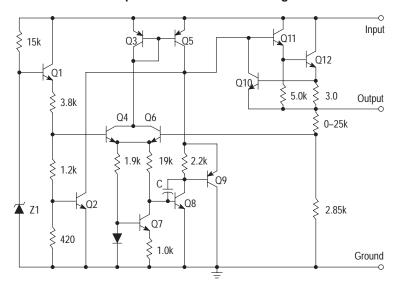
# Three-Terminal Low Current Positive Voltage Regulators

The MC78L00A Series of positive voltage regulators are inexpensive, easy-to-use devices suitable for a multitude of applications that require a regulated supply of up to 100 mA. Like their higher powered MC7800 and MC78M00 Series cousins, these regulators feature internal current limiting and thermal shutdown making them remarkably rugged. No external components are required with the MC78L00 devices in many applications.

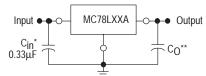
These devices offer a substantial performance advantage over the traditional zener diode–resistor combination, as output impedance and quiescent current are substantially reduced.

- Wide Range of Available, Fixed Output Voltages
- Low Cost
- Internal Short Circuit Current Limiting
- Internal Thermal Overload Protection
- No External Components Required
- Complementary Negative Regulators Offered (MC79L00A Series)

#### **Representative Schematic Diagram**



# **Standard Application**



A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0 V above the output voltage even during the low point on the input ripple voltage.

\*C<sub>in</sub> is required if regulator is located an appreciable distance from power supply filter.

 ${}^{**}C_O\, is\, not\, needed\, for\, stability;\,\, however, it\, does\quad improve\, transient\, response.$ 



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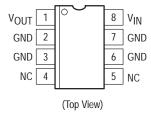
TO-92 P SUFFIX CASE 29



SOP-8\* D SUFFIX CASE 751

\*SOP-8 is an internally modified SO-8 package. Pins 2, 3, 6, and 7 are electrically common to the die attach flag. This internal lead frame modification decreases package thermal resistance and increases power dissipationcapability when appropriately mounted on a printed circuit board. SOP-8 conforms to all external dimensions of the standard SO-8 package.

#### PIN CONNECTIONS



#### **DEVICE TYPE/NOMINAL VOLTAGE**

Voltage
5.0
8.0
9.0
12
15
18
24

# ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

# **MAXIMUM RATINGS** ( $T_A = +125^{\circ}C$ , unless otherwise noted.)

Rating	Symbol	Value	Unit
Input Voltage (2.6 V–8.0 V) (12 V–18 V) (24 V)	VI	30 35 40	Vdc
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C
Operating Junction Temperature Range	TJ	0 to +150	°C

**ELECTRICAL CHARACTERISTICS** (V<sub>I</sub> = 10 V, I<sub>O</sub> = 40 mA, C<sub>I</sub> = 0.33  $\mu$ F, C<sub>O</sub> = 0.1  $\mu$ F,  $-40^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAB), 0 $^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAC), unless otherwise noted.)

