

Boca Semiconductor Corp.

LM79LXXA (KA79LXX, MC79LXX) FIXED VOLTAGE REGULATOR (NEGATIVE)

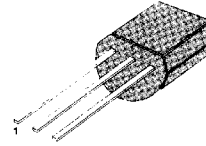
3-TERMINAL 0.1A NEGATIVE VOLTAGE REGULATORS

These regulators employ internal current limiting and thermal shutdown, making them essentially indestructible.

FEATURES

- Output current up to 100mA
- No external components
- Internal thermal over load protection
- Internal short circuit current limiting
- Output Voltage Offered in $\pm 5\%$ Tolerance
- Output Voltage of -5V, -12V, -15V, -18V and -24V

TO-92

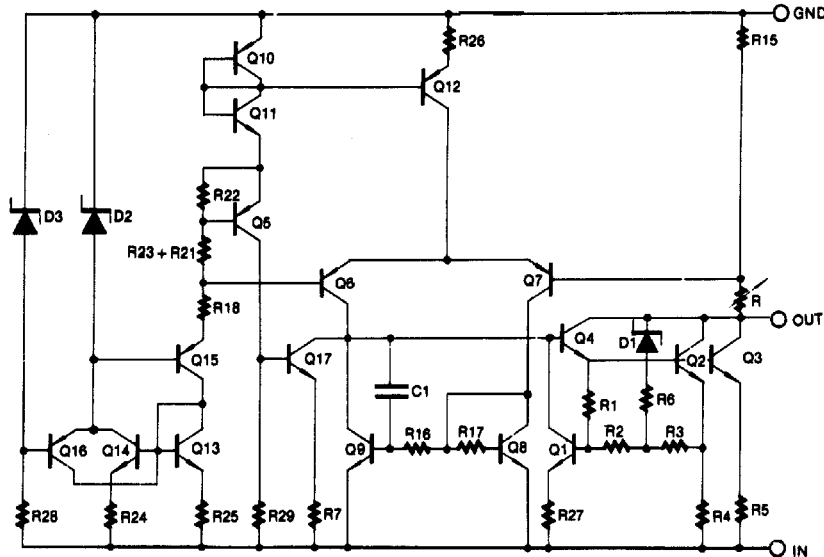


1: GND 2: Input 3: Output

ORDERING INFORMATION

SCHEMATIC DIAGRAM

Device	Package	Operating Temperature
LM79LXXACZ	TO - 92	0 ~ + 125°C



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ABSOLUTE MAXIMUM RATINGS ($T_A = +25^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Input Voltage (-5V) (-12V to -18V) (-24V)	V_I	-30 -35 -40	V_{DC}
Operating Temperature Range	T_{OPR}	$0 \sim +125$	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	$-65 \sim +150$	$^{\circ}\text{C}$

LM79L05A ELECTRICAL CHARACTERISTICS

($V_I = -10\text{V}$, $I_O = 40\text{mA}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, $0^{\circ}\text{C} \leq T_J \leq +125^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	$T_J = +25^{\circ}\text{C}$	- 4.8	- 5.0	- 5.2	V
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$-7.0\text{V} \geq V_I \geq -20\text{V}$	15	150	mV
			$-8\text{V} \geq V_I \geq -20\text{V}$		100	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$1.0\text{mA} \leq I_O \leq 100\text{mA}$	20	60	mV
			$1.0\text{mA} \leq I_O \leq 40\text{mA}$	10	30	
Output Voltage	V_O	$-7.0\text{V} > V_I > -20\text{V}$, $1.0\text{mA} \leq I_O \leq 40\text{mA}$	- 4.75		- 5.25	V
		$V_I = -10\text{V}$, $1.0\text{mA} \leq I_O \leq 70\text{mA}$	- 4.75		- 5.25	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$		2.0	6.0	mA
		$T_J = +125^{\circ}\text{C}$			5.5	
Quiescent Current Change	ΔI_Q	$-8\text{V} \geq V_I \geq -20\text{V}$			1.5	mA
With Line						
With Load		$1.0\text{mA} \leq I_O \leq 40\text{mA}$			0.1	
Output Noise Voltage	V_N	$T_A = +25^{\circ}\text{C}$, $10\text{Hz} \leq f \leq 100\text{KHz}$		30		μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $-8\text{V} \geq V_I \geq -18\text{V}$ $T_J = +25^{\circ}\text{C}$	41	60		dB
Dropout Voltage	V_D	$T_J = +25^{\circ}\text{C}$		1.7		V

