

# KA78TXX

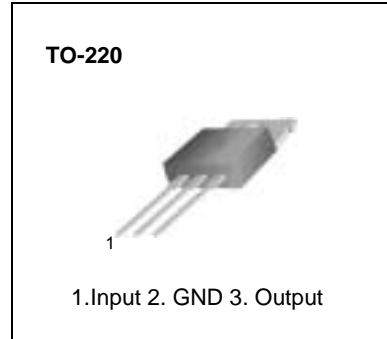
## 3-Terminal 3A Positive Voltage Regulator

### Features

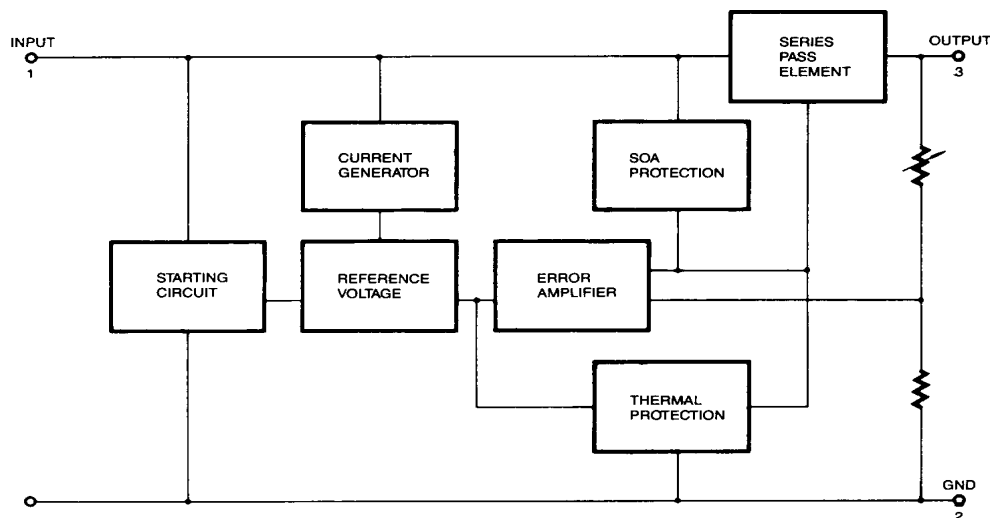
- Output current in excess of 3.0A
- Output transistor safe operating area compensation
- Power dissipation :25W
- Internal short circuit current limiting
- Internal thermal overload protection
- Output voltage offered in 4% tolerance
- No external components required
- Output voltage of 5, 12 and 15V

### Description

This family of fixed voltage regulators are monolithic integrated circuit capable of driving loads in excess of 3.0 A.



### Internal Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for $V_O = 5V$ to $12V$ ) (for $V_O = 15V$ )	$V_I$	35 40	V V
Power Dissipation	PD	Internally limited	-
Thermal Resistance, Junction to Air $T_c = +25\text{ }^\circ\text{C}$	$R_{\theta JA}$	65	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Operating Junction Temperature Range	$T_J$	0 ~ +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-65 ~ +150	$^\circ\text{C}$

