

# KA78XX/KA78XXA

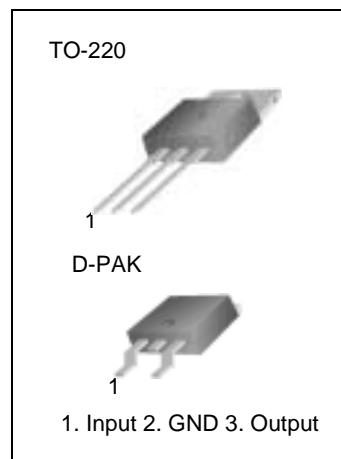
## 3-terminal 1A positive voltage regulator

### Features

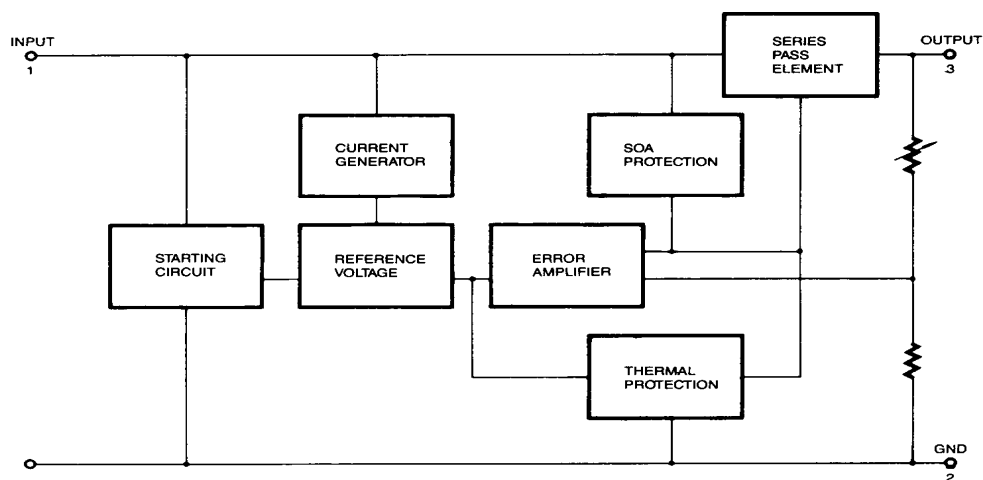
- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 11, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating area Protection

### 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	$R_{\theta JC}$	5	$^{\circ}C/W$
Thermal Resistance Junction-Air	$R_{\theta JA}$	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 $20V$ $V_I = 8V$ to $20V$	4.75	5.0	5.25		
Line Regulation	$\Delta V_O$	$T_J = +25^{\circ}C$	$V_O = 7V$ to $25V$	-	4.0	100	mV
			$V_I = 8V$ to $12V$	-	1.6	50	
Load Regulation	$\Delta V_O$	$T_J = +25^{\circ}C$	$I_O = 5.0mA$ to $1.5A$	-	9	100	mV
			$I_O = 250mA$ to $750mA$	-	4	50	
Quiescent Current	$I_Q$	$T_J = +25^{\circ}C$	-	5.0	8	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	-	$\mu V$	
Ripple Rejection	RR	$f = 120Hz$ $V_O = 8V$ to $18V$	62	73	-	dB	
Dropout Voltage	$V_O$	$I_O = 1A$ , $T_J = +25^{\circ}C$	-	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	

- 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	
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 8.0\text{V to } 21\text{V}$ $V_I = 9.0\text{V to } 21\text{V}$	5.7	6.0	6.3		
Line Regulation	$\Delta V_O$	$T_J = +25^{\circ}\text{C}$	$V_I = 8\text{V to } 25\text{V}$	-	5	120	mV
			$V_I = 9\text{V to } 13\text{V}$	-	1.5	60	
Load Regulation	$\Delta V_O$	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	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	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	-	$\mu\text{V}$	
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 9\text{V to } 19\text{V}$	59	75	-	dB	
Dropout Voltage	$V_O$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2	-	V	
Output Resistance	$R_O$	$f = 1\text{KHz}$	-	19	-	$\text{m}\Omega$	
Short Circuit Current	$I_{SC}$	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA	
Peak Current	$I_{PK}$	$T_J = +25^{\circ}\text{C}$	-	2.2	-	A	

- 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 °C < T<sub>J</sub> < +125 °C, I<sub>O</sub> = 500mA, V<sub>I</sub> = 14V, C<sub>I</sub> = 0.33μF, C<sub>O</sub> = 0.1μF, unless otherwise specified)

Parameter	Symbol	Conditions	KA7808			Unit	
			Min.	Typ.	Max.		
Output Voltage	V <sub>O</sub>	T <sub>J</sub> = +25 °C	7.7	8.0	8.3	V	
		5.0mA ≤ I <sub>O</sub> ≤ 1.0A, P <sub>O</sub> ≤ 15W V <sub>I</sub> = 10.5V to 23V V <sub>I</sub> = 11.5V to 23V	7.6	8.0	8.4		
Line Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	V <sub>I</sub> = 10.5V to 25V	-	5.0	160	mV
			V <sub>I</sub> = 11.5V to 17V	-	2.0	80	
Load Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	I <sub>O</sub> = 5.0mA to 1.5A	-	10	160	mV
			I <sub>O</sub> = 250mA to 750mA	-	5.0	80	
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> = +25 °C	-	5.0	8	mA	
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>O</sub> = 5mA to 1.0A	-	0.05	0.5	mA	
		V <sub>I</sub> = 10.5A to 25V	-	0.5	1.0		
		V <sub>I</sub> = 11.5V to 25V	-	-	-		
Output Voltage Drift	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-0.8	-	mV/°C	
Output Noise Voltage	V <sub>N</sub>	f = 10Hz to 100KHz, T <sub>A</sub> = +25 °C	-	52	-	μV	
Ripple Rejection	RR	f = 120Hz, V <sub>I</sub> = 11.5V to 21.5	56	73	-	dB	
Dropout Voltage	V <sub>O</sub>	I <sub>O</sub> = 1A, T <sub>J</sub> = +25 °C	-	2	-	V	
Output Resistance	R <sub>O</sub>	f = 1KHz	-	17	-	mΩ	
Short Circuit Current	I <sub>SC</sub>	V <sub>I</sub> = 35V, T <sub>A</sub> = +25 °C	-	230	-	mA	
Peak Current	I <sub>PK</sub>	T <sub>J</sub> = +25 °C	-	2.2	-	A	

