

Description

This series of fixed-negative-voltage monolithic integrated-circuit voltage regulators is designed to complement Series MK7800 in a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single point regulation. Each of these regulators can deliver up to 1.5 amperes of output current. The internal current limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and current and also as the power pass element in precision regulators.

Features

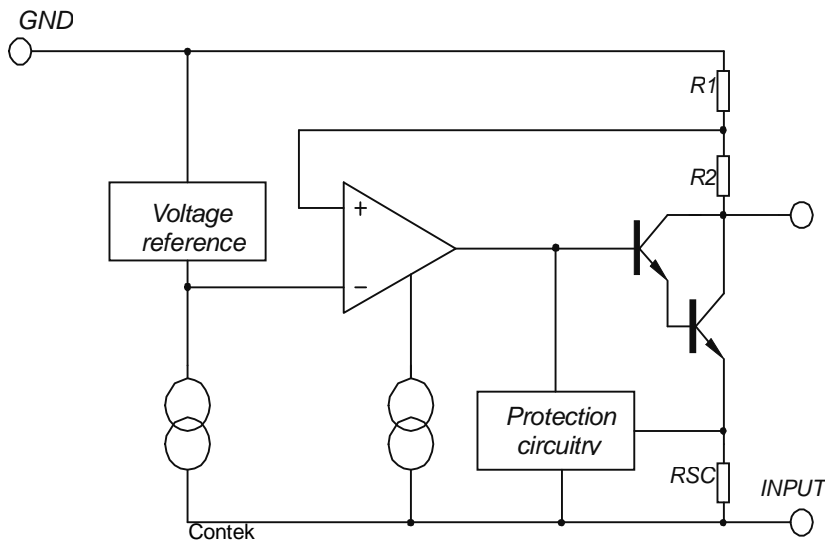
- 3-Terminal Regulators
- Output Current Up to 1.5 A
- No External Components
- Internal Thermal Overload Protection
- High Power Dissipation Capability
- Internal Short-Circuit Current Limiting
- Output Transistor Safe Area Compensation



Package TO-220
(top view)

Package

Internal Block Diagram



Absolute Maximum Ratings

over operating temperature range (unless otherwise noted)

Parameter		Maximum	Units
Input voltage	7924	-40	V
	All others	-35	
Continuous total dissipation at 25 °C free-air temperature		2	W
Continuous total dissipation at (or below) 25 °C case temperature		15	
Operating free-air, case, or virtual junctions temperature range		0 to 150	°C
Storage temperature range		-65 to 150	
Lead temperature 3.2 mm (1/8 inch) from case for 10 seconds		260	

Recommended Operating Conditions

Parameter		Min	Max	Units
Input voltage V_i	7905	-7	-25	V
	7906	-8	-25	
	7908	-10.5	-25	
	7912	-14.5	-30	
	7915	-17.5	-30	
	7918	-21	-33	
	7924	-27	-38	
Output current, I_o			1.5	A
Operating virtual junction temperature, T_j		0	125	°C

Device Selection Guide

Device	Output Voltage
7905	-5V
7906	-6V
7908	-8V
7912	-12V
7915	-15V
7918	-18V
7924	-24V

Electrical Characteristics 7905

Electrical characteristics at specified virtual junction temperature, $V_i = -10V$, $I_o = 500mA$ (unless otherwise noted)

Parameter	Test Conditions*		7905			Units
			Min	Typ	Max	
Output voltage**		25°C	-4.8	-5	-5.2	V
	$I_o = 5mA$ to 1A, $V_i = -7V$ to	0°C to 125°C	-4.75	-5	-5.25	
Input regulation -	$V_i = -7V$ to	25°C		12.5	50	mV
				4	15	
Ripple rejection	$V_i = -8V$ to - 18V, $f = 120Hz$	0°C to 125°C	54	60		dB
Output regulation	$I_o = 5mA$ to	25°C		15	100	mV
	1.5A $I_o =$			5	50	
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-0.4		mV/°C
Output noise voltage	$f = 10 Hz$ to 100 KHz	25°C		125		µV
Dropout voltage	$I_o = 1A$	25°C		1.1		V
Bias current		25°C		1.5	2	
Bias current change -	$V_i = -7V$ to	0°C to 125°C		0.15	0.5	mA
				0.08	0.5	
Peak output current		25°C		2.1		A

