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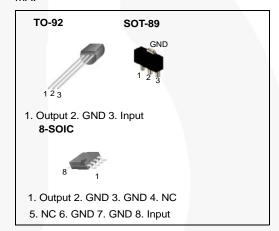
# KA78LXXA / KA78L05AA 3-Terminal 0.1 A Positive Voltage Regulator

#### **Features**

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

#### **Description**

The KA78LXXA / KA78L05AA series of fixed-voltage, monolithic, integrated circuit, voltage regulators are suitable for applications that require supply current up to 100 mA.



#### **Ordering Information**

<b>Product Number</b>	Package	Packing Method	Output Voltage Tolerance	Operating Temperature
KA78L05AZTA		Ammo		
KA78L05AZBU		Bulk		
KA78L06AZTA	•	Ammo		
KA78L08AZTA	•	Ammo		
KA78L09AZTA	TO-92	Ammo		
KA78L10AZTA		Ammo		
KA78L12AZTA		Ammo	± 5%	-40 to +125 °C
KA78L15AZTA		Ammo		
KA78L18AZTA	•	Ammo		
KA78L05AMTF		Tape & Reel		
KA78L08AMTF	SOT-89	Tape & Reel		
KA78L12AMTF	•	Tape & Reel		
KA78L05ADTF	8-SOIC	Tape & Reel		
KA78L05AAZTA	TO-92	Ammo	± 3%	0 to +125 °C

#### **Block Diagram**

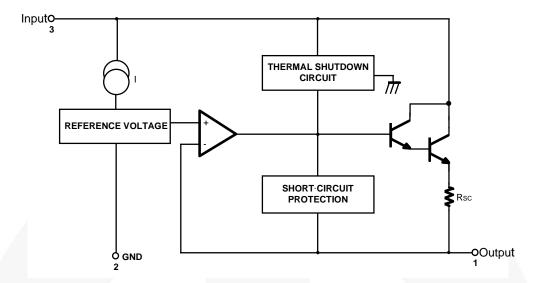


Figure 1. Block Diagram

## **Absolute Maximum Ratings**

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^{\circ}\text{C}$  unless otherwise noted.

Symbol	Parar	meter	Value	Unit
V	Input Voltage	V <sub>O</sub> = 5 V to 8 V	30	V
V <sub>I</sub>	input voltage	V <sub>O</sub> = 12 V to 18 V	35	V
т	Operating Temperature Bongs	KA78LXXA	-40 to +125	- °C
T <sub>OPR</sub>	Operating Temperature Range	KA78L05AA	0 to +125	
T <sub>J(MAX)</sub>	Maximum Junction Temperature		150	°C
T <sub>STG</sub>	Storage Temperature Range		-65 to +150	°C
$R_{\theta JC}$	Thermal Resistance, Junction-Case	TO-92	50	°C/W
		TO-92	150	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-Air	SOT-89	225	°C/W
		8-SOIC	160	°C/W

## **Electrical Characteristics (KA78L05A)**

 $V_I = 10 \text{ V, } I_O = 40 \text{ mA, } -40^{\circ}C \leq T_J \leq 125^{\circ}C, \ C_I = 0.33 \ \mu\text{F, } C_O = 0.1 \ \mu\text{F, unless otherwise specified.}$ 

