

# KA78MXX

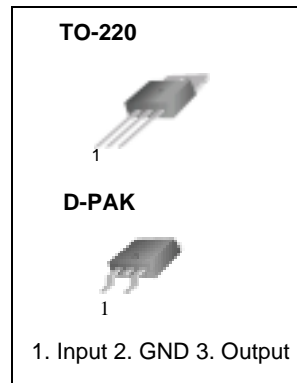
## 3-Terminal 0.5A Positive Voltage Regulator

### Features

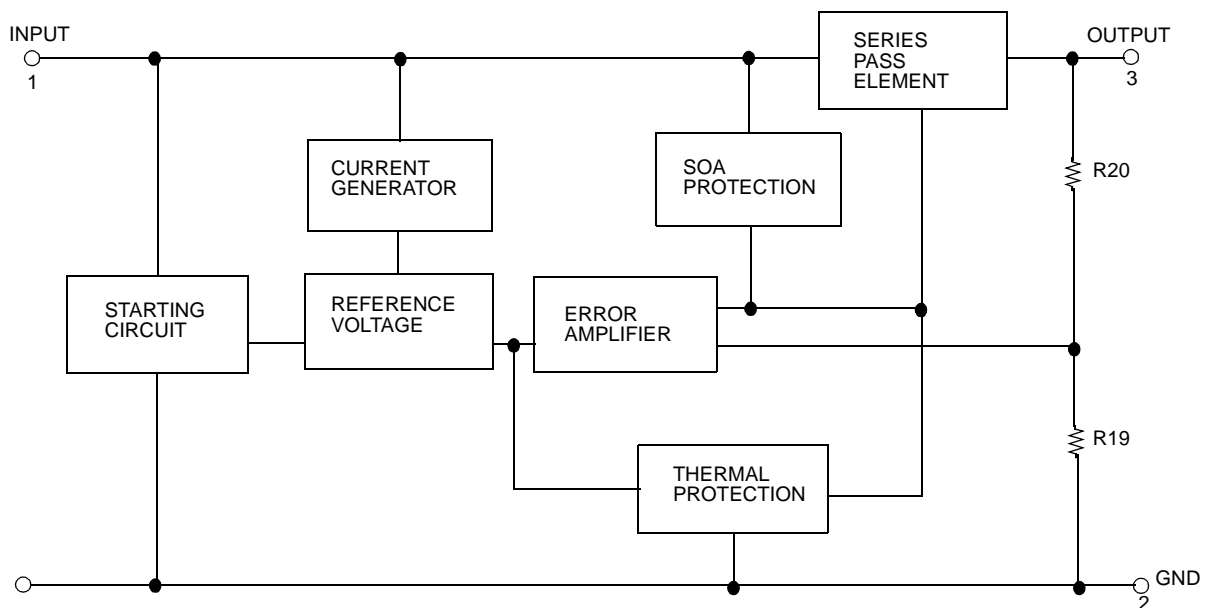
- Output Current up to 0.5A
- Output Voltages of 5, 6, 8, 10, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area (SOA) Protection

### Description

The KA78MXX series of three terminal positive regulators are available in the TO-220/D-PAK package with several fixed output voltages making it useful in a wide range of applications.



### Internal Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage (for $V_O = 5V$ to $18V$ ) (for $V_O = 24V$ )	$V_I$	35	V
	$V_I$	40	V
Thermal Resistance Junction-Cases (Note1) TO-220	$R_{\theta JC}$	2.5	$^{\circ}C/W$
Thermal Resistance Junction-Air (Note1,2) TO-220 D-PAK	$R_{\theta JA}$	66	$^{\circ}C/W$
		92	
Operating Temperature Range	$T_{OPR}$	0 ~ +125	$^{\circ}C$
Storage Temperature Range	$T_{STG}$	-65 ~ +150	$^{\circ}C$