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

<http://www.bocasemi.com>

LM79LXXA (KA79LXX, MC79LXX) FIXED VOLTAGE REGULATOR (NEGATIVE)

LM79L12A ELECTRICAL CHARACTERISTICS

($V_I = -19V$, $I_O = 40mA$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$, $0^\circ C \leq T_J \leq +125^\circ C$, unless otherwise specified)

Characteristic	Symbol	Test 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	$T_J = +25^\circ C$	-14.5V $\geq V_I \geq -27V$		250	mV
			-16V $\geq V_I \geq -27V$		200	
Load Regulation	ΔV_O	$T_J = +25^\circ C$	1.0mA $\leq I_O \leq 100mA$		100	mV
			1.0mA $\leq I_O \leq 40mA$		50	
Output Voltage	V_O	-14.5V $> V_I > -27V$, 1.0mA $\leq I_O \leq 40mA$	-11.4		-12.6	V
		$V_I = -19V$, 1.0mA $\leq I_O \leq 70mA$	-11.4		-12.6	
Quiescent Current	I_Q	$T_J = +25^\circ C$			6.5	mA
		$T_J = +125^\circ C$			6.0	
Quiescent Current Change	With Line	ΔI_Q	-16V $\geq V_I \geq -27V$		1.5	mA
	With Load		1.0mA $\leq I_O \leq 40mA$		0.1	
Output Noise Voltage	V_N	$T_A = +25^\circ C$, 10Hz f 100KHz		80		μV
Ripple Rejection	RR	$f = 120Hz$, -150V $\geq V_I \geq -25V$ $T_J = +25^\circ C$	37	42		dB
Dropout Voltage	V_D	$T_J = +25^\circ C$		1.7		V

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79L15A ELECTRICAL CHARACTERISTICS

($V_I = -23V$, $I_O = 40mA$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$, $0^\circ C \leq T_J \leq +125^\circ C$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	$T_J = +25^\circ C$	-14.4	-15.0	-15.6	V
Line Regulation	ΔV_O	$T_J = +25^\circ C$	-17.5V $\geq V_I \geq -30V$		300	mV
			-27V $\geq V_I \geq -30V$		250	
Load Regulation	ΔV_O	$T_J = +25^\circ C$	1.0mA $\leq I_O \leq 100mA$		150	mV
			1.0mA $\leq I_O \leq 40mA$		75	
Output Voltage	V_O	-17.5V $> V_I > -30V$, 1.0mA $\leq I_O \leq 40mA$	-14.25		-15.75	V
		$V_I = -23V$, 1.0mA $\leq I_O \leq 70mA$	-14.25		-15.75	
Quiescent Current	I_Q	$T_J = +25^\circ C$			6.5	mA
		$T_J = +125^\circ C$			6.0	
Quiescent Current Change	With Line	ΔI_Q	-20V $\geq V_I \geq -30V$		1.5	mA
	With Load		1.0mA $\leq I_O \leq 40mA$		0.1	
Output Noise Voltage	V_N	$T_A = 25^\circ C$, 10Hz $\leq f \leq 100KHz$		90		μV
Ripple Rejection	RR	$f = 120Hz$, -18.5V $\geq V_I \geq -28.5V$ $T_J = +25^\circ C$	34	39		dB
Dropout Voltage	V_D	$T_J = +25^\circ C$		1.7		V

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79LXXA (KA79LXX, MC79LXX) FIXED VOLTAGE REGULATOR (NEGATIVE)

LM79L18A ELECTRICAL CHARACTERISTICS

($V_I = -27V$, $I_O = 40mA$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$, $0^\circ C \leq T_J \leq +125^\circ C$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	$T_J = +25^\circ C$	-17.3	-18.0	-18.7	V
Line Regulation	ΔV_O	$T_J = +25^\circ C$	-20.7V $\geq V_I \geq -33V$		325	mV
			-21V $\geq V_I \geq -33V$		275	
Load Regulation	ΔV_O	$T_J = +25^\circ C$	$1.0mA \leq I_O \leq 100mA$		170	mV
			$1.0mA \leq I_O \leq 40mA$		85	
Output Voltage	V_O	$-20.7V > V_I > -33V$, $1.0mA \leq I_O \leq 40mA$	-17.1		-18.9	V
		$V_I = -1.0V$, $1.0mA \leq I_O \leq 70mA$	-17.1		-18.9	
Quiescent Current	I_Q	$T_J = +25^\circ C$			6.5	mA
		$T_J = +125^\circ C$			6.0	
Quiescent Current Change	With Line	ΔI_Q	$-21V \geq V_I \geq -33V$		1.5	mA
	With Load				0.1	
Output Noise Voltage	V_N	$T_A = +25^\circ C$, $10Hz \leq f \leq 100KHz$		150		μV
Ripple Rejection	RR	$f = 120Hz$, $-23V \geq V_I \geq -33V$ $T_J = +25^\circ C$	33	48		dB
Dropout Voltage	V_D	$T_J = +25^\circ C$		1.7		V

