

# KA78LXXA/KA78L05AA

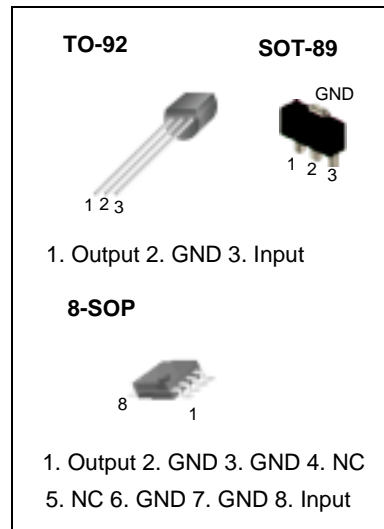
## 3-Terminal 0.1A Positive Voltage Regulator

### Features

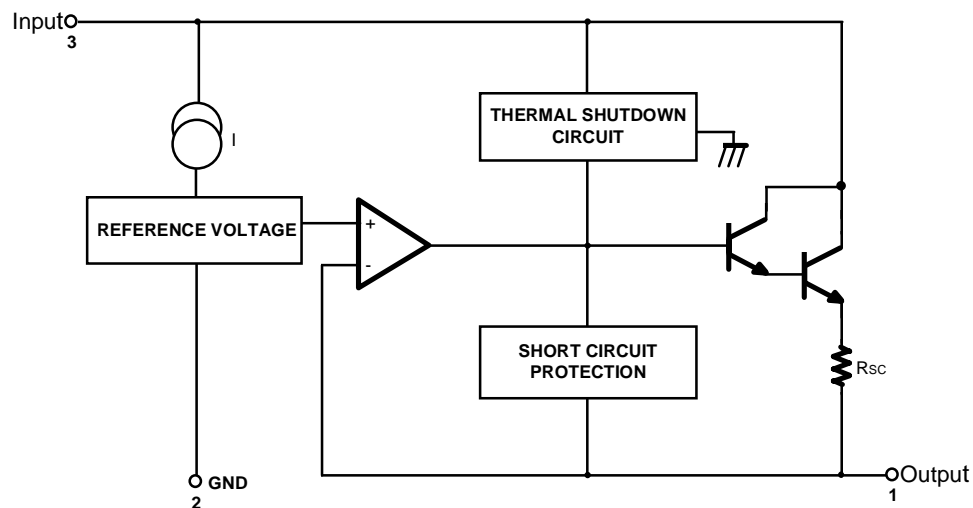
- Maximum Output Current of 100mA
- Output Voltage of 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V and 24V
- Thermal Overload Protection
- Short Circuit Current Limiting
- Output Voltage Offered in  $\pm 5\%$  Tolerance

### Description

The KA78LXXA/KA78L05AA series of fixed voltage monolithic integrated circuit voltage regulators are suitable for application that required supply current up to 100mA.



### Internal Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for $V_O = 5V, 8V$ ) (for $V_O = 12V$ to $18V$ ) (for $V_O = 24V$ )	$V_I$	30 35 40	V V V
Operating Junction Temperature Range	$T_J$	0 ~ +150	°C
Storage Temperature Range	$T_{STG}$	-65 ~ +150	°C

## Electrical Characteristics(KA78L05A)

( $V_I = 10V$ ,  $I_O = 40mA$ ,  $0^\circ C \leq T_J \leq 125^\circ C$ ,  $C_I = 0.33\mu F$ ,  $C_O = 0.1\mu F$ , unless otherwise specified. (Note1))

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ C$	4.8	5.0	5.2	V
Line Regulation (Note1)	$\Delta V_O$	$T_J = 25^\circ C$				
		$7V \leq V_I \leq 20V$	-	8	150	mV
		$8V \leq V_I \leq 20V$	-	6	100	mV
Load Regulation (Note1)	$\Delta V_O$	$T_J = 25^\circ C$				
		$1mA \leq I_O \leq 100mA$	-	11	60	mV
		$1mA \leq I_O \leq 40mA$	-	5.0	30	mV
Output Voltage	$V_O$	$7V \leq V_I \leq 20V$				
		$1mA \leq I_O \leq 40mA$	-	-	5.25	V
		$7V \leq V_I \leq V_{MAX}$ (Note 2)				
		$1mA \leq I_O \leq 70mA$	4.75	-	5.25	V
Quiescent Current	$I_Q$	$T_J = 25^\circ C$	-	2.0	5.5	mA
Quiescent Current Change	with line	$\Delta I_Q$				
	with load	$\Delta I_Q$				
		$8V \leq V_I \leq 20V$	-	-	1.5	mA
		$1mA \leq I_O \leq 40mA$	-	-	0.1	mA
Output Noise Voltage	$V_N$	$T_A = 25^\circ C$ , $10Hz \leq f \leq 100kHz$	-	40	-	$\mu V/V_O$
Temperature Coefficient of $V_O$	$\Delta V_O/\Delta T$	$I_O = 5mA$	-	-0.65	-	mV/°C
Ripple Rejection	RR	$f = 120Hz$ , $8V \leq V_I \leq 18V$ , $T_J = 25^\circ C$	41	80	-	dB
Dropout Voltage	$V_D$	$T_J = 25^\circ C$	-	1.7	-	V

### Note:

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation  $P_D \leq 0.75W$ .

