FAIRCHILD
SEMICONDUCTOR®

KA79XX/KA79XXA

3-Terminal 1A Negative Voltage Regulator

Features

- Output Current in Excess of 1A
- Output Voltages of-5, -6, -8, -9, -10, -12, -15, -18 , -24V
- Internal Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating area Compensation

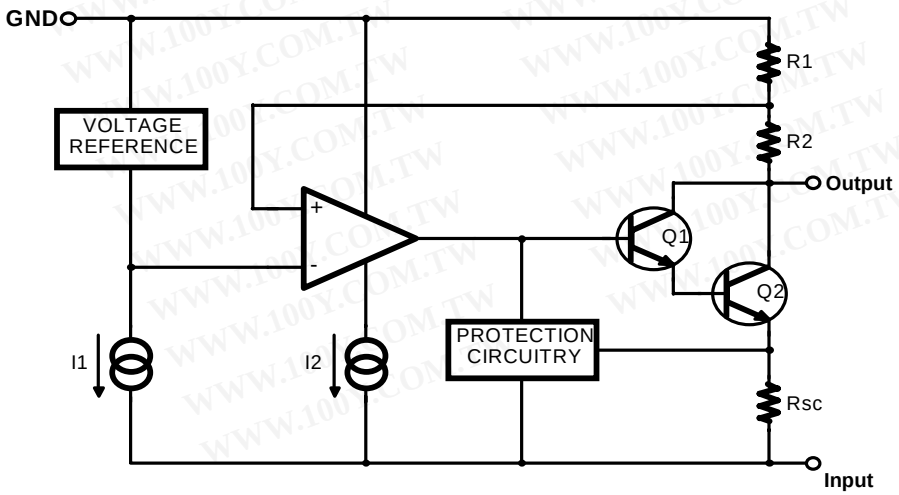
Description

The KA79XX/KA79XXA 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 shutdown and safe operating area protection, making it essentially indestructible.

TO-220

1. GND 2. Input 3. Output

Internal Block Digram



Rev. 1.0.0

Absolute Maximum Ratings

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

Electrical Characteristics (KA7905)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		- 4.8	- 5.0	- 5.2	V
		I_O = 5mA to 1A, P_O ≤15W V_I = -7V to -20V		- 4.75	-5.0	- 5.25	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -7V to -20V I_O=1A	-	5	50	mV
			V_I = -8V to -12V I_O=1A	-	2	25	
		V_I = -7.5V to -25V		-	7	50	
		V_I= -8V to -12V I_O=1A		-	7	50	
Load Regulation (Note1)	ΔV_O	T_J = +25°C I_O = 5mA to 1.5A		-	10	100	mV
		T_J =+25°C I_O = 250mA to 750mA		-	3	50	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -8V to -25V		-	0.1	0.8	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	- 0.4	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	40	-	μV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7906)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		- 5.75	- 6	- 6.25	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = - 9V to - 21V		- 5.7	- 6	- 6.3	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = - 8V to - 25V	-	10	120	mV
			V_I = - 9V to -12V	-	5	60	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	10	120	mV
		T_J =+25°C I_O = 250mA to 750mA		-	3	60	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	-	0.5	mA
		V_I = -9V to -25V		-	-	1.3	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-0.5	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	130	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7908)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		- 7.7	- 8	- 8.3	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -10V to -23V		- 7.6	- 8	- 8.4	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -10.5V to -25V	-	10	100	mV
			V_I= -11V to -17V	-	5	80	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	12	160	mV
		T_J =+25°C I_O = 250mA to 750mA		-	4	80	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -11.5V to -25V		-	0.1	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-0.6	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	175	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7909)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		- 8.7	- 9.0	- 9.3	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -1.5V to -23V		- 8.6	- 9.0	- 9.4	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -10.5V to -25V	-	10	180	mV
			V_I = -11V to -17V	-	5	90	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	12	180	mV
		T_J =+25°C I_O = 250mA to 750mA		-	4	90	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -11.5V to -25V		-	0.1	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-0.6	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	175	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7910)