Symbol	Paramete	er	Cond	ditions	Min.	Тур.	Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		4.8	5.0	5.2	V
$\Delta V_{O}$	Line Regulation <sup>(1)</sup>		T <sub>.1</sub> = 25°C	$7 \text{ V} \leq \text{V}_1 \leq 20 \text{ V}$		8	150	mV
ΔνΟ	Line Regulation V		1 j = 25 C	$8 \text{ V} \leq \text{V}_{\text{I}} \leq 20 \text{ V}$		6	100	mV
$\Delta V_{O}$	Load Regulation (1)		T <sub>.I</sub> = 25°C	$1 \text{ mA} \le I_{O} \le 100 \text{ mA}$		11	60	mV
7,0	Load Negulation V		1	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA		5.0	30	mV
Vo	Output Voltage		$7 \text{ V} \leq \text{V}_{\text{I}} \leq 20 \text{ V}$	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA			5.25	V
٧٥	Output Voltage		$7 \text{ V} \leq \text{V}_{\text{I}} \leq \text{V}_{\text{MAX}}^{(2)}$	1 mA $\leq$ I <sub>O</sub> $\leq$ 70 mA	4.75		5.25	<b>V</b>
IQ	Quiescent Current		$T_J = 25^{\circ}C$			2.0	5.5	mA
$\Delta I_{Q}$	Quiescent Current	With Line	8 V ≤V <sub>I</sub> ≤ 20 V				1.5	mA
$\Delta I_{Q}$	Change	With Load	$1 \text{ mA} \le I_O \le 40 \text{ mA}$	4			0.1	mA
$V_N$	Output Noise Voltag	е	$T_A = 25^{\circ}C, 10 \text{ Hz}$	≤ f ≤ 100 kHz		40		μV/Vo
$\Delta V_{O}/\Delta T$	Temperature Coefficient of V <sub>O</sub>		$I_O = 5 \text{ mA}$			-0.65		mV/°C
RR	Ripple Rejection		$f = 120 \text{ Hz}, 8 \text{ V} \le 7$	$V_{I} \le 18 \text{ V}, T_{J} = 25^{\circ}\text{C}$	41	80		dB
$V_{D}$	Dropout Voltage		T <sub>J</sub> = 25°C			1.7		V

- 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests.
- 2. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Electrical Characteristics (KA78L06A)**

 $V_I = 12 \text{ V, I}_O = 40 \text{ mA, -}40^{\circ}\text{C} \leq T_J \leq 125^{\circ}\text{C, C}_I = 0.33 \text{ }\mu\text{F, C}_O = 0.1 \text{ }\mu\text{F, unless otherwise specified.}$ 

Symbol	Paramete	er	C	onditions	Min.	Тур.	Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		5.75	6.00	6.25	V
41/	Line Regulation (3)		T <sub>.1</sub> = 25°C	8.5 V ≤ V <sub>I</sub> ≤ 20 V		64	175	mV
$\Delta V_{O}$	Line Regulation V		1j = 25 C	9 V ≤ V <sub>I</sub> ≤ 20 V		54	125	mV
41/	Load Regulation (3)		T - 25°C	1 mA ≤ I <sub>O</sub> ≤ 100 mA		12.8	80.0	mV
$\Delta V_{O}$	Load Regulation V		$T_J = 25^{\circ}C$	$1 \text{ mA} \le I_O \le 70 \text{ mA}$		5.8	40.0	mV
V	Output Voltage		$8.5 \text{ V} \le \text{V}_{\text{I}} \le 20 \text{ V}, 1 \text{ mA} \le \text{I}_{\text{O}} \le 40 \text{ mA}$				6.3	V
Vo	Output voltage		$8.5 \text{ V} \le \text{V}_{\text{I}} \le \text{V}_{\text{MAX}}^{(4)}, 1 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA}$		5.7		6.3	V
1	Quiescent Current		T <sub>J</sub> = 25°C				5.5	mA
lQ	Quiescent Current		T <sub>J</sub> = 125°C			3.9	6.0	mA
$\Delta I_{Q}$	Quiescent Current	With Line	9 V ≤ V <sub>I</sub> ≤ 20 V	'			1.5	mA
$\Delta I_Q$	Change	With Load	1 mA ≤ I <sub>O</sub> ≤ 40	mA			0.1	mA
V <sub>N</sub>	Output Noise Voltag	е	$T_A = 25^{\circ}C$ , 10 Hz $\leq$ f $\leq$ 100 kHz			40		μV/Vo
$\Delta V_O/\Delta T$	Temperature Coeffic	cient of V <sub>O</sub>	$I_O = 5 \text{ mA}$			0.75		mV/°C
RR	Ripple Rejection		$f = 120 \text{ Hz}, 10 \text{ V} \le \text{V}_{\text{I}} \le 20 \text{ V}, T_{\text{J}} = 25^{\circ}\text{C}$		40	46	7	dB
$V_D$	Dropout Voltage		T <sub>J</sub> = 25°C			1.7		V

- 3. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests.