## Electrical Characteristics (KA78M05/KA78M05R)

(Refer to the test circuits,  $0 \leq T_J \leq +125^{\circ}C$ ,  $I_O = 350mA$ ,  $V_I = 10V$ , unless otherwise specified,  $C_I = 0.33\mu F$ ,  $C_O = 0.1\mu F$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	$V_O$	$T_J = +25^{\circ}C$	4.8	5	5.2	V	
		$I_O = 5$ to $350mA$ $V_I = 7$ to $20V$	4.75	5	5.25		
Line Regulation (Note3)	$\Delta V_O$	$I_O = 200mA$ $T_J = +25^{\circ}C$	$V_I = 7$ to $25V$	-	-	100	me
			$V_I = 8$ to $25V$	-	-	50	
Load Regulation (Note3)	$\Delta V_O$	$I_O = 5mA$ to $0.5A$ , $T_J = +25^{\circ}C$	-	-	100	mV	
		$I_O = 5mA$ to $200mA$ , $T_J = +25^{\circ}C$	-	-	50		
Quiescent Current	$I_Q$	$T_J = +25^{\circ}C$	-	4.0	6.0	mA	
Quiescent Current Change	$\Delta I_Q$	$I_O = 5mA$ to $350mA$	-	-	0.5	mA	
		$I_O = 200mA$ $V_I = 8$ to $25V$	-	-	0.8		
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5mA$ $T_J = 0$ to $+125^{\circ}C$	-	-0.5	-	mV/ $^{\circ}C$	
Output Noise Voltage	$V_N$	$f = 10Hz$ to $100kHz$	-	40	-	$\mu V/V_O$	
Ripple Rejection	RR	$f = 120Hz$ , $I_O = 300mA$ $V_I = 8$ to $18V$	62	-	-	dB	
Dropout Voltage	$V_D$	$T_J = +25^{\circ}C$ , $I_O = 500mA$	-	2	-	V	
Short Circuit Current	ISC	$T_J = +25^{\circ}C$ , $V_I = 35V$	-	300	-	mA	
Peak Current	$I_{PK}$	$T_J = +25^{\circ}C$	-	700	-	mA	

### Note:

- Thermal resistance test board  
Size: 76.2mm \* 114.3mm \* 1.6mm(1S0P)  
JEDEC standard: JESD51-3, JESD51-7
- Assume no ambient airflow
- 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 (KA78M06/KA78M06R)** (Continued)(Refer to the test circuits,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $I_O=350\text{mA}$ ,  $V_I=11\text{V}$ , unless otherwise specified,  $C_I=0.33\mu\text{F}$ ,  $C_O=0.1\mu\text{F}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J=+25^\circ\text{C}$	5.75	6	6.25	V
		$I_O = 5 \text{ to } 350\text{mA}$ $V_I = 8 \text{ to } 21\text{V}$	5.7	6	6.3	
Line Regulation (Note1)	$\Delta V_O$	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	-	-	100	mV
		$V_I = 8 \text{ to } 25\text{V}$ $V_I = 9 \text{ to } 25\text{V}$	-	-	50	
Load Regulation (Note1)	$\Delta V_O$	$I_O = 5\text{mA to } 0.5\text{A}$ , $T_J = +25^\circ\text{C}$	-	-	120	mV
		$I_O = 5\text{mA to } 200\text{mA}$ , $T_J = +25^\circ\text{C}$	-	-	60	
Quiescent Current	$I_Q$	$T_J = +25^\circ\text{C}$	-	4.0	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 350\text{mA}$	-	-	0.5	mA
		$I_O = 200\text{mA}$ $V_I = 9 \text{ to } 25\text{V}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$ $T_J = 0 \text{ to } +125^\circ\text{C}$	-	-0.5	-	mV/ $^\circ\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$	-	45	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 300\text{mA}$ $V_I = 11.5 \text{ to } 21.5\text{V}$	59	-	-	dB
Dropout Voltage	$V_D$	$T_J = +25^\circ\text{C}$ , $I_O = 500\text{mA}$	-	2	-	V
Short Circuit Current	$I_{SC}$	$T_J = +25^\circ\text{C}$ , $V_I = 35\text{V}$	-	300	-	mA
Peak Current	$I_{PK}$	$T_J = +25^\circ\text{C}$	-	700	-	mA

