	$V_D$		25		1.7		V

**Notes**

\*. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible.

Thermal effects must be taken into account separately.

All characteristics are measured with a  $0.33\mu F$  capacitor across the input and a  $0.1\mu F$  capacitor across the output.

\*\* This specification applies only for DC power dissipation permitted by absolute maximum ratings.