

KA78XX/KA78XXA

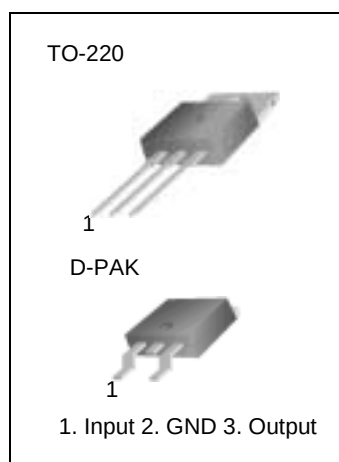
3-terminal 1A positive voltage regulator

Features

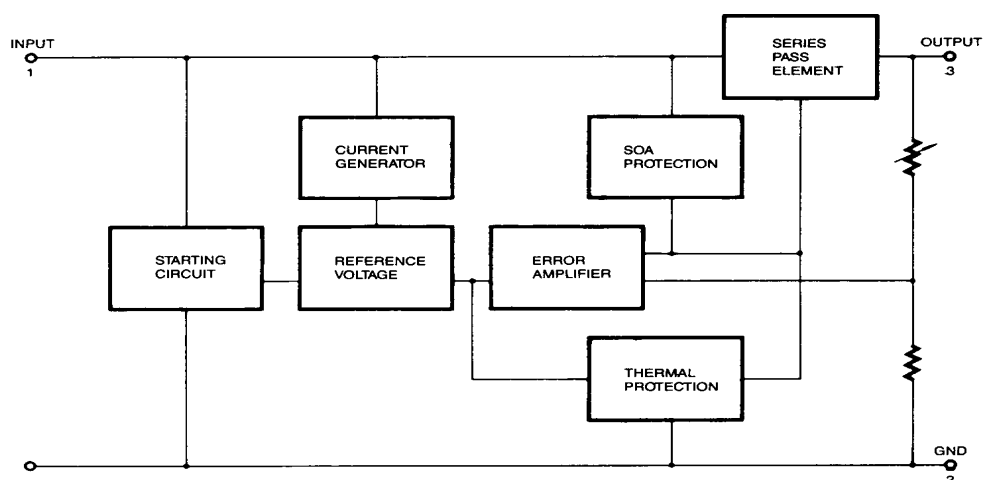
- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 11, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating area Protection

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 $18V$)	V_I	35	V
(for $V_O = 24V$)	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}	$0 \sim +125$	$^{\circ}C$
Storage Temperature Range	T_{STG}	$-65 \sim +150$	$^{\circ}C$

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	ΔV_O	$T_J = +25^{\circ}C$	$V_O = 7V$ to $25V$		-	mV
			$V_I = 8V$ to $12V$		-	
Load Regulation	ΔV_O	$T_J = +25^{\circ}C$	$I_O = 5.0mA$ to $1.5A$		-	mV
			$I_O = 250mA$ to $750mA$		-	
Quiescent Current	I_Q	$T_J = +25^{\circ}C$	-	5.0	8	mA
Quiescent Current Change	ΔI_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	-	μV
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	ΔV_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	ΔV_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	ΔI_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	-	μV
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 , $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$, $I_O = 500\text{mA}$, $V_I = 14\text{V}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions		KA7808			Unit
				Min.	Typ.	Max.	
Output Voltage	V _O	T _J =+25 °C		7.7	8.0	8.3	V
		5.0mA ≤ I _O ≤ 1.0A, P _O ≤ 15W V _I = 10.5V to 23V V _I = 11.5V to 23V		7.6	8.0	8.4	
Line Regulation	ΔV _O	T _J =+25 °C	V _I = 10.5V to 25V	-	5.0	160	mV
			V _I = 11.5V to 17V	-	2.0	80	
Load Regulation	ΔV _O	T _J =+25 °C	I _O = 5.0mA to 1.5A	-	10	160	mV
			I _O = 250mA to 750mA	-	5.0	80	
Quiescent Current	I _Q	T _J =+25 °C		-	5.0	8	mA
Quiescent Current Change	ΔI _Q	I _O = 5mA to 1.0A		-	0.05	0.5	mA
		V _I = 10.5A to 25V		-	0.5	1.0	
		V _I = 11.5V to 25V		-		-	
Output Voltage Drift	ΔV _O /ΔT	I _O = 5mA		-	-0.8	-	mV/ °C
Output Noise Voltage	V _N	f = 10Hz to 100KHz, T _A =+25 °C		-	52	-	μV
Ripple Rejection	RR	f = 120Hz, V _I = 11.5V to 21.5		56	73	-	dB
Dropout Voltage	V _O	I _O = 1A, T _J =+25 °C		-	2	-	V
Output Resistance	R _O	f = 1KHz		-	17	-	mΩ
Short Circuit Current	I _{SC}	V _I = 35V, T _A =+25 °C		-	230	-	mA
Peak Current	I _{PK}	T _J =+25 °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 (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
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 11.5\text{V to } 24\text{V}$ $V_I = 12.5\text{V to } 24\text{V}$	8.6	9	9.4	
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	-	6	180	mV
		$V_I = 11.5\text{V to } 25\text{V}$ $V_I = 12\text{V to } 25\text{V}$	-	2	90	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	-	12	180	mV
		$I_O = 5\text{mA to } 1.5\text{A}$ $I_O = 250\text{mA to } 750\text{mA}$	-	4	90	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$	-	5.0	8	mA
Quiescent Current Change	ΔI_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	
		$V_I = 12.5\text{V to } 26\text{V}$	-	-	-	
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	-	μV
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	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 (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	ΔV_O	$T_J = +25^{\circ}\text{C}$				mV
		$V_I = 12.5\text{V to } 25\text{V}$ $V_I = 13\text{V to } 25\text{V}$	-	10 3	200 100	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$				mV
		$I_O = 5\text{mA to } 1.5\text{A}$ $I_O = 250\text{mA to } 750\text{mA}$	-	12 4	200 400	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$	-	5.1	8	mA
Quiescent Current Change	ΔI_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	-	μV
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	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 (KA7811/KA7811R)