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

LM79L24A ELECTRICAL CHARACTERISTICS

($V_I = -33V$, $I_O = 40mA$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$, $0^\circ C \leq T_J \leq +125^\circ C$, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	$T_J = +25^\circ C$	-23	-24	-25	V
Line Regulation	ΔV_O	$T_J = +25^\circ C$	-27V $\geq V_I \geq -38V$		350	mV
			-28V $\geq V_I \geq -38V$		300	
Load Regulation	ΔV_O	$T_J = +25^\circ C$	$1.0mA \leq I_O \leq 100mA$		200	mV
			$1.0mA \leq I_O \leq 40mA$		100	
Output Voltage	V_O	$-27V > V_I > -38V$, $1.0mA \leq I_O \leq 40mA$	-22.8		-25.2	V
		$V_I = -33V$, $1.0mA \leq I_O \leq 70mA$	-22.8		-25.2	
Quiescent Current	I_Q	$T_J = +25^\circ C$			6.5	mA
		$T_J = +125^\circ C$			6.0	
Quiescent Current Change	With Line	ΔI_Q	$-28V \geq V_I \geq -38V$		1.5	mA
	With Load				0.1	
Output Noise Voltage	V_N	$T_A = +25^\circ C$, $10Hz \leq f \leq 100KHz$		200		μV
Ripple Rejection	RR	$f = 120Hz$, $-29V \geq V_I \geq -35V$ $T_J = +25^\circ C$	31	47		dB
Dropout Voltage	V_D	$T_J = +25^\circ C$		1.7		V

* Load and line regulation are specified at constant junction temperature. Change in V_O due to heating effects must be taken into account separately. Pulse testing with low duty is used.

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TYPICAL APPLICATIONS

Design Considerations

The LM79LXXA Series of fixed voltage regulators are designed with Thermal Overload Protection that shuts down the circuit when subjected to an excessive power overload condition. Internal Short-Circuit Protection that limits the maximum current the circuit will pass.

In many low current applications, compensation capacitors are not required. However, it is recommended that the regulator input be bypassed with a capacitor if the regulator is connected to the power supply filter with long wire lengths, or if the output load capacitance is large. An input bypass

capacitor should be selected to provide good high - frequency characteristics to insure stable operation under all load conditions. A $0.33\mu\text{F}$ or larger tantalum, mylar, or other capacitor having low internal impedance at high frequencies should be chosen. The bypass capacitor should be mounted with the shortest possible leads directly across the regulator's input terminals. Normally good construction techniques should be used to minimize ground loops and lead resistance drops since the regulator has no external sense lead. Bypassing the output is also recommended.

Fig. 1 Positive And Negative Regulator

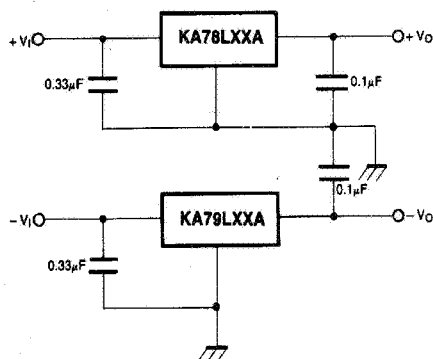
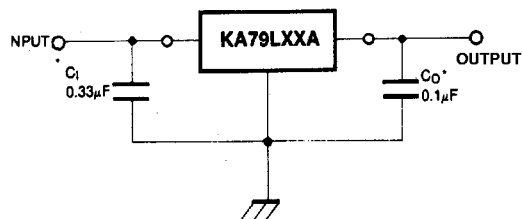


Fig. 2 Typical Application



A common ground is required between the Input and the output voltages. The input voltage must remain typically 2.0V above the output voltage even during the low point on the input ripple voltage.

= C_1 is required if regulator is located an appreciable distance from power supply filter.

** = C_0 improves stability and transient response.

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TO-92