**Note:**

1. 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 (KA78M08/KA78M08R)** (Continued)(Refer to the test circuits,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $I_O=350\text{mA}$ ,  $V_I=14\text{V}$ , unless otherwise specified,  $C_I=0.33\mu\text{F}$ ,  $C_O=0.1\mu\text{F}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^\circ\text{C}$	7.7	8	8.3	V
		$I_O = 5 \text{ to } 350\text{mA}$ $V_I = 10.5 \text{ to } 23\text{V}$	7.6	8	8.4	
Line Regulation (Note1)	$\Delta V_O$	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	-	-	100	mV
		$V_I = 10.5 \text{ to } 25\text{V}$ $V_I = 11 \text{ to } 25\text{V}$	-	-	50	
Load Regulation (Note1)	$\Delta V_O$	$I_O = 5\text{mA} \text{ to } 0.5\text{A}$ , $T_J = +25^\circ\text{C}$	-	-	160	mV
		$I_O = 5\text{mA} \text{ to } 200\text{mA}$ , $T_J = +25^\circ\text{C}$	-	-	80	
Quiescent Current	$I_Q$	$T_J = +25^\circ\text{C}$	-	4.0	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA} \text{ to } 350\text{mA}$	-	-	0.5	mA
		$I_O = 200\text{mA}$ $V_I = 10.5 \text{ to } 25\text{V}$	-	-	0.8	
Output Voltage Drift	RR	$I_O = 5\text{mA}$ $T_J = 0 \text{ to } +125^\circ\text{C}$	-	-0.5	-	mV/ $^\circ\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz} \text{ to } 100\text{KHz}$	-	52	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 300\text{mA}$ $V_I = 9 \text{ to } 19\text{V}$	56	-	-	dB
Dropout Voltage	$V_D$	$T_J = +25^\circ\text{C}$ , $I_O = 500\text{mA}$	-	2	-	V
Short Circuit Current	ISC	$T_J = +25^\circ\text{C}$ , $V_I = 35\text{V}$	-	300	-	mA
Peak Current	IPK	$T_J = +25^\circ\text{C}$	-	700	-	mA

**Note:**

1. 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 (KA78M10)** (Continued)

(Refer to the test circuits,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $I_O=350\text{mA}$ ,  $V_I=17\text{V}$ , unless otherwise specified,  $C_I=0.33\mu\text{F}$ ,  $C_O=0.1\mu\text{F}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^\circ\text{C}$	9.6	10	10.4	V
		$I_O = 5 \text{ to } 350\text{mA}$ $V_I = 12.5 \text{ to } 25\text{V}$	9.5	10	10.5	
Line Regulation (Note1)	$\Delta V_O$	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	-	-	100	mV
		$V_I = 12.5 \text{ to } 25\text{V}$ $V_I = 13 \text{ to } 25\text{V}$	-	-	50	
Load Regulation (Note1)	$\Delta V_O$	$I_O = 5\text{mA} \text{ to } 0.5\text{A}$ , $T_J = +25^\circ\text{C}$	-	-	200	mV
		$I_O = 5\text{mA} \text{ to } 200\text{mA}$ , $T_J = +25^\circ\text{C}$	-	-	100	
Quiescent Current	$I_Q$	$T_J = +25^\circ\text{C}$	-	4.1	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA} \text{ to } 350\text{mA}$	-	-	0.5	mA
		$I_O = 200\text{mA}$ $V_I = 12.5 \text{ to } 25\text{V}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$ $T_J = 0 \text{ to } +125^\circ\text{C}$	-	-0.5	-	mV/ $^\circ\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz} \text{ to } 100\text{KHz}$	-	65	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 300\text{mA}$ $V_I = 13 \text{ to } 23\text{V}$	55	-	-	dB
Dropout Voltage	$V_D$	$T_J = +25^\circ\text{C}$ , $I_O = 500\text{mA}$	-	2	-	V
Short Circuit Current	$I_{SC}$	$T_J = +25^\circ\text{C}$ , $V_I = 35\text{V}$	-	300	-	mA
Peak Current	$I_{PK}$	$T_J = +25^\circ\text{C}$	-	700	-	mA

