

0.5 AMP, 3-TERMINAL NEGATIVE REGULATORS

IP79M00 Series, IP79M00A Series, IP120M Series, IP120MA Series

DESCRIPTION

The IP79M00/A series of voltage regulators are fixed output regulators intended for local, on-card voltage regulation. These devices are available in -5 , -12 , and -15 volt options and are capable of delivering in excess of 500 mA over temperature. The A-suffix devices are fully specified at 0.5A, provide 0.01%/V line regulation, 0.3%/A load regulation, and $\pm 1\%$ output voltage tolerance at room temperature. Protection features include safe operating area, current limiting and thermal shutdown. This series of regulators is available in TO-39 and Ceramic DIP packages.

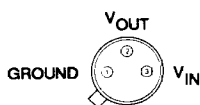
FEATURES

- 1% output voltage tolerance
- -5 , -12 and -15 V fixed output voltages available
- 0.01%/V line regulation
- 0.3%/A load regulation
- Thermal overload protection
- Short-circuit current limit protection
- Safe operating area protection
- Start-up with negative voltage ($\pm$ supplies) on output

4

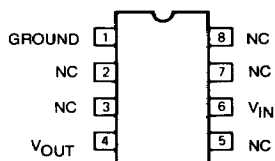
CONNECTIONS

(Bottom View)



TO-39

(Top View)



8 Pin J Package



0.5 AMP, 3-TERMINAL NEGATIVE REGULATORS**ABSOLUTE MAXIMUM RATINGS****Input Voltage** ($V_O = -5V, -12V, -15V$) $-35V$ **Internal Power Dissipation**

(Note 1)

Internally Limited

Operating Temperature Range (T_j)

IP79M00A, IP79M00

 -55°C to $+150^\circ\text{C}$

IP120MA, IP120M

 -55°C to $+150^\circ\text{C}$ **Maximum Junction Temperature**

H Package TO-39

 150°C

8 Pin Ceramic DIP Package J

 150°C **Storage Temperature Range** -65°C to $+150^\circ\text{C}$ **Lead Temperature** (Soldering, 10 sec.) 300°C

Absolute maximum ratings are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the device should be operated at these limits. The electrical characteristics provide conditions for actual device operation.

ELECTRICAL CHARACTERISTICS (NOTE 2)

Parameter	Test Conditions	IP79M05A IP120MA-5			IP79M05 IP120M-5			Units
		Min	Typ	Max	Min	Typ	Max	
Output Voltage, V_O	$I_O = 100\text{mA}, V_{IN} = -10V$	-4.95	-5	-5.05	-4.80	-5	-5.20	V
	$P_D \leq P_{MAX}, 5\text{mA} \leq I_O \leq 350\text{mA}$ $-25V \leq V_{IN} \leq -7V$	-4.85		-5.15	-4.75		-5.25	V
Line Regulation, ΔV_O	$I_O = 350\text{mA}$ $-25V \leq V_{IN} \leq -7V$		3	10			50	mV
	$-18V \leq V_{IN} \leq -8V$		3	10			30	mV
Load Regulation, ΔV_O	$5\text{mA} \leq I_O \leq 500\text{mA}, V_{IN} = -10V$		5	50			100	mV
Quiescent Current, I_Q	$I_O = 350\text{mA}, V_{IN} = -10V$		1	2		1	2	mA
Quiescent Current Change, ΔI_Q	$5\text{mA} \leq I_O \leq 500\text{mA}, V_{IN} = -10V$		0.1	0.4			0.4	mA
	$-25V \leq V_{IN} \leq -8V, I_O = 200\text{mA}$		0.1	0.4			0.4	mA
Output Noise Voltage, V_n	$10\text{Hz} \leq f \leq 100\text{kHz}$		40	400			400	μV
Ripple Rejection, $\Delta V_{IN}/\Delta V_{OUT}$	$I_O = 300\text{mA}, f = 120\text{Hz}$ $-18V \leq V_{IN} \leq -8V$	65	80		54			dB
	$I_O = 100\text{mA}, f = 120\text{Hz}$ $-18V \leq V_{IN} \leq -8V$	65	80		54			dB
Dropout Voltage	$I_O = 350\text{mA}$		1.1	2.3			2.3	V
Short Circuit Current, I_{SC}	$V_{IN} = -35V$		300	600		300	600	mA
Peak Output Current, I_{PK}	$V_{IN} = -10V$	0.5	1.0	1.4	0.5	1.0	1.6	A
Average Temperature	$I_O = 5\text{mA}$		0.5	2.0		0.5		$\text{mV}/^\circ\text{C}$
Coefficient of Output Voltage								