(Refer to test circuit , $0^{\circ}\text{C} < T_J < +125^{\circ}\text{C}$, $I_O = 500\text{mA}$, $V_I = 18\text{V}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions		KA7811			Unit
				Min.	Typ.	Max.	
Output Voltage	V_O	$T_J = +25^{\circ}\text{C}$		10.6	11	11.4	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 13.5\text{V to } 26\text{V}$ $V_I = 14.5\text{V to } 26\text{V}$		10.5	11	11.5	
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$V_I = 13.5\text{V to } 25\text{V}$	-	10	220	mV
			$V_I = 14\text{V to } 21\text{V}$	-	3	110	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$I_O = 5.0\text{mA to } 1.5\text{A}$	-	12	220	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	4	110	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$		-	5.1	8	mA
Quiescent Current Change	ΔI_Q		$I_O = 5\text{mA to } 1.0\text{A}$	-	-	0.5	mA
			$V_I = 13.5\text{V to } 29\text{V}$	-	-	1.0	
			$V_I = 14.5\text{V to } 29\text{V}$	-	-	-	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz to } 100\text{kHz}$, $T_A = +25^{\circ}\text{C}$		-	70	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 14\text{V to } 24\text{V}$		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	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 (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	ΔV_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	ΔV_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	ΔI_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	-	μV
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	I_{SC}	$V_I = 35\text{V}$, $T_A = +25^{\circ}\text{C}$		-	230	-	mA
Peak Current	I_{PK}	$T_J = +25^{\circ}\text{C}$		-	2.2	-	A

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

Parameter	Symbol	Conditions		KA7815			Unit
				Min.	Typ.	Max.	
Output Voltage	V_O	$T_J = +25^{\circ}\text{C}$		14.4	15	15.6	V
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 17.5\text{V to } 30\text{V}$ $V_I = 18.5\text{V to } 30\text{V}$		14.25	15	15.75	
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$V_I = 17.5\text{V to } 30\text{V}$	-	11	300	mV
			$V_I = 20\text{V to } 26\text{V}$	-	3	150	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	12	300	mV
			$I_O = 250\text{mA to } 750\text{mA}$	-	4	150	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$		-	5.2	8	mA
Quiescent Current Change	ΔI_Q	$I_O = 5\text{mA to } 1.0\text{A}$		-	-	0.5	mA
		$V_I = 17.5\text{V to } 30\text{V}$		-	-	1.0	
		$V_I = 18.5\text{V to } 30\text{V}$		-	-	-	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz to } 100\text{KHz}$, $T_A = +25^{\circ}\text{C}$		-	90	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 18.5\text{V to } 28.5\text{V}$		54	70	-	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 (KA7818/KA7818R)

(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
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 21\text{V to } 33\text{V}$ $V_I = 22\text{V to } 33\text{V}$		17.1	18	18.9	
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$V_I = 21\text{V to } 33\text{V}$	-	15	360	mV
			$V_I = 24\text{V to } 30\text{V}$	-	5	180	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	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	mA
Quiescent Current Change	ΔI_Q	$I_O = 5\text{mA to } 1.0\text{A}$		-	-	0.5	mA
		$V_I = 21\text{V to } 33\text{V}$		-	-	1	
		$V_I = 22\text{V to } 33\text{V}$		-	-	-	
Output Voltage Drift	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$		-	-1	-	mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz to } 100\text{kHz}$, $T_A = +25^{\circ}\text{C}$		-	110	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 22\text{V to } 32\text{V}$		53	69	-	dB
Dropout Voltage	V_O	$I_O = 1\text{A}$, $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	R_O	$f = 1\text{kHz}$		-	22	-	$\text{m}\Omega$
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 (KA7824/KA7824R)

(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
		$5.0\text{mA} \leq I_O \leq 1.0\text{A}$, $P_D \leq 15\text{W}$ $V_I = 27\text{V to } 38\text{V}$ $V_I = 28\text{V to } 38\text{V}$		22.8	24	25.25	
Line Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$V_I = 27\text{V to } 38\text{V}$	-	17	480	mV
			$V_I = 30\text{V to } 36\text{V}$	-	6	240	
Load Regulation	ΔV_O	$T_J = +25^{\circ}\text{C}$	$I_O = 5\text{mA to } 1.5\text{A}$	-	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	mA
Quiescent Current Change	ΔI_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	
		$V_I = 28\text{V to } 38\text{V}$		-	-	-	
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	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$ $V_I = 28\text{V to } 38\text{V}$		50	67	-	dB
Dropout Voltage	V_O	$I_O = 1\text{A}$, $T_J = +25^{\circ}\text{C}$		-	2	-	V
Output Resistance	R_O	$f = 1\text{KHz}$		-	28	-	$\text{m}\Omega$
Short Circuit Current	I_{SC}	$V_I = 35\text{V}$, $T_A = +25^{\circ}\text{C}$		-	230	-	mA
Peak Current	I_{PK}	$T_J = +25^{\circ}\text{C}$		-	2.2	-	A