- Load and line regulation are specified at constant junction temperature. Changes in V<sub>O</sub> 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 °C < T<sub>J</sub> < +125 °C, I<sub>O</sub> = 500mA, V<sub>I</sub> = 15V, C<sub>I</sub> = 0.33μF, C<sub>O</sub> = 0.1μF, unless otherwise specified)

Parameter	Symbol	Conditions	KA7809			Unit	
			Min.	Typ.	Max.		
Output Voltage	V <sub>O</sub>	T <sub>J</sub> = +25 °C	8.65	9	9.35	V	
		5.0mA ≤ I <sub>O</sub> ≤ 1.0A, P <sub>D</sub> ≤ 15W V <sub>I</sub> = 11.5V to 24V V <sub>I</sub> = 12.5V to 24V	8.6	9	9.4		
Line Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	V <sub>I</sub> = 11.5V to 25V	-	6	180	mV
			V <sub>I</sub> = 12V to 25V	-	2	90	
Load Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	I <sub>O</sub> = 5mA to 1.5A	-	12	180	mV
			I <sub>O</sub> = 250mA to 750mA	-	4	90	
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> = +25 °C	-	5.0	8	mA	
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>O</sub> = 5mA to 1.0A	-	-	0.5	mA	
		V <sub>I</sub> = 11.5V to 26V	-	-	1.3		
		V <sub>I</sub> = 12.5V to 26V	-	-	-		
Output Voltage Drift	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-1	-	mV/°C	
Output Noise Voltage	V <sub>N</sub>	f = 10Hz to 100KHz, T <sub>A</sub> = +25 °C	-	58	-	μV	
Ripple Rejection	RR	f = 120Hz V <sub>I</sub> = 13V to 23V	56	71	-	dB	
Dropout Voltage	V <sub>O</sub>	I <sub>O</sub> = 1A, T <sub>J</sub> = +25 °C	-	2	-	V	
Output Resistance	R <sub>O</sub>	f = 1KHz	-	17	-	mΩ	
Short Circuit Current	I <sub>SC</sub>	V <sub>I</sub> = 35V, T <sub>A</sub> = +25 °C	-	250	-	mA	
Peak Current	I <sub>PK</sub>	T <sub>J</sub> = +25 °C	-	2.2	-	A	

- Load and line regulation are specified at constant junction temperature. Changes in V<sub>O</sub> due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7810/KA7810R)

(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	
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 12.5\text{V to } 25\text{V}$ $V_I = 13.5\text{V to } 25\text{V}$	9.5	10	10.5		
Line Regulation	$\Delta V_O$	$T_J = +25^{\circ}\text{C}$	$V_I = 12.5\text{V to } 25\text{V}$	-	10	200	mV
			$V_I = 13\text{V to } 25\text{V}$	-	3	100	
Load Regulation	$\Delta V_O$	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	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	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		
		$V_I = 13.5\text{V to } 29\text{V}$	-	-	-		
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	-	$\mu\text{V}$	
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 13\text{V to } 23\text{V}$	56	71	-	dB	
Dropout Voltage	$V_O$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2	-	V	
Output Resistance	$R_O$	$f = 1\text{kHz}$	-	17	-	$\text{m}\Omega$	
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	250	-	mA	
Peak Current	IPK	$T_J = +25^{\circ}\text{C}$	-	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.

## Electrical Characteristics (KA7811/KA7811R)

(Refer to test circuit ,0 °C < T<sub>J</sub> < +125 °C, I<sub>O</sub> = 500mA, V<sub>I</sub> = 18V, C<sub>I</sub>= 0.33μF, C<sub>O</sub>= 0.1μF, unless otherwise specified)

Parameter	Symbol	Conditions	KA7811			Unit	
			Min.	Typ.	Max.		
Output Voltage	V <sub>O</sub>	T <sub>J</sub> = +25 °C	10.6	11	11.4	V	
		5.0mA ≤ I <sub>O</sub> ≤ 1.0A, P <sub>D</sub> ≤ 15W V <sub>I</sub> = 13.5V to 26V V <sub>I</sub> = 14.5V to 26V	10.5	11	11.5		
Line Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	V <sub>I</sub> = 13.5V to 25V	-	10	220	mV
			V <sub>I</sub> = 14V to 21V	-	3	110	
Load Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	I <sub>O</sub> = 5.0mA to 1.5A	-	12	220	mV
			I <sub>O</sub> = 250mA to 750mA	-	4	110	
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> = +25 °C	-	5.1	8	mA	
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>O</sub> = 5mA to 1.0A V <sub>I</sub> = 13.5V to 29V V <sub>I</sub> = 14.5V to 29V	-	-	0.5	mA	
			-	-	1.0		
			-	-	-		
Output Voltage Drift	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-1	-	mV/°C	
Output Noise Voltage	V <sub>N</sub>	f = 10Hz to 100KHz, T <sub>A</sub> = +25 °C	-	70	-	μV	
Ripple Rejection	RR	f = 120Hz V <sub>I</sub> = 14V to 24V	55	71	-	dB	
Dropout Voltage	V <sub>O</sub>	I <sub>O</sub> = 1A, T <sub>J</sub> = +25 °C	-	2	-	V	
Output Resistance	R <sub>O</sub>	f = 1KHz	-	18	-	mΩ	
Short Circuit Current	I <sub>SC</sub>	V <sub>I</sub> = 35V, T <sub>A</sub> = +25 °C	-	250	-	mA	
Peak Current	I <sub>PK</sub>	T <sub>J</sub> = +25 °C	-	2.2	-	A	

- Load and line regulation are specified at constant junction temperature. Changes in V<sub>O</sub> 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			Unit	
			Min.	Typ.	Max.		
Output Voltage	$V_O$	$T_J = +25^{\circ}\text{C}$	11.5	12	12.5	V	
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 14.5\text{V to } 27\text{V}$ $V_I = 15.5\text{V to } 27\text{V}$	11.4	12	12.6		
Line Regulation	$\Delta V_O$	$T_J = +25^{\circ}\text{C}$	$V_I = 14.5\text{V to } 30\text{V}$	-	10	240	mV
			$V_I = 16\text{V to } 22\text{V}$	-	3.0	120	
Load Regulation	$\Delta V_O$	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	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	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		
		$V_I = 15\text{V to } 30\text{V}$	-	-	-		
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	-	$\mu\text{V}$	
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 15\text{V to } 25\text{V}$	55	71	-	dB	
Dropout Voltage	$V_O$	$I_O = 1\text{A}$ , $T_J = +25^{\circ}\text{C}$	-	2	-	V	
Output Resistance	$R_O$	$f = 1\text{kHz}$	-	18	-	$\text{m}\Omega$	
Short Circuit Current	ISC	$V_I = 35\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	230	-	mA	
Peak Current	IPK	$T_J = +25^{\circ}\text{C}$	-	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.



