

4825898 INTEGRATED POWER

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INTEGRATED POWER SEMICONDUCTORS, LTD.

0.5 Amp, 3-Terminal
Negative Regulators

T-58-11-13

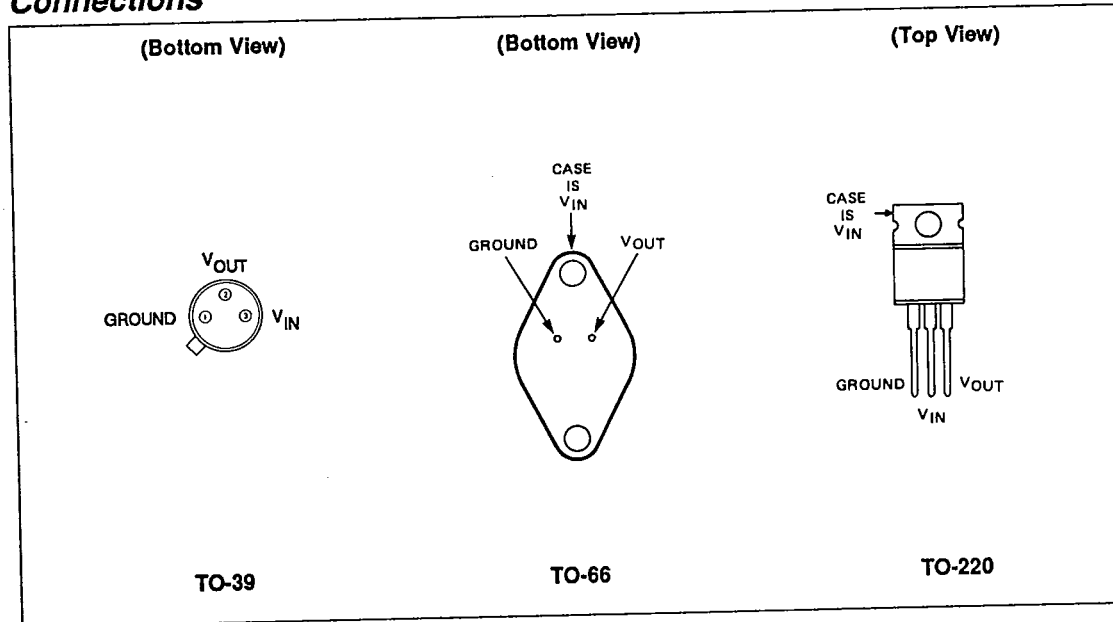
Description

The IP79M00/A/AC/C 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. The entire series of regulators is available in the TO-39 and TO-66 packages and the IP79M00AC/IP79M00C series is also available in the TO-220 plastic power package.

Features

- 1% output voltage tolerance
- -5, -12, and -15V 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
- 100% thermal limit burn-in
- Start-up with positive voltage ($\pm$ supplies) on output

Connections



Section 5 - Voltage Regulators
IP79M00 Series, IP79M00A Series,
IP79M00C Series, IP79M00AC Series

