

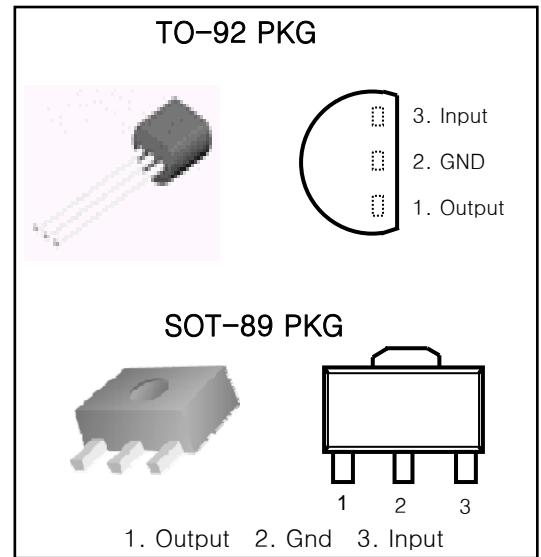
3-TERMINAL 0.1A NEGATIVE VOLTAGE REGULATORS

FEATURES

- Output Current Up to 100mA
- No External Components
- Internal Thermal Overload Protection
- Internal Short-Circuit Limiting
- Output Voltage of 5V, 12V, 15V, 18V and 24V.
- Moisture Sensitivity Level 3

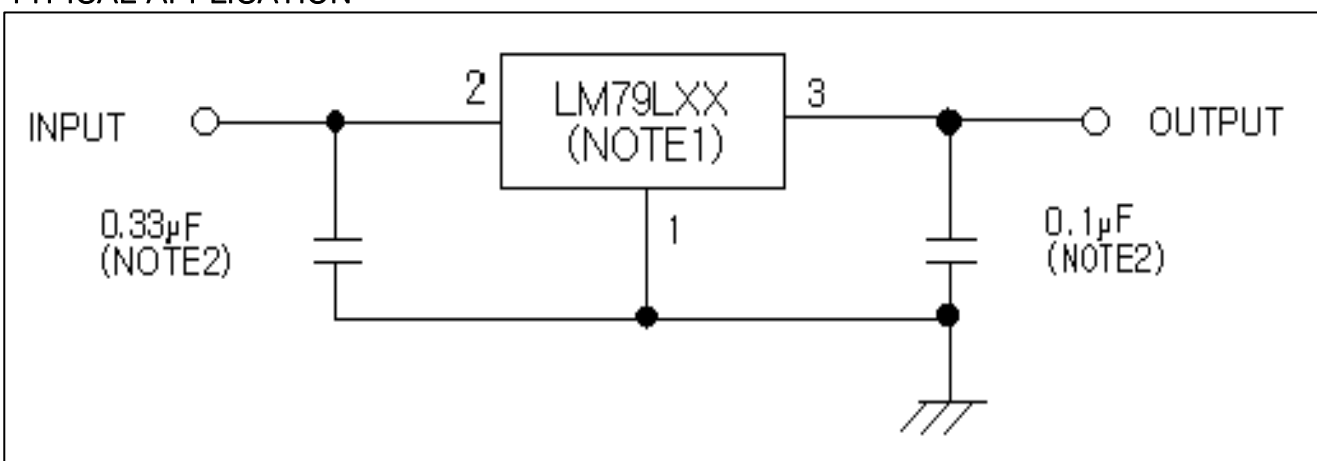
DESCRIPTION

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 100mA 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.



ORDERING INFORMATION		
Device	Marking	Package
LM79LXX	LM79LXX	TO-92
LM79LXXF	LM79LXX	SOT-89

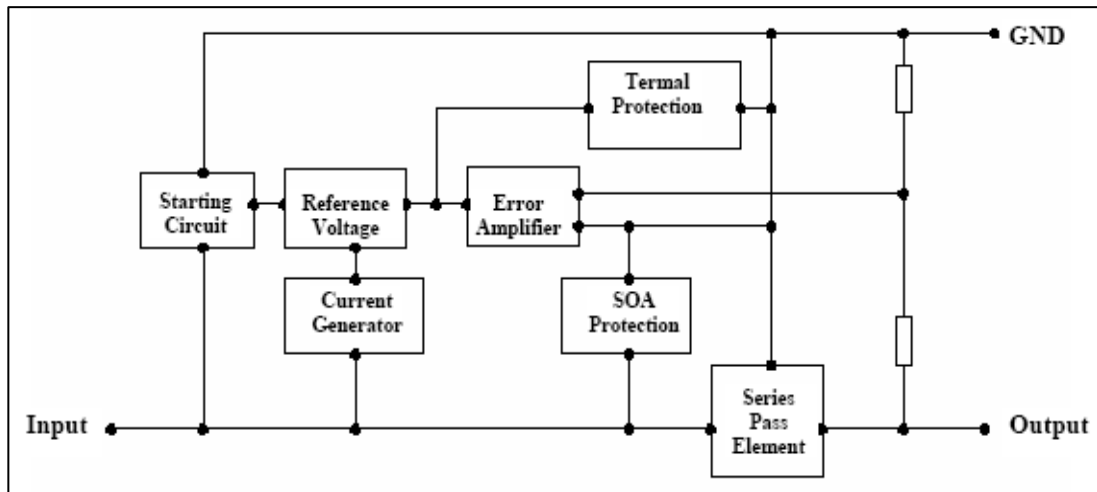
TYPICAL APPLICATION



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.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic		Symbol	Value	Unit
Input voltage	LM79L05	V_i	-30	V
	LM79L12 ~ LM79L18		-35	
	LM79L24		-40	
Operating junction temperature		T_{opr}	0 ~ +150	°C
Storage temperature		T_{stg}	-65 ~ +150	
Soldering temperature and time		T_{sol}	260/10sec	