  4. Power dissipation: P<sub>D</sub> ≤ 0.75 W.

## **Electrical Characteristics (KA78L08A)**

 $V_{I}=14~V,~I_{O}=40~mA,~-40^{\circ}C \leq T_{J} \leq 125^{\circ}C,~C_{I}=0.33~\mu F,~C_{O}=0.1~\mu F,~unless~otherwise~specified.$ 

Symbol	Parameter	Parameter		tions	Min.	Тур.	Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		7.7	8.0	8.3	V
41/	Line Regulation (5	5)	T <sub>.l</sub> = 25°C	$10.5 \text{ V} \le \text{V}_{\text{I}} \le 23 \text{ V}$		10	175	mV
$\Delta V_{O}$	Line Regulation V	,	1 j = 25 C	11 V ≤ V <sub>I</sub> ≤ 23 V		8	125	mV
41/	Load Regulation	(5)	T <sub>.l</sub> = 25°C	$1 \text{ mA} \le I_{O} \le 100 \text{ mA}$		15	80	mV
$\Delta V_{O}$	Load Regulation	,	1 <sub>J</sub> = 25 C	$1 \text{ mA} \le I_{O} \le 40 \text{ mA}$		8	40	mV
V	Output Voltage		$10.5 \text{ V} \le \text{V}_{\text{I}} \le 23 \text{ V}$	$1 \text{ mA} \le I_O \le 40 \text{ mA}$	7.6		8.4	V
Vo	Output voitage		$10.5 \text{ V} \le \text{V}_{\text{I}} \le \text{V}_{\text{MAX}}^{(6)}$	$1~\text{mA} \leq I_O \leq 70~\text{mA}$	7.6		8.4	V
IQ	Quiescent Curren	it	T <sub>J</sub> = 25°C			2.0	5.5	mA
$\Delta I_{Q}$	Quiescent	With Line	11 V ≤ V <sub>I</sub> ≤ 23 V				1.5	mA
$\Delta I_{Q}$	Current Change	With Load	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA				0.1	mA
V <sub>N</sub>	Output Noise Volt	tage	$T_A = 25^{\circ}C$ , 10 Hz $\leq$ f :	≤100 kHz		60		μV/Vo
$\Delta V_{O}/\Delta T$	Temperature Coefficient of $V_O$		I <sub>O</sub> = 5 mA			-0.8		mV/°C
RR	Ripple Rejection		f = 120 Hz, 11 V ≤ V <sub>I</sub>	≤ 21 V, T <sub>J</sub> = 25°C	39	70		dB
$V_D$	Dropout Voltage		T <sub>J</sub> = 25°C			1.7		V

- 5. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests.

  6. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Electrical Characteristics (KA78L09A)**

 $V_I = 15 \text{ V, } I_O = 40 \text{ mA, } -40^{\circ}C \leq T_J \leq 125^{\circ}C, \ C_I = 0.33 \ \mu\text{F, } C_O = 0.1 \ \mu\text{F, unless otherwise specified.}$ 

