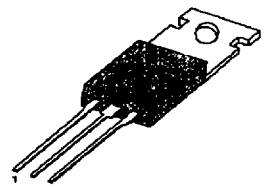
3-TERMINAL 1A NEGATIVE VOLTAGE REGULATORS

The KA79XX series of three-terminal negative regulators are available in TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible.

TO-220



1: GND 2: Input 3: Output

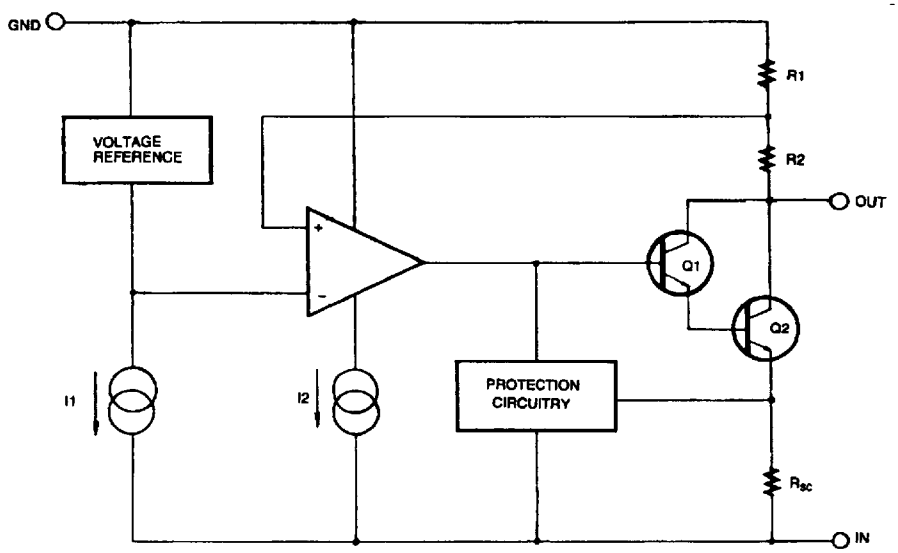
FEATURES

- Output Current in Excess of 1A
- Output Voltages of -5, -6, -8, -12,-15, -18, -24V
- Internal Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe-Area Compensation

ORDERING INFORMATION

Device	Package	Operating Temperature
KA79XX	TO-220	0 ~ 125℃

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (T_A=25℃, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Input Voltage	V_I	-35	V
Thermal Resistance Junction-Cases Junction-Air	$R_{\theta JC}$ $R_{\theta JA}$	5 65	℃/W ℃/W
Operating Temperature Range	T_{OPR}	0 ~ +125	℃
Storage Temperature Range	T_{STG}	-65 ~ +150	℃

KA7905 ELECTRICAL CHARACTERISTICS

(V_I = 10V, I_O = 500mA, 0℃ ≤ T_J ≤ 125℃, C_I=2.2μF, C_O = 1μF, unless otherwise specified.)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25℃		-4.8	-5	-5.2	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -7 to -20V		-4.75	-5	-5.25	
Line Regulation	ΔV_O	T_J =25℃	V_I = -7 to -25W		10	100	mV
			V_I= -8 to -12V				
Load Regulation	ΔV_O	T_J = 25℃ I_O = 5mA to 1.5A			10	100	mV
		T_J = 25℃ I_O = 250 to 750mA			3	50	
Quiescent Current	I_Q	T_J = 25℃			3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A			0.05	0.5	mA
		V_I = -8 to -25V			0.1	1.3	
Temperature Coefficient of V_O	$\Delta V_O/\Delta T$	I_O = 5mA			-0.4		mV/℃
Output Noise Voltage	V_N	f = 10Hz to 100Khz T_A = 25℃			100		μV
Ripple Rejection	RR	f = 120Hz, I_O = -35V ΔV_I = 10V		54	60		dB
Dropout Voltage	V_D	T_J= 25℃ I_O = 1A		2			V
Short Circuit Current	I_{SC}	T_J= 25℃, V_I = -35V			300		mA
Peak Current	I_{PK}	T_J = 25℃			2.2		A

