FAIRCHILD

SEMICONDUCTOR®

MC79LXXA/LM79LXXA 3-Terminal 0.1A Negative Voltage Regulator

Features

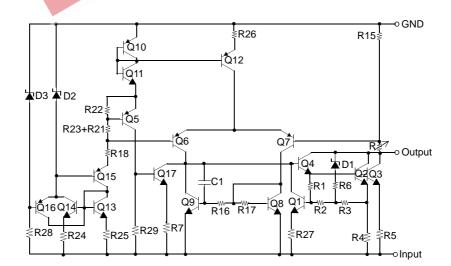
- Output Current up to 100mA
- No External Components
- Internal Thermal Over Load Protection
- Internal Short Circuit Current Limiting
- Output Voltage Offered in ±5% Tolerance
- Output Voltage of -5V, -8V, -12V, -15V, -18V, -24V

Description

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



Internal Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for $V_0 = -5V$ to $-8V$) (for $V_0 = -12V$ to $-18V$) (for $V_0 = -24V$)	VI	-30 -35 -40	V
Operating Temperature Range	TOPR	0 ~ +125	۵°
Storage Temperature Range	TSTG	-65 ~ +150	٥C

Electrical Characteristics(MC79L05A/LM79L05A)

(VI = -10V, IO = 40mA, CI = 0.33μ F, CO = 0.1μ F, 0°C \leq TJ \leq +125°C, unless otherwise specified)

Parameter		Symbol	Conditions		Min.	Тур.	Max.	Unit
Output Voltage		Vo	TJ = +25°C		-4.8	-5.0	-5.2	V
				$-7.0V \ge VI \ge -20V$	-	15	150	mV
Line Regulation (Not	e1)	ΔVo	TJ =+25°C	$-8V \ge V_I \ge -20V$	-	-	100	mV
Load Regulation (No	to1)	ΔVο	Т,ј =+25°С	$1.0mA \le I_O \le 100mA$	-	20	60	mV
		200	15 = +25 C	$1.0mA \le IO \le 40mA$	-	10	30	mV
Output Voltage		Vo			-4.75	-	-5.25	V
Oulput voltage	Oulput Vollage		$V_{I} = -10V, 1.0mA \le I_{O} \le 70mA$		-4.75	-	-5.25	V
Quiescent Current	Ouissesst Current		T _J =+25°C		-	2.0	5.5	mA
		lQ	TJ = +125°C		-	-	6.0	ШA
Quiescent Current	With Line	ΔlQ	-8V ≥ VI ≥ -20V		-	-	1.5	mA
Change	With Load	ΔlQ	$1.0\text{mA} \le \text{IO} \le 40\text{mA}$		-	-	0.1	mA
Output Noise Voltage	e	VN	$T_A = +25^{\circ}C, 10Hz \le f \le 100kHz$		-	30	-	μV
Ripple Rejection	T	RR	$ \begin{array}{l} f=120Hz,-8V\geq V_I\geq -18V\\ T_J=+25^\circ C \end{array} $		41	60	-	dB
Dropout Voltage		VD	TJ = +25°C		-	1.7	-	V

Note:

1. 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.

Electrical Characteristics (MC79L08A) (Continued)

(VI = -14V, IO = 40mA, CI = 0.33μ F, CO = 0.1μ F, 0° C \leq TJ \leq +125°C, unless otherwise specified)

Parameter		Symbol	Conditions		Min.	Тур.	Max.	Unit
Output Voltage		Vo	TJ = +25°C		-7.7	-8.0	-8.3	V
				-10.3V ≥ VI ≥ -23V	-	-	175	mV
Line Regulation(Note	e1)	ΔVo	TJ = +25°C	$-12V \ge VI \ge -23V$	-	-	125	mV
Load Pagulation (No	to1)	ΔVο	T.J = +25°C	$1.0mA \le I_0 \le 100mA$	-	-	80	mV
Load Regulation (No	ne i)	200	1J = +25 C	$1.0mA \le I_0 \le 40mA$	-	-	40	mV
		Vo	-10.3V \ge VI \ge -23V, 1.0mA \le I ₀ \le 40mA		-7.6	-	-8.4	V
Output voltage	Output Voltage		$V_I = -14V$, $1.0mA \le I_0 \le 70mA$		-7.6	-	-8.4	
Quiescent Current		L	Tj = +25°C		-	-	6.0	mA
Quiescent Current		lq	Tj = +125°C		-	-	5.5	IIIA
Quiescent Current	With Line		-11.7V ≥ VI ≥ -23	SV	-	-	1.5	mA
Change	With Load	ΔlQ	$1.0mA \le I_0 \le 40n$	nA a	-	-	0.1	mA
Output Noise Voltag	e	VN	$T_j = +25^{\circ}C,10Hz \le f \le 100kHz$		-	50	-	μV
Ripple Rejection		RR	$ \begin{array}{l} f=120Hz,-11V\geq V_l\geq -21V\\ T_j=+25^\circ C \end{array} $		39	55	-	dB
Dropout Voltage		VD	Tj = +25°C	on	-	1.7	-	V