Symbol	Paramet	er	Condi	tions	Min.	Тур.	Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		8.64	9.00	9.36	V
$\Delta V_{O}$	Line Regulation (7)		T <sub>.l</sub> = 25°C	$11.5 \text{ V} \le \text{V}_{\text{I}} \le 24 \text{ V}$		90	200	mV
740	Line Regulation V		1j = 25 C	13 V ≤ V <sub>I</sub> ≤ 24 V		100	150	mV
$\Delta V_{O}$	Load Regulation (7)	)	T <sub>.I</sub> = 25°C	$1~\text{mA} \leq I_{O} \leq 100~\text{mA}$		20	90	mV
740	Load Regulation		1) = 23 0	$1 \text{ mA} \le I_{O} \le 40 \text{ mA}$		10	45	mV
Vo	Output Voltage		$11.5 \text{ V} \le \text{V}_{\text{I}} \le 24 \text{ V}$	$1~\text{mA} \leq I_{O} \leq 40~\text{mA}$	8.55		9.45	V
٧٥	Output Voltage		11.5 $V \le V_I \le V_{MAX}^{(8)}$	$1~\text{mA} \leq I_O \leq 70~\text{mA}$	8.55		9.45	V
IQ	Quiescent Current		$T_J = 25^{\circ}C$			2.1	6.0	mA
$\Delta I_{Q}$	Quiescent Current	With Line	$13~V \leq V_I \leq 24~V$				1.5	mA
$\Delta I_{Q}$	Change	With Load	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA				0.1	mA
$V_N$	Output Noise Volta	ge	$T_A = 25^{\circ}C, 10 \text{ Hz} \le f \le$	≤ 100 kHz		70		μV/Vo
$\Delta V_{O}/\Delta T$	Temperature Coefficient of V <sub>O</sub>		$I_O = 5 \text{ mA}$			-0.9		mV/°C
RR	Ripple Rejection		$f = 120 \text{ Hz}, 12 \text{ V} \le \text{V}_1 \le$	$\leq$ 22 V, T <sub>J</sub> = 25°C	38	44		dB
$V_D$	Dropout Voltage		$T_J = 25^{\circ}C$			1.7		V

- 7. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests. 8. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Electrical Characteristics (KA78L10A)**

 $V_{I} = 16 \text{ V, } I_{O} = 40 \text{ mA, } -40 \text{ }^{\circ}\text{C} \leq T_{J} \leq 125 \text{ }^{\circ}\text{C, } C_{I} = 0.33 \text{ } \mu\text{F, } C_{O} = 0.1 \text{ } \mu\text{F, unless otherwise specified.}$ 

Symbol	Paramete	er		Conditions	Min.	Тур.	Max.	Unit		
Vo	Output Voltage		T <sub>J</sub> = 25°C		9.6	10.0	10.4	V		
41/	Line Regulation <sup>(9)</sup>		T <sub>.1</sub> = 25°C	12.5 V ≤ V <sub>I</sub> ≤ 25 V		100	220	mV		
$\Delta V_{O}$	Line Regulation		1 j = 25 C	14 V ≤ V <sub>I</sub> ≤ 25 V		100	170	mV		
41/	Load Regulation <sup>(9)</sup>		T <sub>.1</sub> = 25°C	1 mA ≤ I <sub>O</sub> ≤ 100 mA		20	94	mV		
$\Delta V_{O}$	Load Regulation		1 J = 25 C	$1 \text{ mA} \le I_O \le 70 \text{ mA}$		10	47	mV		
			$12.5 \text{ V} \leq \text{V}_{\text{I}} \leq \text{I}$	25 V, 1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA	9.5		10.5			
Vo	Output Voltage		12.5 $V \le V_I \le V_{MAX}^{(10)}$ , 1 mA $\le I_O \le 70$ mA		9.5		10.5	V		
	Quiescent Current		$T_J = 25^{\circ}C$				6.0	mA		
IQ	Quiescent Current		T <sub>J</sub> =125°C			4.2	6.5	ША		
$\Delta I_Q$	Quiescent Current	With Line	12.5 V ≤ V <sub>I</sub> ≤	25 V			1.5	mA		
$\Delta I_Q$	Change	With Load	$1 \text{ mA} \leq I_O \leq 4$	40 mA			0.1	mA		
V <sub>N</sub>	Output Noise Voltage	е	$T_A = 25^{\circ}C$ , 10 Hz $\leq f \leq$ 100 kHz		$T_A = 25^{\circ}C$ , 10 Hz $\leq f \leq$ 100 kHz			74		μV/Vo
$\Delta V_O/\Delta T$	Temperature Coeffic	eient of V <sub>O</sub>	I <sub>O</sub> = 5 mA			0.95		mV/°C		
RR	Ripple Rejection		$f = 120 \text{ Hz}, 15 \text{ V} \le \text{V}_{\text{I}} \le 25 \text{ V}, \text{T}_{\text{J}} = 25^{\circ}\text{C}$		38	43		dB		
$V_D$	Dropout Voltage		$T_J = 25^{\circ}C$			1.7		٧		