## Electrical Characteristics (KA7815/KA7815R)

(Refer to test circuit ,0 °C < T<sub>J</sub> < +125 °C, I<sub>O</sub> = 500mA, V<sub>I</sub> = 23V, C<sub>I</sub>= 0.33μF, C<sub>O</sub>= 0.1μF, unless otherwise specified)

Parameter	Symbol	Conditions	KA7815			Unit	
			Min.	Typ.	Max.		
Output Voltage	V <sub>O</sub>	T <sub>J</sub> =+25 °C	14.4	15	15.6	V	
		5.0mA ≤ I <sub>O</sub> ≤ 1.0A, P <sub>D</sub> ≤ 15W V <sub>I</sub> = 17.5V to 30V V <sub>I</sub> = 18.5V to 30V	14.25	15	15.75		
Line Regulation	ΔV <sub>O</sub>	T <sub>J</sub> =+25 °C	V <sub>I</sub> = 17.5V to 30V	-	11	300	mV
			V <sub>I</sub> = 20V to 26V	-	3	150	
Load Regulation	ΔV <sub>O</sub>	T <sub>J</sub> =+25 °C	I <sub>O</sub> = 5mA to 1.5A	-	12	300	mV
			I <sub>O</sub> = 250mA to 750mA	-	4	150	
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> =+25 °C	-	5.2	8	mA	
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>O</sub> = 5mA to 1.0A	-	-	0.5	mA	
		V <sub>I</sub> = 17.5V to 30V	-	-	1.0		
		V <sub>I</sub> = 18.5V to 30V	-	-	-		
Output Voltage Drift	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-1	-	mV/°C	
Output Noise Voltage	V <sub>N</sub>	f = 10Hz to 100KHz, T <sub>A</sub> =+25 °C	-	90	-	μV	
Ripple Rejection	RR	f = 120Hz V <sub>I</sub> = 18.5V to 28.5V	54	70	-	dB	
Dropout Voltage	V <sub>O</sub>	I <sub>O</sub> = 1A, T <sub>J</sub> =+25 °C	-	2	-	V	
Output Resistance	R <sub>O</sub>	f = 1KHz	-	19	-	mΩ	
Short Circuit Current	I <sub>SC</sub>	V <sub>I</sub> = 35V, T <sub>A</sub> =+25 °C	-	250	-	mA	
Peak Current	I <sub>PK</sub>	T <sub>J</sub> =+25 °C	-	2.2	-	A	

- Load and line regulation are specified at constant junction temperature. Changes in V<sub>O</sub> due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7818/KA7818R)

(Refer to test circuit ,0 °C < T<sub>J</sub> < +125 °C, I<sub>O</sub> = 500mA, V<sub>I</sub> = 27V, C<sub>I</sub>= 0.33μF, C<sub>O</sub>= 0.1μF, unless otherwise specified)

Parameter	Symbol	Conditions	KA7818			Unit	
			Min.	Typ.	Max.		
Output Voltage	V <sub>O</sub>	T <sub>J</sub> = +25 °C	17.3	18	18.7	V	
		5.0mA ≤ I <sub>O</sub> ≤ 1.0A, P <sub>D</sub> ≤ 15W V <sub>I</sub> = 21V to 33V V <sub>I</sub> = 22V to 33V	17.1	18	18.9		
Line Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	V <sub>I</sub> = 21V to 33V	-	15	360	mV
			V <sub>I</sub> = 24V to 30V	-	5	180	
Load Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	I <sub>O</sub> = 5mA to 1.5A	-	15	360	mV
			I <sub>O</sub> = 250mA to 750mA	-	5.0	180	
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> = +25 °C	-	5.2	8	mA	
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>O</sub> = 5mA to 1.0A	-	-	0.5	mA	
		V <sub>I</sub> = 21V to 33V	-	-	1		
		V <sub>I</sub> = 22V to 33V	-	-			
Output Voltage Drift	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-1	-	mV/°C	
Output Noise Voltage	V <sub>N</sub>	f = 10Hz to 100KHz, T <sub>A</sub> = +25 °C	-	110	-	μV	
Ripple Rejection	RR	f = 120Hz V <sub>I</sub> = 22V to 32V	53	69	-	dB	
Dropout Voltage	V <sub>O</sub>	I <sub>O</sub> = 1A, T <sub>J</sub> = +25 °C	-	2	-	V	
Output Resistance	R <sub>O</sub>	f = 1KHz	-	22	-	mΩ	
Short Circuit Current	I <sub>SC</sub>	V <sub>I</sub> = 35V, T <sub>A</sub> = +25 °C	-	250	-	mA	
Peak Current	I <sub>PK</sub>	T <sub>J</sub> = +25 °C	-	2.2	-	A	

- Load and line regulation are specified at constant junction temperature. Changes in V<sub>O</sub> due to heating effects must be taken into account separately. Pulse testing with low duty is used.

## Electrical Characteristics (KA7824/KA7824R)

(Refer to test circuit ,0 °C < T<sub>J</sub> < +125 °C, I<sub>O</sub> = 500mA, V<sub>I</sub> = 33V, C<sub>I</sub> = 0.33μF, C<sub>O</sub> = 0.1μF, unless otherwise specified)