**Note:**

1. 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 (KA78M12/KA78M12R)** (Continued)(Refer to the test circuits,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $I_O=350\text{mA}$ ,  $V_I=19\text{V}$ , unless otherwise specified,  $C_I=0.33\mu\text{F}$ ,  $C_O=0.1\mu\text{F}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	$V_O$	$T_J=+25^\circ\text{C}$	11.5	12	12.5	V	
		$I_O = 5 \text{ to } 350\text{mA}$ $V_I = 14.5 \text{ to } 27\text{V}$	11.5	12	12.6		
Line Regulation (Note1)	$\Delta V_O$	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	$V_I = 14.5 \text{ to } 30\text{V}$	-	-	100	mV
			$V_I = 16 \text{ to } 30\text{V}$	-	-	50	
Load Regulation (Note1)	$\Delta V_O$	$I_O = 5\text{mA to } 0.5\text{A}, T_J = +25^\circ\text{C}$		-	-	240	mV
		$I_O = 5\text{mA to } 200\text{mA}, T_J = +25^\circ\text{C}$		-	-	120	
Quiescent Current	$I_Q$	$T_J=+25^\circ\text{C}$	-	4.1	6.0	mA	
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 350\text{mA}$		-	-	0.5	mA
		$I_O = 200\text{mA}$ $V_I = 14.5 \text{ to } 30\text{V}$		-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$ $T_J = 0 \text{ to } +125^\circ\text{C}$		-	-0.5	-	mV/ $^\circ\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$		-	75	-	$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}, I_O = 300\text{mA}$ $V_I = 15 \text{ to } 25\text{V}$		55	-	-	dB
Dropout Voltage	$V_D$	$T_J = +25^\circ\text{C}, I_O = 500\text{mA}$		-	2	-	V
Short Circuit Current	$I_{SC}$	$T_J = +25^\circ\text{C}, V_I = 35\text{V}$		-	300	-	mA
Peak Current	$I_{PK}$	$T_J = +25^\circ\text{C}$		-	700	-	mA

**Note:**

1. 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 (KA78M15)** (Continued)

(Refer to the test circuits,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $I_O=350\text{mA}$ ,  $V_I=23\text{V}$ , unless otherwise specified,  $C_I=0.33\mu\text{F}$ ,  $C_O=0.1\mu\text{F}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J=+25^\circ\text{C}$	14.4	15	15.6	V
		$I_O = 5 \text{ to } 350\text{mA}$ $V_I = 17.5 \text{ to } 30\text{V}$	14.25	15	15.75	
Line Regulation (Note1)	$\Delta V_O$	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	-	-	100	mV
		$V_I = 17.5 \text{ to } 30\text{V}$ $V_I = 20 \text{ to } 30\text{V}$	-	-	50	
Load Regulation (Note1)	$\Delta V_O$	$I_O = 5\text{mA to } 0.5\text{A}$ , $T_J = +25^\circ\text{C}$	-	-	300	mV
		$I_O = 5\text{mA to } 200\text{mA}$ , $T_J = +25^\circ\text{C}$	-	-	150	
Quiescent Current	$I_Q$	$T_J=+25^\circ\text{C}$	-	4.1	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 350\text{mA}$	-	-	0.5	mA
		$I_O = 200\text{mA}$ $V_I = 17.5 \text{ to } 30\text{V}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$ $T_J = 0 \text{ to } +125^\circ\text{C}$	-	-1	-	mV/ $^\circ\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz to } 100\text{KHz}$	-	100	-	$\mu\text{V}/V_o$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 300\text{mA}$ $V_I = 18.5 \text{ to } 28.5\text{V}$	54	-	-	dB
Dropout Voltage	$V_D$	$T_J = +25^\circ\text{C}$ , $I_O = 500\text{mA}$	-	2	-	V
Short Circuit Current	$I_{SC}$	$T_J = +25^\circ\text{C}$ , $V_I = 35\text{V}$	-	300	-	mA
Peak Current	$I_{PK}$	$T_J = +25^\circ\text{C}$	-	700	-	mA

**Note:**

1. 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 (KA78M18)** (Continued)(Refer to the test circuits,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $I_O=350\text{mA}$ ,  $V_I=26\text{V}$ , unless otherwise specified,  $C_I=0.33\mu\text{F}$ ,  $C_O=0.1\mu\text{F}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Output Voltage	$V_O$	$T_J=+25^\circ\text{C}$	17.3	18	18.7	V	
		$I_O = 5 \text{ to } 350\text{mA}$ $V_I = 20.5 \text{ to } 33\text{V}$	17.1	18	18.9		
Line Regulation (Note1)	$\Delta V_O$	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	$V_I = 21 \text{ to } 33\text{V}$	-	-	100	mV
			$V_I = 24 \text{ to } 33\text{V}$	-	-	50	
Load Regulation (Note1)	$\Delta V_O$	$I_O = 5\text{mA to } 0.5\text{A}, T_J = +25^\circ\text{C}$	-	-	360	mV	
		$I_O = 5\text{mA to } 200\text{mA}, T_J = +25^\circ\text{C}$	-	-	180		
Quiescent Current	$I_Q$	$T_J = +25^\circ\text{C}$	-	4.2	6.0	mA	
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA to } 350\text{mA}$	-	-	0.5	mA	
		$I_O = 200\text{mA}$ $V_I = 21 \text{ to } 33\text{V}$	-	-	0.8		
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}, T_J = 0 \text{ to } 125^\circ\text{C}$	-	-1.1	-	mV/ $^\circ\text{C}$	
Output Noise Voltage	$V_N$	$f=10\text{Hz to } 100\text{KHz}$	-	100	-	$\mu\text{V}/V_O$	
Ripple Rejection	RR	$f=120\text{Hz}, I_O=300\text{mA}, V_I=22 \text{ to } 32\text{V}$	53	-	-	dB	
Dropout Voltage	$V_D$	$T_J = +25^\circ\text{C}, I_O=500\text{mA}$	-	2	-	V	
Short Circuit Current	$I_{SC}$	$T_J = +25^\circ\text{C}, V_I=35\text{V}$	-	300	-	mA	
Peak Current	$I_{PK}$	$T_J = +25^\circ\text{C}$	-	700	-	mA	

