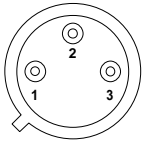
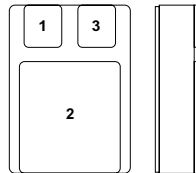


## 0.5 AMP NEGATIVE VOLTAGE REGULATOR



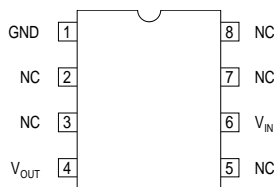
Pin 1 – Ground  
 Pin 2 –  $V_{OUT}$   
 Case –  $V_{IN}$

H Package – TO-39



Pin 1 – Ground  
 Pin 2 –  $V_{IN}$   
 Case –  $V_{OUT}$

SMD Package - SMD1  
 CERAMIC SURFACE MOUNT



8 Pin J Package

### FEATURES

- OUTPUT CURRENT UP TO 0.5A
- OUTPUT VOLTAGES OF -5, -12, -15V
- 0.01% / V LINE REGULATION
- 0.3% / A LOAD REGULATION
- THERMAL OVERLOAD PROTECTION
- SHORT CIRCUIT PROTECTION
- OUTPUT TRANSISTOR SOA PROTECTION
- 1% VOLTAGE TOLERANCE (–A VERSIONS)

### Order Information

Part Number	H-Pack (TO-39)	J-Pack CERDIP	SMD-Pack SMD1	Temp. Range
IP79MxxAzz	✓	✓	✓	-55 to +150°C
IP79Mxxzz	✓	✓	✓	"
IP120MAzz-xx	✓		✓	"
IP120Mzz-xx	✓		✓	"

**Note:**

xx = Voltage Code (05, 12, 15)  
 zz = Package Code (H, J)  
 eg. IP79M05J IP120MAH-12

### DESCRIPTION

The IP120MA and IP79M00A 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 500mA 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.

### ABSOLUTE MAXIMUM RATINGS ( $T_C = 25^\circ\text{C}$ unless otherwise stated)

$V_I$	DC Input Voltage (for $V_O = -5, -12, -15\text{V}$ )	-35V
$P_D$	Power Dissipation	Internally limited
$R_{\theta JC}$	Thermal Resistance Junction to Case	– H Package 20°C / W – SMD Package TBA°C / W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	– H Package 120°C / W – J Package 119°C / W
$T_J$	Operating Junction Temperature Range	-55 to 150°C
$T_{stg}$	Storage Temperature	-65 to 150°C

Note 1. Although power dissipation is internally limited, these specifications are applicable for maximum power dissipation  $P_{MAX}$  of 2W for the H-Package, 1.05W for the J-Package and 15W for the SG-Package.

## ELECTRICAL CHARACTERISTICS

Parameter	Test Conditions	IP79M05A IP120MA-05			IP79M05 IP120M-05			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
$V_O$ Output Voltage	$I_O = 100\text{mA}$ $V_{IN} = -10\text{V}$	-4.95	-5	-5.05	-4.8	-5	-5.2	V
	$I_O = 5\text{mA to } 350\text{mA}$ $P_D \leq P_{MAX}$ $V_{IN} = -7\text{V to } -25\text{V}$ $T_J = -55 \text{ to } 150^\circ\text{C}$	-4.85		-5.15	-4.75		-5.25	
$\Delta V_O$ Line Regulation	$I_O = 350\text{mA}$	$V_{IN} = -7\text{V to } -25\text{V}$	3	10			50	mV
		$V_{IN} = -8\text{V to } -18\text{V}$ $T_J = -55 \text{ to } 150^\circ\text{C}$	3	10			30	
$\Delta V_O$ Load Regulation	$I_O = 5\text{mA to } 500\text{mA}$ $V_{IN} = -10\text{V}$ $T_J = -55 \text{ to } 150^\circ\text{C}$		5	50			100	mV
$I_Q$ Quiescent Current	$V_{IN} = -10\text{V}$ $I_O = 350\text{mA}$ $T_J = -55 \text{ to } 150^\circ\text{C}$		1	2		1	2	mA
$\Delta I_Q$ Quiescent Current Change	$I_O = 5\text{mA to } 500\text{mA}$ $V_{IN} = -10\text{V}$ $T_J = -55 \text{ to } 150^\circ\text{C}$		0.1	0.4			0.4	mA
	$I_O = 200\text{mA}$ $V_{IN} = -8\text{V to } -25\text{V}$ $T_J = -55 \text{ to } 150^\circ\text{C}$		0.1	0.4			0.4	
$V_N$ Output Noise Voltage	$f = 10\text{Hz to } 100\text{kHz}$		40	400			400	$\mu\text{V}$
$\frac{\Delta V_{IN}}{\Delta V_O}$ Ripple Rejection	$f = 120\text{Hz}$ $V_{IN} = -8\text{V to } -18\text{V}$	$I_O = 300\text{mA}$	65	80	54			dB
		$I_O = 100\text{mA}$ $T_J = -55 \text{ to } 150^\circ\text{C}$	65	80	54			
Dropout Voltage	$I_O = 350\text{mA}$		1.1	2.3			2.3	V
$I_{sc}$ Short Circuit Current	$V_{IN} = -35\text{V}$		300	600		300	600	mA
$I_{pk}$ Peak Output Current	$V_{IN} = -10\text{V}$	0.5	1.0	1.4	0.5	1.0	1.6	A
Average Temperature Coefficient of $V_O$	$I_O = 5\text{mA}$		0.5	2.0		0.5		$\frac{\text{mV}}{^\circ\text{C}}$