(V_I = -17V, I_O = 500mA, 0°C ≤T_J ≤ +125°C, C_I =2.2µF, C_O =1µF, unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		- 10.5	- 10	- 11.5	V
		I_O = 5mA to 1A, P_O≤15W V_I = -12V to -28		- 10.4	- 10	- 11.6	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -12.5V to -28V	-	12	200	mV
			V_I = -14V to -20V	-	6	100	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	12	200	mV
		T_J =+25°C I_O = 250mA to 750mA		-	4	100	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -13 to -28V		-	0.1	1	
Temperature Coefficient of V_O	$\Delta Vo/\Delta T$	I_O = 5mA		-	-1	-	mV/°C
Output Noise Voltage	V_N	10Hz ≤ f ≤ 100KHz T_A =+25°C		-	280	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7912)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		-11.5	-12	-12.5	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -15.5V to -27V		-11.4	-12	-12.6	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -14.5V to -30V	-	12	240	mV
			V_I= -16V to -22V	-	6	120	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	12	240	mV
		T_J =+25°C I_O = 250mA to 750mA		-	4	120	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -15V to -30V		-	0.1	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-0.8	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	200	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7915)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		-14.4	-15	-15.6	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -18V to -30V		-14.25	-15	-15.75	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -17.5V to -30V	-	12	300	mV
			V_I = -20V to -26V	-	6	150	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	12	300	mV
		T_J =+25°C I_O = 250mA to 750mA		-	4	150	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -18.5V to -30V		-	0.1	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-0.9	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	250	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7918)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		-17.3	-18	-18.7	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -22.5V to -33V		-17.1	-18	-18.9	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -21V to -33V	-	15	360	mV
			V_I = -24V to -30V	-	8	180	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	15	360	mV
		T_J =+25°C I_O = 250mA to 750mA		-	5	180	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	-	0.5	mA
		V_I = -22V to -33V		-	-	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-1	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	300	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7924)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		- 23	- 24	- 25	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -27V to -38V		- 22.8	- 24	- 25.2	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = - 27V to - 38V	-	15	480	mV
			V_I = - 30V to - 36V	-	8	180	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	15	480	mV
		T_J =+25°C I_O = 250mA to 750mA		-	5	240	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	-	0.5	mA
		V_I = -27V to -38V		-	-	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-1	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	400	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7905A)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		- 4.9	- 5.0	- 5.1	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -7V to -20V		- 4.8	-5.0	- 5.2	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -7V to -20V I_O=1A	-	5	50	mV
			V_I = -8V to -12V I_O=1A	-	2	25	
		T_J=+25°C V_I = -7.5V to -25V		-	7	50	
		V_I= -8V to -12V I_O=1A		-	7	50	
Load Regulation (Note1)	ΔV_O	I_O = 5mA to 1.5A		-	10	100	mV
		T_J =+25°C I_O = 250mA to 750mA		-	3	50	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -8V to -25V		-	0.1	0.8	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	- 0.4	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	40	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7912A)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		-11.75	-12	-12.25	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -15.5V to -27V		-11.5	-12	-12.5	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -14.5V to -30V	-	12	240	mV
			V_I= -16V to -22V	-	6	120	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	12	240	mV
		T_J =+25°C I_O = 250mA to 750mA		-	4	120	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -15V to -30V		-	0.1	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-0.8	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	200	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Electrical Characteristics (KA7915A)

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

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=+25°C		-14.7	-15	-15.3	V
		I_O = 5mA to 1A, P_O ≤ 15W V_I = -18V to -30V		-14.4	-15	-15.6	
Line Regulation (Note1)	ΔV_O	T_J=+25°C	V_I = -17.5V to -30V	-	12	300	mV
			V_I = -20V to -26V	-	6	150	
Load Regulation (Note1)	ΔV_O	T_J=+25°C I_O = 5mA to 1.5A		-	12	300	mV
		T_J =+25°C I_O = 250mA to 750mA		-	4	150	
Quiescent Current	I_Q	T_J =+25°C		-	3	6	mA
Quiescent Current Change	ΔI_Q	I_O = 5mA to 1A		-	0.05	0.5	mA
		V_I = -18.5V to -30V		-	0.1	1	
Temperature Coefficient of V_D	$\Delta Vo/\Delta T$	I_O = 5mA		-	-0.9	-	mV/°C
Output Noise Voltage	V_N	f = 10Hz to 100KHz T_A =+25°C		-	250	-	µV
Ripple Rejection	RR	f = 120Hz ΔV_I = 10V		54	60	-	dB
Dropout Voltage	V_D	T_J=+25°C I_O = 1A		-	2	-	V
Short Circuit Current	I_{SC}	T_J =+25°C, V_I = -35V		-	300	-	mA
Peak Current	I_{PK}	T_J =+25°C		-	2.2	-	A

Note

1. 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.