Electrical Characteristics 7906

Electrical characteristics at specified virtual junction temperature, $V_i = -11V$, $I_o = 500mA$ (unless otherwise noted)

Parameter	Test Conditions*		7906			Units
			Min	Typ	Max	
Output voltage**		25°C	-5.75	-6	-6.25	V
	$I_o = 5mA$ to 1A, $V_i = -8V$ to	0°C to 125°C	-5.7	-6	-6.3	
Input regulation -	$V_i = -8V$ to	25°C		12.5	120	mV
				4	60	
Ripple rejection	$V_i = -9V$ to - 19V, $f =$	0°C to 125°C	54	60		dB
Output regulation	$I_o = 5mA$ to	25°C		15	120	mV
	1.5A $I_o =$			5	60	
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-0.4		mV/°C
Output noise voltage	$f = 10 Hz$ to 100 KHz	25°C		150		µV
Dropout voltage	$I_o = 1A$	25°C		1.1		V
Bias current		25°C		1.5	2	
Bias current change -	$V_i = -8V$ to	0°C to 125°C		0.15	1.3	mA
				0.08	0.5	
Peak output current		25°C		2.1		A

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

** This specification applies only for dc power dissipation permitted by absolute maximum ratings.

Electrical Characteristics 7908

Electrical characteristics at specified virtual junction temperature, $V_i = -14V$, $I_o = 500mA$ (unless otherwise noted)

Parameter	Test Conditions*		7908			Units
			Min	Typ	Max	
Output voltage**		25°C	-7.7	-8	-8.3	V
	$I_o = 5mA$ to 1A, $V_i = -10.5V$ to -23V, $P \leq 15W$	0°C to 125°C	-7.6	-8	-8.4	
Input regulation	$V_i = -10.5V$ to -25V	25°C		12.5	160	mV
	$V_i = -11V$ to -17V			4	80	
Ripple rejection	$V_i = -11.5V$ to -21.5V, $f = 120Hz$	0°C to 125°C	54	60		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		15	160	mV
	$I_o = 250mA$ to 750mA			5	80	
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-0.6		mV/°C
Output noise voltage	$f = 10Hz$ to 100 KHz	25°C		200		µV
Dropout voltage	$I_o = 1A$	25°C		1.1		V
Bias current		25°C		1.5	2	
Bias current change	$V_i = -10.5V$ to -25V	0°C to 125°C		0.15	1	mA
	$I_o = 5mA$ to 1A			0.08	0.5	
Peak output current		25°C		2.1		A

Electrical Characteristics 7912

Electrical characteristics at specified virtual junction temperature, $V_i = -19V$, $I_o = 500mA$ (unless otherwise noted)

Parameter	Test Conditions*		7912			Units
			Min	Typ	Max	
Output voltage**		25°C	-11.5	-12	-12.5	V
	$I_o = 5mA$ to 1A, $V_i = -14.5V$ to -27V, $P \leq 15W$	0°C to 125°C	-11.4	-12	-12.6	
Input regulation	$V_i = -14.5V$ to -30V	25°C		5	80	mV
	$V_i = -16V$ to -22V			3	30	
Ripple rejection	$V_i = -15V$ to -25V, $f = 120Hz$	0°C to 125°C	54	60		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		15	200	mV
	$I_o = 250mA$ to 750mA			5	75	
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-0.8		mV/°C
Output noise voltage	$f = 10Hz$ to 100 KHz	25°C		300		µV
Dropout voltage	$I_o = 1A$	25°C		1.1		V
Bias current		25°C		2	3	
Bias current change	$V_i = -14.5V$ to -30V	0°C to 125°C		0.04	0.5	mA
	$I_o = 5mA$ to 1A			0.06	0.5	
Peak output current		25°C		2.1		A

* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

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Electrical Characteristics 7915

Electrical characteristics at specified virtual junction temperature, $V_I = -23V$, $I_o = 500mA$ (unless otherwise noted)

