

# KA78XX/KA78XXA

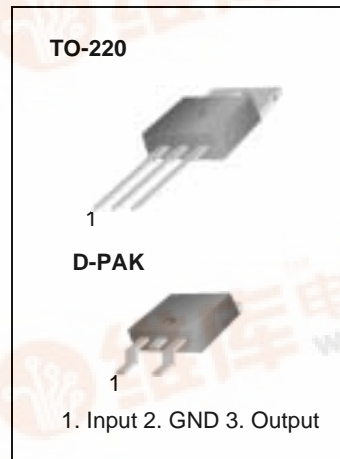
## 3-Terminal 1A Positive Voltage Regulator

### Features

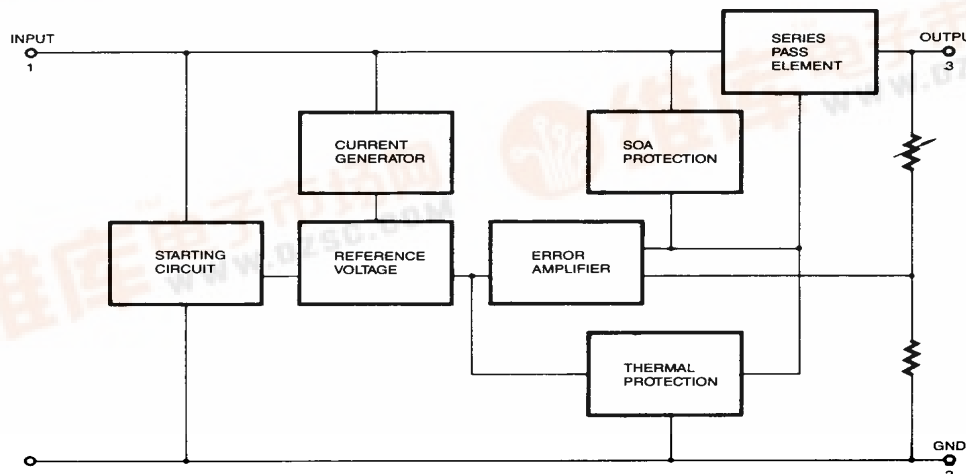
- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area Protection

### Description

The KA78XX/KA78XXA series of three-terminal positive regulator are available in the TO-220/D-PAK 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 operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.



### Internal Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for $V_O = 5V$ to $18V$ ) (for $V_O = 24V$ )	$V_I$	35	V
	$V_I$	40	V
Thermal Resistance Junction-Cases (TO-220)	$R_{\theta JC}$	5	$^{\circ}C/W$
Thermal Resistance Junction-Air (TO-220)	$R_{\theta JA}$	65	$^{\circ}C/W$
Operating Temperature Range (KA78XX/A/R)	$T_{OPR}$	0 ~ +125	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-65 ~ +150	$^{\circ}C$

## Electrical Characteristics (KA7805/KA7805R)

(Refer to test circuit ,  $0^{\circ}C < T_J < 125^{\circ}C$ ,  $I_O = 500mA$ ,  $V_I = 10V$ ,  $C_I = 0.33\mu F$ ,  $C_O = 0.1\mu F$ , unless otherwise specified)