- 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. $T_J = 0$ to $+125$ °C, $I_O = 1A$, $V_I = 10V$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	$T_J = +25$ °C	4.9	5	5.1	V
		$I_O = 5mA$ to $1A$, $P_D \leq 5W$ $V_I = 7.5V$ to $20V$	4.8	5	5.2	
*Line Regulation	ΔV_O	$V_I = 7.5V$ to $25V$ $I_O = 500mA$	-	5	50	mV
		$V_I = 8V$ to $12V$	-	3	50	
		$T_J = +25$ °C	$V_I = 7.3V$ to $25V$	-	5	50
			$V_I = 8V$ to $12V$	-	1.5	25
*Load Regulation		$T_J = +25$ °C $I_O = 5mA$ to $1.5A$	-	9	100	mV
		$I_O = 5mA$ to $1A$	-	9	100	
		$I_O = 250mA$ to $750mA$	-	4	50	
Quiescent Current	I_Q	$T_J = +25$ °C	-	5.0	6	mA
Quiescent Current Change	ΔI_Q	$I_O = 5mA$ to $1A$	-	-	0.5	mA
		$V_I = 8V$ to $25V$, $I_O = 500mA$	-	-	0.8	
		$V_I = 7.5V$ to $20V$, $T_J = +25$ °C	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5mA$	-	-0.8	-	mV/°C
Output Noise Voltage	V_N	$f = 10Hz$ to $100KHz$ $T_A = +25$ °C	-	10	-	μV
Ripple Rejection	RR	$f = 120Hz$, $I_O = 500mA$ $V_I = 8V$ to $18V$	-	68	-	dB
Dropout Voltage	V_D	$I_O = 1A$, $T_J = +25$ °C	-	2	-	V
Output Resistance	R_O	$f = 1KHz$	-	17	-	m Ω
Short Circuit Current	I_{SC}	$V_I = 35V$, $T_A = +25$ °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 (KA7806A)

(Refer to the test circuits. $T_J = 0$ to $+150^\circ\text{C}$, $I_O = 1\text{A}$, $V_I = 11\text{V}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, 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 1A , $P_D \leq 15\text{W}$ $V_I = 8.6\text{V}$ to 21V	5.76	6	6.24	
*Line Regulation	ΔV_O	$V_I = 8.6\text{V}$ to 25V $I_O = 500\text{mA}$	-	5	60	mV
		$V_I = 9\text{V}$ to 13V	-	3	60	
		$T_J = +25^\circ\text{C}$	$V_I = 8.3\text{V}$ to 21V	-	5	60
			$V_I = 9\text{V}$ to 13V	-	1.5	30
*Load Regulation		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	9	100	mV
		$I_O = 5\text{mA}$ to 1A	-	4	100	
		$I_O = 250\text{mA}$ to 750mA	-	5.0	50	
Quiescent Current	I_Q	$T_J = +25^\circ\text{C}$	-	4.3	6	mA
Quiescent Current Change	ΔI_Q	$I_O = 5\text{mA}$ to 1A	-	-	0.5	mA
		$V_I = 9\text{V}$ to 25V , $I_O = 500\text{mA}$	-	-	0.8	
		$V_I = 8.5\text{V}$ to 21V , $T_J = +25^\circ\text{C}$	-	-	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 100KHz $T_A = +25^\circ\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 9\text{V}$ to 19V	-	65	-	dB
Dropout Voltage	V_D	$I_O = 1\text{A}$, $T_J = +25^\circ\text{C}$	-	2	-	V
Output Resistance	R_O	$f = 1\text{KHz}$	-	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 (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 1A , $P_D \leq 15\text{W}$ $V_I = 8.6\text{V}$ to 21V	7.7	8	8.3	
*Line Regulation	ΔV_O	$V_I = 10.6\text{V}$ to 25V $I_O = 500\text{mA}$	-	6	80	mV
		$V_I = 11\text{V}$ to 17V	-	3	80	
		$T_J = +25^\circ\text{C}$	$V_I = 10.4\text{V}$ to 23V	-	6	80
			$V_I = 11\text{V}$ to 17V	-	2	40
*Load Regulation		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	12	100	mV
		$I_O = 5\text{mA}$ to 1A	-	12	100	
		$I_O = 250\text{mA}$ to 750mA	-	5	50	
Quiescent Current	I_Q	$T_J = +25^\circ\text{C}$	-	5.0	6	mA
Quiescent Current Change	ΔI_Q	$I_O = 5\text{mA}$ to 1A	-	-	0.5	mA
		$V_I = 11\text{V}$ to 25V , $I_O = 500\text{mA}$	-	-	0.8	
		$V_I = 10.6\text{V}$ to 23V , $T_J = +25^\circ\text{C}$	-	-	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 100KHz $T_A = +25^\circ\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 11.5\text{V}$ to 21.5V	-	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	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 (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 1A , $P_D \leq 15\text{W}$ $V_I = 11.2\text{V}$ to 24V	8.65	9.0	9.35	
*Line Regulation	ΔV_O	$V_I = 11.7\text{V}$ to 25V $I_O = 500\text{mA}$	-	6	90	mV
		$V_I = 12.5\text{V}$ to 19V	-	4	45	
		$T_J = +25^\circ\text{C}$	$V_I = 11.5\text{V}$ to 24V	-	6	90
			$V_I = 12.5\text{V}$ to 19V	-	2	45
*Load Regulation		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.0A	-	12	100	mV
		$I_O = 5\text{mA}$ to 1.0A	-	12	100	
		$I_O = 250\text{mA}$ to 750mA	-	5	50	
Quiescent Current	I_Q	$T_J = +25^\circ\text{C}$	-	5.0	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 11.7\text{V}$ to 25V , $T_J = +25^\circ\text{C}$	-	-	0.8	mA
		$V_I = 12\text{V}$ to 25V , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to 1.0A	-	-	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 100KHz $T_A = +25^\circ\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 12\text{V}$ to 22V	-	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	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 (KA7810A)