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

KA7906 ELECTRICAL CHARACTERISTICS

(V_I = 11V, I_O = 500mA, 0℃ ≤ T_J ≤ 125℃, C_I = 2.2μF, C_O = 1μF, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25℃	- 5.75	- 6	- 6.25	V
		I_O = 5mA to 1A, P_O ≤ 15W, V_I = - 9 to - 21V	- 5.7	- 6	- 6.3	
Line Regulation	ΔV_O	T_J = 25℃, V_I = - 8 to - 25W		10	120	mV
		T_J = 25℃, V_I = - 9 to -12V		5	60	
Load Regulation	ΔV_O	T_J = 25℃, I_O = 5mA to 1.5A		10	120	mV
		T_J = 25℃, I_O = 250 to 750mA		3	60	
Quiescent Current	I_Q	T_J = 25℃		3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A			0.5	mA
		V_I = -9 to -25V			1.3	
Temperature Coefficient of V_D	$\Delta V_O/\Delta T$	I_O = 5mA		-0.5		mV/℃
Output Noise Voltage	V_N	f = 10Hz to 100Khz, T_A = 25℃		130		μV
Ripple Rejection	RR	f = 120Hz, ΔV_I = 10V	54	60		dB
Dropout Voltage	V_D	T_J = 25℃, I_O = 1A	2			V
Short Circuit Current	I_{SC}	T_J = 25℃, V_I = -35V		300		mA
Peak Current	I_{PK}	T_J = 25℃		2.2		A

KA7908 ELECTRICAL CHARACTERISTICS

(V_I = 14V, I_O = 500mA, 0℃ ≤ T_J ≤ 125℃, C_I = 2.2 μF, C_O = 1 μF, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25℃	-7.7	-8	-8.3	V
		I_O = 5mA to 1A, P_O ≤ 15W, V_I = -1.5 to -23V	-7.6	-8	-8.4	
Line Regulation	ΔV_O	T_J = 25℃, V_I = -10.5 to -25W		10	100	mV
		T_J = 25℃, V_I = -11 to -17V		5	80	
Load Regulation	ΔV_O	T_J = 25℃, I_O = 5mA to 1.5A		12	160	mV
		T_J = 25℃, I_O = 250 to 750mA		4	80	
Quiescent Current	I_Q	T_J = 25℃		3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		0.05	0.5	mA
		V_I = -11.5 to -25V		0.1	1	
Temperature Coefficient of V_O	$\Delta V_O/\Delta T$	I_O = 5mA		-0.6		mV/℃
Output Noise Voltage	V_N	f = 10Hz to 100Khz, T_A = 25℃		175		μV
Ripple Rejection	RR	f = 120Hz, ΔV_I = 10V	54	60		dB
Dropout Voltage	V_D	T_J = 25℃, I_O = 1A	2			V
Short Circuit Current	I_{SC}	T_J = 25℃, V_I = -35V		300		mA
Peak Current	I_{PK}	T_J = 25℃		2.2		A

KA7912 ELECTRICAL CHARACTERISTICS

(V_I= 18V, I_O=500mA, 0℃ ≤ T_J ≤ 125℃, C_I=2.2μF, C_O = 1μF, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25℃	-11.5	-12	-12.5	V
		I_O = 5mA to 1A, P_O ≤ 15W, V_I = -15.5 to -27V	-11.4	-12	-12.6	
Line Regulation	ΔV_O	T_J = 25℃, V_I = -14.5 to -30W		12	240	mV
		T_J = 25℃, V_I = -16 to -22V		6	120	
Load Regulation	ΔV_O	T_J = 25℃, I_O = 5mA to 1.5A		12	240	mV
		T_J = 25℃, I_O = 250 to 750mA		4	120	
Quiescent Current	I_Q	T_J = 25℃		3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		0.05	0.5	mA
		V_I = -15 to -30V		0.1	1	
Temperature Coefficient of V_D	$\Delta V_O/\Delta T$	I_O = 5mA		-0.8		mV/℃
Output Noise Voltage	V_N	f = 10Hz to 100Khz, T_A = 25℃		200		μV
Ripple Rejection	RR	f = 120Hz, ΔV_I = 10V	54	60		dB
Dropout Voltage	V_D	T_J = 25℃, I_O = 1A	2			V
Short Circuit Current	I_{SC}	T_J = 25℃, V_I = -35V		300		mA
Peak Current	I_{PK}	T_J = 25℃		2.2		A

KA7915 ELECTRICAL CHARACTERISTICS

(V_I = 23V, I_O = 500mA, 0℃ ≤ T_J ≤ 125℃, C_I=2.2μF, C_O = 1μF, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25℃	-14.4	-15	-15.6	V
		I_O = 5mA to 1A, P_O ≤ 15W, V_I = -18 to -30V	-14.25	-15	-15.75	
Line Regulation	ΔV_O	T_J = 25℃, V_I = -17.5 to -30W		12	300	mV
		T_J = 25℃, V_I = -20 to -26V		6	150	
Load Regulation	ΔV_O	T_J = 25℃, I_O = 5mA to 1.5A		12	300	mV
		T_J = 25℃, I_O = 250 to 750mA		4	150	
Quiescent Current	I_Q	T_J = 25℃		3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		0.05	0.5	mA
		V_I = -18.5 to -30V		0.1	1	
Temperature Coefficient of V_D	$\Delta V_O/\Delta T$	I_O = 5mA		-0.9		mV/℃
Output Noise Voltage	V_N	f = 10Hz to 100Khz, T_A = 25℃		250		μV
Ripple Rejection	RR	f = 120Hz, ΔV_I = 10V	54	60		dB
Dropout Voltage	V_D	T_J= 25℃, I_O = 1A	2			V
Short Circuit Current	I_{SC}	T_J= 25℃, V_I = -35V		300		mA
Peak Current	I_{PK}	T_J = 25℃		2.2		A