Parameter	Symbol	Conditions	KA7805			Unit
			Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}C$	4.8	5.0	5.2	V
		$5.0mA \leq I_O \leq 1.0A$ , $P_O \leq 15W$ $V_I = 7V$ to $20V$	4.75	5.0	5.25	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}C$	$V_O = 7V$ to $25V$		-	mV
			$V_I = 8V$ to $12V$		-	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}C$	$I_O = 5.0mA$ to $1.5A$		-	mV
			$I_O = 250mA$ to $750mA$		-	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}C$	-	5.0	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5mA$ to $1.0A$	-	0.03	0.5	mA
		$V_I = 7V$ to $25V$	-	0.3	1.3	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5mA$	-	-0.8	-	mV/ $^{\circ}C$
Output Noise Voltage	$V_N$	$f = 10Hz$ to $100KHz$ , $T_A = +25^{\circ}C$	-	42	-	$\mu V/V_O$
Ripple Rejection	RR	$f = 120Hz$ $V_O = 8V$ to $18V$	62	73	-	dB
Dropout Voltage	$V_{Drop}$	$I_O = 1A$ , $T_J = +25^{\circ}C$	-	2	-	V
Output Resistance	$r_O$	$f = 1KHz$	-	15	-	m $\Omega$
Short Circuit Current	$I_{SC}$	$V_I = 35V$ , $T_A = +25^{\circ}C$	-	230	-	mA
Peak Current	$I_{PK}$	$T_J = +25^{\circ}C$	-	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 (KA7806/KA7806R)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 11\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7806			Unit
				Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$		5.75	6.0	6.25	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 8.0\text{V to } 21\text{V}$		5.7	6.0	6.3	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}\text{C}$	$V_I = 8\text{V to } 25\text{V}$	-	5	120	mV
			$V_I = 9\text{V to } 13\text{V}$	-	1.5	60	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	9	120	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	3	60	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$		-	5.0	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1\text{A}$		-	-	0.5	mA
		$V_I = 8\text{V to } 25\text{V}$		-	-	1.3	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-0.8	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ , $T_A = +25^{\circ}\text{C}$		-	45	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 9\text{V to } 19\text{V}$		59	75	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$		-	19	-	$\text{m}\Omega$
Short Circuit Current	$I_{\text{SC}}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$		-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$		-	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 (KA7808/KA7808R)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 14\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7808			Unit
				Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$		7.7	8.0	8.3	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 10.5\text{V to } 23\text{V}$		7.6	8.0	8.4	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}\text{C}$	$V_I = 10.5\text{V to } 25\text{V}$	-	5.0	160	mV
			$V_I = 11.5\text{V to } 17\text{V}$	-	2.0	80	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$	$I_O = 5.0\text{mA to } 1.5\text{A}$	-	10	160	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	5.0	80	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$		-	5.0	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1.0\text{A}$		-	0.05	0.5	mA
		$V_I = 10.5\text{V to } 25\text{V}$		-	0.5	1.0	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-0.8	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ , $T_A = +25^{\circ}\text{C}$		-	52	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $V_I = 11.5\text{V to } 21.5\text{V}$		56	73	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$		-	17	-	$\text{m}\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$		-	230	-	mA
Peak Current	$I_{PK}$	$T_J = +25^{\circ}\text{C}$		-	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 (KA7809/KA7809R)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 15\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7809			Unit
				Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$		8.65	9	9.35	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 11.5\text{V to } 24\text{V}$		8.6	9	9.4	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}\text{C}$	$V_I = 11.5\text{V to } 25\text{V}$	-	6	180	mV
			$V_I = 12\text{V to } 17\text{V}$	-	2	90	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	12	180	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	4	90	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$		-	5.0	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1.0\text{A}$		-	-	0.5	mA
		$V_I = 11.5\text{V to } 26\text{V}$		-	-	1.3	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ , $T_A = +25^{\circ}\text{C}$		-	58	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 13\text{V to } 23\text{V}$		56	71	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$		-	17	-	m $\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$		-	250	-	mA
Peak Current	IPK	$T_J = +25^{\circ}\text{C}$		-	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 (KA7810)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 16\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7810			Unit
				Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$		9.6	10	10.4	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 12.5\text{V to } 25\text{V}$		9.5	10	10.5	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}\text{C}$	$V_I = 12.5\text{V to } 25\text{V}$	-	10	200	mV
			$V_I = 13\text{V to } 25\text{V}$	-	3	100	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	12	200	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	4	400	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$		-	5.1	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1.0\text{A}$		-	-	0.5	mA
		$V_I = 12.5\text{V to } 29\text{V}$		-	-	1.0	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ , $T_A = +25^{\circ}\text{C}$		-	58	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 13\text{V to } 23\text{V}$		56	71	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$		-	17	-	m $\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$		-	250	-	mA
Peak Current	IPK	$T_J = +25^{\circ}\text{C}$		-	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 (KA7812/KA7812R)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 19\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7812/KA7812R			Unit
				Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$		11.5	12	12.5	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 14.5\text{V to } 27\text{V}$		11.4	12	12.6	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}\text{C}$	$V_I = 14.5\text{V to } 30\text{V}$	-	10	240	mV
			$V_I = 16\text{V to } 22\text{V}$	-	3.0	120	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	11	240	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	5.0	120	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$		-	5.1	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1.0\text{A}$		-	0.1	0.5	mA
		$V_I = 14.5\text{V to } 30\text{V}$		-	0.5	1.0	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ , $T_A = +25^{\circ}\text{C}$		-	76	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 15\text{V to } 25\text{V}$		55	71	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$		-	18	-	$\text{m}\Omega$
Short Circuit Current	$I_{\text{SC}}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$		-	230	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$		-	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 (KA7815)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 23\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7815			Unit
				Min.	Typ.	Max.	
Output Voltage	VO	TJ =+25 °C		14.4	15	15.6	V
		5.0mA ≤ IO≤1.0A, PO≤15W VI = 17.5V to 30V		14.25	15	15.75	
Line Regulation (Note1)	Regline	TJ =+25 °C	VI = 17.5V to 30V	-	11	300	mV
			VI = 20V to 26V	-	3	150	
Load Regulation (Note1)	Regload	TJ =+25 °C	IO = 5mA to 1.5A	-	12	300	mV
			IO = 250mA to 750mA	-	4	150	
Quiescent Current	IQ	TJ =+25 °C		-	5.2	8.0	mA
Quiescent Current Change	ΔIQ	IO = 5mA to 1.0A		-	-	0.5	mA
		VI = 17.5V to 30V		-	-	1.0	
Output Voltage Drift	ΔVO/ΔT	IO = 5mA		-	-1	-	mV/°C
Output Noise Voltage	VN	f = 10Hz to 100KHz, TA =+25 °C		-	90	-	μV/VO
Ripple Rejection	RR	f = 120Hz VI = 18.5V to 28.5V		54	70	-	dB
Dropout Voltage	VDrop	IO = 1A, TJ=+25 °C		-	2	-	V
Output Resistance	ro	f = 1KHz		-	19	-	mΩ
Short Circuit Current	ISC	VI = 35V, TA=+25 °C		-	250	-	mA
Peak Current	IPK	TJ =+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 (KA7818)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 27\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7818			Unit
				Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$		17.3	18	18.7	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 21\text{V to } 33\text{V}$		17.1	18	18.9	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}\text{C}$	$V_I = 21\text{V to } 33\text{V}$	-	15	360	mV
			$V_I = 24\text{V to } 30\text{V}$	-	5	180	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	15	360	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	5.0	180	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$		-	5.2	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1.0\text{A}$		-	-	0.5	mA
		$V_I = 21\text{V to } 33\text{V}$		-	-	1	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ , $T_A = +25^{\circ}\text{C}$		-	110	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 22\text{V to } 32\text{V}$		53	69	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$		-	22	-	$\text{m}\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$		-	250	-	mA
Peak Current	IPK	$T_J = +25^{\circ}\text{C}$		-	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 (KA7824)