Parameter	Symbol	Conditions	KA7824			Unit	
			Min.	Typ.	Max.		
Output Voltage	V <sub>O</sub>	T <sub>J</sub> = +25 °C	23	24	25	V	
		5.0mA ≤ I <sub>O</sub> ≤ 1.0A, P <sub>D</sub> ≤ 15W V <sub>I</sub> = 27V to 38V V <sub>I</sub> = 28V to 38V	22.8	24	25.25		
Line Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	V <sub>I</sub> = 27V to 38V	-	17	480	mV
			V <sub>I</sub> = 30V to 36V	-	6	240	
Load Regulation	ΔV <sub>O</sub>	T <sub>J</sub> = +25 °C	I <sub>O</sub> = 5mA to 1.5A	-	15	480	mV
			I <sub>O</sub> = 250mA to 750mA	-	5.0	240	
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> = +25 °C	-	5.2	8	mA	
Quiescent Current Change	ΔI <sub>Q</sub>	I <sub>O</sub> = 5mA to 1.0A	-	0.1	0.5	mA	
		V <sub>I</sub> = 27V to 38V	-	0.5	1		
		V <sub>I</sub> = 28V to 38V	-	-	-		
Output Voltage Drift	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-1.5	-	mV/°C	
Output Noise Voltage	V <sub>N</sub>	f = 10Hz to 100KHz, T <sub>A</sub> = +25 °C	-	60	-	μV	
Ripple Rejection	RR	f = 120Hz V <sub>I</sub> = 28V to 38V	50	67	-	dB	
Dropout Voltage	V <sub>O</sub>	I <sub>O</sub> = 1A, T <sub>J</sub> = +25 °C	-	2	-	V	
Output Resistance	R <sub>O</sub>	f = 1KHz	-	28	-	mΩ	
Short Circuit Current	I <sub>SC</sub>	V <sub>I</sub> = 35V, T <sub>A</sub> = +25 °C	-	230	-	mA	
Peak Current	I <sub>PK</sub>	T <sub>J</sub> = +25 °C	-	2.2	-	A	

- Load and line regulation are specified at constant junction temperature. Changes in V<sub>O</sub> 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.  $T_J = 0$  to  $+125$  °C,  $I_O = 1$  A,  $V_I = 10$  V,  $C_I = 0.33$   $\mu$ F,  $C_O = 0.1$   $\mu$ F, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	$V_O$	$T_J = +25$ °C	4.9	5	5.1	V	
		$I_O = 5$ mA to 1 A, $P_D \leq 5$ W $V_I = 7.5$ V to 20 V	4.8	5	5.2		
*Line Regulation	$\Delta V_O$	$V_I = 7.5$ V to 25 V $I_O = 500$ mA	-	5	50	mV	
		$V_I = 8$ V to 12 V	-	3	50		
		$T_J = +25$ °C	$V_I = 7.3$ V to 25 V	-	5		50
			$V_I = 8$ V to 12 V	-	1.5		25
*Load Regulation		$T_J = +25$ °C $I_O = 5$ mA to 1.5 A	-	9	100	mV	
		$I_O = 5$ mA to 1 A	-	9	100		
		$I_O = 250$ mA to 750 mA	-	4	50		
Quiescent Current	$I_Q$	$T_J = +25$ °C	-	5.0	6	mA	
Quiescent Current Change	$\Delta I_Q$	$I_O = 5$ mA to 1 A	-	-	0.5	mA	
		$V_I = 8$ V to 25 V, $I_O = 500$ mA	-	-	0.8		
		$V_I = 7.5$ V to 20 V, $T_J = +25$ °C	-	-	0.8		
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5$ mA	-	-0.8	-	mV/°C	
Output Noise Voltage	$V_N$	$f = 10$ Hz to 100 KHz $T_A = +25$ °C	-	10	-	$\mu$ V	
Ripple Rejection	RR	$f = 120$ Hz, $I_O = 500$ mA $V_I = 8$ V to 18 V	-	68	-	dB	
Dropout Voltage	$V_D$	$I_O = 1$ A, $T_J = +25$ °C	-	2	-	V	
Output Resistance	$R_O$	$f = 1$ KHz	-	17	-	m $\Omega$	
Short Circuit Current	ISC	$V_I = 35$ V, $T_A = +25$ °C	-	250	-	mA	
Peak Current	$I_{PK}$	$T_J = +25$ °C	-	2.2	-	A	

- 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.  $T_J = 0$  to  $+150$  °C,  $I_O = 1$  A,  $V_I = 11$  V,  $C_I = 0.33$   $\mu$ F,  $C_O = 0.1$   $\mu$ F, unless otherwise specified)

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

- 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.  $T_J = 0^\circ\text{C}$  to  $+150^\circ\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 14\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , 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 $1\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 8.6\text{V}$ to $21\text{V}$	7.7	8	8.3		
*Line Regulation	$\Delta V_O$	$V_I = 10.6\text{V}$ 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		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ 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	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	-	$\mu\text{V}$	
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	$V_D$	$I_O = 1\text{A}$ , $T_J = +25^\circ\text{C}$	-	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	

- 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.  $T_J = 0^\circ\text{C}$  to  $+125^\circ\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 15\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , 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 $1\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 11.2\text{V}$ to $24\text{V}$	8.65	9.0	9.35		
*Line Regulation	$\Delta V_O$	$V_I = 11.7\text{V}$ 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		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ 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	-	$\mu\text{V}$	
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	$V_D$	$I_O = 1\text{A}$ , $T_J = +25^\circ\text{C}$	-	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	$I_{PK}$	$T_J = +25^\circ\text{C}$	-	2.2	-	A	

- 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.  $T_J = 0$  to  $+125$  °C,  $I_O = 1A$ ,  $V_I = 16V$ ,  $C_I = 0.33\mu F$ ,  $C_O = 0.1\mu F$ , unless otherwise specified)

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

- 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 (KA7811A)

(Refer to the test circuits.  $T_J = 0$  to  $+125^\circ\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 18\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	$V_O$	$T_J = +25^\circ\text{C}$	10.8	11.0	11.2	V	
		$I_O = 5\text{mA}$ to $1\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 13.8\text{V}$ to $26\text{V}$	10.6	11.0	11.4		
*Line Regulation	$\Delta V_O$	$V_I = 12.8\text{V}$ to $26\text{V}$ $I_O = 500\text{mA}$	-	10	110	mV	
		$V_I = 15\text{V}$ to $21\text{V}$	-	4	55		
		$T_J = +25^\circ\text{C}$	$V_I = 13.5\text{V}$ to $26\text{V}$	-	10		110
			$V_I = 15\text{V}$ to $21\text{V}$	-	3		55
*Load Regulation		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ 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	$\Delta I_Q$	$V_I = 13.8\text{V}$ to $26\text{V}$ , $T_J = +25^\circ\text{C}$	-	-	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	-	$\mu\text{V}$	
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 14\text{V}$ to $24\text{V}$	-	61	-	dB	
Dropout Voltage	$V_D$	$I_O = 1\text{A}$ , $T_J = +25^\circ\text{C}$	-	2.0	-	V	
Output Resistance	$R_O$	$f = 1\text{KHz}$	-	18	-	$\text{m}\Omega$	
Short Circuit Current	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	