**Note:**

1. 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 (KA78M24)** (Continued)

(Refer to the test circuits,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $I_O=350\text{mA}$ ,  $V_I=33\text{V}$ , unless otherwise specified,  $C_I=0.33\mu\text{F}$ ,  $C_O=0.1\mu\text{F}$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = +25^\circ\text{C}$	23	24	25	V
		$I_O = 5 \text{ to } 350\text{mA}$ $V_I = 27 \text{ to } 38\text{V}$	22.8	24	25.2	
Line Regulation	$\Delta V_O$	$I_O = 200\text{mA}$ $T_J = +25^\circ\text{C}$	-	-	100	mV
		$V_I = 27 \text{ to } 38\text{V}$ $V_I = 28 \text{ to } 38\text{V}$	-	-	50	
Load Regulation	$\Delta V_O$	$I_O = 5\text{mA} \text{ to } 0.5\text{A}$ , $T_J = +25^\circ\text{C}$	-	-	480	mV
		$I_O = 5\text{mA} \text{ to } 200\text{mA}$ , $T_J = +25^\circ\text{C}$	-	-	240	
Quiescent Current	$I_Q$	$T_J = +25^\circ\text{C}$	-	4.2	6	mA
Quiescent Current Change	$\Delta I_Q$	$I_O = 5\text{mA} \text{ to } 350\text{mA}$	-	-	0.5	mA
		$I_O = 200\text{mA}$ $V_I = 27 \text{ to } 38\text{V}$	-	-	0.8	
Output Voltage Drift	$\Delta V/\Delta T$	$I_O = 5\text{mA}$ $T_J = 0 \text{ to } +125^\circ\text{C}$	-	-1.2	-	mV/ $^\circ\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz} \text{ to } 100\text{KHz}$	-	170	-	$\mu\text{V}$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $I_O = 300\text{mA}$ $V_I = 28 \text{ to } 38\text{V}$	50	-	-	dB
Dropout Voltage	$V_D$	$T_J = +25^\circ\text{C}$ , $I_O = 500\text{mA}$	-	2	-	V
Short Circuit Current	ISC	$T_J = +25^\circ\text{C}$ , $V_I = 35\text{V}$	-	300	-	mA
Peak Current	IPK	$T_J = +25^\circ\text{C}$	-	700	-	mA

**Note:**

1. 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 Applications

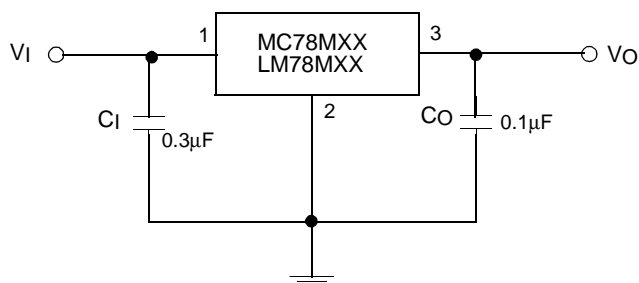


Figure 1. Fixed Output Regulator

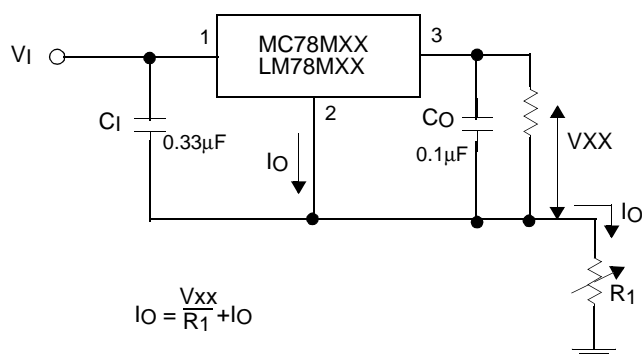


Figure 2. Constant Current Regulator

### Notes:

1. To specify an output voltage, substitute voltage value for "XX"
2. Although no output capacitor is needed for stability, it does improve transient response.
3. Required if regulator is located an appreciable distance from power Supply filter