(Refer to test circuit ,  $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$ ,  $I_O = 500\text{mA}$ ,  $V_I = 33\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions		KA7824			Unit
				Min.	Typ.	Max.	
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$		23	24	25	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 27\text{V to } 38\text{V}$		22.8	24	25.25	
Line Regulation (Note1)	Regline	$T_J = +25^{\circ}\text{C}$	$V_I = 27\text{V to } 38\text{V}$	-	17	480	mV
			$V_I = 30\text{V to } 36\text{V}$	-	6	240	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	15	480	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	5.0	240	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$		-	5.2	8.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1.0\text{A}$		-	0.1	0.5	mA
		$V_I = 27\text{V to } 38\text{V}$		-	0.5	1	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1.5	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{kHz}$ , $T_A = +25^{\circ}\text{C}$		-	60	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 28\text{V to } 38\text{V}$		50	67	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	$r_O$	$f = 1\text{kHz}$		-	28	-	$\text{m}\Omega$
Short Circuit Current	$I_{\text{SC}}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$		-	230	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$		-	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 (KA7805A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 10\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	4.9	5	5.1	V
		$I_O = 5\text{mA}$ to $1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 7.5\text{V}$ to $20\text{V}$	4.8	5	5.2	
Line Regulation (Note1)	Regline	$V_I = 7.5\text{V}$ to $25\text{V}$ $I_O = 500\text{mA}$	-	5	50	mV
		$V_I = 8\text{V}$ to $12\text{V}$	-	3	50	
		$T_J = +25^{\circ}\text{C}$	$V_I = 7.3\text{V}$ to $20\text{V}$	5	50	
			$V_I = 8\text{V}$ to $12\text{V}$	1.5	25	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to $1.5\text{A}$	-	9	100	mV
		$I_O = 5\text{mA}$ to $1\text{A}$	-	9	100	
		$I_O = 250\text{mA}$ to $750\text{mA}$	-	4	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.0	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA}$ to $1\text{A}$	-	-	0.5	mA
		$V_I = 8\text{V}$ to $25\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$V_I = 7.5\text{V}$ to $20\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-0.8	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 8\text{V}$ to $18\text{V}$	-	68	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	17	-	$\text{m}\Omega$
Short Circuit Current	$I_{\text{SC}}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

## Electrical Characteristics (KA7806A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 11\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	5.58	6	6.12	V
		$I_O = 5\text{mA to } 1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 8.6\text{V to } 21\text{V}$	5.76	6	6.24	
Line Regulation (Note1)	Regline	$V_I = 8.6\text{V to } 25\text{V}$ $I_O = 500\text{mA}$	-	5	60	mV
		$V_I = 9\text{V to } 13\text{V}$	-	3	60	
		$T_J = +25^{\circ}\text{C}$	$V_I = 8.3\text{V to } 21\text{V}$	-	5	60
			$V_I = 9\text{V to } 13\text{V}$	-	1.5	30
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA to } 1.5\text{A}$	-	9	100	mV
		$I_O = 5\text{mA to } 1\text{A}$	-	4	100	
		$I_O = 250\text{mA to } 750\text{mA}$	-	5.0	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	4.3	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 1\text{A}$	-	-	0.5	mA
		$V_I = 9\text{V to } 25\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$V_I = 8.5\text{V to } 21\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-0.8	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 9\text{V to } 19\text{V}$	-	65	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	17	-	$\text{m}\Omega$
Short Circuit Current	$I_{\text{SC}}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