- 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.  $T_J = 0$  to  $+125^\circ\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 19\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , 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 $1\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 14.8\text{V}$ to $27\text{V}$	11.5	12	12.5		
*Line Regulation	$\Delta V_O$	$V_I = 14.8\text{V}$ 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		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ 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 $30\text{V}$ , $T_J = +25^\circ\text{C}$	-		0.5	mA	
		$V_I = 14\text{V}$ to $27\text{V}$ , $I_O = 500\text{mA}$	-		0.8		
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-		0.8		
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.0	-	$\text{mV}/^\circ\text{C}$	
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{KHz}$ $T_A = +25^\circ\text{C}$	-	10	-	$\mu\text{V}$	
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	$V_D$	$I_O = 1\text{A}$ , $T_J = +25^\circ\text{C}$	-	2.0	-	V	
Output Resistance	$R_O$	$f = 1\text{KHz}$	-	18	-	$\text{m}\Omega$	
Short Circuit Current	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	

- 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.  $T_J = 0$  to  $+150^\circ\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 23\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , 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 $1\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 17.7\text{V}$ to $30\text{V}$	14.4	15	15.6		
*Line Regulation	$\Delta V_O$	$V_I = 17.9\text{V}$ 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		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ 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 $30\text{V}$ , $T_J = +25^\circ\text{C}$	-	-	0.5	mA	
		$V_I = 17.5\text{V}$ to $30\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8		
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-	-	0.8		
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$	-	-1.0	-	$\text{mV}/^\circ\text{C}$	
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{KHz}$ $T_A = +25^\circ\text{C}$	-	10	-	$\mu\text{V}$	
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	$V_D$	$I_O = 1\text{A}$ , $T_J = +25^\circ\text{C}$	-	2.0	-	V	
Output Resistance	$R_O$	$f = 1\text{KHz}$	-	19	-	$\text{m}\Omega$	
Short Circuit Current	$I_{SC}$	$V_I = 35\text{V}$ , $T_A = +25^\circ\text{C}$	-	250	-	mA	
Peak Current	$I_{PK}$	$T_J = +25^\circ\text{C}$	-	2.2	-	A	

- 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.  $T_J = 0$  to  $+150^\circ\text{C}$ ,  $I_O = 1\text{A}$ ,  $V_I = 27\text{V}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , 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 $1\text{A}$ , $P_D \leq 15\text{W}$ $V_I = 21\text{V}$ to $33\text{V}$	17.3	18	18.7		
*Line Regulation	$\Delta V_O$	$V_I = 21\text{V}$ 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		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ 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 $33\text{V}$ , $T_J = +25^\circ\text{C}$	-	-	0.5	mA	
		$V_I = 21\text{V}$ to $33\text{V}$ , $I_O = 500\text{mA}$	-	-	0.8		
		$I_O = 5\text{mA}$ to $1.0\text{A}$	-	-	0.8		
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	-	$\mu\text{V}$	
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 500\text{mA}$ $V_I = 18.5\text{V}$ to $28.5\text{V}$	-	57	-	dB	
Dropout Voltage	$V_D$	$I_O = 1\text{A}$ , $T_J = +25^\circ\text{C}$	-	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	$I_{PK}$	$T_J = +25^\circ\text{C}$	-	2.2	-	A	

- 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.  $T_J = 0$  to  $+150$  °C,  $I_O = 1A$ ,  $V_I = 33V$ ,  $C_I = 0.33\mu F$ ,  $C_O = 0.1\mu F$ , unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	$V_O$	$T_J = +25$ °C	23.5	24	24.5	V	
		$I_O = 5mA$ to $1A$ , $P_D \leq 15W$ $V_I = 27.3V$ to $38V$	23	24	25		
*Line Regulation	$\Delta V_O$	$V_I = 27V$ to $38V$ $I_O = 500mA$	-	18	240	mV	
		$V_I = 21V$ to $33V$	-	6	240		
		$T_J = +25$ °C	$V_I = 26.7V$ to $38V$	-	18		240
			$V_I = 30V$ to $36V$	-	6		120
*Load Regulation		$T_J = +25$ °C $I_O = 5mA$ to $1.5A$	-	15	100	mV	
		$I_O = 5mA$ to $1.0A$	-	15	100		
		$I_O = 250mA$ to $750mA$	-	7	50		
Quiescent Current	$I_Q$	$T_J = +25$ °C	-	5.2	6.0	mA	
Quiescent Current Change	$\Delta I_Q$	$V_I = 27.3V$ to $38V$ , $T_J = +25$ °C	-	-	0.5	mA	
		$V_I = 27.3V$ to $38V$ , $I_O = 500mA$	-	-	0.8		
		$I_O = 5mA$ to $1.0A$	-	-	0.8		
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5mA$	-	-1.5	-	mV/ °C	
Output Noise Voltage	$V_N$	$f = 10Hz$ to $100KHz$ $T_A = 25$ °C	-	10	-	$\mu V$	
Ripple Rejection	RR	$f = 120Hz$ , $I_O = 500mA$ $V_I = 18.5V$ to $28.5V$	-	54	-	dB	
Dropout Voltage	$V_D$	$I_O = 1A$ , $T_J = +25$ °C	-	2.0	-	V	
Output Resistance	$R_O$	$f = 1KHz$	-	20	-	m $\Omega$	
Short Circuit Current	ISC	$V_I = 35V$ , $T_A = +25$ °C	-	250	-	mA	
Peak Current	$I_{PK}$	$T_J = +25$ °C	-	2.2	-	A	