1) 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 ( $t_p \leq 10\text{ms}$ ,  $\delta \leq 5\%$ ). Output voltage changes due to changes in internal temperature must be taken into account separately.

2) Test Conditions unless otherwise stated:  $T_J = 25^\circ\text{C}$

$P_{MAX} = 2\text{W}$  for H Package (TO-39)

$P_{MAX} = 1.05\text{W}$  for J Package (CERDIP)

$P_{MAX} = 15\text{W}$  for SMD1 Package (SMD1)

## ELECTRICAL CHARACTERISTICS

Parameter	Test Conditions	IP79M12A IP120MA-12			IP79M12 IP120M-12			Units	
		Min.	Typ.	Max.	Min.	Typ.	Max.		
V <sub>O</sub> Output Voltage	I <sub>O</sub> = 100mA V <sub>IN</sub> = -19V	-11.88	-12	-12.12	-11.5	-12	-12.5	V	
	I <sub>O</sub> = 5mA to 350mA P <sub>D</sub> ≤ P <sub>MAX</sub> V <sub>IN</sub> = -14.5V to -30V T <sub>J</sub> = -55 to 150°C			-12.36	-11.4		-12.6		
ΔV <sub>O</sub> Line Regulation	I <sub>O</sub> = 350mA V <sub>IN</sub> = -14.5V to -30V T <sub>J</sub> = -55 to 150°C		4	18			80	mV	
			4	18			50		
ΔV <sub>O</sub> Load Regulation	I <sub>O</sub> = 5mA to 500mA V <sub>IN</sub> = -19V T <sub>J</sub> = -55 to 150°C		10	60			240	mV	
I <sub>Q</sub> Quiescent Current	V <sub>IN</sub> = -19V I <sub>O</sub> = 350mA T <sub>J</sub> = -55 to 150°C		1.5	3		1.5	3	mA	
ΔI <sub>Q</sub> Quiescent Current Change	I <sub>O</sub> = 5mA to 500mA V <sub>IN</sub> = -19V T <sub>J</sub> = -55 to 150°C		0.1	0.4			0.4	mA	
	I <sub>O</sub> = 200mA V <sub>IN</sub> = -14.5V to -30V T <sub>J</sub> = -55 to 150°C		0.1	0.4			0.4		
V <sub>N</sub> Output Noise Voltage	f = 10Hz to 100kHz		96	960			960	μV	
$\frac{\Delta V_{IN}}{\Delta V_O}$ Ripple Rejection	f = 120Hz V <sub>IN</sub> = -15V to -25V	I <sub>O</sub> = 300mA	58	72		54		dB	
		I <sub>O</sub> = 100mA T <sub>J</sub> = -55 to 150°C	58	72		54			
Dropout Voltage	I <sub>O</sub> = 350mA		1.1	2.3			2.3	V	
I <sub>sc</sub> Short Circuit Current	V <sub>IN</sub> = -35V		300	600		300	600	mA	
I <sub>pk</sub> Peak Output Current	V <sub>IN</sub> = -19V		0.5	1.0	1.4	0.5	1.0	1.6	A
Average Temperature Coefficient of V <sub>O</sub>	I <sub>O</sub> = 5mA		1.2	4.8		1.2		mV/°C	