(Refer to the test circuits. $T_J = 0$ to $+125^\circ\text{C}$, $I_O = 1\text{A}$, $V_I = 16\text{V}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, 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 1A , $P_D \leq 15\text{W}$ $V_I = 12.8\text{V}$ to 25V	9.6	10	10.4	
*Line Regulation	ΔV_O	$V_I = 12.8\text{V}$ to 26V $I_O = 500\text{mA}$	-	8	100	mV
		$V_I = 13\text{V}$ to 20V	-	4	50	
		$T_J = +25^\circ\text{C}$	$V_I = 12.5\text{V}$ to 25V	8	100	
			$V_I = 13\text{V}$ to 20V	3	50	
*Load Regulation		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	12	100	mV
		$I_O = 5\text{mA}$ to 1.0A	-	12	100	
		$I_O = 250\text{mA}$ to 750mA	-	5	50	
Quiescent Current	I_Q	$T_J = +25^\circ\text{C}$	-	5.0	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 13\text{V}$ to 26V , $T_J = +25^\circ\text{C}$	-	-	0.5	mA
		$V_I = 12.8\text{V}$ to 25V , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to 1.0A	-	-	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 100KHz $T_A = +25^\circ\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 14\text{V}$ to 24V	-	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	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 (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 1A , $P_D \leq 15\text{W}$ $V_I = 13.8\text{V}$ to 26V	10.6	11.0	11.4	
*Line Regulation	ΔV_O	$V_I = 12.8\text{V}$ to 26V $I_O = 500\text{mA}$	-	10	110	mV
		$V_I = 15\text{V}$ to 21V	-	4	55	
		$T_J = +25^{\circ}\text{C}$	$V_I = 13.5\text{V}$ to 26V	-	10	110
			$V_I = 15\text{V}$ to 21V	-	3	55
*Load Regulation		$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	12	100	mV
		$I_O = 5\text{mA}$ to 1.0A	-	12	100	
		$I_O = 250\text{mA}$ to 750mA	-	5	50	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$	-	5.1	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 13.8\text{V}$ to 26V , $T_J = +25^{\circ}\text{C}$	-	-	0.8	mA
		$V_I = 14\text{V}$ to 27V , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to 1.0A	-	-	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 100KHz $T_A = +25^{\circ}\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 14\text{V}$ to 24V	-	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	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 (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 1A , $P_D \leq 15\text{W}$ $V_I = 14.8\text{V}$ to 27V	11.5	12	12.5	
*Line Regulation	ΔV_O	$V_I = 14.8\text{V}$ to 30V $I_O = 500\text{mA}$	-	10	120	mV
		$V_I = 16\text{V}$ to 22V	-	4	120	
		$T_J = +25^\circ\text{C}$	$V_I = 14.5\text{V}$ to 27V	-	10	120
			$V_I = 16\text{V}$ to 22V	-	3	60
*Load Regulation		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	12	100	mV
		$I_O = 5\text{mA}$ to 1.0A	-	12	100	
		$I_O = 250\text{mA}$ to 750mA	-	5	50	
Quiescent Current	I_Q	$T_J = +25^\circ\text{C}$	-	5.1	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 15\text{V}$ to 30V , $T_J = +25^\circ\text{C}$	-		0.5	mA
		$V_I = 14\text{V}$ to 27V , $I_O = 500\text{mA}$	-		0.8	
		$I_O = 5\text{mA}$ to 1.0A	-		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 100KHz $T_A = +25^\circ\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 14\text{V}$ to 24V	-	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 1A , $P_D \leq 15\text{W}$ $V_I = 17.7\text{V}$ to 30V	14.4	15	15.6	
*Line Regulation	ΔV_O	$V_I = 17.9\text{V}$ to 30V $I_O = 500\text{mA}$	-	10	150	mV
		$V_I = 20\text{V}$ to 26V	-	5	150	
		$T_J = +25^{\circ}\text{C}$	$V_I = 17.5\text{V}$ to 30V	-	11	150
			$V_I = 20\text{V}$ to 26V	-	3	75
*Load Regulation		$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	12	100	mV
		$I_O = 5\text{mA}$ to 1.0A	-	12	100	
		$I_O = 250\text{mA}$ to 750mA	-	5	50	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$	-	5.2	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 17.5\text{V}$ to 30V , $T_J = +25^{\circ}\text{C}$	-	-	0.5	mA
		$V_I = 17.5\text{V}$ to 30V , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to 1.0A	-	-	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 100KHz $T_A = +25^{\circ}\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 18.5\text{V}$ to 28.5V	-	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 1A , $P_D \leq 15\text{W}$ $V_I = 21\text{V}$ to 33V	17.3	18	18.7	
*Line Regulation	ΔV_O	$V_I = 21\text{V}$ to 33V $I_O = 500\text{mA}$	-	15	180	mV
		$V_I = 21\text{V}$ to 33V	-	5	180	
		$T_J = +25^{\circ}\text{C}$	$V_I = 20.6\text{V}$ to 33V	-	15	180
			$V_I = 24\text{V}$ to 30V	-	5	90
*Load Regulation		$T_J = +25^{\circ}\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	15	100	mV
		$I_O = 5\text{mA}$ to 1.0A	-	15	100	
		$I_O = 250\text{mA}$ to 750mA	-	7	50	
Quiescent Current	I_Q	$T_J = +25^{\circ}\text{C}$	-	5.2	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 21\text{V}$ to 33V , $T_J = +25^{\circ}\text{C}$	-	-	0.5	mA
		$V_I = 21\text{V}$ to 33V , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to 1.0A	-	-	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 100KHz $T_A = +25^{\circ}\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 18.5\text{V}$ to 28.5V	-	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	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 (KA7824A)