- 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

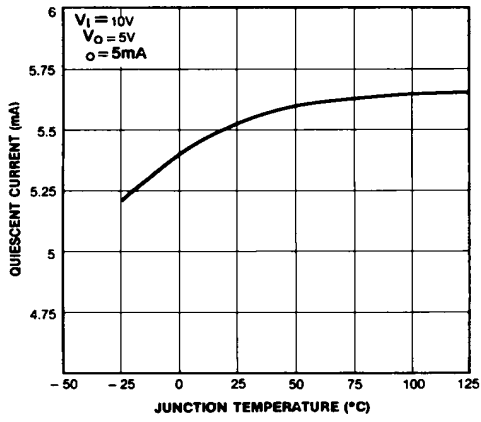


Figure 1. Quiescent Current

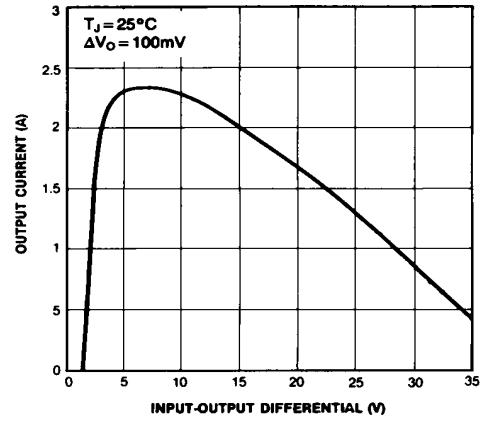


Figure 2. Peak Output Current

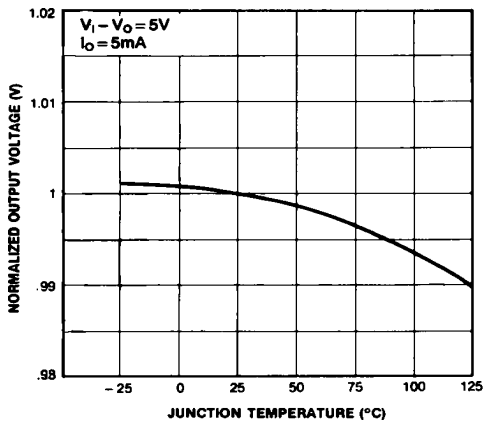


Figure 3. Output Voltage

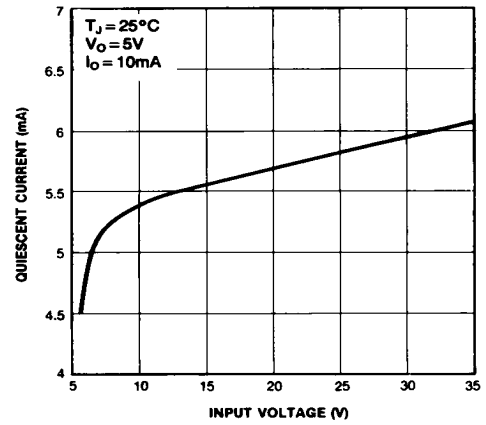


Figure 4. Quiescent Current

## Typical Applications

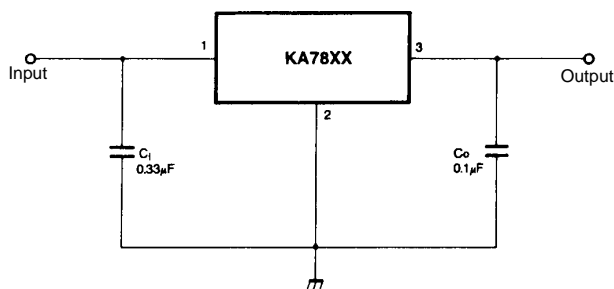


Figure 5. DC Parameters

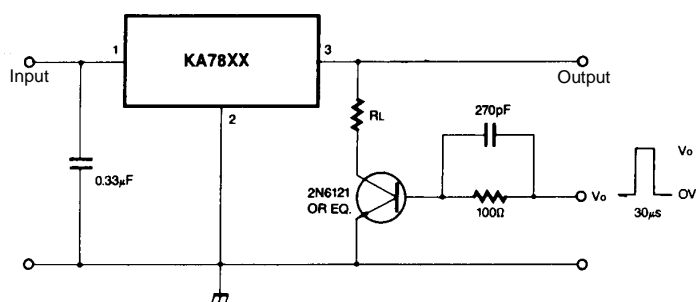


Figure 6. Load Regulation

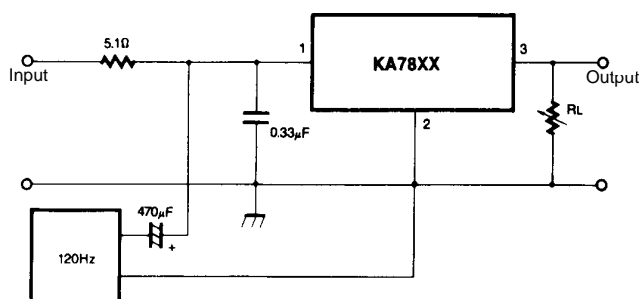


Figure 7. Ripple Rejection

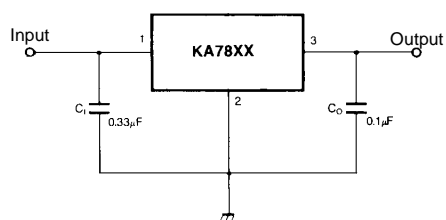


Figure 8. Fixed Output Regulator

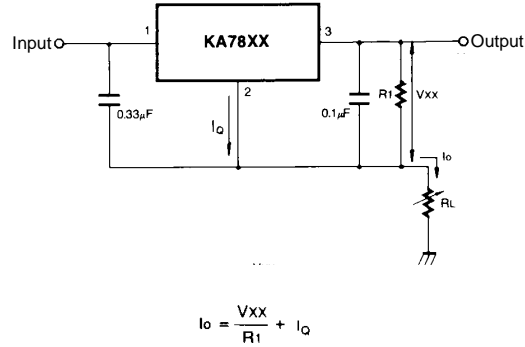
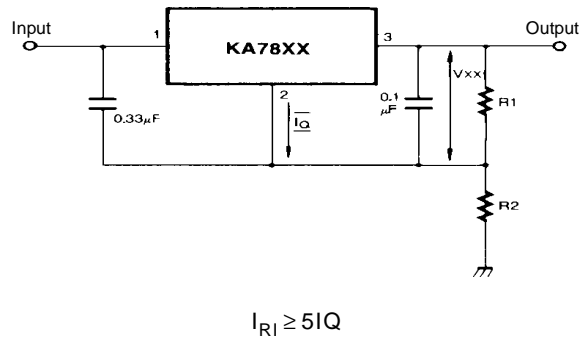


Figure 9. Constant Current Regulator

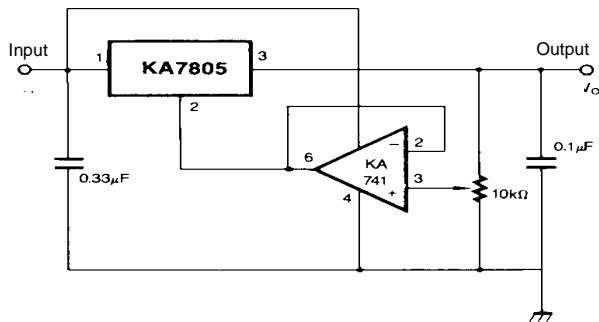
**Notes:**

- (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>I</sub> is required if regulator is located an appreciable distance from power Supply filter.
- (3) C<sub>O</sub> improves stability and transient response.