**Electrical Characteristics(KA78L06A)** (Continued)

( $V_I = 12V$ ,  $I_O = 40mA$ ,  $0^\circ C \leq T_J \leq 125^\circ C$ ,  $C_I = 0.33\mu F$ ,  $C_O = 0.1\mu F$ , unless otherwise specified. (Note 1))

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage		V <sub>O</sub>	T <sub>J</sub> = 25°C	5.75	6.0	6.25	V	
Line Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	8.5V ≤ V <sub>I</sub> ≤ 20V	-	64	175	mV
				9V ≤ V <sub>I</sub> ≤ 20V	-	54	125	mV
Load Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	1mA ≤ I <sub>O</sub> ≤ 100mA	-	12.8	80	mV
				1mA ≤ I <sub>O</sub> ≤ 70mA	-	5.8	40	mV
Output Voltage		V <sub>O</sub>	8.5 ≤ V <sub>I</sub> ≤ 20V, 1mA ≤ I <sub>O</sub> ≤ 40mA	5.7	-	6.3	V	
			8.5 ≤ V <sub>I</sub> ≤ V <sub>MAX</sub> (Note), 1mA ≤ I <sub>O</sub> ≤ 70mA	5.7	-	6.3	V	
Quiescent Current		I <sub>Q</sub>	T <sub>J</sub> = 25°C	-	-	5.5	mA	
			T <sub>J</sub> = 125°C	-	3.9	6.0	mA	
Quiescent Current Change	with line	ΔI <sub>Q</sub>	9 ≤ V <sub>I</sub> ≤ 20V	-	-	1.5	mA	
	with load	ΔI <sub>Q</sub>	1mA ≤ I <sub>O</sub> ≤ 40mA	-	-	0.1	mA	
Output Noise Voltage		V <sub>N</sub>	T <sub>A</sub> = 25°C, 10Hz ≤ f ≤ 100kHz	-	40	-	μV/V <sub>O</sub>	
Temperature Coefficient of V <sub>O</sub>		ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	0.75	-	mV/°C	
Ripple Rejection		RR	f = 120Hz, 10V ≤ V <sub>I</sub> ≤ 20V, T <sub>J</sub> = 25°C	40	46	-	dB	
Dropout Voltage		V <sub>D</sub>	T <sub>J</sub> = 25°C	-	1.7	-	V	

**Note:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation  $P_D \leq 0.75W$ .

**Electrical Characteristics(KA78L08A)** (Continued)(V<sub>I</sub> = 14V, I<sub>O</sub> = 40mA, 0°C ≤ T<sub>J</sub> ≤ 125°C, C<sub>I</sub> = 0.33μF, C<sub>O</sub> = 0.1μF, unless otherwise specified. (Note 1))

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V <sub>O</sub>	T <sub>J</sub> = 25°C	7.7	8.0	8.3	V
Line Regulation (Note1)	ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	10.5V ≤ V <sub>I</sub> ≤ 23V	-	10	175 mV
			11V ≤ V <sub>I</sub> ≤ 23V	-	8	125 mV
Load Regulation (Note1)	ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	1mA ≤ I <sub>O</sub> ≤ 100mA	-	15	80 mV
			1mA ≤ I <sub>O</sub> ≤ 40mA	-	8.0	40 mV
Output Voltage	V <sub>O</sub>	10.5V ≤ V <sub>I</sub> ≤ 23V	1mA ≤ I <sub>O</sub> ≤ 40mA	7.6	-	8.4 V
		10.5V ≤ V <sub>I</sub> ≤ V <sub>MAX</sub> (Note 2)	1mA ≤ I <sub>O</sub> ≤ 70mA	7.6	-	8.4 V
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> = 25°C	-	2.0	5.5	mA
Quiescent Current Change	with line	ΔI <sub>Q</sub>	11V ≤ V <sub>I</sub> ≤ 23V	-	-	1.5 mA
	with load	ΔI <sub>Q</sub>	1mA ≤ I <sub>O</sub> ≤ 40mA	-	-	0.1 mA
Output Noise Voltage	V <sub>N</sub>	T <sub>A</sub> = 25°C, 10Hz ≤ f ≤ 100kHz	-	60	-	μV/V <sub>O</sub>
Temperature Coefficient of V <sub>O</sub>	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-0.8	-	mV/°C
Ripple Rejection	RR	f = 120Hz, 11V ≤ V <sub>I</sub> ≤ 21V, T <sub>J</sub> = 25°C	39	70	-	dB
Dropout Voltage	V <sub>D</sub>	T <sub>J</sub> = 25°C	-	1.7	-	V