Typical Perfomance Characteristics

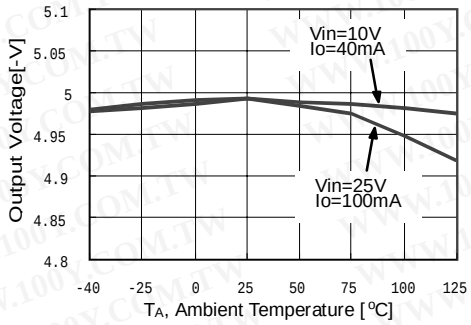


Figure 1. Output Voltage

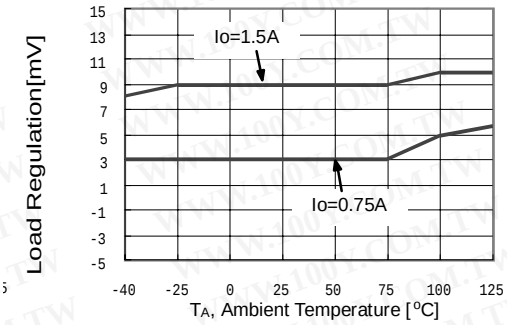


Figure 2. Load Regulation

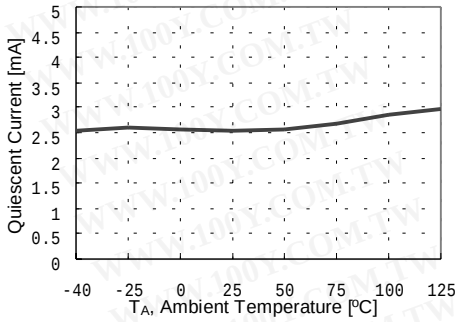


Figure 3. Quiescent Current

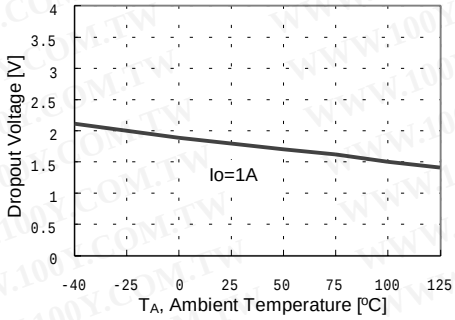


Figure 4. Dropout Voltage

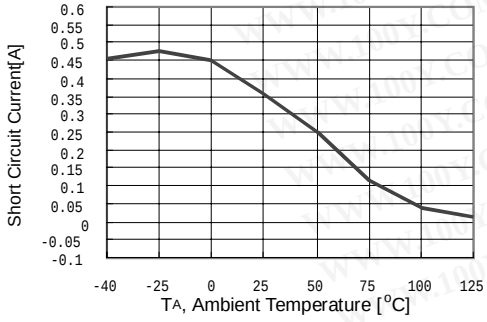


Figure 5. Short Circuit Current

Typical Applications

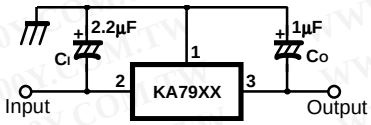


Figure 6. Negative Fixed output regulator

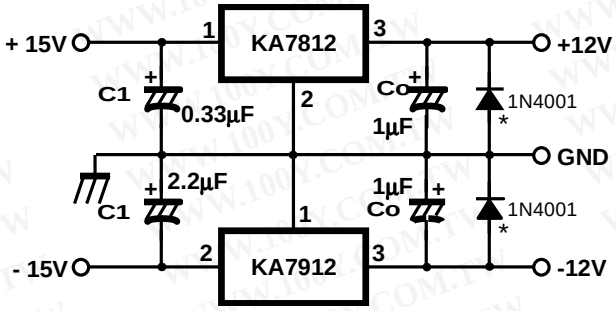


Figure 7. Split power supply (± 12V/1A)

Notes:

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

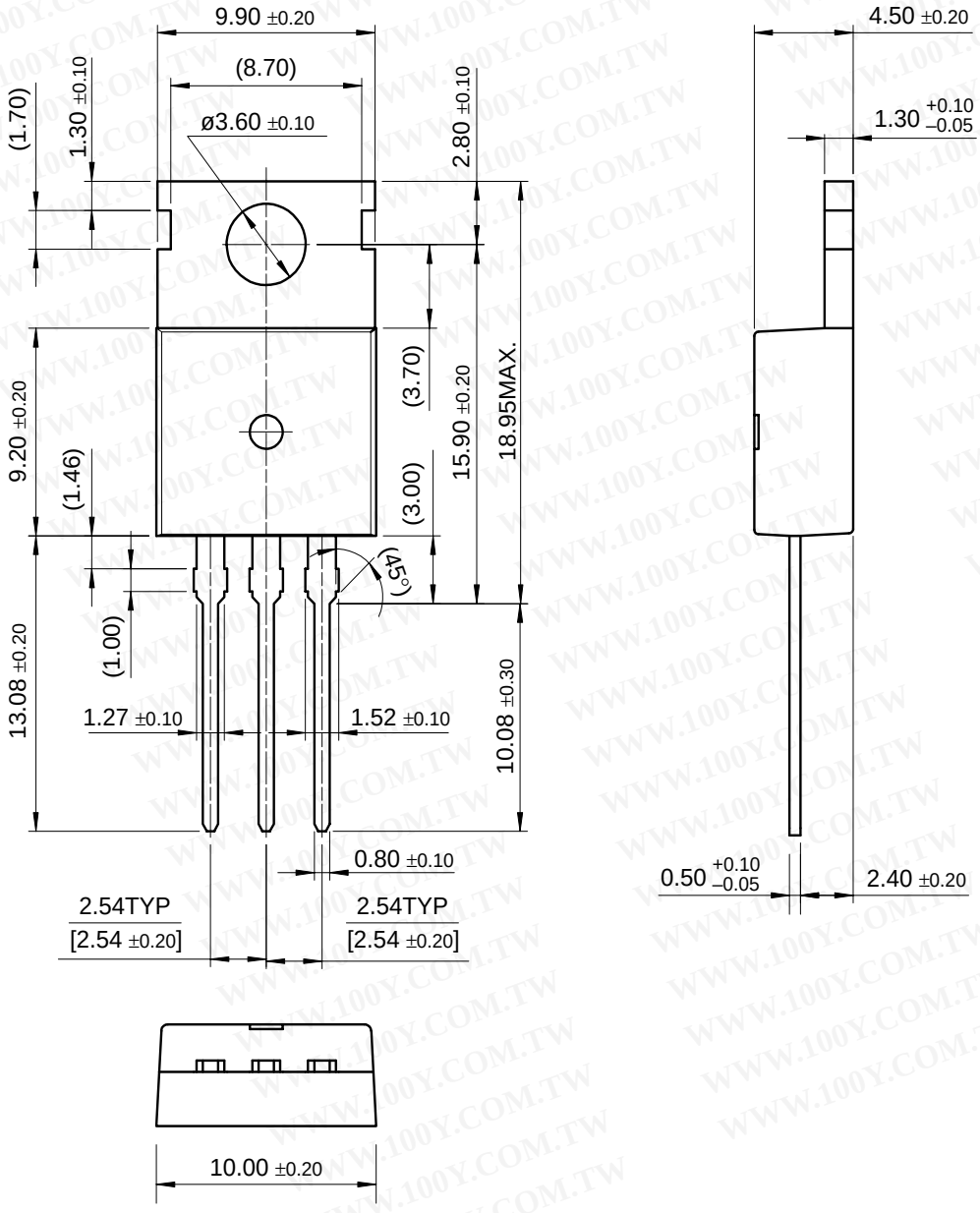
(2) Required for stability. For value given, capacitor must be solid tantalum. If aluminium electronics are used, at least ten times value shown should be selected. C_I is required if regulator is located an appreciable distance from power supply filter.

(3) To improve transient response. If large capacitors are used, a high current diode from input to output (1N400l or similar) should be introduced to protect the device from momentary input short circuit.

Mechanical Dimensions

Package

TO-220



Ordering Information

Product Number	Output Voltage Tolerance	Package	Operating Temperature
KA7905	±4%	TO-220	0 ~ + 125°C
KA7906			
KA7908			
KA7909			
KA7910			
KA7912			
KA7915			
KA7918			
KA7924			
KA7905A	± 2%		
KA7912A			
KA7915A			