Parameter	Test Conditions*		7915			Units
			Min	Typ	Max	
Output voltage**		25°C	-14.4	-15	-15.6	V
	$I_o = 5mA$ to 1A, $V_I = -17.5V$ to -30V, $P \leq 15W$	0°C to 125°C	- 14.25	-15	- 15.75	
Input regulation	$V_I = -17.5V$ to -30V	25°C		5	100	mV
	$V_I = -20V$ to -26V			3	50	
Ripple rejection	$V_I = -18.5V$ to -28.5V, $f = 120Hz$	0°C to 125°C	54	60		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		15	200	mV
	$I_o = 250mA$ to 750mA			5	75	
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1		mV/°C
Output noise voltage	$f = 10$ Hz to 100 KHz	25°C		375		µV
Dropout voltage	$I_o = 1A$	25°C		1.1		V
Bias current		25°C		2	3	
Bias current change	$V_I = -17.5V$ to -30V	0°C to 125°C		0.04	0.5	mA
	$I_o = 5mA$ to 1A			0.06	0.5	
Peak output current		25°C		2.1		A

Electrical Characteristics 7918

Electrical characteristics at specified virtual junction temperature, $V_I = -27V$, $I_o = 500mA$ (unless otherwise noted)

Parameter	Test Conditions*		MIK7918			Units
			Min	Typ	Max	
Output voltage**		25°C	-17.3	-18	-18.7	V
	$I_o = 5mA$ to 1A, $V_I = -21V$ to -33V, $P \leq$	0°C to 125°C	-17.1	-18	-18.9	
Input regulation	$V_I = -21V$ to -33V	25°C		5	360	mV
	$V_I = -24V$ to -30V			3	180	
Ripple rejection	$V_I = -22V$ to -32V, $f = 120Hz$	0°C to 125°C	54	60		dB
Output regulation	$I_o = 5mA$ to 1.5A	25°C		30	360	mV
	$I_o = 250mA$ to 750mA			10	180	
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1.0		mV/°C
Output noise voltage	$f = 10Hz$ to 100 KHz	25°C		450		µV
Dropout voltage	$I_o = 1A$	25°C		1.1		V
Bias current		25°C		2	3	
Bias current change	$V_I = -21V$ to -33V	0°C to 125°C		0.04	1	mA
	$I_o = 5mA$ to 1A			0.06	0.5	
Peak output current		25°C		2.1		A

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Electrical Characteristics 7924

Electrical characteristics at specified virtual junction temperature, $V_i = -33V$, $I_o = 500mA$ (unless otherwise noted)

Parameter	Test Conditions*	7924			Units	
		Min	Typ	Max		
Output voltage**	25°C	-23	-24	-25	V	
	$I_o = 5mA$ to 1A, $V_i = -27V$ to -38V, $P \leq$	0°C to 125°C	-22.8	-24		-25.2
Input regulation	$V_i = -27V$ to -38V	25°C	5	480	mV	
	$V_i = -30V$ to -36V		3	240		
Ripple rejection	$V_i = -28V$ to -38V, $f = 120Hz$	0°C to 125°C	54	60	dB	
Output regulation	$I_o = 5mA$ to 1.5A	25°C	85	480	mV	
	$I_o = 250mA$ to 750mA		25	240		
Temperature coefficient of output voltage	$I_o = 5mA$	0°C to 125°C		-1	mV/°C	
Output noise voltage	$f = 10Hz$ to 100 KHz	25°C	600		µV	
Dropout voltage	$I_o = 1A$	25°C	1.1		V	
Bias current		25°C	2	3		
Bias current change	$V_i = -27V$ to -38V	0°C to 125°C		0.04	1	mA
	$I_o = 5mA$ to 1A			0.06	0.5	
Peak output current		25°C		2.1	A	

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Typical Applications Circuit

When using a negative regulator, bypass capacitors are a must on both the input and output. Recommended values are 2 µF on the input and 1 µF on the output. It is considered good practice to include a 0.1 µF capacitor on the output to improve the transient response (Fig. 1). These capacitors may be mylar, ceramic, or tantalum, provided that

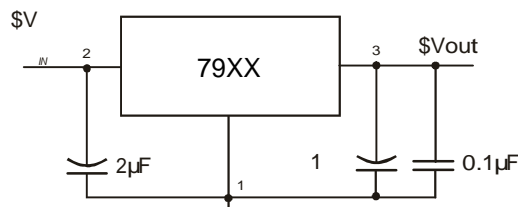


Figure 1. Negative Regulator

Ordering Information

ORDERING NUMBER	PACKAGE	MARKING
79XX	TO - 220	ET79XX

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