- 9. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests. 10. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Electrical Characteristics (KA78L12A)**

 $V_I = 19 \text{ V, I}_O = 40 \text{ mA, -}40^{\circ}\text{C} \leq T_J \leq 125^{\circ}\text{C, C}_I = 0.33 \text{ }\mu\text{F, C}_O = 0.1 \text{ }\mu\text{F, unless otherwise specified.}$ 

Symbol	Parame	Parameter		Conditions			Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		11.5	12.0	12.5	V
$\Delta V_{\mathbf{O}}$	Line Regulation <sup>(1</sup>	1)	T <sub>.I</sub> = 25°C	$14.5 \text{ V} \le \text{V}_{\text{I}} \le 27 \text{ V}$		20	250	mV
7,0	Line Regulation	,	11 = 23 0	16 $V \le V_1 \le 27 V$		15	200	mV
$\Delta V_{\mathbf{O}}$	Load Regulation (	11)	$T_J = 25^{\circ}C$	$1~\text{mA} \le I_O \le 100~\text{mA}$		20	100	mV
ΔvO	Load Regulation	,		1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA		10	50	mV
V	Output Voltage		$14.5 \text{ V} \le \text{V}_{\text{I}} \le 27 \text{ V}$	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA	11.4		12.6	V
Vo	Output voltage		$14.5 \text{ V} \le \text{V}_{\text{I}} \le \text{V}_{\text{MAX}}^{(12)}$	$1~\text{mA} \leq I_O \leq 70~\text{mA}$	11.4		12.6	V
IQ	Quiescent Current	t	$T_J = 25^{\circ}C$			2.1	6.0	mA
$\Delta I_{Q}$	Quiescent	With Line	$16 \text{ V} \leq \text{V}_{\text{I}} \leq 27 \text{ V}$				1.5	mA
$\Delta I_{Q}$	Current Change	With Load	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA				0.1	mA
V <sub>N</sub>	Output Noise Volt	age	$T_A = 25^{\circ}C, 10 \text{ Hz} \le f \le$	100 kHz		80		μV/Vo
$\Delta V_O/\Delta T$	Temperature Coefficient of V <sub>O</sub>		$I_O = 5 \text{ mA}$			-1.0		mV/°C
RR	Ripple Rejection		f = 120 Hz, 15 V ≤ V <sub>I</sub> ≤	25 V, T <sub>J</sub> = 25°C	37	65		dB
$V_D$	Dropout Voltage		T <sub>J</sub> = 25°C			1.7	70.	V

- 11. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests. 12. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Electrical Characteristics (KA78L15A)**

 $V_I = 23~V,~I_O = 40~mA,~-40^{\circ}C \leq T_J \leq 125^{\circ}C,~C_I = 0.33~\mu F,~C_O = 0.1~\mu F,~unless~otherwise~specified.$ 