## Electrical Characteristics(KA78T05)

( $V_I = 10V$ ,  $I_O = 3.0\text{ A}$ ,  $0\text{ }^\circ\text{C} \leq T_J \leq +125\text{ }^\circ\text{C}$ ,  $P_o \leq P_{MAX}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$5\text{mA} \leq I_O \leq 3.0\text{A}$ , $T_J = +25\text{ }^\circ\text{C}$ $7.3\text{V} \leq V_I \leq 20\text{V}$ , $5\text{mA} \leq I_O \leq 2.0\text{A}$	4.8 4.75	5.0 5.0	5.2 5.25	V
Line Regulation (Note1)	$\Delta V_O$	$7.2\text{V} \leq V_I \leq 35\text{V}$ , $I_O = 5\text{mA}$ , $T_J = +25\text{ }^\circ\text{C}$ $7.2\text{V} \leq V_I \leq 35\text{V}$ , $I_O = 1.0\text{A}$ , $T_J = +25\text{ }^\circ\text{C}$ $7.5\text{V} \leq V_I \leq 20\text{V}$ , $I_O = 2.0\text{A}$ $8.0\text{V} \leq V_I \leq 12\text{V}$ , $I_O = 3.0\text{A}$	-	3.0	2.5	mV
Load Regulation (Note1)	$\Delta V_O$	$5\text{mA} \leq I_O \leq 3.0\text{A}$ , $T_J = +25\text{ }^\circ\text{C}$ $5\text{mA} \leq I_O \leq 3.0\text{A}$	-	10 15	30 80	mV mV
Thermal Regulation	REGT	Pulse = 10ms, $P = 20\text{W}$ $T_A = +25\text{ }^\circ\text{C}$	-	0.002	0.03	% $V_O/W$
Quiescent Current	$I_Q$	$5\text{mA} \leq I_O \leq 3.0\text{A}$ , $T_J = +25\text{ }^\circ\text{C}$ $5\text{mA} \leq I_O \leq 3.0\text{A}$	-	3.5 4.0	5.0 6.0	mA mA
Quiescent Current Change	$\Delta I_Q$	$7.2\text{V} \leq V_I \leq 35\text{V}$ , $I_O = 5\text{mA}$ $T_J = +25\text{ }^\circ\text{C}$ ; $7.5\text{V} \leq V_I \leq 20\text{V}$ , $I_O = 2.0\text{A}$ ; $5\text{mA} \leq I_O \leq 3.0\text{A}$	-	0.1	0.8	mA
Ripple Rejection	RR	$f = 120\text{Hz}$ , $8\text{V} \leq V_I \leq 18\text{V}$ , $I_O = 2.0\text{A}$	-	75	-	dB
Dropout Voltage	$V_D$	$I_O = 3\text{A}$ , $T_J = +25\text{ }^\circ\text{C}$	-	2.2	2.5	V
Output Noise Voltage	$V_N$	$T_A = +25\text{ }^\circ\text{C}$ , $10\text{Hz} \leq f \leq 100\text{kHz}$	-	10	-	$\mu\text{V}/V_O$
Peak Output Current	$I_{PK}$	$T_A = +25\text{ }^\circ\text{C}$	-	5.0	-	A
Output Resistance	$R_o$	$f = 1.0\text{kHz}$	-	2.0	-	$\text{m}\Omega$
Short Circuit Current Limit	$I_{sc}$	$V_I = 35\text{V}$ , $T_J = +25\text{ }^\circ\text{C}$	-	1.5	2.5	A
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$I_O = 5.0\text{mA}$	-	0.2	-	$\text{mV}/^\circ\text{C}$

### Note:

1. Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due heating effects must be taken into account separately. Pulse testing with low duty is used. ( $P_{MAX} = 25\text{W}$ )

## Electrical Characteristics(KA78T12)

( $V_I = 19V$ ,  $I_O = 3.0 A$ ,  $0^\circ C \leq T_J \leq +125^\circ C$ ,  $P_O \leq P_{MAX}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$5mA \leq I_O \leq 3.0A$ , $T_J = +25^\circ C$ $14.5V \leq V_I \leq 27V$ , $5mA \leq I_O \leq 2.0A$	11.5 11.4	12 12	12.5 12.8	V
Line Regulation (Note1)	$\Delta V_O$	$14.5V \leq V_I \leq 35V$ , $I_O = 5mA$ , $T_J = +25^\circ C$ $14.5V \leq V_I \leq 35V$ , $I_O = 1.0A$ , $T_J = +25^\circ C$ $14.9V \leq V_I \leq 28V$ , $I_O = 2.0A$ $16V \leq V_I \leq 22V$ , $I_O = 3.0A$	-	6.0	45	mV
Load Regulation (Note1)	$\Delta V_O$	$5mA \leq I_O \leq 3.0A$ , $T_J = +25^\circ C$ $5mA \leq I_O \leq 3.0A$	-	10 15	30 80	mV mV
Thermal Regulation	$REG_T$	Pulse = 10ms, $P = 20W$ $T_A = +25^\circ C$	-	0.002	0.03	% $V_O/W$
Quiescent Current	$I_Q$	$5mA \leq I_O \leq 3.0A$ , $T_J = +25^\circ C$ $5mA \leq I_O \leq 3.0A$	-	3.5 4.0	5.0 6.0	mA mA
Quiescent Current Change	$\Delta I_Q$	$14.5V \leq V_I \leq 35V$ , $I_O = 5mA$ $T_J = +25^\circ C$ ; $14.9V \leq V_I \leq 27V$ , $I_O = 2.0A$ ; $5mA \leq I_O \leq 3.0A$	-	0.1	0.8	mA
Ripple Rejection	RR	$f = 120Hz$ , $15V \leq V_I \leq 25V$ , $I_O = 2.0A$	57	67	-	dB
Dropout Voltage	$V_D$	$I_O = 3A$ , $T_J = +25^\circ C$	-	2.2	2.5	V
Output Noise Voltage	$V_N$	$T_A = +25^\circ C$ , $10Hz \leq f \leq 100KHz$	-	10	-	$\mu V/V_O$
Peak Output Current	$I_{PK}$	$T_A = +25^\circ C$	-	5.0	-	A
Output Resistance	$R_O$	$f = 1.0kHz$	-	2.0	-	$m\Omega$
Short Circuit Current Limit	$I_{SC}$	$V_I = 35V$ , $T_J = +25^\circ C$	-	1.5	2.5	A
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$I_O = 5.0mA$	-	0.5	-	$mV/^\circ C$