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	mA
Operating virtual junction temperature, T_j		0	125	°C

LM79L05 ELECTRICAL CHARACTERISTICS

 (At specified virtual junction temperature, $V_i=10V$, $I_o=40mA$ (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25°C	-4.8	-5	-5.2	V
		$1mA \leq I_o \leq 40mA$	0°C ~ 125°C	-4.75	-5	-5.25	
		$-7V \leq V_i \leq -20V$		-4.75	-5	-5.25	
Line regulation	Reg line	$-7V \leq V_i \leq -20V$	25°C		32	150	mV
		$-8V \leq V_i \leq -20V$			26	100	
Load regulation	Reg load	$1mA \leq I_o \leq 100mA$	25°C		15	60	mV
		$1mA \leq I_o \leq 40mA$			8	30	
Bias current	I_B		25°C		3.8	6	mA
			125°C			5.5	
Bias current change	ΔI_B	$-8V \leq V_i \leq -20V$	0°C ~ 125°C			1.5	mA
		$1mA \leq I_o \leq 40mA$				0.1	
Output noise voltage	V_N	$10Hz \leq f \leq 100kHz$	25°C		42		μV
Ripple rejection	RR	$-8V \leq V_i \leq -18V$ $f=120Hz$	25°C	41	49		dB
Dropout voltage	V_D		25°C		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, $V_i=10V$, $I_o=40mA$ (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25°C	-5.76	-6	-6.24	V
		$1mA \leq I_o \leq 40mA$	0°C ~ 125°C	-5.7	-6	-6.3	
		$-8.0V \leq V_i \leq -21V$		-5.7	-6	-6.3	
Line regulation	Reg line	$-8V \leq V_i \leq -21V$	25°C		50	150	mV
		$-9V \leq V_i \leq -21V$			45	110	
Load regulation	Reg load	$1mA \leq I_o \leq 100mA$	25°C		12	70	mV
		$1mA \leq I_o \leq 40mA$			5.5	35	
Bias current	I_B		25°C			6	mA
			125°C			5.5	
Bias current change	ΔI_B	$-9V \leq V_i \leq -21V$	0°C ~ 125°C			1.5	mA
		$1mA \leq I_o \leq 40mA$				0.1	
Output noise voltage	V_N	$10Hz \leq f \leq 100kHz$	25°C		50		μV
Ripple rejection	RR	$-9V \leq V_i \leq -19V$ $f=120Hz$	25°C	39	47		dB
Dropout voltage	V_D		25°C		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.

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LM79L08 ELECTRICAL CHARACTERISTICS

(At specified virtual junction temperature, $V_i=14V$, $I_o=40mA$ (unless otherwise noted))

Characteristic	Symbol	Test condition *		Min.	Typ.	Max.	Unit
Output voltage **	V_{OUT}		25°C	-8.3	-8	-7.7	V
		$1mA \leq I_o \leq 40mA$	0°C ~ 125°C	-8.4	-8	-7.6	
		$-10.5V \leq V_i \leq -23V$		-8.4	-8	-7.6	
Line regulation	Reg line	$-10.5V \leq V_i \leq -23V$	25°C		20	175	mV
		$-11V \leq V_i \leq -23V$			12	125	
Load regulation	Reg load	$1mA \leq I_o \leq 100mA$	25°C		18	80	mV
		$1mA \leq I_o \leq 40mA$			9	42	
Bias current	I_B		25°C			6.5	mA
			125°C			6	
Bias current change	ΔI_B	$-11V \leq V_i \leq -23V$	0°C ~ 125°C			1.5	mA
		$1mA \leq I_o \leq 40mA$				0.1	
Output noise voltage	V_N	$10Hz \leq f \leq 100kHz$	25°C		60		μV
Ripple rejection	RR	$-12V \leq V_i \leq -23V$ $f=120Hz$	25°C	42	49		dB
Dropout voltage	V_D		25°C		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.

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LM79L09 ELECTRICAL CHARACTERISTICS

 (At specified virtual junction temperature, $V_i = -15V$, $I_o = 40mA$ (unless otherwise noted))

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

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LM79L12 ELECTRICAL CHARACTERISTICS

 (At specified virtual junction temperature, $V_i=19V$, $I_o=40mA$ (unless otherwise noted))

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

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LM79L15 ELECTRICAL CHARACTERISTICS

 (At specified virtual junction temperature, $V_i=23V$, $I_o=40mA$ (unless otherwise noted))

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

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LM79L18 ELECTRICAL CHARACTERISTICS

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

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

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LM79L24 ELECTRICAL CHARACTERISTICS

 (At specified virtual junction temperature, $V_i=32V$, $I_o=40mA$ (unless otherwise noted))

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