Note:

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

Electrical Characteristics(MC79L12A) (Continued)

(VI = -19V, IO = 40mA, CI = 0.33μ F, CO = 0.1μ F, 0° C \leq TJ \leq +125°C, unless otherwise specified)

Parameter		Symbol	Conditions		Min.	Тур.	Max.	Unit
Output Voltage		Vo	TJ = +25°C		-11.5	-12.0	-12.5	V
				$-14.5V \ge V_I \ge -27V$	-	-	250	mV
Line Regulation (Not	te1)	ΔVO	TJ = +25°C	$-16V \ge VI \ge -27V$	-	-	200	mV
Load Population (No	to1)	ΔVο	T,J = +25°C	$1.0mA \le IO \le 100mA$	-	-	100	mV
Load Regulation (No	ne i)	200	1J = +25 C	$1.0mA \le IO \le 40mA$	-	-	50	mV
		Vo	$-14.5V > V_I > -27V$, $1.0mA \le IO \le 40mA$		-11.4	-	-12.6	V
Output Voltage		$V_{I} = -19V, 1.0mA \le I_{O} \le 70mA$		-11.4	-	-12.6	V	
Quiescent Current			$T_J = +25^{\circ}C$		-	-	6.0	m۸
		lQ	T _J = +125°C		-	-	6.5	mA
Quiescent Current	With Line	ΔlQ	$-16V \ge V_I \ge -27V$		-	-	1.5	mA
Change	With Load	ΔlQ	$1.0 \text{mA} \le \text{IO} \le 40 \text{r}$	mA 🔬	-	-	0.1	mA
Output Noise Voltag	e	VN	$T_A = +25^{\circ}C, 10Hz \le f \le 100kHz$		-	80	-	μV
Ripple Rejection		RR	$ f = 120Hz, -15V \ge \forall I \ge -25V \\ T_J = +25^{\circ}C $		37	42	-	dB
Dropout Voltage		VD	Tj = +25°C	on	-	1.7	-	V

Note:

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

Electrical Characteristics(MC79L15A) (Continued)

(VI = -23V, IO = 40mA, CI = 0.33μ F, CO = 0.1μ F, 0° C \leq TJ \leq +125°C, unless otherwise specified)

Parameter		Symbol	C	onditions	Min.	Тур.	Max.	Unit
Output Voltage		Vo	TJ = +25°C		-14.4	-15.0	-15.6	V
				$-17.5V \ge V_I \ge -30V$	-	-	300	mV
Line Regulation (No	te1)	ΔVO	$T_J = +25^{\circ}C$ $-20V \ge V_I \ge -30V$		-	-	250	mV
Load Population (N	oto1)	ΔVο	TJ = +25°C	$1.0mA \le IO \le 100mA$	-	-	150	mV
Load Regulation (No	Jie I)	ΔνΟ	1J = +25 C	$1.0mA \le IO \le 40mA$	-	-	75	mV
		Vo	$-17.5V \ge V_I \ge -30V, \ 1.0mA \le I_O \le 40mA$		-14.25	-	-15.75	V
Oulput voltage	Output Voltage		$V_{I} = -23V, 1.0mA \le I_{O} \le 70mA$		-14.25	-	-15.75	V
Quiescent Current			TJ = +25°C		-	-	6.0	m۸
Quiescent Current		lq	T _J = +125°C		-	-	6.5	mA
Quiescent Current	With Line	ΔlQ	$-20V \ge V_I \ge -30^{\circ}$	V	-	-	1.5	mA
Change	With Load	ΔlQ	$1.0 \text{mA} \le \text{IO} \le 40$	0mA 🔬	-	-	0.1	mA
Output Noise Voltag	e	VN	$T_A = +25^{\circ}C, 10Hz \le f \le 100kHz$		-	90	-	μV
Ripple Rejection		RR	$f = 120Hz, -18.5V \ge V_1 \ge -28.5V$ $T_J = +25^{\circ}C$		34	39	-	dB
Dropout Voltage		VD	Tj = +25°C		-	1.7	-	V