(Refer to the test circuits. $T_J = 0$ to $+150^\circ\text{C}$, $I_O = 1\text{A}$, $V_I = 33\text{V}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, 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 1A , $P_D \leq 15\text{W}$ $V_I = 27.3\text{V}$ to 38V	23	24	25	
*Line Regulation	ΔV_O	$V_I = 27\text{V}$ to 38V $I_O = 500\text{mA}$	-	18	240	mV
		$V_I = 21\text{V}$ to 33V	-	6	240	
		$T_J = +25^\circ\text{C}$	$V_I = 26.7\text{V}$ to 38V	-	18	240
			$V_I = 30\text{V}$ to 36V	-	6	120
*Load Regulation		$T_J = +25^\circ\text{C}$ $I_O = 5\text{mA}$ to 1.5A	-	15	100	mV
		$I_O = 5\text{mA}$ to 1.0A	-	15	100	
		$I_O = 250\text{mA}$ to 750mA	-	7	50	
Quiescent Current	I_Q	$T_J = +25^\circ\text{C}$	-	5.2	6.0	mA
Quiescent Current Change	ΔI_Q	$V_I = 27.3\text{V}$ to 38V , $T_J = +25^\circ\text{C}$	-	-	0.5	mA
		$V_I = 27.3\text{V}$ to 38V , $I_O = 500\text{mA}$	-	-	0.8	
		$I_O = 5\text{mA}$ to 1.0A	-	-	0.8	
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 100KHz $T_A = 25^\circ\text{C}$	-	10	-	μV
Ripple Rejection	RR	$f = 120\text{Hz}$, $I_O = 500\text{mA}$ $V_I = 18.5\text{V}$ to 28.5V	-	54	-	dB
Dropout Voltage	V_D	$I_O = 1\text{A}$, $T_J = +25^\circ\text{C}$	-	2.0	-	V
Output Resistance	R_O	$f = 1\text{KHz}$	-	20	-	$\text{m}\Omega$
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.

