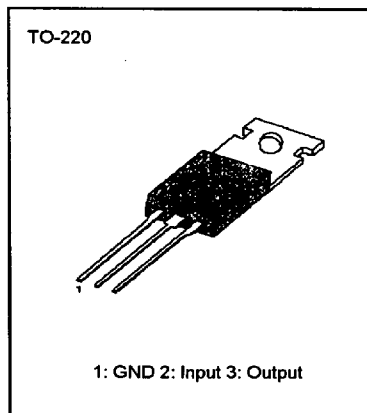


3-TERMINAL 1A NEGATIVE VOLTAGE REGULATORS

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.



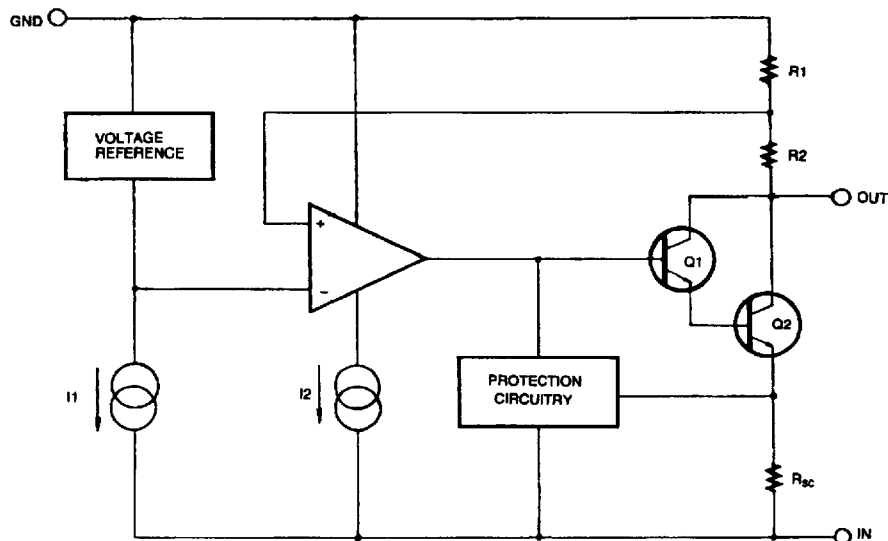
FEATURES

- 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°C

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$, unless otherwise specified)

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

KA7905 ELECTRICAL CHARACTERISTICS

($V_I = 10\text{V}$, $I_O = 500\text{mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_1 = 2.2\mu\text{F}$, $C_O = 1\mu\text{F}$, unless otherwise specified.)

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

($V_I = 11V$, $I_O = 500mA$, $0^\circ C \leq T_J \leq 125^\circ C$, $C_I = 2.2\mu F$, $C_O = 1\mu F$, unless otherwise specified.)

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

KA7908 ELECTRICAL CHARACTERISTICS

($V_i = 14V$, $I_o = 500mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $C_i = 2.2\mu F$, $C_o = 1\mu F$, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit	
Output Voltage	V_o	$T_j = 25^\circ C$	- 7.7	- 8	- 8.3	V	
		$I_o = 5mA$ to $1A$, $P_o \leq 15W$ $V_i = -1.5$ to $-23V$	- 7.6	- 8	- 8.4		
Line Regulation	ΔV_o	$T_j = 25^\circ C$	$V_i = -10.5$ to $-25W$		10	100	mV
			$V_i = -11$ to $-17V$		5	80	
Load Regulation	ΔV_o	$T_j = 25^\circ C$ $I_o = 5mA$ to $1.5A$		12	160	mV	
		$T_j = 25^\circ C$ $I_o = 250$ to $750mA$		4	80		
Quiescent Current	I_q	$T_j = 25^\circ C$		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_D	$\Delta V_o / \Delta T$	$I_o = 5mA$		-0.6		mV/ $^\circ C$	
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_A = 25^\circ C$		175		μV	
Ripple Rejection	RR	$f = 120Hz$ $\Delta V_i = 10V$	54	60		dB	
Dropout Voltage	V_D	$T_j = 25^\circ C$ $I_o = 1A$	2			V	
Short Circuit Current	I_{sc}	$T_j = 25^\circ C$, $V_i = -35V$		300		mA	
Peak Current	I_{PK}	$T_j = 25^\circ C$		2.2		A	

KA7912 ELECTRICAL CHARACTERISTICS

($V_i = 18V$, $I_o = 500mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $C_1 = 2.2\mu F$, $C_o = 1\mu F$, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	$T_j = 25^\circ C$	-11.5	-12	-12.5	V
		$I_o = 5mA$ to 1A, $P_o \leq 15W$ $V_i = -15.5$ to -27V	-11.4	-12	-12.6	
Line Regulation	ΔV_o	$T_j = 25^\circ C$	$V_i = -14.5$ to -30V	12	240	mV
			$V_i = -16$ to -22V	6	120	
Load Regulation	ΔV_o	$T_j = 25^\circ C$ $I_o = 5mA$ to 1.5A		12	240	mV
		$T_j = 25^\circ C$ $I_o = 250$ to 750mA		4	120	
Quiescent Current	I_o	$T_j = 25^\circ C$		3	6	mA
Quiescent Current Change	ΔI_o	$I_o = 5mA$ to 1A		0.05	0.5	mA
		$V_i = -15$ to -30V		0.1	1	
Temperature Coefficient of V_o	$\Delta V_o / \Delta T$	$I_o = 5mA$		-0.8		mV/ $^\circ C$
Output Noise Voltage	V_N	$f = 10Hz$ to 100KHz $T_A = 25^\circ C$		200		μV
Ripple Rejection	RR	$f = 120Hz$ $\Delta V_i = 10V$	54	60		dB
Dropout Voltage	V_D	$T_j = 25^\circ C$ $I_o = 1A$	2			V
Short Circuit Current	I_{SC}	$T_j = 25^\circ C$, $V_i = -35V$		300		mA
Peak Current	I_{PK}	$T_j = 25^\circ C$		2.2		A