Note:

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

Electrical Characteristics(MC79L18A) (Continued)

(VI = -27V, IO = 40mA, CI = 0.33μ F, CO = 0.1μ F, 0° C \leq TJ \leq +125°C, unless otherwise specified)

Parameter		Symbol	Conditions		Min.	Тур.	Max.	Unit
Output Voltage		Vo	TJ = +25°C		-17.3	-18.0	-18.7	V
				$-20.7V \ge V_I \ge -33V$	-	-	325	mV
Line Regulation (Not	te1)	ΔVO	TJ = +25°C	-21V ≥ VI ≥ -33V	-	-	275	mV
Load Pogulation (No	sto 1)	ΔVο	TJ = +25°C	$1.0mA \le IO \le 100mA$	-	-	170	mV
Load Regulation (No	ne i)	200	1J = +25 C	$1.0mA \le IO \le 40mA$	-	-	85	mV
		Vo	$-20.7V > V_I > -33V$, $1.0mA \le I_O \le 40mA$		-17.1	-	-18.9	V
Output voltage	Output Voltage		$V_I = -27V$, $1.0mA \le I_O \le 70mA$		-17.1	-	-18.9	V
Quiescent Current		lo	$T_J = +25^{\circ}C$		-	-	6.5	mA
Quiescent Current		lQ	T _J = +125°C		-	-	6.0	mA
Quiescent Current	With Line	ΔlQ	$-21V \ge V_I \ge -33V_I$	V	-	-	1.5	mA
Change	With Load	ΔlQ	$1.0\text{mA} \le \text{IO} \le 40$)mA	-	-	0.1	mA
Output Noise Voltag	e	VN	$T_A = +25^{\circ}C,10Hz \le f \le 100kHz$		-	150	-	μV
Ripple Rejection		RR	$ \begin{array}{l} f=120Hz,-23V\geq V_l\geq -33V\\ T_J=+25^\circ C \end{array} $		33	48	-	dB
Dropout Voltage		VD	$T_{J} = +25^{\circ}C$	2	-	1.7	-	V

Note:

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

Electrical Characteristics(MC79L24A) (Continued)

(VI = -33V, IO = 40mA, CI = 0.33μ F, CO = 0.1μ F, 0° C \leq TJ \leq +125°C, unless otherwise specified)

Parameter		Symbol	Conditions		Min.	Тур.	Max.	Unit
Output Voltage		Vo	TJ = +25°C		-23	-24	-25	V
				$-27V \ge V_I \ge -38V$	-	-	350	mV
Line Regulation (Not	te1)	ΔVO	TJ = +25°C	$-28V \ge V_I \ge -38V$	-	-	300	mV
Load Regulation (No	(to1)	ΔVο	TJ = +25°C	$1.0mA \le IO \le 100mA$	-	-	200	mV
LOAD REGULATION (NC	ne i)	200	1J = +25 C	$1.0mA \le IO \le 40mA$	-	-	100	mV
		Vo	$-27V \ge V_I \ge -38V$, $1.0mA \le I_O \le 40mA$		-22.8	-	-25.2	V
Oulput voltage	Output Voltage		$V_{I} = -33V$, 1.0mA $\leq I_{O} \leq 70$ mA		-22.8	-	-25.2	V
Quiescent Current			$T_J = +25^{\circ}C$		-	-	6.5	mA
Quiescent Current		lQ	TJ = +125°C		-	-	6.0	ШA
Quiescent Current	With Line	ΔlQ	$-28V \ge V_I \ge -38$	3V	-	-	1.5	mA
Change	With Load	ΔlQ	$1.0mA \le IO \le 4$	10mA	-	-	0.1	mA
Output Noise Voltag	e	VN	$T_A = +25^{\circ}C, 10Hz \le f \le 100kHz$		-	200	-	μV
Ripple Rejection		RR	$ \begin{array}{l} f=120Hz,-29V\geq V_I\geq -35V\\ T_J=+25^\circ C \end{array} $		31	47	-	dB
Dropout Voltage		VD	TJ = +25°C		-	1.7	-	V

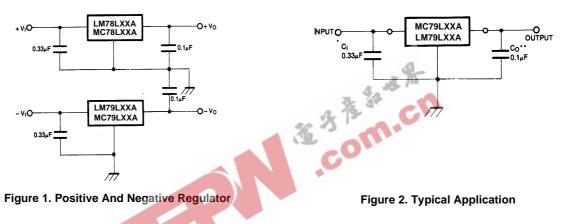
Note:

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

Typical Application

Design Considerations

The MC79LXXA/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 0.33μ 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.