KA7918 ELECTRICAL CHARACTERISTICS

(V_I = 27V, I_O = 500mA, 0℃ ≤ T_J ≤ 125℃, C_I = 2.2 μF, C_O = 1 μF, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25℃	-17.3	-18	-18.7	V
		I_O = 5mA to 1A, P_O ≤ 15W, V_I = -22.5 to -33V	-17.1	-18	-18.9	
Line Regulation	ΔV_O	T_J = 25℃, V_I = -21 to -33W		15	360	mV
		T_J = 25℃, V_I = -24 to -30V		8	180	
Load Regulation	ΔV_O	T_J = 25℃, I_O = 5mA to 1.5A		15	360	mV
		T_J = 25℃, I_O = 250 to 750mA		5	180	
Quiescent Current	I_Q	T_J = 25℃		3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A			0.5	mA
		V_I = -22 to -33V			1	
Temperature Coefficient of V_D	$\Delta V_O/\Delta T$	I_O = 5mA		-1		mV/℃
Output Noise Voltage	V_N	f = 10Hz to 100Khz, T_A = 25℃		300		μV
Ripple Rejection	RR	f = 120Hz, ΔV_I = 10V	54	60		dB
Dropout Voltage	V_D	T_J = 25℃, I_O = 1A		2		V
Short Circuit Current	I_{SC}	T_J = 25℃, V_I = -35V		300		mA
Peak Current	I_{PK}	T_J = 25℃		2.2		A

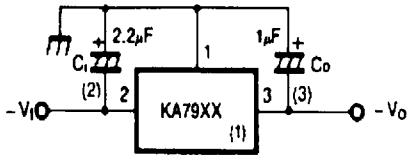
KA7924 ELECTRICAL CHARACTERISTICS

(V_I = 33V, I_O = 500mA, 0℃ ≤ T_J ≤ 125℃, C_I = 2.2 μF, C_O = 1 μF, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_O	T_J = 25℃	- 23	- 24	- 25	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -27 to -38V	- 22.8	- 24	- 25.2	
Line Regulation	ΔV_O	T_J = 25℃, V_I = - 27 to - 38W		15	480	mV
		T_J = 25℃, V_I = - 30 to - 36V		8	180	
Load Regulation	ΔV_O	T_J = 25℃ I_O = 5mA to 1.5A		15	480	mV
		T_J = 25℃ I_O = 250 to 750mA		5	240	
Quiescent Current	I_Q	T_J = 25℃		3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A			0.5	mA
		V_I = -27 to -38V			1	
Temperature Coefficient of V_O	$\Delta V_O/\Delta T$	I_O = 5mA		-1		mV/℃
Output Noise Voltage	V_N	f = 10Hz to 100Khz T_A = 25℃		400		μV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V	54	60		dB
Dropout Voltage	V_D	T_J = 25℃ I_O = 1A		2		V
Short Circuit Current	I_{SC}	T_J = 25℃, V_I = -35V		300		mA
Peak Current	I_{PK}	T_J = 25℃		2.2		A

APPLICATION INFORMATION

Fig. 1 - Fixed output regulator



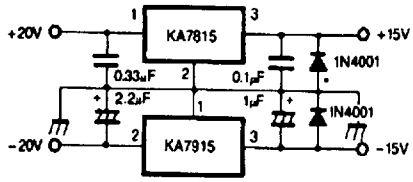
Notes:

(1) To specify an output voltage, substitute voltage value for "XX"

(2) Required for stability. For value given, capacitor must be solid tantalum. If aluminium electrolitics are used, at least ten times value shown should be selected. C_I is required if regulator is located an appreciable distance from power supply filter.

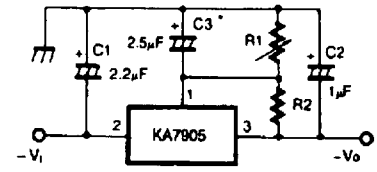
(3) To improve transient response. If large capacitors are used, a high current diode from input to output (1N400I or similar) should be introduced to protect the device from momentary input short circuit.

Fig. 2 - Split power supply (± 15V/1A)



• Against potential latch-up problems.

Fig. 3 - Circuit for increasing output voltage



$V_O = V_{XX} \cdot \frac{R_1 + R_2}{R_2}$

$V_{XX}/R_2 > 3I_Q$

• C3 optional for improved transient response and ripple relection.

Dimensions in Milimeters