Symbol	Parame	eter	Condit	ions	Min.	Тур.	Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		14.4	15.0	15.6	V
$\Delta V_{\mathbf{O}}$	Line Regulation <sup>(1</sup>	13)	T <sub>.1</sub> = 25°C	17.5 V ≤ V <sub>I</sub> ≤ 30 V		25	300	mV
ΔvO	Line Regulation	,	1j = 25 C	20 V ≤ V <sub>I</sub> ≤ 30 V		20	250	mV
41/	Load Regulation	(13)	T <sub>.1</sub> = 25°C	$1 \text{ mA} \le I_{O} \le 100 \text{ mA}$		25	150	mV
$\Delta V_{O}$	Load Regulation	,	1 <sub>J</sub> = 25 C	$1 \text{ mA} \le I_O \le 40 \text{ mA}$		12	75	mV
\/	Output Voltage		$17.5 \text{ V} \le \text{V}_{\text{I}} \le 30 \text{ V}$	$1 \text{ mA} \le I_O \le 40 \text{ mA}$	14.25		15.75	V
Vo	Output voltage		$17.5 \text{ V} \le \text{V}_{\text{I}} \le \text{V}_{\text{MAX}}^{(14)}$	$1~\text{mA} \leq I_O \leq 70~\text{mA}$	14.25		15.75	V
IQ	Quiescent Curre	nt	$T_J = 25^{\circ}C$			2.1	6.0	mA
$\Delta I_{Q}$	Quiescent	With Line	$20~V \leq V_I \leq 30~V$				1.5	mA
$\Delta I_{Q}$	Current Change	With Load	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA				0.1	mA
V <sub>N</sub>	Output Noise Vo	ltage	$T_A = 25^{\circ}C, 10 \text{ Hz} \le f \le$	100 kHz		90		μV/Vo
$\Delta V_{O}/\Delta T$	Temperature Coefficient of V <sub>O</sub>		I <sub>O</sub> = 5 mA			-1.3		mV/°C
RR	Ripple Rejection		$f = 120 \text{ Hz}, 18.5 \text{ V} \le \text{V}$	I ≤ 28.5 V, T <sub>J</sub> =25°C	34	60		dB
V <sub>D</sub>	Dropout Voltage	_	T <sub>J</sub> = 25°C			1.7		V

- 13. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests. 14. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Electrical Characteristics (KA78L18A)**

 $V_I = 27 \text{V, I}_O = 40 \text{mA, -} 40^{\circ} \text{C} \leq T_J \leq 125^{\circ} \text{C, C}_I = 0.33 \ \mu\text{F, C}_O = 0.1 \ \mu\text{F, unless otherwise specified.}$ 

Symbol	Parame	Parameter		Conditions		Тур.	Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		17.3	18.0	18.7	V
$\Delta V_{\mathbf{O}}$	Line Regulation (1	5)	T <sub>.1</sub> = 25°C	$21~V \leq V_I \leq 33~V$		145	300	mV
ΔνΟ	Line Regulation	,	11 - 23 0	$22~V \leq V_I \leq 33~V$		135	250	mV
41/	Load Regulation (	15)	T <sub>.1</sub> = 25°C	1 mA ≤ I <sub>O</sub> ≤100 mA		30	170	mV
$\Delta V_{O}$	Load Regulation		1j = 25 C	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA		15	85	mV
W	Output Voltage		$21~V \leq V_I \leq 33~V$	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA	17.1		18.9	V
Vo	Output voltage		$21V \le V_I \le V_{MAX}^{(16)}$	1 mA $\leq$ I <sub>O</sub> $\leq$ 70 mA	17.1		18.9	V
IQ	Quiescent Curren	t	T <sub>J</sub> = 25°C			2.2	6.0	mA
$\Delta I_{Q}$	Quiescent	With Line	$21~V \leq V_I \leq 33~V$				1.5	mA
$\Delta I_{Q}$	Current Change	With Load	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA				0.1	mA
V <sub>N</sub>	Output Noise Volt	age	$T_A = 25^{\circ}C$ , 10 Hz $\leq$ f	≤ 100 kHz		150		μV/Vo
$\Delta V_O/\Delta T$	Temperature Coefficient of V <sub>O</sub>		$I_O = 5 \text{ mA}$			-1.8		mV/°C
RR	Ripple Rejection		f = 120 Hz, 23 V ≤ V	<sub>I</sub> ≤ 33V, T <sub>J</sub> = 25°C	34	48		dB
$V_D$	Dropout Voltage		T <sub>J</sub> = 25°C			1.7		V

- 15. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests.