### Note:

1. Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due heating effects must be taken into account separately. Pulse testing with low duty is used. ( $P_{MAX} = 25W$ )

## Electrical Characteristics(KA78T15)

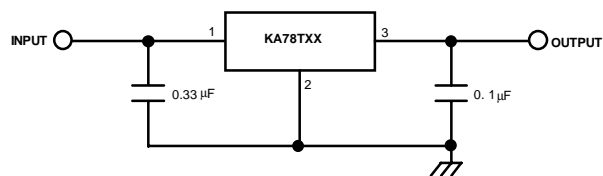
( $V_I = 23V$ ,  $I_O = 3.0A$ ,  $0^\circ C \leq T_J \leq +125^\circ C$ ,  $P_O \leq P_{MAX}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$5mA \leq I_O \leq 3.0A$ , $T_J = +25^\circ C$ $17.5V \leq V_I \leq 30V$ , $5mA \leq I_O \leq 2.0A$	14.4 14.25	15 15	15.6 15.75	V
Line Regulation (Note1)	$\Delta V_O$	$17.6V \leq V_I \leq 40V$ , $I_O = 5mA$ , $T_J = +25^\circ C$ $17.6V \leq V_I \leq 40V$ , $I_O = 1.0A$ , $T_J = +25^\circ C$ $18V \leq V_I \leq 30V$ , $I_O = 2.0A$ $20V \leq V_I \leq 26V$ , $I_O = 3.0A$	-	7.5	55	mV
Load Regulation (Note1)	$\Delta V_O$	$5mA \leq I_O \leq 3.0A$ , $T_J = +25^\circ C$ $5mA \leq I_O \leq 3.0A$	-	10 15	30 80	mV mV
Thermal Regulation	$REG_T$	Pulse = 10ms, $P = 20W$ $T_A = +25^\circ C$	-	0.002	0.03	% $V_O/W$
Quiescent Current	$I_Q$	$5mA \leq I_O \leq 3.0A$ , $T_J = +25^\circ C$ $5mA \leq I_O \leq 3.0A$	-	3.5 4.0	5.0 6.0	mA mA
Quiescent Current Change	$\Delta I_Q$	$17.6V \leq V_I \leq 40V$ , $I_O = 5mA$ $T_J = +25^\circ C$ ; $18V \leq V_I \leq 30V$ , $I_O = 2.0A$ ; $5mA \leq I_O \leq 3.0A$	-	0.1	0.8	mA
Ripple Rejection	RR	$f = 120Hz$ , $18.5V \leq V_I \leq 28.5V$ , $I_O = 2.0A$	55	65	-	dB
Dropout Voltage	$V_D$	$I_O = 3A$ , $T_J = +25^\circ C$	-	2.2	2.5	V
Output Noise Voltage	$V_N$	$T_A = +25^\circ C$ , $10Hz \leq f \leq 100KHz$	-	10	-	$\mu V/V_O$
Peak Output Current	$I_{PK}$	$T_A = +25^\circ C$	-	5.0	-	A
Output Resistance	$R_O$	$f = 1.0kHz$	-	2.0	-	$m\Omega$
Short Circuit Current Limit	$I_{SC}$	$V_I = 40V$ , $T_J = +25^\circ C$	-	1.0	2.0	A
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$I_O = 5.0mA$	-	0.5	-	$mV/^\circ C$

### Note:

1. Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due heating effects must be taken into account separately. Pulse testing with low duty is used. ( $P_{MAX} = 25W$ )