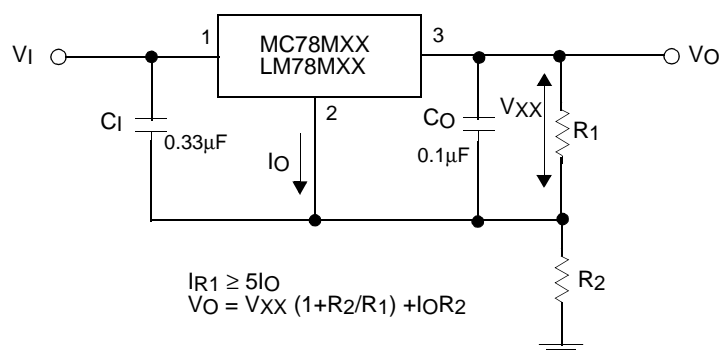


Figure 3. Circuit for Increasing Output Voltage

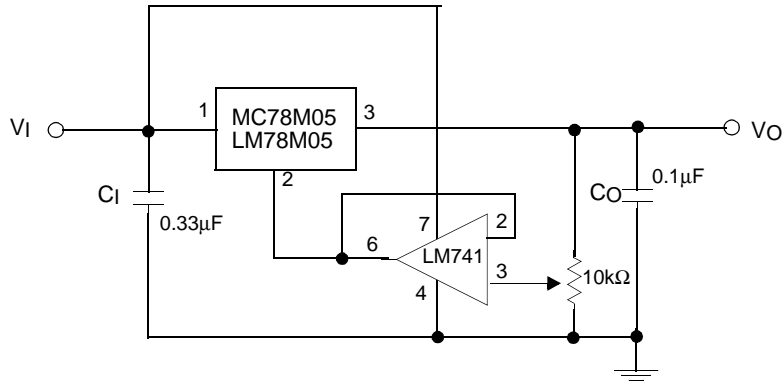


Figure 4. Adjustable Output Regulator (7 to 30V)