The ● denotes the specifications which apply over the full operating temperature range, all others apply at $T_j = 25^\circ\text{C}$ unless otherwise specified.

Note 1: Thermal resistance of the TO-39 package (H) is typically $20^\circ\text{C}/\text{W}$ junction to case and $120^\circ\text{C}/\text{W}$ case to ambient. Although power dissipation is internally limited, these specifications apply for up to 2W for the TO-39 package, and 1.05W for the J package. Thermal resistance of the J package is typically $119^\circ\text{C}/\text{W}$ junction to ambient. (Derate at $8.4\text{mW}/^\circ\text{C}$ for ambient temperatures above 25°C).

Note 2: All characteristics are measured with a capacitor across the input of $0.22\mu\text{F}$ and a capacitor across the output of $0.1\mu\text{F}$. All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques ($t_w \leq 10\text{ms}$, duty cycle $\leq 5\%$). Output voltage changes due to changes in internal temperature must be taken into account separately.



0.5 AMP, 3-TERMINAL NEGATIVE REGULATORS**ELECTRICAL CHARACTERISTICS (CONTINUED)**

Parameter	Test Conditions	IP79M12A/IP120MA-12			IP79M12/IP120M-12			Units
		Min	Typ	Max	Min	Typ	Max	
Output Voltage, V_O	$I_O = 100\text{mA}$, $V_{IN} = -19\text{V}$	-11.88	-12	-12.12	-11.50	-12	-12.50	V
	$P_D \leq P_{MAX}$, $5\text{mA} \leq I_O \leq 350\text{mA}$ $-30\text{V} \leq V_{IN} \leq -14.5\text{V}$	-11.64		-12.36	-11.40		-12.60	V
Line Regulation, ΔV_O	$I_O = 350\text{mA}$, $-30\text{V} \leq V_{IN} \leq -14.5\text{V}$		4	18			80	mV
	$-25\text{V} \leq V_{IN} \leq -15\text{V}$		4	18			50	mV
Load Regulation, ΔV_O	$5\text{mA} \leq I_O \leq 500\text{mA}$, $V_{IN} = -19\text{V}$		10	60			240	mV
Quiescent Current, I_Q	$I_O = 350\text{mA}$, $V_{IN} = -19\text{V}$		1.5	3		1.5	3	mA
Quiescent Current Change, ΔI_Q	$5\text{mA} \leq I_O \leq 500\text{mA}$, $V_{IN} = -19\text{V}$		0.1	0.4			0.4	mA
	$-30\text{V} \leq V_{IN} \leq -14.5\text{V}$, $I_O = 200\text{mA}$		0.1	0.4			0.4	mA
Output Noise Voltage, V_n	$10\text{Hz} \leq f \leq 100\text{kHz}$		96	960			960	μV
Ripple Rejection, $\Delta V_{IN}/\Delta V_{OUT}$	$I_O = 300\text{mA}$, $f = 120\text{Hz}$ $-25\text{V} \leq V_{IN} \leq -15\text{V}$	58	72		54			dB
	$I_O = 100\text{mA}$, $f = 120\text{Hz}$ $-25\text{V} \leq V_{IN} \leq -15\text{V}$	58	72		54			dB
Dropout Voltage	$I_O = 350\text{mA}$		1.1	2.3			2.3	V
Short Circuit Current, I_{SC}	$V_{IN} = -35\text{V}$		300	600		300	600	mA
Peak Output Current, I_{PK}	$V_{IN} = -19\text{V}$	0.5	1.0	1.4	0.5	1.0	1.6	A
Average Temperature Coefficient of Output Voltage	$I_O = 5\text{mA}$		1.2	4.8		1.2		mV/ $^{\circ}\text{C}$