**Note:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation P<sub>D</sub> ≤ 0.75W.

**Electrical Characteristics(KA78L09A)** (Continued)

( $V_I = 15V$ ,  $I_O = 40mA$ ,  $0^\circ C \leq T_J \leq 125^\circ C$ ,  $C_I = 0.33\mu F$ ,  $C_O = 0.1\mu F$ , unless otherwise specified. (Note 1))

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage		V <sub>O</sub>	T <sub>J</sub> = 25°C	8.64	9.0	9.36	V	
Line Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	11.5V ≤ V <sub>I</sub> ≤ 24V	-	90	200	mV
				13V ≤ V <sub>I</sub> ≤ 24V	-	100	150	mV
Load Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	1mA ≤ I <sub>O</sub> ≤ 100mA	-	20	90	mV
				1mA ≤ I <sub>O</sub> ≤ 40mA	-	10	45	mV
Output Voltage		V <sub>O</sub>	11.5V ≤ V <sub>I</sub> ≤ 24V	1mA ≤ I <sub>O</sub> ≤ 40mA	8.55	-	9.45	V
			11.5V ≤ V <sub>I</sub> ≤ V <sub>MAX</sub> (Note 2)	1mA ≤ I <sub>O</sub> ≤ 70mA	8.55	-	9.45	V
Quiescent Current		I <sub>Q</sub>	T <sub>J</sub> = 25°C	-	2.1	6.0	mA	
Quiescent Current Change	with line	ΔI <sub>Q</sub>	13V ≤ V <sub>I</sub> ≤ 24V	-	-	1.5	mA	
	with load	ΔI <sub>Q</sub>	1mA ≤ I <sub>O</sub> ≤ 40mA	-	-	0.1	mA	
Output Noise Voltage		V <sub>N</sub>	T <sub>A</sub> = 25°C, 10Hz ≤ f ≤ 100kHz	-	70	-	μV/V <sub>O</sub>	
Temperature Coefficient of V <sub>O</sub>		ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-0.9	-	mV/ °C	
Ripple Rejection		RR	f = 120Hz, 12V ≤ V <sub>I</sub> ≤ 22V, T <sub>J</sub> = 25°C	38	44	-	dB	
Dropout Voltage		V <sub>D</sub>	T <sub>J</sub> = 25°C	-	1.7	-	V	

**Note:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation  $P_D \leq 0.75W$ .

**Electrical Characteristics(KA78L10A)** (Continued)(V<sub>I</sub> = 16V, I<sub>O</sub> = 40mA, 0 °C ≤ T<sub>J</sub> ≤ 125 °C, C<sub>I</sub> = 0.33 μF, C<sub>O</sub> = 0.1μF, unless otherwise specified. (Note 1)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage		V <sub>O</sub>	T <sub>J</sub> = 25°C	9.6	10.0	10.4	V	
Line Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	12.5 ≤ V <sub>I</sub> ≤ 25V	-	100	220	mV
				14V ≤ V <sub>I</sub> ≤ 25V	-	100	170	mV
Load Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	1mA ≤ I <sub>O</sub> ≤ 100mA	-	20	94	mV
				1mA ≤ I <sub>O</sub> ≤ 70mA	-	10	47	mV
Output Voltage		V <sub>O</sub>	12.5V ≤ V <sub>I</sub> ≤ 25V, 1mA ≤ I <sub>O</sub> ≤ 40mA	9.5	-	10.5	V	
			12.5V ≤ V <sub>I</sub> ≤ V <sub>MAX</sub> (Note2) 1mA ≤ I <sub>O</sub> ≤ 70mA	9.5	-	10.5		
Quiescent Current		I <sub>Q</sub>	T <sub>J</sub> = 25°C	-	-	6.0	mA	
			T <sub>J</sub> = 125°C	-	4.2	6.5		
Quiescent Current Change	with line	ΔI <sub>Q</sub>	12.5 ≤ V <sub>I</sub> ≤ 25V	-	-	1.5	mA	
	with load	ΔI <sub>Q</sub>	1mA ≤ I <sub>O</sub> ≤ 40mA	-	-	0.1	mA	
Output Noise Voltage		V <sub>N</sub>	T <sub>A</sub> = 25°C, 10Hz ≤ f ≤ 100kHz	-	74	-	μV/V <sub>O</sub>	
Temperature Coefficient of V <sub>O</sub>		ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	0.95	-	mV/°C	
Ripple Rejection		RR	f = 120Hz, 15V ≤ V <sub>I</sub> ≤ 25V, T <sub>J</sub> = 25°C	38	43	-	dB	
Dropout Voltage		V <sub>D</sub>	T <sub>J</sub> = 25°C	-	1.7	-	V	