## Electrical Characteristics (KA7808A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 14\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	7.84	8	8.16	V
		$I_O = 5\text{mA}$ to $1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 10.6\text{V}$ to $23\text{V}$	7.7	8	8.3	
Line Regulation (Note1)	Regline	$V_I = 10.6\text{V}$ to $25\text{V}$ $I_O = 500\text{mA}$	-	6	80	mV
		$V_I = 11\text{V}$ to $17\text{V}$	-	3	80	
		$T_J = +25^{\circ}\text{C}$	$V_I = 10.4\text{V}$ to $23\text{V}$	-	6	80
			$V_I = 11\text{V}$ to $17\text{V}$	-	2	40
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to $1.5\text{A}$	-	12	100	mV
		$I_O = 5\text{mA}$ to $1\text{A}$	-	12	100	
		$I_O = 250\text{mA}$ to $750\text{mA}$	-	5	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.0	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA}$ to $1\text{A}$	-	-	0.5	mA
		$V_I = 11\text{V}$ to $25\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$V_I = 10.6\text{V}$ to $23\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-0.8	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 11.5\text{V}$ to $21.5\text{V}$	-	62	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	18	-	$\text{m}\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{PK}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

## Electrical Characteristics (KA7809A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 15\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	8.82	9.0	9.18	V
		$I_O = 5\text{mA}$ to $1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 11.2\text{V}$ to $24\text{V}$	8.65	9.0	9.35	
Line Regulation (Note1)	Regline	$V_I = 11.7\text{V}$ to $25\text{V}$ $I_O = 500\text{mA}$	-	6	90	mV
		$V_I = 12.5\text{V}$ to $19\text{V}$	-	4	45	
		$T_J = +25^{\circ}\text{C}$	$V_I = 11.5\text{V}$ to $24\text{V}$	6	90	
			$V_I = 12.5\text{V}$ to $19\text{V}$	2	45	
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to $1.0\text{A}$	-	12	100	mV
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-	12	100	
		$I_O = 250\text{mA}$ to $750\text{mA}$	-	5	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.0	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$V_I = 11.7\text{V}$ to $25\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.8	mA
		$V_I = 12\text{V}$ to $25\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-	-	0.5	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.0	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 12\text{V}$ to $22\text{V}$	-	62	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2.0	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	17	-	$\text{m}\Omega$
Short Circuit Current	$I_{\text{SC}}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

## Electrical Characteristics (KA7810A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 16\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	9.8	10	10.2	V
		$I_O = 5\text{mA to } 1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 12.8\text{V to } 25\text{V}$	9.6	10	10.4	
Line Regulation (Note1)	Regline	$V_I = 12.8\text{V to } 26\text{V}$ $I_O = 500\text{mA}$	-	8	100	mV
		$V_I = 13\text{V to } 20\text{V}$	-	4	50	
		$T_J = +25^{\circ}\text{C}$	$V_I = 12.5\text{V to } 25\text{V}$	-	8	100
			$V_I = 13\text{V to } 20\text{V}$	-	3	50
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA to } 1.5\text{A}$	-	12	100	mV
		$I_O = 5\text{mA to } 1.0\text{A}$	-	12	100	
		$I_O = 250\text{mA to } 750\text{mA}$	-	5	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.0	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$V_I = 13\text{V to } 26\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.5	mA
		$V_I = 12.8\text{V to } 25\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA to } 1.0\text{A}$	-	-	0.5	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.0	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 14\text{V to } 24\text{V}$	-	62	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2.0	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	17	-	$\text{m}\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

## Electrical Characteristics (KA7812A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 19\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	11.75	12	12.25	V
		$I_O = 5\text{mA}$ to $1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 14.8\text{V}$ to $27\text{V}$	11.5	12	12.5	
Line Regulation (Note1)	Regline	$V_I = 14.8\text{V}$ to $30\text{V}$ $I_O = 500\text{mA}$	-	10	120	mV
		$V_I = 16\text{V}$ to $22\text{V}$	-	4	120	
		$T_J = +25^{\circ}\text{C}$	$V_I = 14.5\text{V}$ to $27\text{V}$	-	10	120
			$V_I = 16\text{V}$ to $22\text{V}$	-	3	60
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to $1.5\text{A}$	-	12	100	mV
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-	12	100	
		$I_O = 250\text{mA}$ to $750\text{mA}$	-	5	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.1	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$V_I = 15\text{V}$ to $30\text{V}$ , $T_J = +25^{\circ}\text{C}$	-		0.8	mA
		$V_I = 14\text{V}$ to $27\text{V}$ , $I_O = 500\text{mA}$	-		0.8	
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-		0.5	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.0	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 14\text{V}$ to $24\text{V}$	-	60	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2.0	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	18	-	$\text{m}\Omega$
Short Circuit Current	$I_{\text{SC}}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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



## Electrical Characteristics (KA7815A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 23\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	14.7	15	15.3	V
		$I_O = 5\text{mA}$ to $1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 17.7\text{V}$ to $30\text{V}$	14.4	15	15.6	
Line Regulation (Note1)	Regline	$V_I = 17.9\text{V}$ to $30\text{V}$ $I_O = 500\text{mA}$	-	10	150	mV
		$V_I = 20\text{V}$ to $26\text{V}$	-	5	150	
		$T_J = +25^{\circ}\text{C}$	$V_I = 17.5\text{V}$ to $30\text{V}$	-	11	150
			$V_I = 20\text{V}$ to $26\text{V}$	-	3	75
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to $1.5\text{A}$	-	12	100	mV
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-	12	100	
		$I_O = 250\text{mA}$ to $750\text{mA}$	-	5	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.2	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$V_I = 17.5\text{V}$ to $30\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.8	mA
		$V_I = 17.5\text{V}$ to $30\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-	-	0.5	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.0	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 18.5\text{V}$ to $28.5\text{V}$	-	58	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2.0	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	19	-	$\text{m}\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