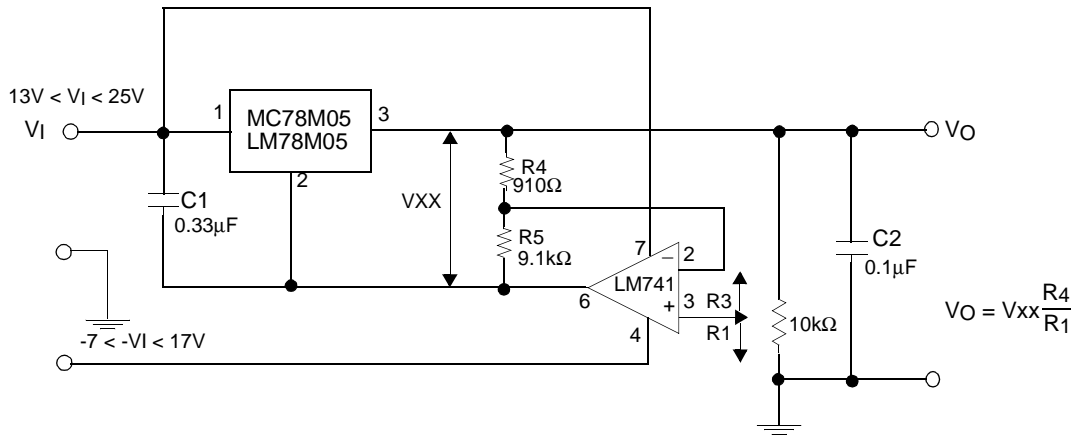


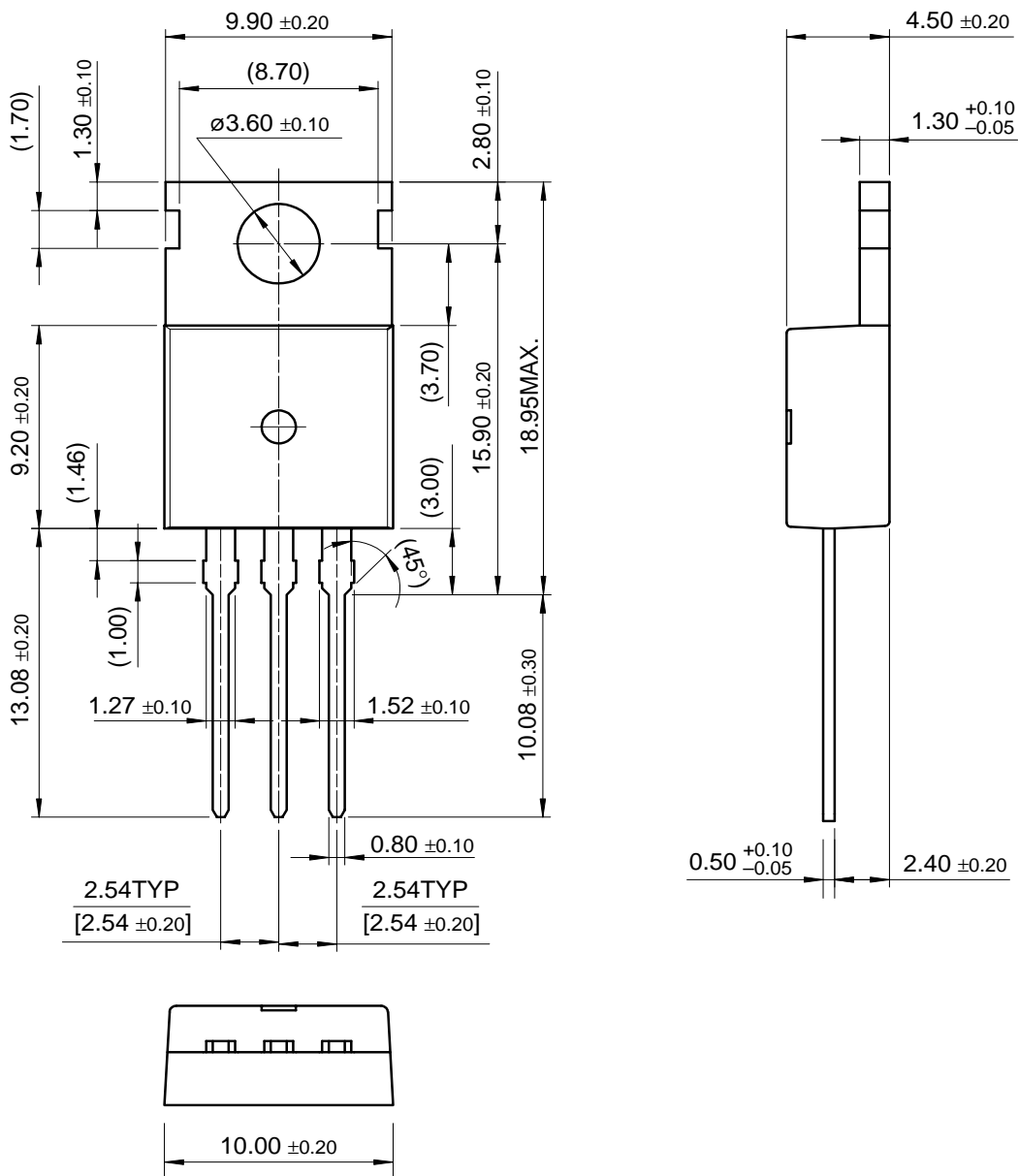
Figure 5. 0.5 to 10V Regulator

# Mechanical Dimensions

## Package

Dimensions in millimeters

### TO-220

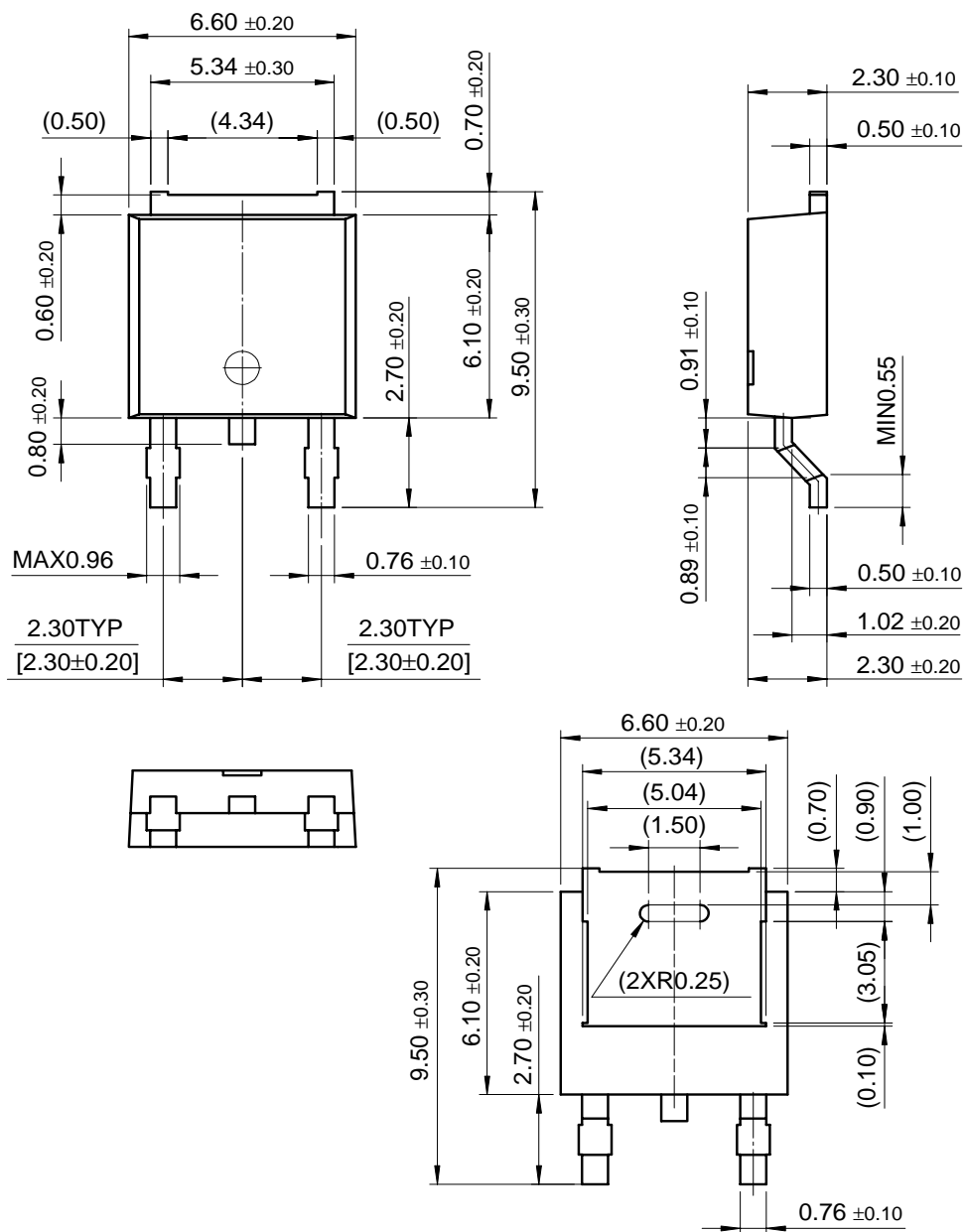


# Mechanical Dimensions (Continued)

## Package

Dimensions in millimeters

### D-PAK



## Ordering Information

Product Number	Package	Operating Temperature
KA78M05	TO-220	0 ~ +125°C
KA78M06		
KA78M08		
KA78M10		
KA78M12		
KA78M15		
KA78M18		
KA78M24		
KA78M05R	D-PAK	
KA78M06R		
KA78M08R		
KA78M12R		
KA78M08AR		

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KA78M08  
3-Terminal 0.5A Positive Voltage Regulator

Contents

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

General description

The KA78MXX series of three-terminal positive regulators are available in the TO-220/D-PAK package with several fixed output voltages making it useful in a wide range of applications.

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Features

- Output Current up to 0.5A
- Output Voltage of 5, 6, 8, 10, 12, 15, 18, 20, 24V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating area (SOA)Protection

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Product status/pricing/packaging

Product	Product status	Package type	Leads	Packing method
KA78M08RTF	Full Production	TO-252(DPAK)	2	TAPE REEL
KA78M08TSTU	Full Production	TO-220	3	RAIL
KA78M08TU	Full Production	TO-220	3	RAIL
KA78M08	Full Production	TO-220	3	BULK
KA78M08RTM	Full Production	TO-252(DPAK)	2	TAPE REEL

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