**Notes:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation P<sub>D</sub> ≤ 0.75W.

**Electrical Characteristics(KA78L12A)** (Continued)(V<sub>I</sub> = 19V, I<sub>O</sub> = 40mA, 0°C ≤ T<sub>J</sub> ≤ 125°C, C<sub>I</sub> = 0.33 μF, C<sub>O</sub> = 0.1μF, unless otherwise specified. (Note 1)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage		V <sub>O</sub>	T <sub>J</sub> = 25°C	11.5	12	12.5	V	
Line Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	14.5V ≤ V <sub>I</sub> ≤ 27V	-	20	250	mV
				16V ≤ V <sub>I</sub> ≤ 27V	-	15	200	mV
Load Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	1mA ≤ I <sub>O</sub> ≤ 100mA	-	20	100	mV
				1mA ≤ I <sub>O</sub> ≤ 40mA	-	10	50	mV
Output Voltage		V <sub>O</sub>	14.5V ≤ V <sub>I</sub> ≤ 27V	1mA ≤ I <sub>O</sub> ≤ 40mA	11.4	-	12.6	V
			14.5V ≤ V <sub>I</sub> ≤ V <sub>MAX</sub> (Note 2)	1mA ≤ I <sub>O</sub> ≤ 70mA	11.4	-	12.6	V
Quiescent Current		I <sub>Q</sub>	T <sub>J</sub> = 25°C	-	2.1	6.0	mA	
Quiescent Current Change	with line	ΔI <sub>Q</sub>	16V ≤ V <sub>I</sub> ≤ 27V	-	-	1.5	mA	
	with load	ΔI <sub>Q</sub>	1mA ≤ I <sub>O</sub> ≤ 40mA	-	-	0.1	mA	
Output Noise Voltage		V <sub>N</sub>	T <sub>A</sub> = 25°C, 10Hz ≤ f ≤ 100kHz	-	80	-	μV/V <sub>O</sub>	
Temperature Coefficient of V <sub>O</sub>		ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-1.0	-	mV/°C	
Ripple Rejection		RR	f = 120Hz, 15V ≤ V <sub>I</sub> ≤ 25V, T <sub>J</sub> = 25°C	37	65	-	dB	
Dropout Voltage		V <sub>D</sub>	T <sub>J</sub> = 25°C	-	1.7	-	V	

**Note:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation P<sub>D</sub> ≤ 0.75W.

**Electrical Characteristics(KA78L15A)** (Continued)

( $V_I = 23V$ ,  $I_O = 40mA$ ,  $0^\circ C \leq T_J \leq 125^\circ C$ ,  $C_I = 0.33 \mu F$ ,  $C_O = 0.1 \mu F$ , unless otherwise specified. (Note 1))

Parameter		Symbol	Conditions		Min.	Typ.	Max.	Unit
Output Voltage		V <sub>O</sub>	T <sub>J</sub> = 25°C		14.4	15	15.6	V
Line Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	17.5V ≤ V <sub>I</sub> ≤ 30V	-	25	300	mV
				20V ≤ V <sub>I</sub> ≤ 30V	-	20	250	mV
Load Regulation (Note1)		ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	1mA ≤ I <sub>O</sub> ≤ 100mA	-	25	150	mV
				1mA ≤ I <sub>O</sub> ≤ 40mA	-	12	75	mV
Output Voltage		V <sub>O</sub>	17.5V ≤ V <sub>I</sub> ≤ 30V	1mA ≤ I <sub>O</sub> ≤ 40mA	14.25	-	15.75	V
			17.5V ≤ V <sub>I</sub> ≤ V <sub>MAX</sub> (Note 2)	1mA ≤ I <sub>O</sub> ≤ 70mA	14.25	-	15.75	V
Quiescent Current		I <sub>Q</sub>	T <sub>J</sub> = 25°C		-	2.1	6.0	mA
Quiescent Current Change	with line	ΔI <sub>Q</sub>	20V ≤ V <sub>I</sub> ≤ 30V		-	-	1.5	mA
	with load	ΔI <sub>Q</sub>	1mA ≤ I <sub>O</sub> ≤ 40mA		-	-	0.1	mA
Output Noise Voltage		V <sub>N</sub>	T <sub>A</sub> = 25°C, 10Hz ≤ f ≤ 100kHz		-	90	-	μV/V <sub>o</sub>
Temperature Coefficient of V <sub>O</sub>		ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA		-	-1.3	-	mV/°C
Ripple Rejection		RR	f = 120Hz, 18.5V ≤ V <sub>I</sub> ≤ 28.5V, T <sub>J</sub> = 25°C		34	60	-	dB
Dropout Voltage		V <sub>D</sub>	T <sub>J</sub> = 25°C		-	1.7	-	V