## Electrical Characteristics (KA7818A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 27\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	17.64	18	18.36	V
		$I_O = 5\text{mA to } 1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 21\text{V to } 33\text{V}$	17.3	18	18.7	
Line Regulation (Note1)	Regline	$V_I = 21\text{V to } 33\text{V}$ $I_O = 500\text{mA}$	-	15	180	mV
		$V_I = 21\text{V to } 33\text{V}$	-	5	180	
		$T_J = +25^{\circ}\text{C}$	$V_I = 20.6\text{V to } 33\text{V}$	-	15	180
			$V_I = 24\text{V to } 30\text{V}$	-	5	90
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA to } 1.5\text{A}$	-	15	100	mV
		$I_O = 5\text{mA to } 1.0\text{A}$	-	15	100	
		$I_O = 250\text{mA to } 750\text{mA}$	-	7	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.2	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$V_I = 21\text{V to } 33\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.8	mA
		$V_I = 21\text{V to } 33\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA to } 1.0\text{A}$	-	-	0.5	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.0	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ $T_A = +25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 22\text{V to } 32\text{V}$	-	57	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2.0	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	19	-	$\text{m}\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

## Electrical Characteristics (KA7824A)

(Refer to the test circuits.  $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 33\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	23.5	24	24.5	V
		$I_O = 5\text{mA to } 1\text{A}$ , $P_O \leq 15\text{W}$ $V_I = 27.3\text{V to } 38\text{V}$	23	24	25	
Line Regulation (Note1)	Regline	$V_I = 27\text{V to } 38\text{V}$ $I_O = 500\text{mA}$	-	18	240	mV
		$V_I = 21\text{V to } 33\text{V}$	-	6	240	
		$T_J = +25^{\circ}\text{C}$	$V_I = 26.7\text{V to } 38\text{V}$	-	18	240
			$V_I = 30\text{V to } 36\text{V}$	-	6	120
Load Regulation (Note1)	Regload	$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA to } 1.5\text{A}$	-	15	100	mV
		$I_O = 5\text{mA to } 1.0\text{A}$	-	15	100	
		$I_O = 250\text{mA to } 750\text{mA}$	-	7	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}\text{C}$	-	5.2	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$V_I = 27.3\text{V to } 38\text{V}$ , $T_J = +25^{\circ}\text{C}$	-	-	0.8	mA
		$V_I = 27.3\text{V to } 38\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA to } 1.0\text{A}$	-	-	0.5	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.5	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$ $T_A = 25^{\circ}\text{C}$	-	10	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 28\text{V to } 38\text{V}$	-	54	-	dB
Dropout Voltage	$V_{\text{Drop}}$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2.0	-	V
Output Resistance	$r_O$	$f = 1\text{KHz}$	-	20	-	$\text{m}\Omega$
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA
Peak Current	$I_{\text{PK}}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A