		M	C78L05AC,	AB	
Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage ( $T_J = +25^{\circ}C$ )	Vo	4.8	5.0	5.2	Vdc
Line Regulation (T <sub>J</sub> = +25°C, I <sub>O</sub> = 40 mA)	Reg <sub>line</sub>				mV
7.0 $Vdc \le V_1 \le 20 Vdc$ 8.0 $Vdc \le V_1 \le 20 Vdc$			55 45	150 100	
Load Regulation $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 100 \text{ mA})$ $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 40 \text{ mA})$	Regload		11 5.0	60 30	mV
Output Voltage $ (7.0 \text{ Vdc} \leq \text{V}_{\text{I}} \leq 20 \text{ Vdc}, \ 1.0 \text{ mA} \leq \text{I}_{\text{O}} \leq 40 \text{ mA}) $ $ (\text{V}_{\text{I}} = 10 \text{ V}, \ 1.0 \text{ mA} \leq \text{I}_{\text{O}} \leq 70 \text{ mA}) $	Vo	4.75 4.75		5.25 5.25	Vdc
Input Bias Current $(T_J = +25^{\circ}C)$ $(T_J = +125^{\circ}C)$	lВ	_ _	3.8 -	6.0 5.5	mA
Input Bias Current Change (8.0 Vdc $\leq$ V <sub>I</sub> $\leq$ 20 Vdc) (1.0 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA)	ΔΙΙΒ	_ _	- -	1.5 0.1	mA
Output Noise Voltage $(T_A = +25^{\circ}C, 10 \text{ Hz} \le f \le 100 \text{ kHz})$	V <sub>n</sub>	_	40	_	μV
Ripple Rejection ( $I_O = 40 \text{ mA}$ , $f = 120 \text{ Hz}$ , $8.0 \text{ Vdc} \le \text{V}_I \le 18 \text{ V}$ , $\text{T}_J = +25^{\circ}\text{C}$ )	RR	41	49	_	dB
Dropout Voltage (T <sub>J</sub> = +25°C)	V <sub>I</sub> – V <sub>O</sub>	-	1.7	_	Vdc

**ELECTRICAL CHARACTERISTICS** (V<sub>I</sub> = 14 V, I<sub>O</sub> = 40 mA, C<sub>I</sub> = 0.33  $\mu$ F, C<sub>O</sub> = 0.1  $\mu$ F,  $-40^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAB), 0 $^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAC), unless otherwise noted.)

		М	C78L08AC,	AB	
Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T <sub>J</sub> = +25°C)	Vo	7.7	8.0	8.3	Vdc
Line Regulation $(T_J = +25^{\circ}C, I_O = 40 \text{ mA})$	Reg <sub>line</sub>				mV
10.5 Vdc ≤ V <sub>I</sub> ≤ 23 Vdc 11 Vdc ≤ V <sub>I</sub> ≤ 23 Vdc		_	20 12	175 125	
Load Regulation $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 100 \text{ mA})$ $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 40 \text{ mA})$	Reg <sub>load</sub>	_ _	15 8.0	80 40	mV
Output Voltage $ (10.5 \text{ Vdc} \le \text{V}_{\text{I}} \le 23 \text{ Vdc}, \ 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 40 \text{ mA}) \\ (\text{V}_{\text{I}} = 14 \text{ V}, \ 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA}) $	Vo	7.6 7.6	_ _	8.4 8.4	Vdc
Input Bias Current $(T_J = +25^{\circ}C)$ $(T_J = +125^{\circ}C)$	I <sub>IB</sub>	_ _	3.0	6.0 5.5	mA
Input Bias Current Change (11 Vdc $\leq$ V <sub>I</sub> $\leq$ 23 Vdc) (1.0 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA)	ΔlIB	_ _	_ _	1.5 0.1	mA
Output Noise Voltage $(T_A = +25^{\circ}C, 10 \text{ Hz} \le f \le 100 \text{ kHz})$	V <sub>n</sub>	_	60	_	μV
Ripple Rejection (I <sub>O</sub> = 40 mA, f = 120 Hz, 12 V $\leq$ V <sub>I</sub> $\leq$ 23 V, T <sub>J</sub> = +25°C)	RR	37	57	_	dB
Dropout Voltage (T <sub>J</sub> = +25°C)	V <sub>I</sub> – V <sub>O</sub>	-	1.7	-	Vdc

**ELECTRICAL CHARACTERISTICS** (V<sub>I</sub> = 15 V, I<sub>O</sub> = 40 mA, C<sub>I</sub> = 0.33  $\mu$ F, C<sub>O</sub> = 0.1  $\mu$ F,  $-40^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAB), 0 $^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAC), unless otherwise noted.)