**Note:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation  $P_D \leq 0.75W$ .



**Electrical Characteristics(KA78L18A)** (Continued)

( $V_I = 27V$ ,  $I_O = 40mA$ ,  $0^\circ C \leq T_J \leq 125^\circ C$ ,  $C_I = 0.33 \mu F$ ,  $C_O = 0.1 \mu F$ , unless otherwise specified. (Note 1))

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ C$	17.3	18	18.7	V
Line Regulation (Note1)	$\Delta V_O$	$T_J = 25^\circ C$	$21V \leq V_I \leq 33V$	-	145	300 mV
			$22V \leq V_I \leq 33V$	-	135	250 mV
Load Regulation (Note1)	$\Delta V_O$	$T_J = 25^\circ C$	$1mA \leq I_O \leq 100mA$	-	30	170 mV
			$1mA \leq I_O \leq 40mA$	-	15	85 mV
Output Voltage	$V_O$	$21V \leq V_I \leq 33V$	$1mA \leq I_O \leq 40mA$	17.1	-	18.9 V
		$21V \leq V_I \leq V_{MAX}$ (Note 2)	$1mA \leq I_O \leq 70mA$	17.1	-	18.9 V
Quiescent Current	$I_Q$	$T_J = 25^\circ C$	-	2.2	6.0	mA
Quiescent Current Change	with line	$\Delta I_Q$	$21V \leq V_I \leq 33V$	-	-	1.5 mA
	with load	$\Delta I_Q$	$1mA \leq I_O \leq 40mA$	-	-	0.1 mA
Output Noise Voltage	$V_N$	$T_A = 25^\circ C$ , $10Hz \leq f \leq 100kHz$	-	150	-	$\mu V/V_O$
Temperature Coefficient of $V_O$	$\Delta V_O/\Delta T$	$I_O = 5mA$	-	-1.8	-	mV/ $^\circ C$
Ripple Rejection	RR	$f = 120Hz$ , $23V \leq V_I \leq 33V$ , $T_J = 25^\circ C$	34	48	-	dB
Dropout Voltage	$V_D$	$T_J = 25^\circ C$	-	1.7	-	V

**Note:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation  $P_D \leq 0.75W$ .

**Electrical Characteristics(KA78L24A)** (Continued)(V<sub>I</sub> = 33V, I<sub>O</sub> = 40mA, 0°C ≤ T<sub>J</sub> ≤ 125°C, C<sub>I</sub> = 0.33 μF, C<sub>O</sub> = 0.1μF, unless otherwise specified. (Note 1))

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V <sub>O</sub>	T <sub>J</sub> = 25°C	23	24	25	V
Line Regulation (Note1)	ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	27V ≤ V <sub>I</sub> ≤ 38V	-	160	300 mV
			28V ≤ V <sub>I</sub> ≤ 38V	-	150	250 mV
Load Regulation (Note1)	ΔV <sub>O</sub>	T <sub>J</sub> = 25°C	1mA ≤ I <sub>O</sub> ≤ 100mA	-	40	200 mV
			1mA ≤ I <sub>O</sub> ≤ 40mA	-	20	100 mV
Output Voltage	V <sub>O</sub>	27V ≤ V <sub>I</sub> ≤ 38V	1mA ≤ I <sub>O</sub> ≤ 40mA	22.8	-	25.2 V
		27V ≤ V <sub>I</sub> ≤ V <sub>MAX</sub> (Note 2)	1mA ≤ I <sub>O</sub> ≤ 70mA	22.8	-	25.2 V
Quiescent Current	I <sub>Q</sub>	T <sub>J</sub> = 25°C	-	2.2	6.0	mA
Quiescent Current Change	with line	ΔI <sub>Q</sub>	28V ≤ V <sub>I</sub> ≤ 38V	-	-	1.5 mA
	with load	ΔI <sub>Q</sub>	1mA ≤ I <sub>O</sub> ≤ 40mA	-	-	0.1 mA
Output Noise Voltage	V <sub>N</sub>	T <sub>A</sub> = 25°C, 10Hz ≤ f ≤ 100kHz	-	200	-	μV/V <sub>O</sub>
Temperature Coefficient of V <sub>O</sub>	ΔV <sub>O</sub> /ΔT	I <sub>O</sub> = 5mA	-	-2.0	-	mV/°C
Ripple Rejection	RR	f = 120Hz, 28V ≤ V <sub>I</sub> ≤ 38V, T <sub>J</sub> = 25°C	34	45	-	dB
Dropout Voltage	V <sub>D</sub>	T <sub>J</sub> = 25°C	-	1.7	-	V

**Note:**

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation P<sub>D</sub> ≤ 0.75W.

## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for $V_O = 5V, 8V$ ) (for $V_O = 12V$ to $18V$ ) (for $V_O = 24V$ )	$V_I$	30 35 40	V V V
Operating Junction Temperature Range	$T_J$	0 ~ +150	°C
Storage Temperature Range	$T_{STG}$	-65 ~ +150	°C

## Electrical Characteristics(KA78L05AA) (Continued)

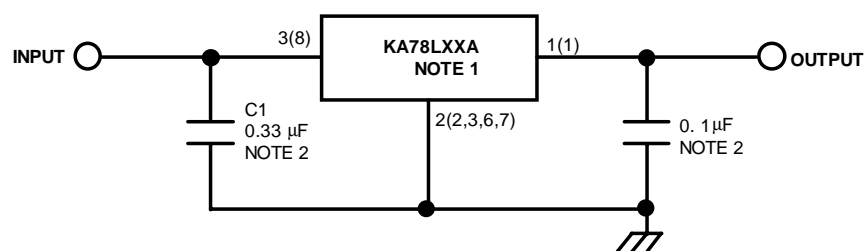
( $V_I = 10V$ ,  $I_O = 40mA$ ,  $0^\circ C \leq T_J \leq 125^\circ C$ ,  $C_I = 0.33 \mu F$ ,  $C_O = 0.1 \mu F$ , unless otherwise specified. (Note 1))

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ C$	4.9	5.0	5.1	V
Line Regulation (Note1)	$\Delta V_O$	$T_J = 25^\circ C$				
		$7V \leq V_I \leq 20V$	-	8	150	mV
		$8V \leq V_I \leq 20V$	-	6	100	mV
Load Regulation (Note1)	$\Delta V_O$	$T_J = 25^\circ C$				
		$1mA \leq I_O \leq 100mA$	-	11	50	mV
		$1mA \leq I_O \leq 40mA$	-	5.0	25	mV
Output Voltage	$V_O$	$7V \leq V_I \leq 20V$	-	-	5.15	V
		$7V \leq V_I \leq V_{MAX}$ (Note 2)	4.85	-	5.15	V
Quiescent Current	$I_Q$	$T_J = 25^\circ C$	-	2.0	5.5	mA
Quiescent Current Change	with line $\Delta I_Q$	$8V \leq V_I \leq 20V$	-	-	1.5	mA
	with load $\Delta I_Q$	$1mA \leq I_O \leq 40mA$	-	-	0.1	mA
Output Noise Voltage	$V_N$	$T_A = 25^\circ C$ , $10Hz \leq f \leq 100kHz$	-	40	-	$\mu V/V_O$
Temperature Coefficient of $V_O$	$\Delta V_O/\Delta T$	$I_O = 5mA$	-	-0.65	-	mV/°C
Ripple Rejection	RR	$f = 120Hz$ , $8V \leq V_I \leq 18V$ , $T_J = 25^\circ C$	41	80	-	dB
Dropout Voltage	$V_D$	$T_J = 25^\circ C$	-	1.7	-	V

### Note:

1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represent pulse test conditions with junction temperature as indicated at the initiation of tests.
2. Power dissipation  $P_D \leq 0.75W$ .