## Typical Application

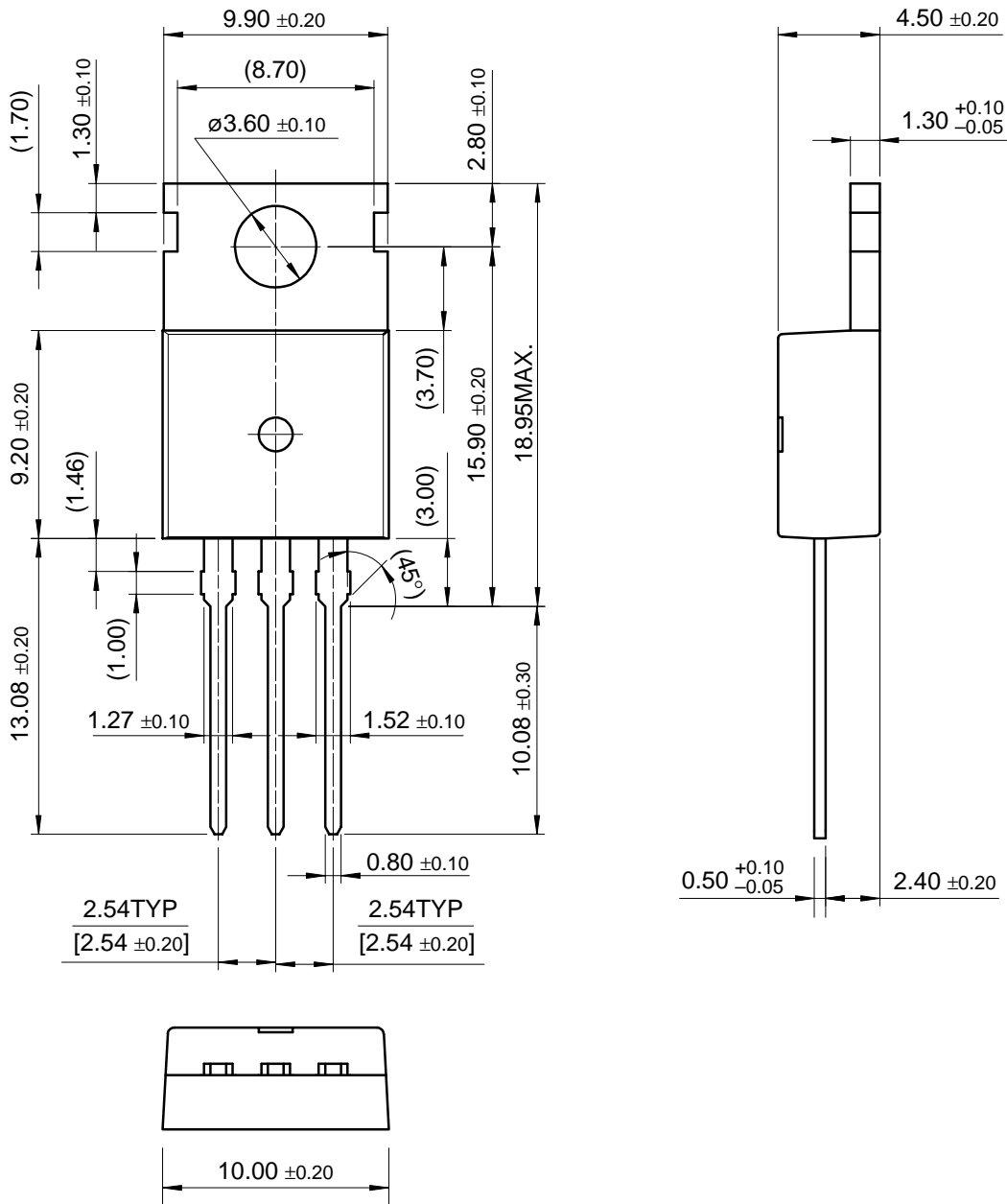
**Notes:**

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

### TO-220



---

## Ordering Information

Product Number	Package	Operating Temperature
KA78T05	TO-220	0 ~ + 125 °C
KA78T12		
KA78T15		

**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

**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 CORPORATION. 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.



Fairchild Semiconductor

SEARCH | Parametric | Cross Reference

space

Product Folders and

Applies

find products

Home >> Find products >>

[Products groups](#)

[Analog and Mixed](#)

[Signal](#)

[Discrete](#)

[Interface](#)

[Logic](#)

[Microcontrollers](#)

[Non-Volatile](#)

[Memory](#)

[Optoelectronics](#)

[Markets and](#)

[applications](#)

[New products](#)

[Product selection and](#)

[parametric search](#)

[Cross-reference](#)

[search](#)

KA78T05

3-Terminal 3A Positive Voltage Regulator

Contents

[General description](#) | [Features](#) | [Product status/pricing/packaging](#)

General description

This family of fixed voltage regulators are monolithic integrated circuit capable of driving loads in excess of 3.0 A.

[back to top](#)

Features

- Output current in excess of 3.0A
- Output transistor safe operating area compensation
- Power dissipation: 25W
- Internal short circuit current limiting
- Internal thermal overload protection
- Output voltage offered in 4% tolerance
- No external components required
- Output voltage of 5, 12 and 15V

[back to top](#)

Product status/pricing/packaging

Product	Product status	Package type	Leads	Packing method
KA78T05	Full Production	TO-220	3	BULK
KA78T05TU	Full Production	TO-220	3	RAIL

[back to top](#)

Related Links

[Request samples](#)

[How to order products](#)

[Product Change Notices \(PCNs\)](#)

[Support](#)

[Distributor and field sales representatives](#)

[Quality and reliability](#)

[Design tools](#)

Datasheet

[Download this datasheet](#)

PDF

[e-mail this datasheet](#)

[E-]

This page [Print version](#)

technical information

buy products

technical support

my Fairchild

company

[Home](#) | [Find products](#) | [Technical information](#) | [Buy products](#) |  
[Support](#) | [Company](#) | [Contact us](#) | [Site index](#) | [Privacy policy](#)

---

[© Copyright 2002 Fairchild Semiconductor](#)

---