### Note:

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

Typical Performance Characteristics

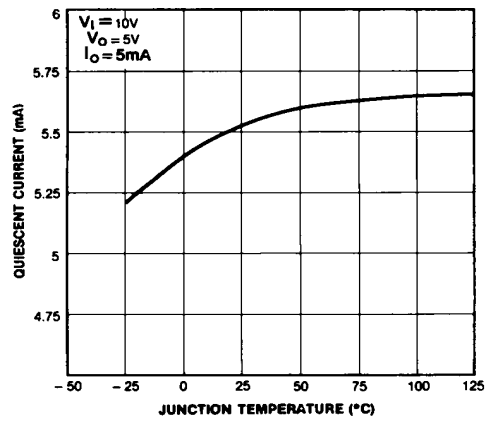


Figure 1. Quiescent Current

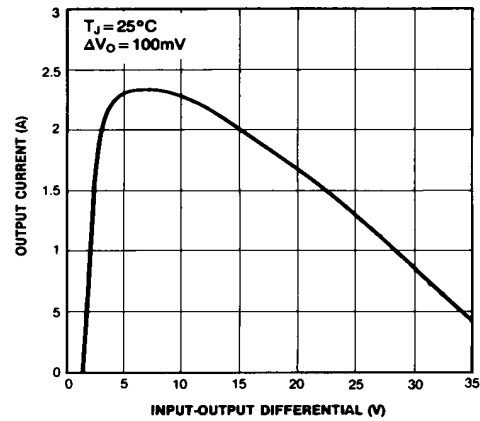


Figure 2. Peak Output Current

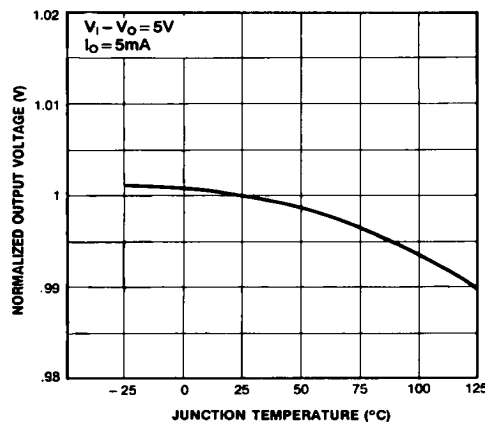


Figure 3. Output Voltage

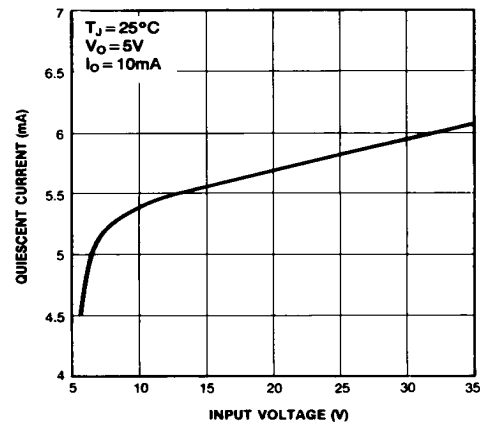


Figure 4. Quiescent Current

## Typical Applications

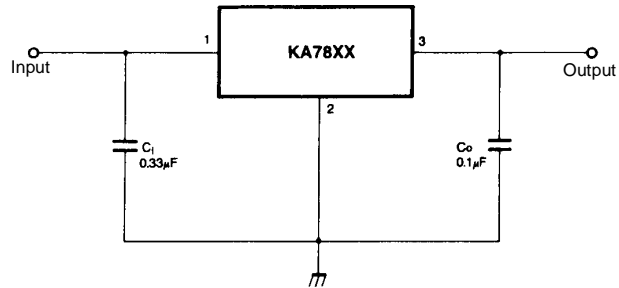


Figure 5. DC Parameters

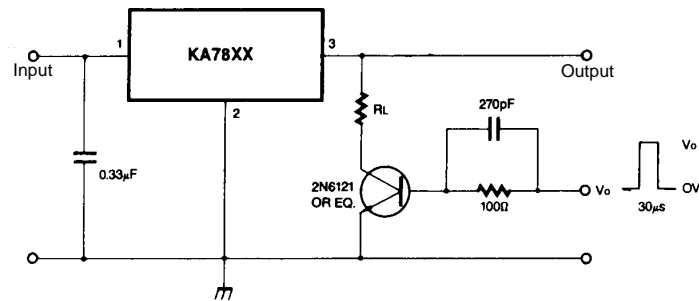


Figure 6. Load Regulation

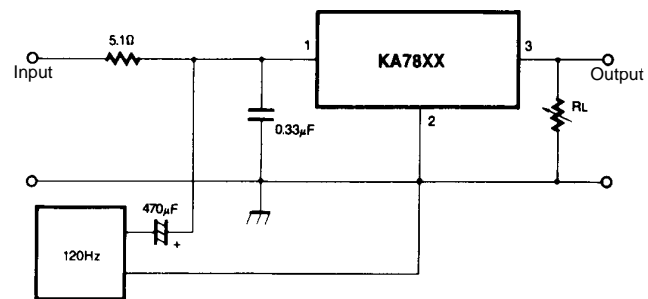


Figure 7. Ripple Rejection

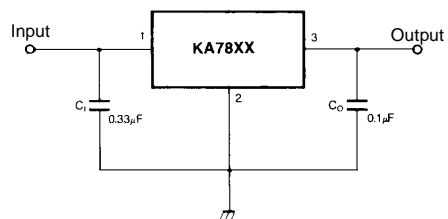


Figure 8. Fixed Output Regulator

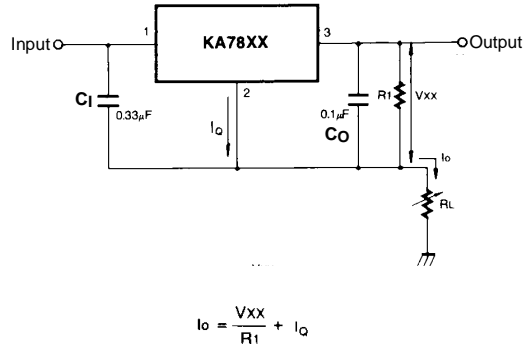


Figure 9. Constant Current Regulator

**Notes:**

- (1) To specify an output voltage, substitute voltage value for "XX." A common ground is required between the input and the Output voltage. The input voltage must remain typically 2.0V above the output voltage even during the low point on the input ripple voltage.
- (2) C<sub>1</sub> is required if regulator is located an appreciable distance from power Supply filter.
- (3) C<sub>0</sub> improves stability and transient response.