Typical Performance Characteristics

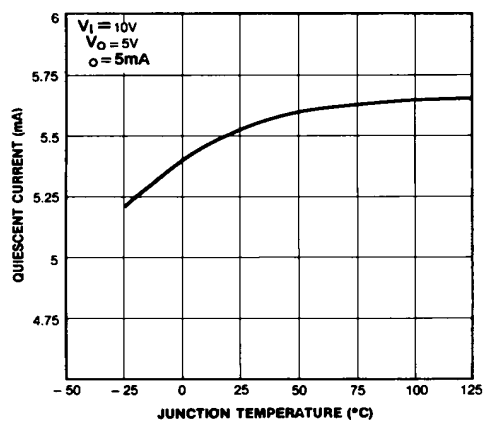


Figure 1. Quiescent Current

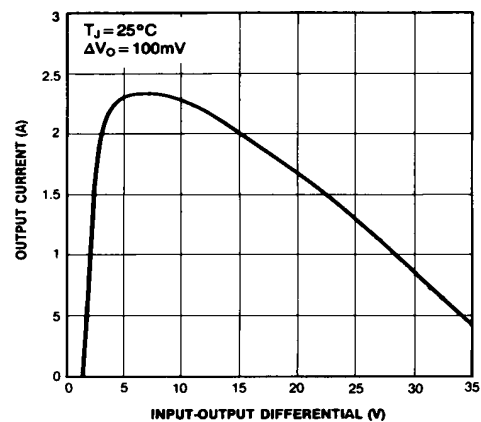


Figure 2. Peak Output Current

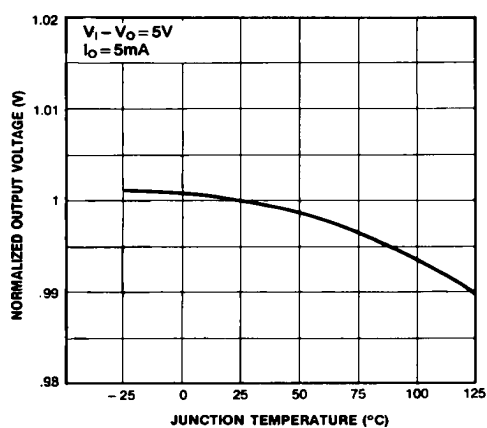


Figure 3. Output Voltage

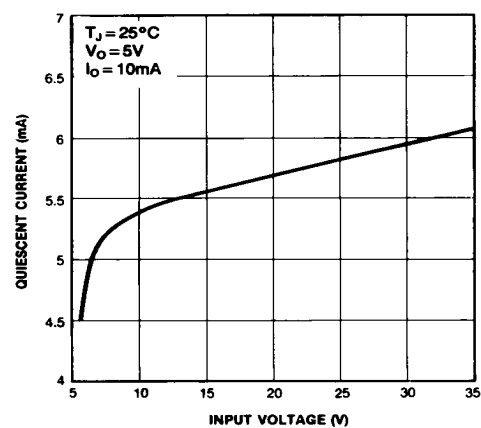


Figure 4. Quiescent Current

Typical Applications

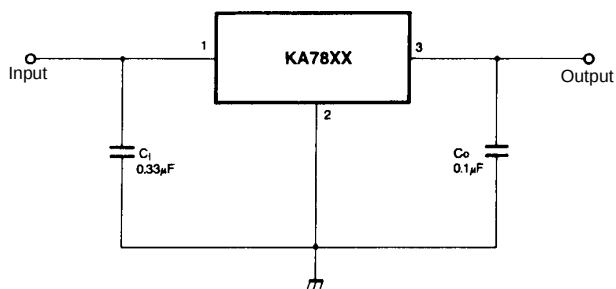


Figure 5. DC Parameters

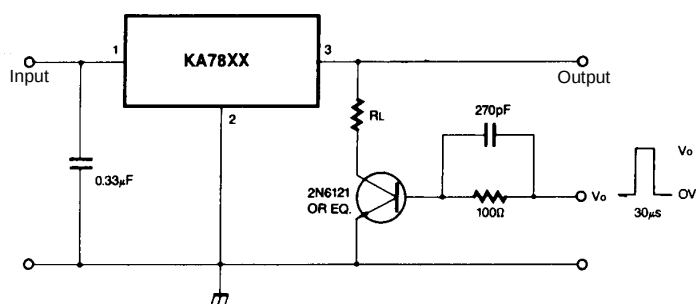


Figure 6. Load Regulation

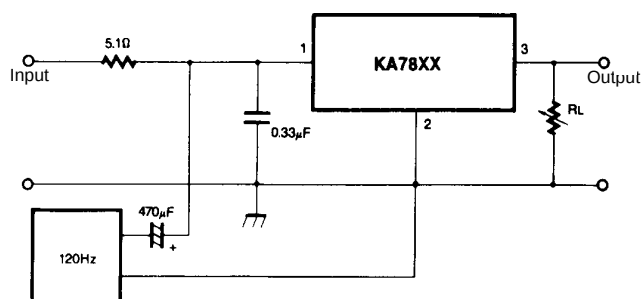


Figure 7. Ripple Rejection

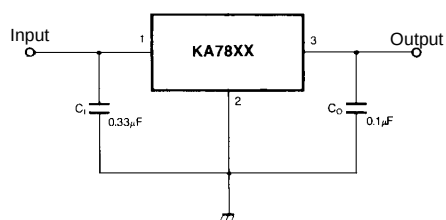


Figure 8. Fixed Output Regulator

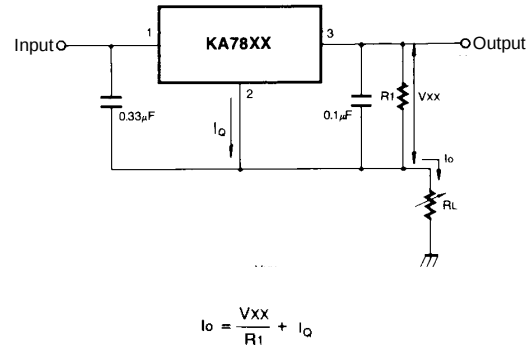
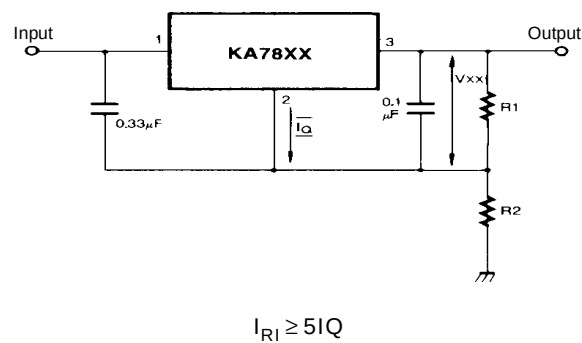


Figure 9. Constant Current Regulator

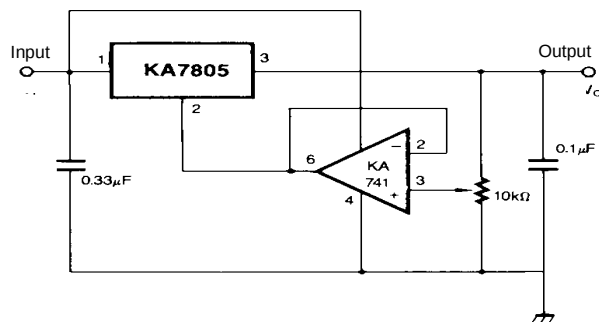
Notes:

- (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_I is required if regulator is located an appreciable distance from power Supply filter.
- (3) C_O improves stability and transient response.