  16. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Electrical Characteristics (KA78L05AA)**

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

Symbol	Parameter		Cond	Conditions		Тур.	Max.	Unit
Vo	Output Voltage		T <sub>J</sub> = 25°C		4.9	5.0	5.1	V
۸\/	Line Regulation (17)	1	T <sub>.1</sub> = 25°C	7 V ≤ V <sub>I</sub> ≤ 20 V		8	150	mV
$\Delta V_{O}$	Line Regulation .		1 j = 25 C	8 V ≤ V <sub>I</sub> ≤ 20 V		6	100	mV
41/	Load Regulation (17	<b>'</b> )	T <sub>.1</sub> = 25°C	1 mA ≤ I <sub>O</sub> ≤ 100 mA		11	50	mV
$\Delta V_{O}$	Load Regulation	,	1 J = 25 C	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA		5.0	25	mV
W	Output Voltage		7 V ≤V <sub>I</sub> ≤ 20 V	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA			5.15	V
V <sub>O</sub>	Output Voltage		$7 \text{ V} \leq \text{V}_{\text{I}} \leq \text{V}_{\text{MAX}}^{(18)}$	1 mA $\leq$ I <sub>O</sub> $\leq$ 70 mA	4.85		5.15	V
IQ	Quiescent Current		T <sub>J</sub> = 25°C			2.0	5.5	mA
$\Delta I_{Q}$	Quiescent Current	With Line	8 V ≤V <sub>I</sub> ≤ 20 V				1.5	mA
$\Delta I_{Q}$	Change	With Load	1 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA				0.1	mA
V <sub>N</sub>	Output Noise Voltag	ge	T <sub>A</sub> = 25°C, 10 Hz ≤	≤ f ≤ 100 kHz		40		μV/Vo
$\Delta V_O/\Delta T$	Temperature Coefficient of V <sub>O</sub>		I <sub>O</sub> = 5 mA			-0.65		mV/°C
RR	Ripple Rejection		f = 120 Hz, 8 V ≤ V	$I_{\rm I} \le 18  \rm V,  T_{\rm J} = 25^{\circ} \rm C$	41	80		dB
$V_{D}$	Dropout Voltage		T <sub>J</sub> = 25°C			1.7	7	V

- 17. 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 represents pulse test conditions with junction temperature as indicated at the initiation of tests.

  18. Power dissipation:  $P_D \le 0.75 \text{ W}$ .

## **Typical Application**

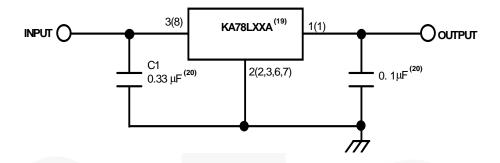


Figure 2. Typical Application

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

## **Physical Dimensions** 4.70 4.30 2.23 MIN 1.87 1.45 0.50 X 45° 0.30 X 45° В (1.40) € SYMM 2.70 5.30 MIN 4.50 3.90<sup>4</sup> 2.30 1.30 0.89 0.52 0.30 (2X) C 0.10 M C A B (0.54) 1.50 3.00 0.90 MIN 2X 0.96 MIN 1.70 1.30 1.50 3.00 MIN LAND PATTERN RECOMMENDATION SEATING PLANE 0.60 <u>C</u> 0.40 0.50 0.35 (0.35) 2.29 (2.70) 2.13 NOTES: UNLESS OTHERWISE SPECIFIED. A. REFERENCE TO JEDEC TO-243 VARIATION AA. B. ALL DIMENSIONS ARE IN MILLIMETERS. DOES NOT COMPLY JEDEC STANDARD VALUE. D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSION. E. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994. F. DRAWING FILE NAME: MA03CREV3