KA7915 ELECTRICAL CHARACTERISTICS

($V_i = 23V$, $I_o = 500mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $C_i = 2.2\mu F$, $C_o = 1\mu F$, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	$T_j = 25^\circ C$	-14.4	-15	-15.6	V
		$I_o = 5mA$ to 1A, $P_o \leq 15W$ $V_i = -18$ to -30V	-14.25	-15	-15.75	
Line Regulation	ΔV_o	$T_j = 25^\circ C$	$V_i = -17.5$ to -30V	12	300	mV
			$V_i = -20$ to -26V	6	150	
Load Regulation	ΔV_o	$T_j = 25^\circ C$ $I_o = 5mA$ to 1.5A		12	300	mV
		$T_j = 25^\circ C$ $I_o = 250$ to 750mA		4	150	
Quiescent Current	I_o	$T_j = 25^\circ C$		3	6	mA
Quiescent Current Change	ΔI_o	$I_o = 5mA$ to 1A		0.05	0.5	mA
		$V_i = -18.5$ to -30V		0.1	1	
Temperature Coefficient of V_o	$\Delta V_o / \Delta T$	$I_o = 5mA$		-0.9		mV/ $^\circ C$
Output Noise Voltage	V_n	$f = 10Hz$ to 100KHz $T_A = 25^\circ C$		250		μV
Ripple Rejection	RR	$f = 120Hz$ $\Delta V_i = 10V$	54	60		dB
Dropout Voltage	V_D	$T_j = 25^\circ C$ $I_o = 1A$	2			V
Short Circuit Current	I_{sc}	$T_j = 25^\circ C$, $V_i = -35V$		300		mA
Peak Current	I_{PK}	$T_j = 25^\circ C$		2.2		A

KA7918 ELECTRICAL CHARACTERISTICS

($V_I = 27V$, $I_O = 500mA$, $0^\circ C \leq T_J \leq 125^\circ C$, $C_I = 2.2 \mu F$, $C_O = 1 \mu F$, unless otherwise specified.)

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

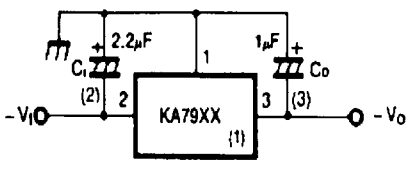
KA7924 ELECTRICAL CHARACTERISTICS

($V_i = 33V$, $I_o = 500mA$, $0^\circ C \leq T_j \leq 125^\circ C$, $C_i = 2.2\mu F$, $C_o = 1\mu F$, unless otherwise specified.)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage	V_o	$T_j = 25^\circ C$	-23	-24	-25	V
		$I_o = 5mA$ to $1A$, $P_o \leq 15W$ $V_i = -27$ to $-38V$	-22.8	-24	-25.2	
Line Regulation	ΔV_o	$T_j = 25^\circ C$	$V_i = -27$ to $-38V$	15	480	mV
			$V_i = -30$ to $-36V$	8	180	
Load Regulation	ΔV_o	$T_j = 25^\circ C$		15	480	mV
		$I_o = 5mA$ to $1.5A$		5	240	
Quiescent Current	I_o	$T_j = 25^\circ C$		3	6	mA
Quiescent Current Change	ΔI_o	$I_o = 5mA$ 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/ $^\circ C$
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_A = 25^\circ C$		400		μV
Ripple Rejection	RR	$f = 120Hz$ $\Delta V_i = 10V$	54	60		dB
Dropout Voltage	V_D	$T_j = 25^\circ C$ $I_o = 1A$		2		V
Short Circuit Current	I_{sc}	$T_j = 25^\circ C$, $V_i = -35V$		300		mA
Peak Current	I_{PK}	$T_j = 25^\circ C$		2.2		A

APPLICATION INFORMATION

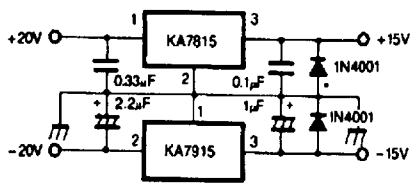
Fig. 1 - Fixed output regulator



Notes:

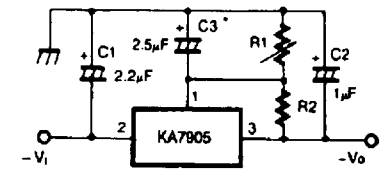
- (1) To specify an output voltage, substitute voltage value for "XX"
- (2) Required for stability. For value given, capacitor must be solid tantalum. If aluminium electrolytics are used, at least ten times value shown should be selected. C₁ is required if regulator is located an appreciable distance from power supply filter.
- (3) To improve transient response. If large capacitors are used, a high current diode from input to output (1N4001 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



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

$$V_{XX}/R_2 > 3I_o$$

• C₃ optional for improved transient response and ripple rejection.

Dimensions in Millimeters