## Typical Application



'(') : 8SOP Type

### Notes:

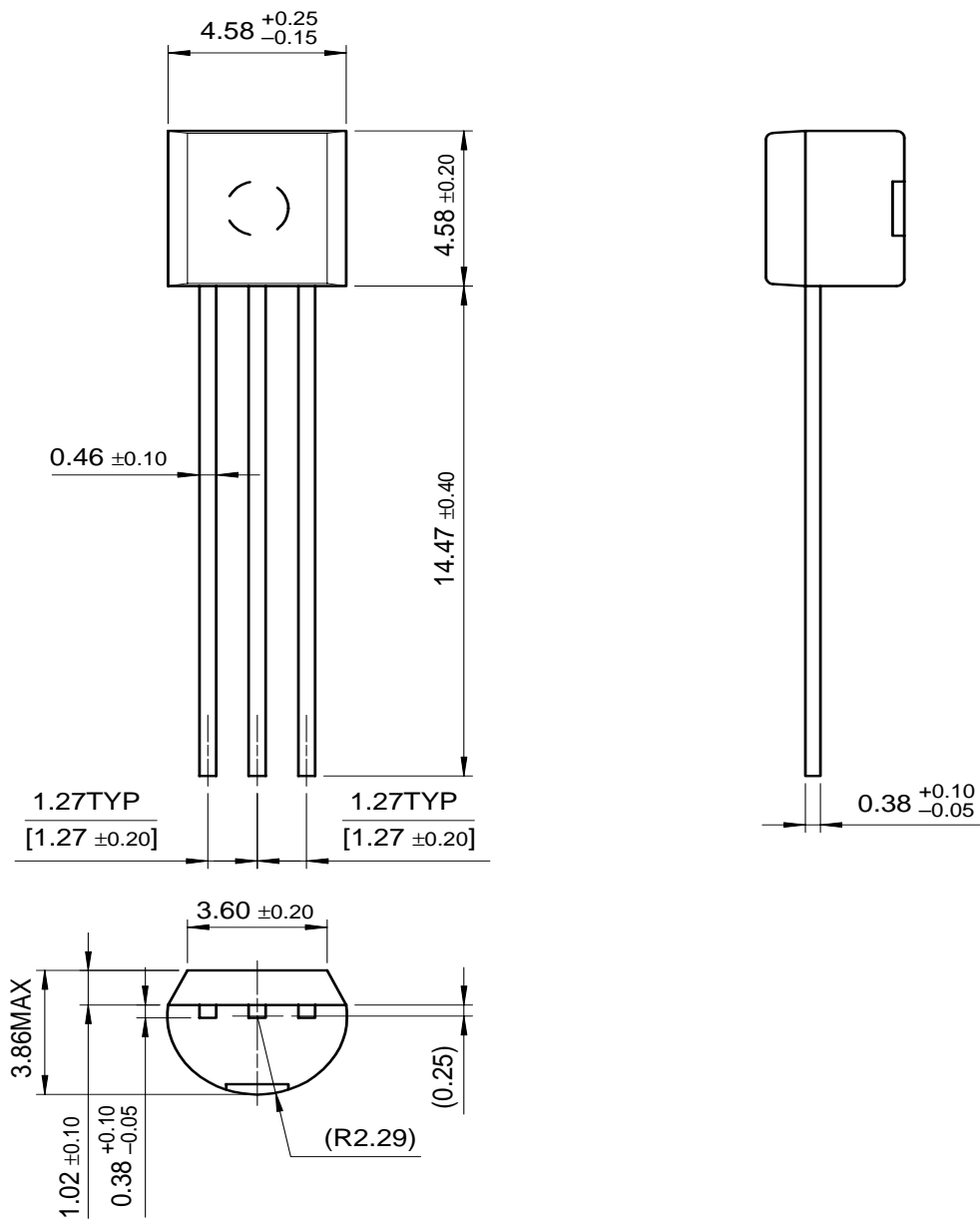
1. To specify an output voltage, substitute voltage value for "XX".
2. Bypass Capacitors are recommend for optimum stability and transient response and should be located as close as possible to the regulator