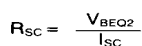
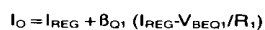
$$V_O = V_{xx}(1+R_2/R_1)+I_Q R_2$$

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)



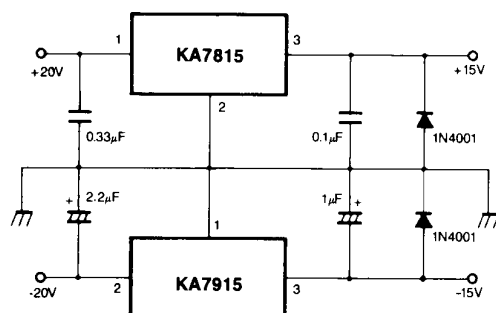


Figure 15. Split Power Supply (±15V-1A)

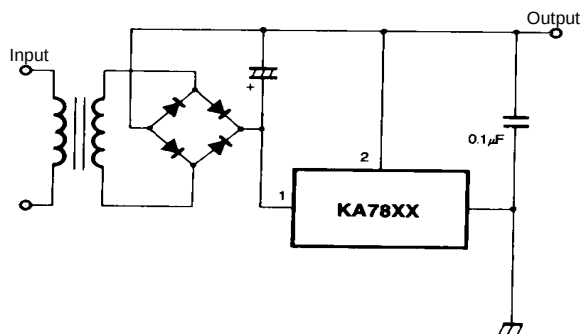


Figure 16. Negative Output Voltage Circuit

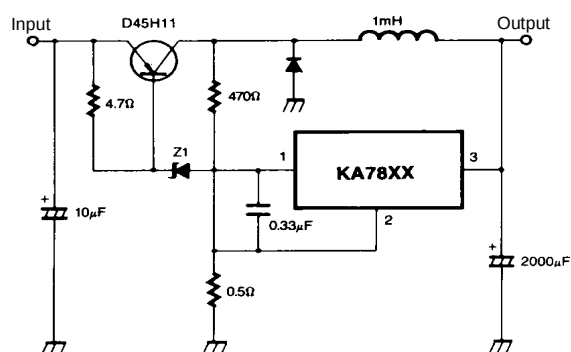
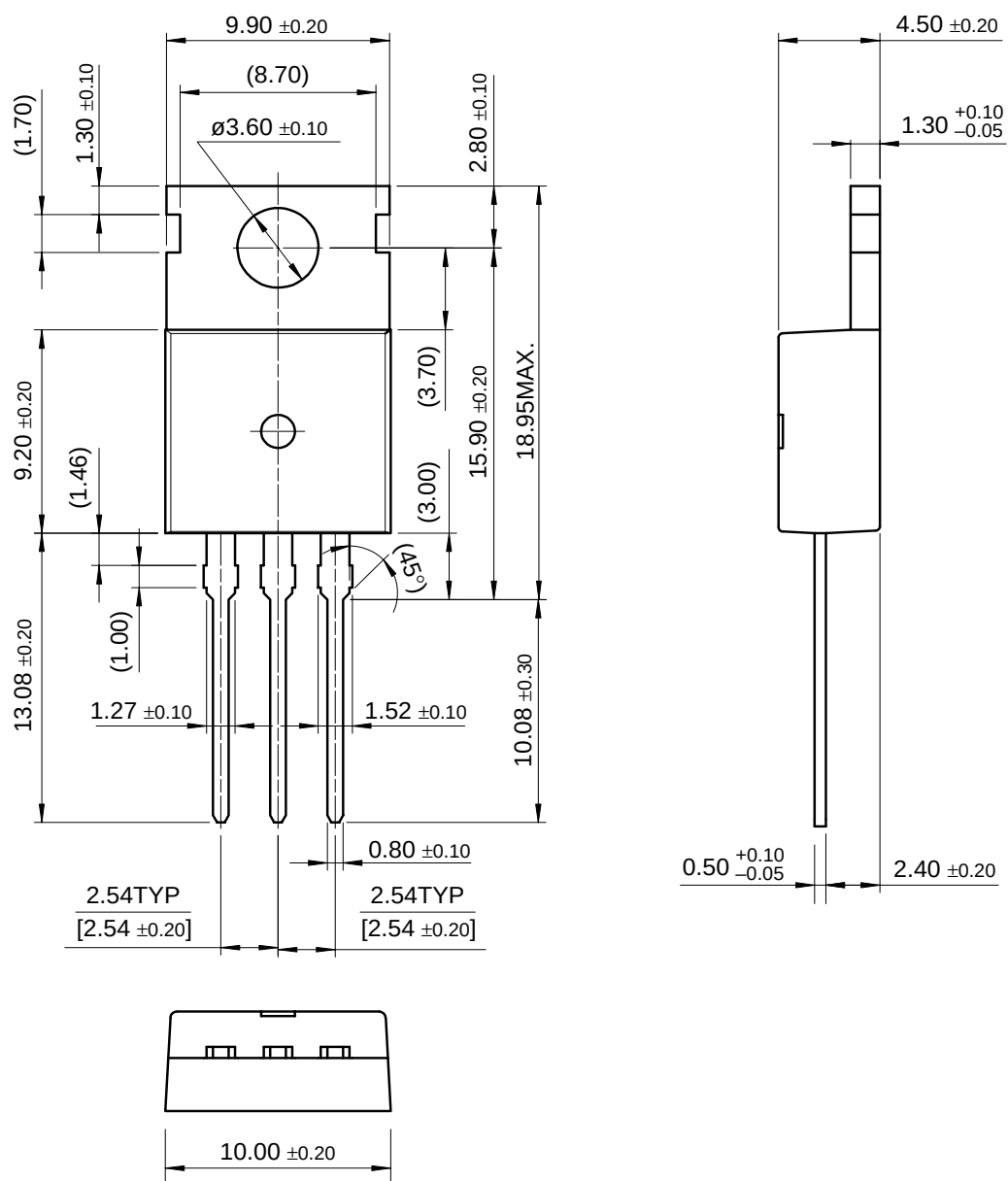