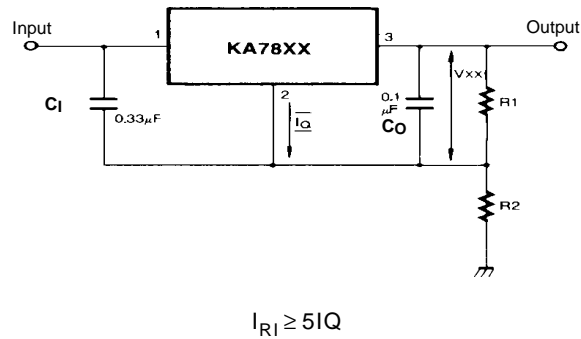


Figure 10. Circuit for Increasing Output Voltage

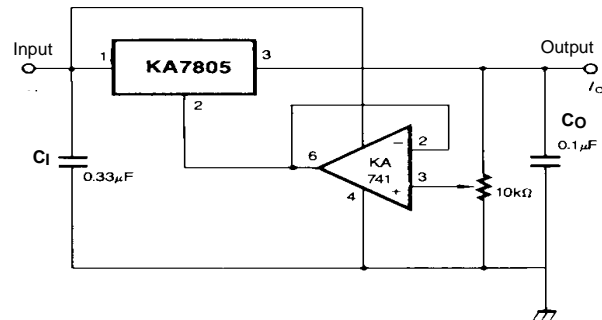


Figure 11. Adjustable Output Regulator (7 to 30V)

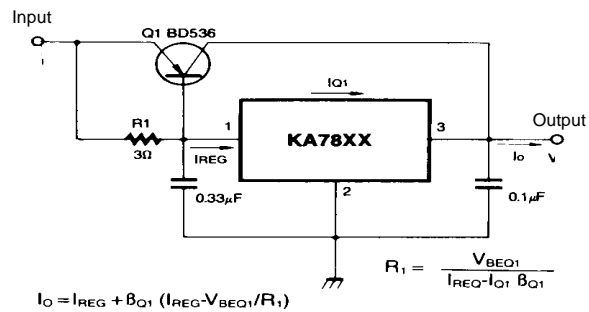


Figure 12. High Current Voltage Regulator

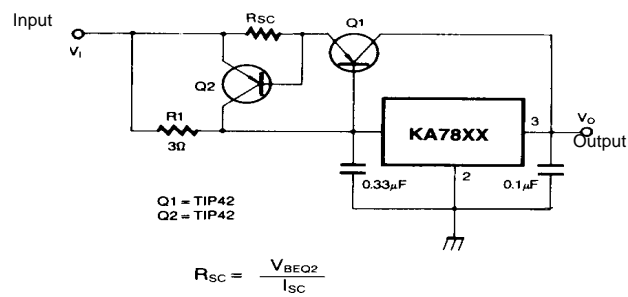


Figure 13. High Output Current with Short Circuit Protection

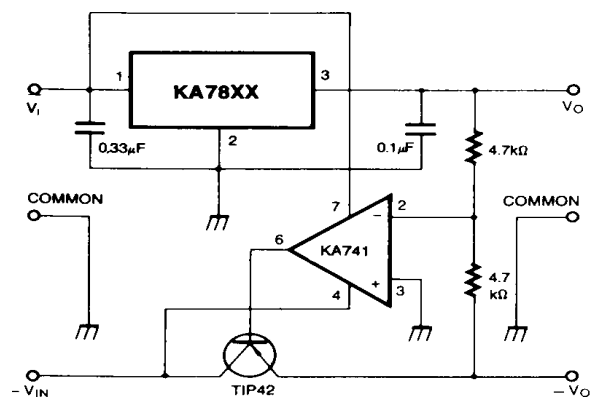


Figure 14. Tracking Voltage Regulator

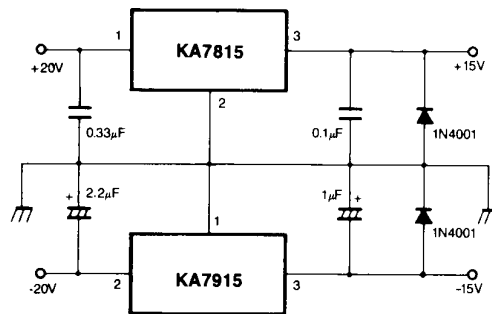


Figure 15. Split Power Supply ( ±15V-1A)