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.

* C1 is required if regulator is located an appreciable distance from power supply filter.

* Co improves stability and transient response.

Mechanical Dimensions

 0.46 ± 0.10

1.27TYP

[1.27 ±0.20]

 $\frac{1.02 \pm 0.10}{0.38 \pm 0.05}$

3.86MAX

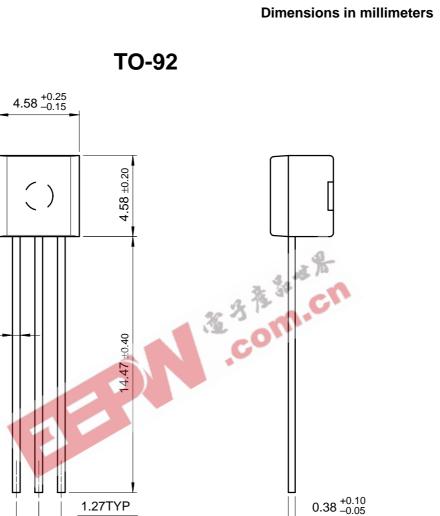
[1.27 ±0.20]

(0.25)

(R2.29)

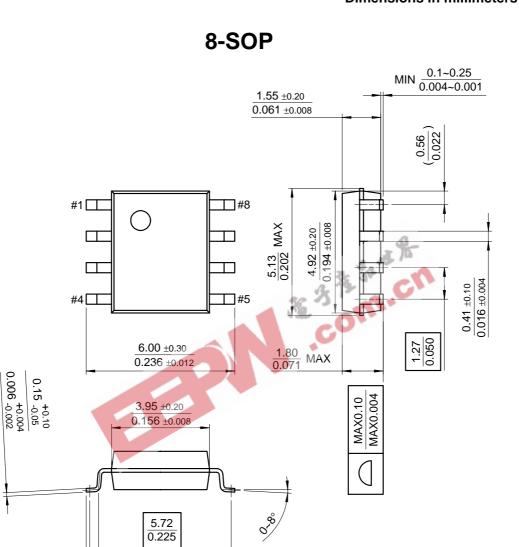
 $\underline{3.60} \pm 0.20$

Package



Mechanical Dimensions (Continued)

Package



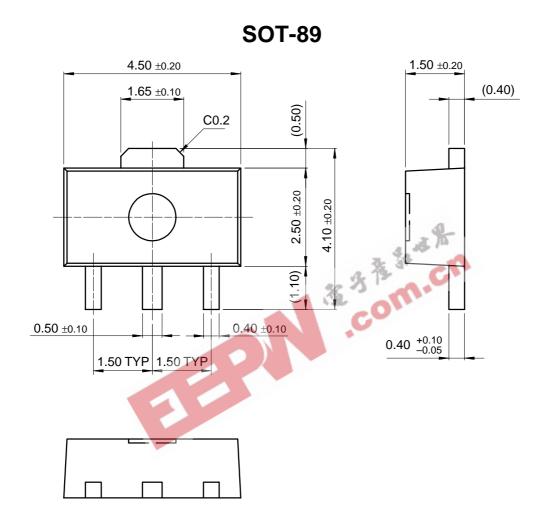
Dimensions in millimeters

 $\frac{0.50 \pm 0.20}{0.020 \pm 0.008}$

Mechanical Dimensions (Continued)

Package

Dimensions in millimeters



Ordering Information

Product Number	Package	Operating Temperature
LM79L05ACZ	TO-92	0 ~ +125°C
Product Number	Package	Operating Temperature
MC79L05ACP		
MC79L08ACP		
MC79L12ACP	TO-92	
MC79L15ACP	10-92	
MC79L18ACP		0 ~ +125°C
MC79L24ACP		
MC79L05ACD	8-SOP	
MC79L15ACD	0-30P	
MC79L05ACH	SOT-89	



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- A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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