Figure 3. 3-LEAD, SOT-89, JEDEC TO-243, OPTION AA

## Physical Dimensions (Continued)

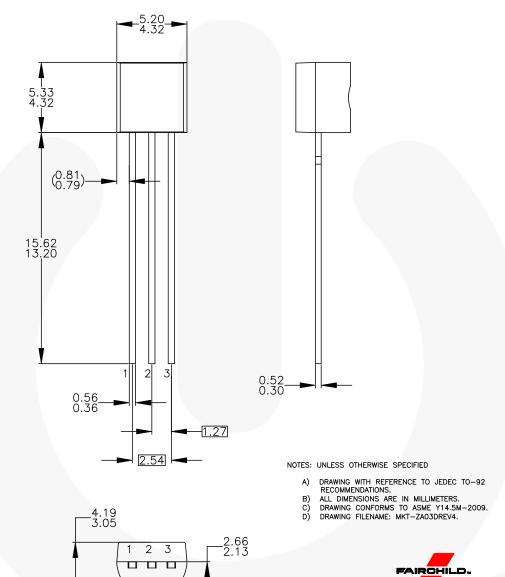
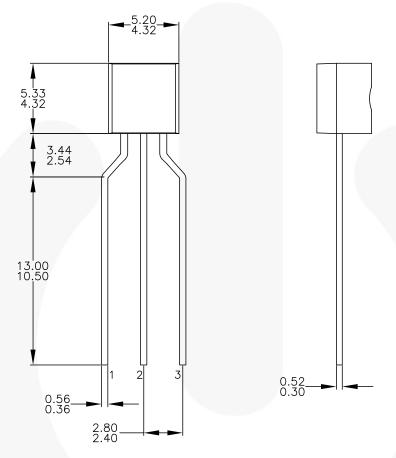
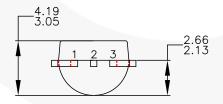


Figure 4. 3-LEAD, TO-92, JEDEC TO-92 COMPLIANT STRAIGHT LEAD CONFIGURATION, BULK TYPE

## Physical Dimensions (Continued)





NOTES: UNLESS OTHERWISE SPECIFIED

- DRAWING CONFORMS TO JEDEC MS-013, VARIATION AC. ALL DIMENSIONS ARE IN MILLIMETERS. DRAWING CONFORMS TO ASME Y14.5M-2009. DRAWING FILENAME: MKT-ZAO3FREV3. FAIRCHILD SEMICONDUCTOR.

Figure 5. 3-LEAD, TO-92, MOLDED 0.200 IN LINE SPACING LEAD FORM, AMMO TYPE

## Physical Dimensions (Continued) **→** A 4.90±0.10-0.65 (0.635)В 1.75 6.00±0.20 5.60 3.90±0.10 PIN ONE INDICATOR 1.27 1.27 0.25 $\bigcirc$ C B A LAND PATTERN RECOMMENDATION SEE DETAIL A 0.175±0.075 0.22±0.03 1.75 MAX $\bigcirc$ 0.10 0.42±0.09 OPTION A - BEVEL EDGE $-(0.86) \times 45^{\circ}$ R0.10 GAGE PLANE OPTION B - NO BEVEL EDGE R0.10 0.36 NOTES: A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA. SEATING PLANE B) ALL DIMENSIONS ARE IN MILLIMETERS. 0.65±0.25 C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS. (1.04)D) LANDPATTERN STANDARD: SOIC127P600X175-8M **DETAIL A** E) DRAWING FILENAME: M08Arev16

Figure 6. 8-LEAD, SOIC, JEDEC MS-012, 0.150" NARROW BODY





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