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Absolute Maximum Ratings

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Input Voltage ($V_O = -5V, -12V, -15V$)	-35V	Maximum Junction Temperature	
Internal Power Dissipation (Note 1)	Internally Limited	TO-39 Package H	150°C
		TO-66 Package R	150°C
		TO-220 Package T	125°C
Operating Temperature Range (T_j)		Storage Temperature Range	-65°C to +150°C
IP79M00A, IP79M00	-55°C to +150°C	Lead Temperature (Soldering, 10 sec.)	300°C
IP79M00AC, IP79M00C	0°C to +125°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 IP79M05AC			IP79M05 IP79M05C			Units
		Min	Typ	Max	Min	Typ	Max	
Output Voltage, V_O	$I_O = 100mA, V_{IN} = -10V$	-4.95	-5	-5.05	-4.80	-5	-5.20	V
	$P_D \leq P_{MAX}, 5mA \leq I_O \leq 350mA$ $-25V \leq V_{IN} \leq -7V$	-4.85		-5.15	-4.75		-5.25	V
Line Regulation, ΔV_O	$I_O = 350mA, -25V \leq V_{IN} \leq -7V$		3	10			50	mV
	$-18V \leq V_{IN} \leq -8V$		3	10			30	mV
Load Regulation, ΔV_O	$5mA \leq I_O \leq 500mA, V_{IN} = -10V$		5	50			100	mV
Quiescent Current, I_Q	$I_O = 350mA, V_{IN} = -10V$		1	2		1	2	mA
Quiescent Current Change, ΔI_Q	$5mA \leq I_O \leq 500mA, V_{IN} = -10V$		0.1	0.4			0.4	mA
	$-25V \leq V_{IN} \leq -8V, I_O = 200mA$		0.1	0.4			0.4	mA
Output Noise Voltage, V_n	$10Hz \leq f \leq 100kHz$		40	400			400	μV
Ripple Rejection, $\Delta V_{IN}/\Delta V_{OUT}$	$I_O = 300mA, f = 120Hz$ $-18V \leq V_{IN} \leq -8V$	65	80		54			dB
	$I_O = 100mA, f = 120Hz$ $-18V \leq V_{IN} \leq -8V$	65	80		54			dB
Dropout Voltage	$I_O = 350mA$		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	$I_O = 5mA$		0.5	2.0		0.5		mV/°C
Coefficient of Output Voltage								

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

Note 1: Thermal resistance of the TO-39 package (H) is typically $20^\circ C/W$ junction to case and $120^\circ C/W$ case to ambient. Thermal resistance of the TO-66 package (R) is typically $4^\circ C/W$ junction to case and $35^\circ C/W$ case to ambient. Thermal resistance of the TO-220 package (T) is typically $4^\circ C/W$ junction to case and $50^\circ C/W$ case to ambient.

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

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Electrical Characteristics (Cont.)

Parameter	Test Conditions	IP79M12A IP79M12AC			IP79M12 IP79M12O			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		$\text{mV}/^\circ\text{C}$

Parameter	Test Conditions	IP79M15A IP79M15AC			IP79M15 IP79M15C			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		$\text{mV}/^\circ\text{C}$

Section 5 - Voltage Regulators
 IP79M00 Series, IP79M00A Series,
 IP79M00C Series, IP79M00AC Series

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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
IP79M05ACH	0°C to +125°C	TO-39
IP79M05CH	0°C to +125°C	TO-39
IP79M12AH	-55°C to +150°C	TO-39
IP79M12H	-55°C to +150°C	TO-39
IP79M12ACH	0°C to +125°C	TO-39
IP79M12CH	0°C to +125°C	TO-39
IP79M15AH	-55°C to +150°C	TO-39
IP79M15H	-55°C to +150°C	TO-39
IP79M15ACH	0°C to +125°C	TO-39
IP79M15CH	0°C to +125°C	TO-39
IP79M05AR	-55°C to +150°C	TO-66
IP79M05R	-55°C to +150°C	TO-66
IP79M05ACR	0°C to +125°C	TO-66
IP79M05CR	0°C to +125°C	TO-66
IP79M12AR	-55°C to +150°C	TO-66
IP79M12R	-55°C to +150°C	TO-66
IP79M12ACR	0°C to +125°C	TO-66
IP79M12CR	0°C to +125°C	TO-66
IP79M15AR	-55°C to +150°C	TO-66
IP79M15R	-55°C to +150°C	TO-66
IP79M15ACR	0°C to +125°C	TO-66
IP79M15CR	0°C to +125°C	TO-66
IP79M05ACT	0°C to +125°C	TO-220
IP79M05CT	0°C to +125°C	TO-220
IP79M12ACT	0°C to +125°C	TO-220
IP79M12CT	0°C to +125°C	TO-220
IP79M15ACT	0°C to +125°C	TO-220
IP79M15CT	0°C to +125°C	TO-220

Section 5 - Voltage Regulators
 IP79M00 Series, IP79M00A Series,
 IP79M00C Series, IP79M00AC Series

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