- 1) All characteristics are measured with a capacitor across the input of 0.22μF and a capacitor across the output of 0.1μF.  
 All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques ( $t_p \leq 10\text{ms}$ ,  $\delta \leq 5\%$ ). Output voltage changes due to changes in internal temperature must be taken into account separately.
- 2) Test Conditions unless otherwise stated: T<sub>J</sub> = 25°C  
 P<sub>MAX</sub> = 2W for H Package (TO-39)  
 P<sub>MAX</sub> = 1.05W for J Package (CERDIP)  
 P<sub>MAX</sub> = 15W for SMD Package (SMD1)

## ELECTRICAL CHARACTERISTICS

Parameter	Test Conditions	IP79M15A IP120MA-15			IP79M15 IP120M-15			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
V <sub>O</sub> Output Voltage	I <sub>O</sub> = 100mA      V <sub>IN</sub> = -23V	-14.85	-15	-15.15	-14.4	-15	-15.6	V
	I <sub>O</sub> = 5mA to 350mA P <sub>D</sub> ≤ P <sub>MAX</sub> V <sub>IN</sub> = -17.5V to -30V T <sub>J</sub> = -55 to 150°C	-14.55		-15.45	-14.25		-15.75	
ΔV <sub>O</sub> Line Regulation	I <sub>O</sub> = 350mA      V <sub>IN</sub> = -17.5V to -30V V <sub>IN</sub> = -18V to -28V T <sub>J</sub> = -55 to 150°C		4	22			80	mV
			4	22			50	
ΔV <sub>O</sub> Load Regulation	I <sub>O</sub> = 5mA to 500mA V <sub>IN</sub> = -23V      T <sub>J</sub> = -55 to 150°C		12	75			240	mV
I <sub>Q</sub> Quiescent Current	V <sub>IN</sub> = -23V      I <sub>O</sub> = 350mA T <sub>J</sub> = -55 to 150°C		1.5	3		1.5	3	mA
ΔI <sub>Q</sub> Quiescent Current Change	I <sub>O</sub> = 5mA to 500mA V <sub>IN</sub> = -23V      T <sub>J</sub> = -55 to 150°C		0.1	0.4			0.4	mA
	I <sub>O</sub> = 200mA      V <sub>IN</sub> = -17.5V to -30V T <sub>J</sub> = -55 to 150°C		0.1	0.4			0.4	
V <sub>N</sub> Output Noise Voltage	f = 10Hz to 100kHz		120	1200			1200	μV
$\frac{\Delta V_{IN}}{\Delta V_O}$ Ripple Rejection	f = 120Hz      I <sub>O</sub> = 300mA	57	70		54			dB
	V <sub>IN</sub> = -18.5V to -28.5V I <sub>O</sub> = 100mA T <sub>J</sub> = -55 to 150°C	57	70		54			
Dropout Voltage	I <sub>O</sub> = 350mA		1.1	2.3			2.3	V
I <sub>sc</sub> Short Circuit Current	V <sub>IN</sub> = -35V		300	600		300	600	mA
I <sub>pk</sub> Peak Output Current	V <sub>IN</sub> = -23V	0.5	1.0	1.4	0.5	1.0	1.6	A
Average Temperature Coefficient of V <sub>O</sub>	I <sub>O</sub> = 5mA		1.5	6.0		1.5		mV/°C

- 1) All characteristics are measured with a capacitor across the input of 0.22μF and a capacitor across the output of 0.1μF.  
 All characteristics except noise voltage and ripple rejection ratio are measured using pulse techniques ( $t_p \leq 10\text{ms}$ ,  $\delta \leq 5\%$ ). Output voltage changes due to changes in internal temperature must be taken into account separately.
- 2) Test Conditions unless otherwise stated: T<sub>J</sub> = 25°C  
 P<sub>MAX</sub> = 2W for H Package (TO-39)  
 P<sub>MAX</sub> = 1.05W for J Package (CERDIP)  
 P<sub>MAX</sub> = 15W for SMD Package (SMD1)