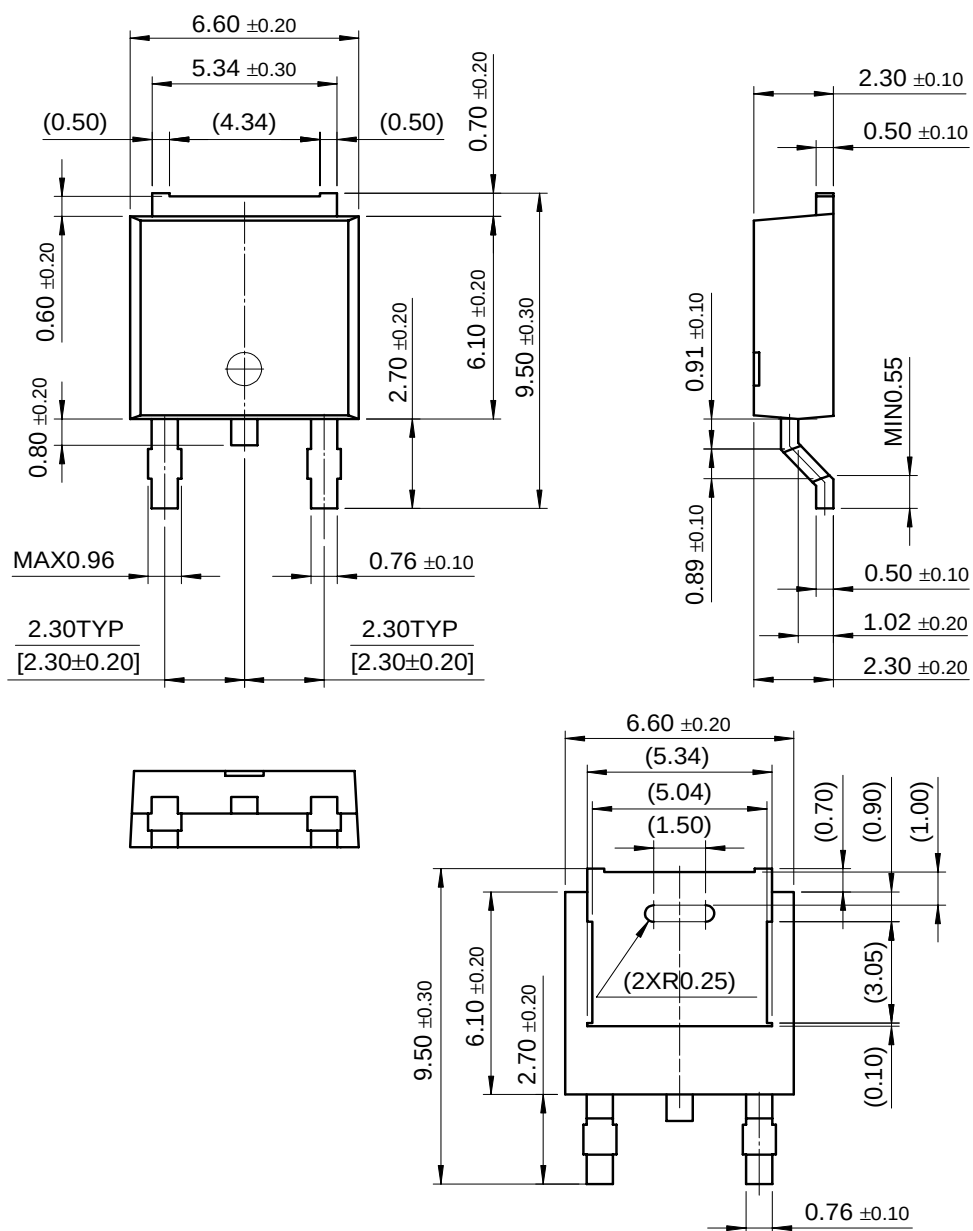
Figure 17. Switching Regulator

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℃
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			

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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.