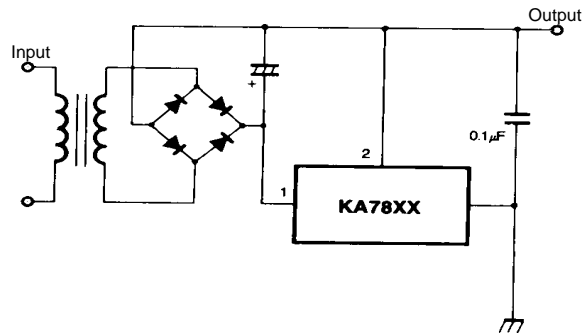


Figure 16. Negative Output Voltage Circuit

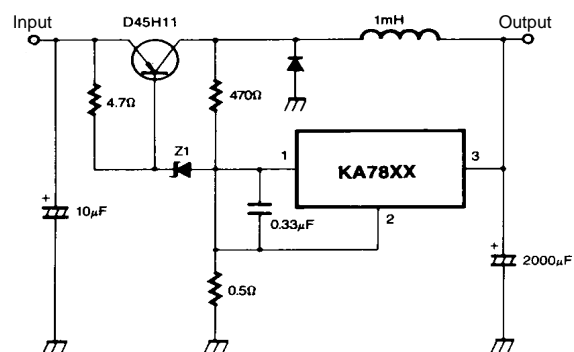


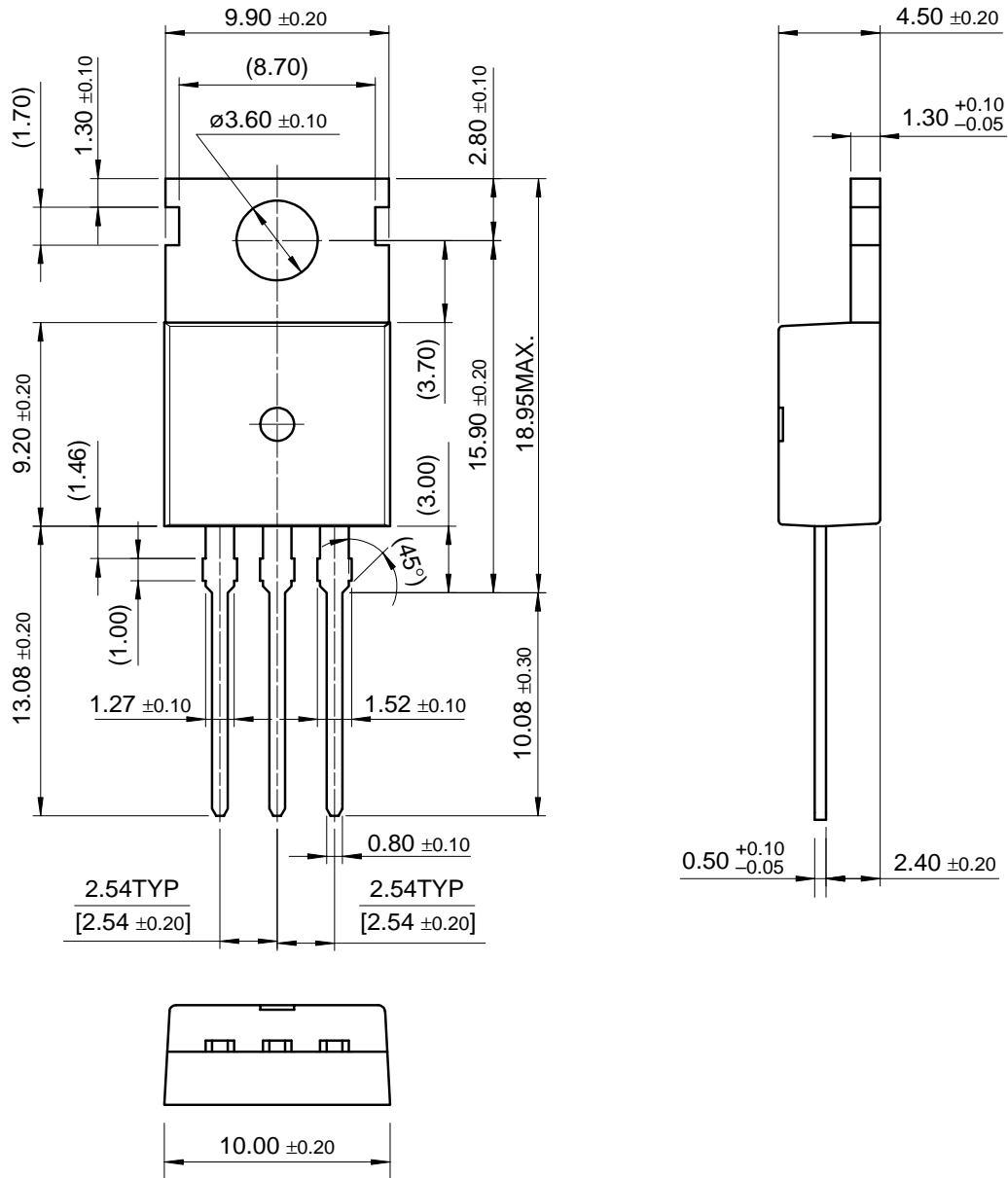
Figure 17. Switching Regulator



## Mechanical Dimensions

### Package

## TO-220





## Ordering Information

Product Number	Output Voltage Tolerance	Package	Operating Temperature
KA7805 / KA7806	±4%	TO-220	0 ~ + 125°C
KA7808 / KA7809			
KA7810			
KA7812 / KA7815			
KA7818 / KA7824			
KA7805A / KA7806A	±2%		
KA7808A / KA7809A			
KA7810A / KA7812A			
KA7815A / KA7818A			
KA7824A			
KA7805R / KA7806R	±4%	D-PAK	
KA7808R / KA7809R			
KA7812R			

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.