$$V_O = V_{XX}(1+R_2/R_1)+I_Q R_2$$

Figure 10. Circuit for Increasing Output Voltage



$$V_O = V_{XX}(1+R_2/R_1)+I_Q R_2$$

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



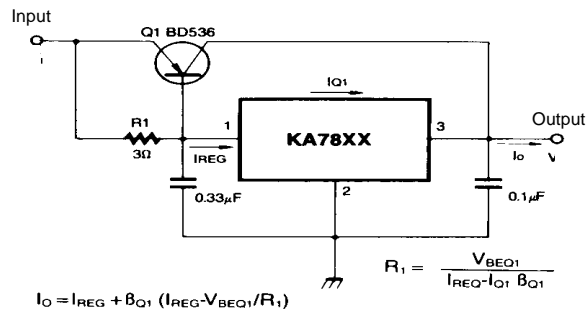


Figure 12. High Current Voltage Regulator

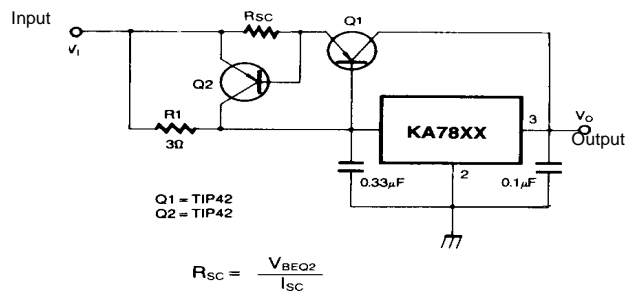


Figure 13. High Output Current with Short Circuit Protection

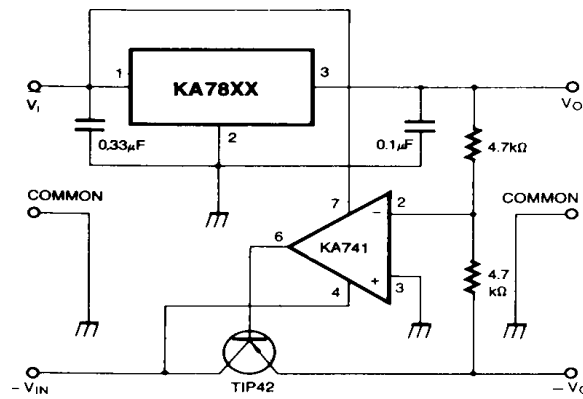


Figure 14. Tracking Voltage Regulator

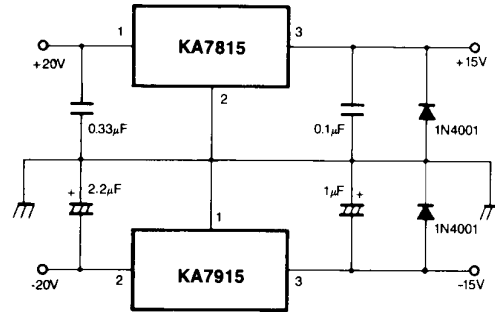


Figure 15. Split Power Supply ( ±15V-1A)

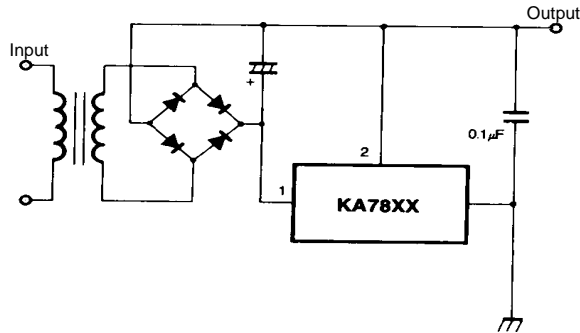


Figure 16. Negative Output Voltage Circuit

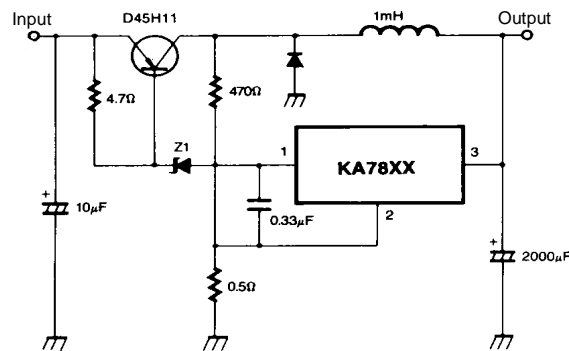
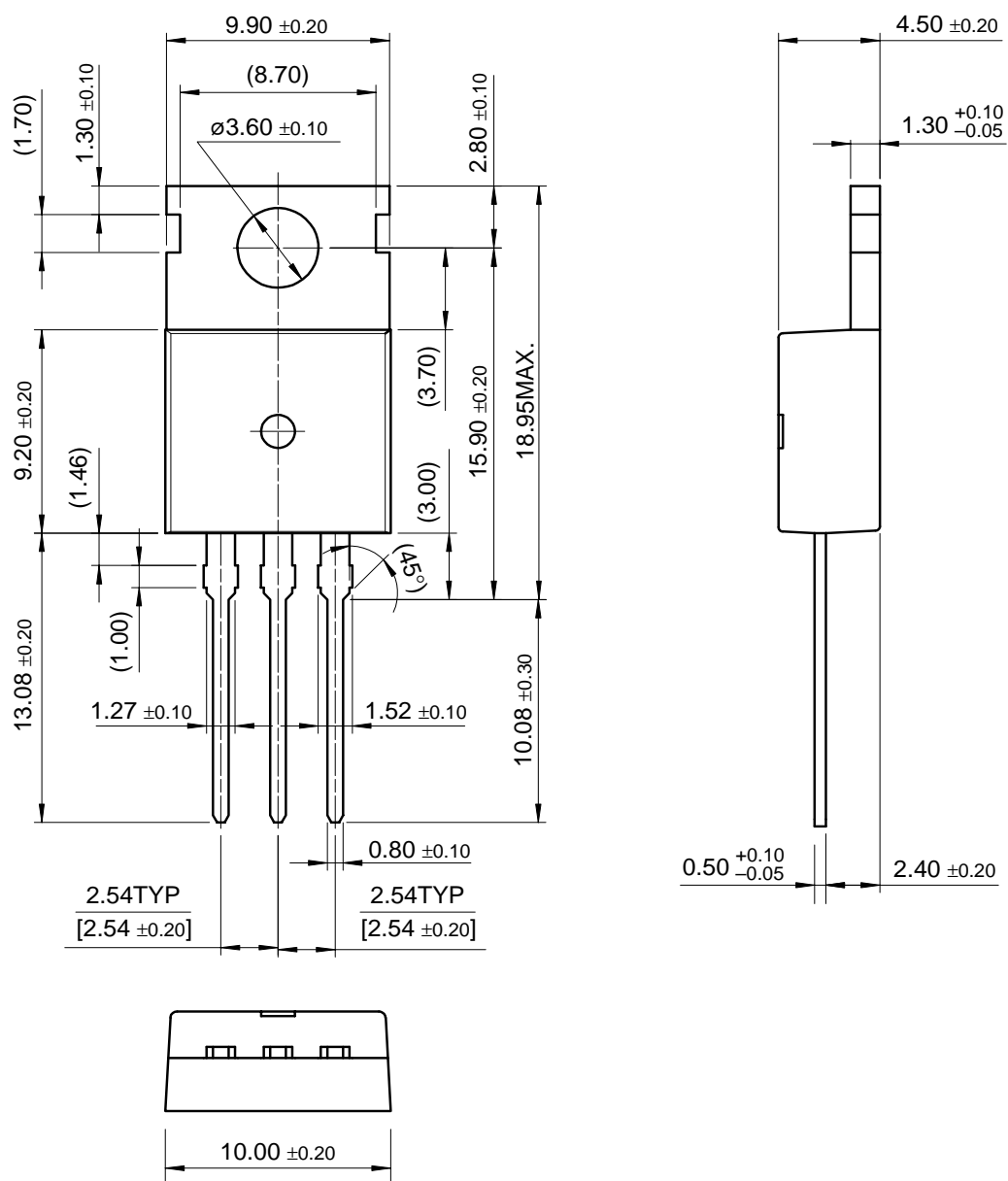