Mechanical Dimensions

Package

Dimensions in millimeters

TO-92

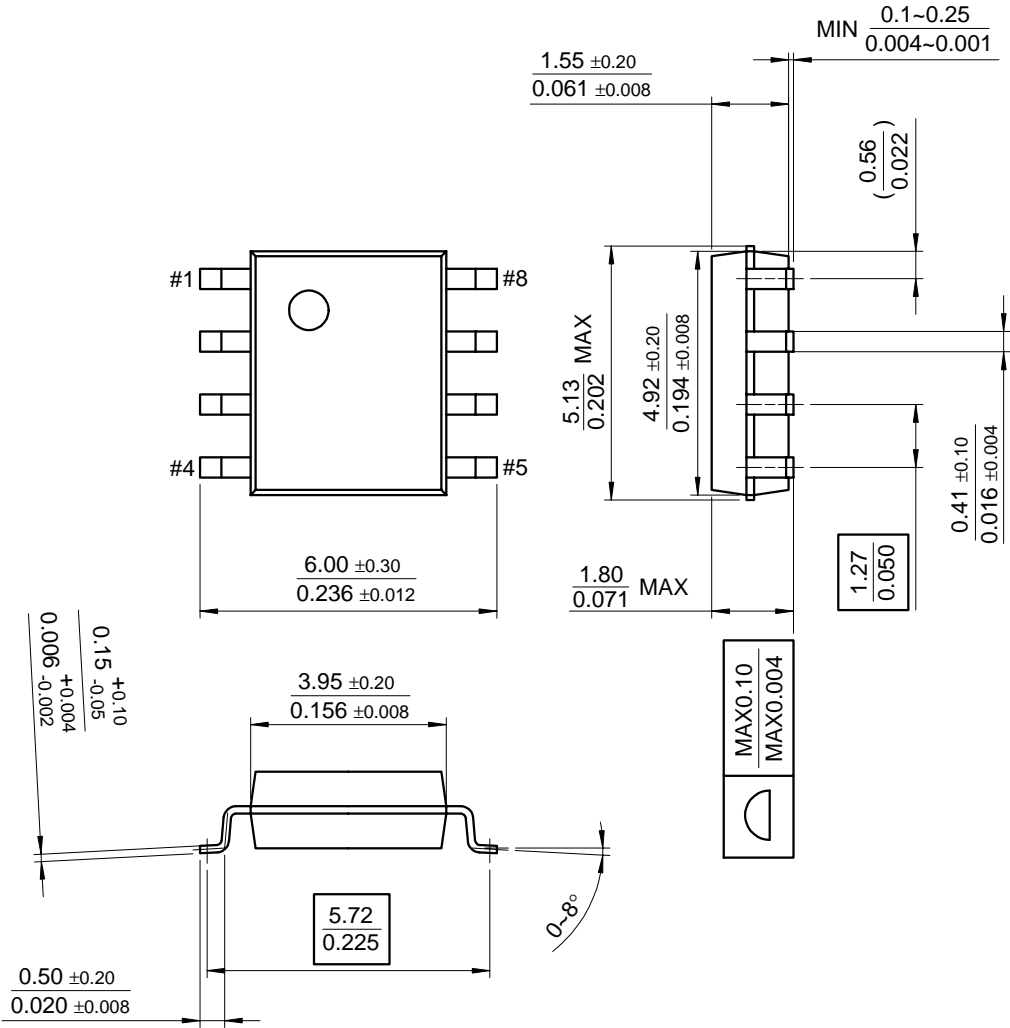


Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

8-SOP

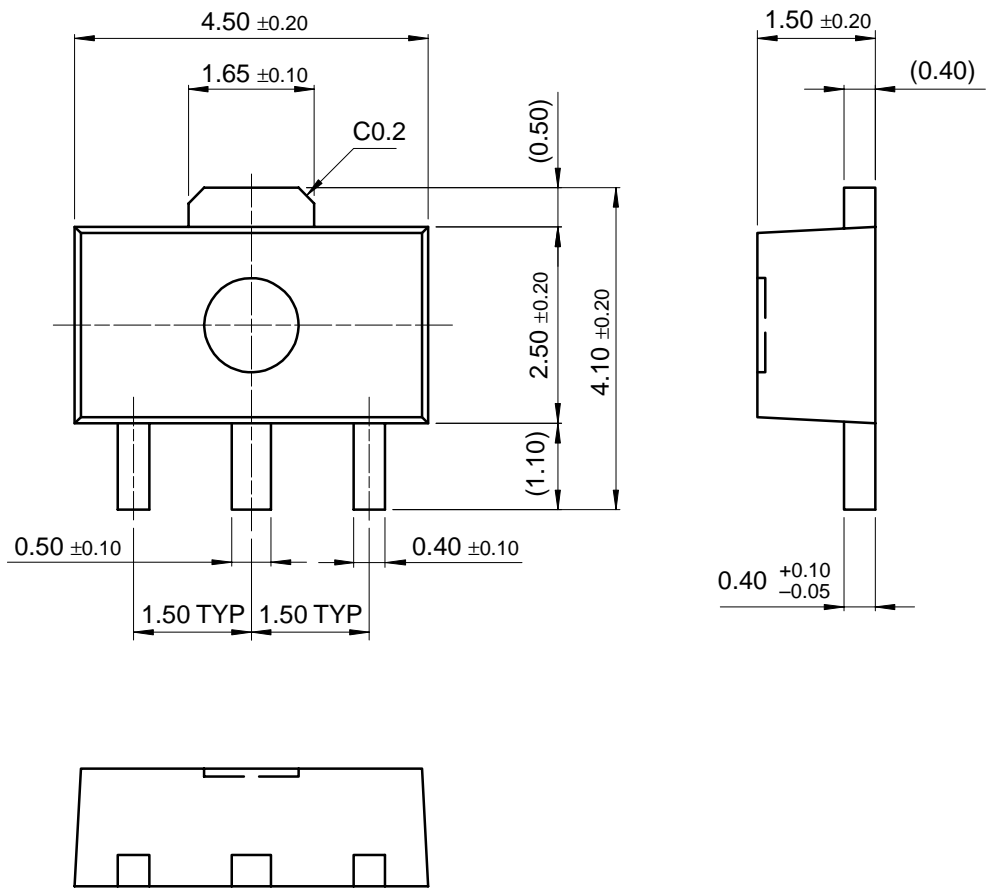


Mechanical Dimensions (Continued)

Package

Dimensions in millimeters

SOT-89



## Ordering Information

Product Number	Package	Output Voltage Tolerance	Operating Temperature
KA78L05AZ	TO-92	5%	0 ~ +125 °C
KA78L06AZ			
KA78L08AZ			
KA78L09AZ			
KA78L10AZ			
KA78L12AZ			
KA78L15AZ			
KA78L18AZ			
KA78L24AZ			
KA78L05AD	8-SOP		
KA78L08AD			
KA78L12AD			
KA78L05AM	SOT-89		
KA78L08AM			
KA78L12AM			
KA78L05AAZ	TO-92	2%	

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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.