Parameter	Test Conditions	IP79M15A/IP120MA-15			IP79M15/IP120M-15			Units
		Min	Typ	Max	Min	Typ	Max	
Output Voltage, V_O	$I_O = 100\text{mA}$, $V_{IN} = -23\text{V}$	-14.85	-15	-15.15	-14.40	-15	-15.60	V
	$P_D \leq P_{MAX}$, $5\text{mA} \leq I_O \leq 350\text{mA}$ $-30\text{V} \leq V_{IN} \leq -17.5\text{V}$	-14.55		-15.45	-14.25		-15.75	V
Line Regulation, ΔV_O	$I_O = 350\text{mA}$, $-30\text{V} \leq V_{IN} \leq -17.5\text{V}$		4	22			80	mV
	$-28\text{V} \leq V_{IN} \leq -18\text{V}$		4	22			50	mV
Load Regulation, ΔV_O	$5\text{mA} \leq I_O \leq 500\text{mA}$, $V_{IN} = -23\text{V}$		12	75			240	mV
Quiescent Current, I_Q	$I_O = 350\text{mA}$, $V_{IN} = -23\text{V}$		1.5	3		1.5	3	mA
Quiescent Current Change, ΔI_Q	$5\text{mA} \leq I_O \leq 500\text{mA}$, $V_{IN} = -23\text{V}$		0.1	0.4			0.4	mA
	$-30\text{V} \leq V_{IN} \leq -17.5\text{V}$, $I_O = 200\text{mA}$		0.1	0.4			0.4	mA
Output Noise Voltage, V_n	$10\text{Hz} \leq f \leq 100\text{kHz}$		120	1200			1200	μV
Ripple Rejection, $\Delta V_{IN}/\Delta V_{OUT}$	$I_O = 300\text{mA}$, $f = 120\text{Hz}$ $-28.5\text{V} \leq V_{IN} \leq -18.5\text{V}$	57	70		54			dB
	$I_O = 100\text{mA}$, $f = 120\text{Hz}$ $-28.5\text{V} \leq V_{IN} \leq -18.5\text{V}$	57	70		54			dB
Dropout Voltage	$I_O = 350\text{mA}$		1.1	2.3			2.3	V
Short Circuit Current, I_{SC}	$V_{IN} = -35\text{V}$		300	600		300	600	mA
Peak Output Current, I_{PK}	$V_{IN} = -23\text{V}$	0.5	1.0	1.4	0.5	1.0	1.6	A
Average Temperature Coefficient of Output Voltage	$I_O = 5\text{mA}$		1.5	6.0		1.5		mV/ $^{\circ}\text{C}$



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ORDER INFORMATION

Part Number	Temperature Range	Package
IP79M05AH	-55°C to +150°C	TO-39
IP79M05H	-55°C to +150°C	TO-39
IP79M12AH	-55°C to +150°C	TO-39
IP79M12H	-55°C to +150°C	TO-39
IP79M15AH	-55°C to +150°C	TO-39
IP79M15H	-55°C to +150°C	TO-39
IP79M05AJ	-55°C to +150°C	8 Pin Ceramic DIP
IP79M05J	-55°C to +150°C	8 Pin Ceramic DIP
IP79M12AJ	-55°C to +150°C	8 Pin Ceramic DIP
IP79M12J	-55°C to +150°C	8 Pin Ceramic DIP
IP79M15AJ	-55°C to +150°C	8 Pin Ceramic DIP
IP79M15J	-55°C to +150°C	8 Pin Ceramic DIP
IP120MAH-5	-55°C to +150°C	TO-39
IP120MH-5	-55°C to +150°C	TO-39
IP120MAH-12	-55°C to +150°C	TO-39
IP120MH-12	-55°C to +150°C	TO-39
IP120MAH-15	-55°C to +150°C	TO-39
IP120MH-15	-55°C to +150°C	TO-39

4