Figure 17. Switching Regulator

## Mechanical Dimensions

### Package

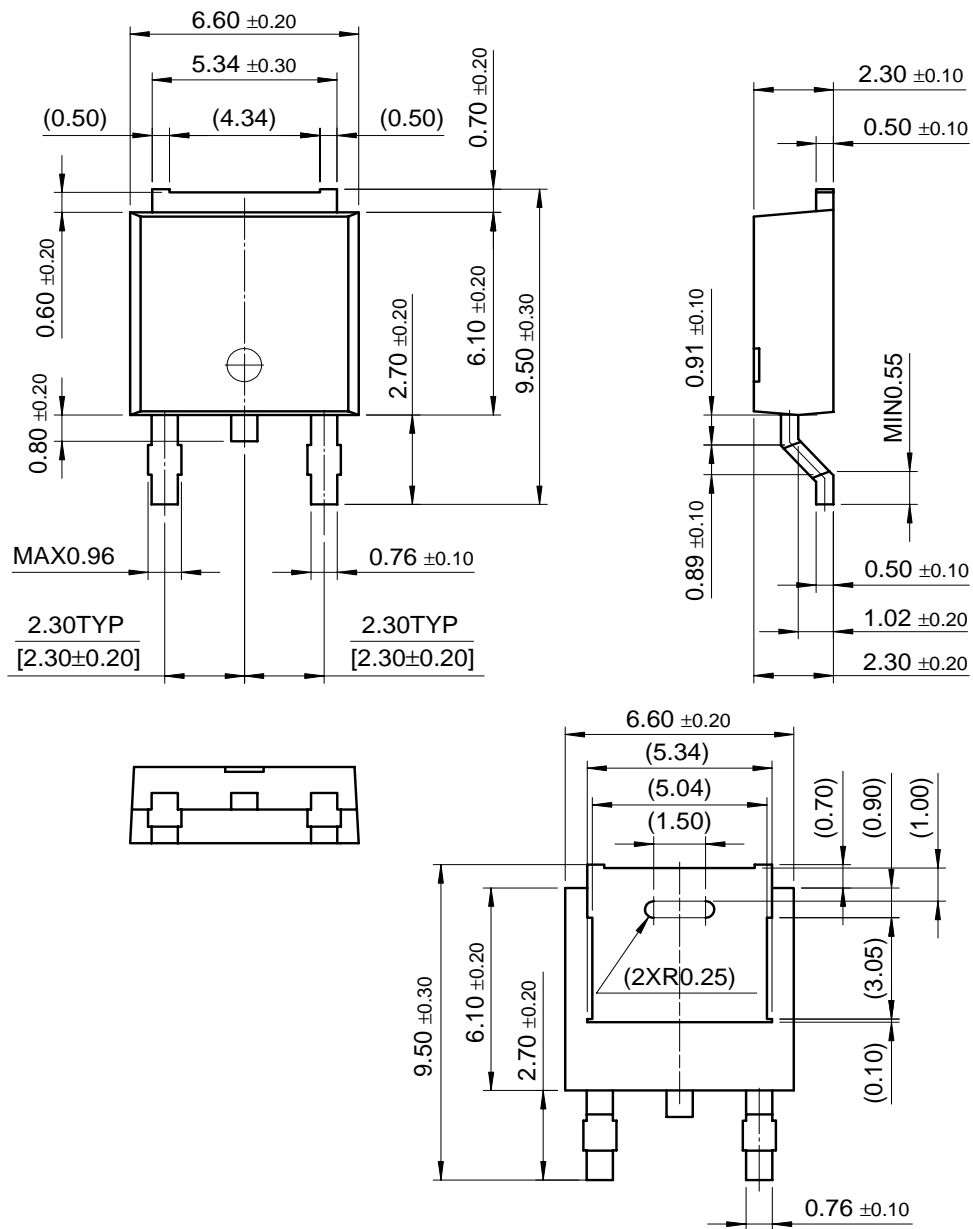
### TO-220



# Mechanical Dimensions (Continued)

## Package

### D-PAK



## Ordering Information

Product Number	Output Voltage Tolerance	Package	Operating Temperature
KA7805 / KA7806	±4%	TO-220	0 ~ + 125°C
KA7808 / KA7809			
KA7810 / KA7811			
KA7812 / KA7815			
KA7818 / KA7824			
KA7805A / KA7806A	±2%		
KA7808A / KA7809A			
KA7810A / KA7811A			
KA7812A / KA7815A			
KA7818A / KA7824A			
KA7805R / KA7806R	±4%	D-PAK	
KA7808R / KA7809R			
KA7810R / KA7811R			
KA7812R / KA7815R			
KA7818R / KA7824R			

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR INTERNATIONAL. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
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.