		М	C78L09AC,	АВ	
Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T <sub>J</sub> = +25°C)	VO	8.6	9.0	9.4	Vdc
Line Regulation $ (T_J = +25^{\circ}C, I_O = 40 \text{ mA}) $ $ 11.5 \text{ Vdc} \leq V_I \leq 24 \text{ Vdc} $ $ 12 \text{ Vdc} \leq V_I \leq 24 \text{ Vdc} $	Reg <sub>line</sub>	_ _	20 12	175 125	mV
Load Regulation $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 100 \text{ mA})$ $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 40 \text{ mA})$	Reg <sub>load</sub>	- -	15 8.0	90 40	mV
Output Voltage $(11.5 \text{ Vdc} \le \text{V}_{\text{I}} \le 24 \text{ Vdc}, 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 40 \text{ mA})$ $(\text{V}_{\text{I}} = 15 \text{ V}, 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA})$	VO	8.5 8.5	- -	9.5 9.5	Vdc
Input Bias Current $(T_J = +25^{\circ}C)$ $(T_J = +125^{\circ}C)$	I <sub>IB</sub>	- -	3.0	6.0 5.5	mA
Input Bias Current Change (11 Vdc $\leq$ V <sub>I</sub> $\leq$ 23 Vdc) (1.0 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA)	ΔlIB	_ _	- -	1.5 0.1	mA
Output Noise Voltage $(T_A = +25^{\circ}C, 10 \text{ Hz} \le f \le 100 \text{ kHz})$	V <sub>n</sub>	_	60	_	μV
Ripple Rejection (I <sub>O</sub> = 40 mA, f = 120 Hz, 13 V $\leq$ V <sub>I</sub> $\leq$ 24 V, T <sub>J</sub> = +25°C)	RR	37	57	_	dB
Dropout Voltage (T <sub>J</sub> = +25°C)	VI – VO	_	1.7	_	Vdc

**ELECTRICAL CHARACTERISTICS** (V<sub>I</sub> = 19 V, I<sub>O</sub> = 40 mA, C<sub>I</sub> = 0.33  $\mu$ F, C<sub>O</sub> = 0.1  $\mu$ F,  $-40^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAB), 0 $^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAC), unless otherwise noted.)

		M	C78L12AC,	AB	
Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T <sub>J</sub> = +25°C)	Vo	11.5	12	12.5	Vdc
Line Regulation $ (T_J = +25^{\circ}C, I_O = 40 \text{ mA}) $ $ 14.5 \text{ Vdc} \leq V_I \leq 27 \text{ Vdc} $ $ 16 \text{ Vdc} \leq V_I \leq 27 \text{ Vdc} $	Reg <sub>line</sub>	_ _	120 100	250 200	mV
Load Regulation $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 100 \text{ mA})$ $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 40 \text{ mA})$	Regload	- -	20 10	100 50	mV
Output Voltage $(14.5 \text{ Vdc} \le \text{V}_{\text{I}} \le 27 \text{ Vdc}, 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 40 \text{ mA})$ $(\text{V}_{\text{I}} = 19 \text{ V}, 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA})$	Vo	11.4 11.4	_ _	12.6 12.6	Vdc
Input Bias Current $(T_J = +25^{\circ}C)$ $(T_J = +125^{\circ}C)$	I <sub>IB</sub>	_ _	4.2 -	6.5 6.0	mA
Input Bias Current Change (16 Vdc $\leq$ V <sub>I</sub> $\leq$ 27 Vdc) (1.0 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA)	ΔI <sub>IB</sub>	_ _	_ _	1.5 0.1	mA
Output Noise Voltage $(T_A = +25^{\circ}C, 10 \text{ Hz} \le f \le 100 \text{ kHz})$	Vn	_	80	_	μV
Ripple Rejection (I <sub>O</sub> = 40 mA, f = 120 Hz, 15 V $\leq$ V <sub>I</sub> $\leq$ 25 V, T <sub>J</sub> = +25°C)	RR	37	42	-	dB
Dropout Voltage (T <sub>J</sub> = +25°C)	V <sub>I</sub> – V <sub>O</sub>	_	1.7	_	Vdc

**ELECTRICAL CHARACTERISTICS** (V<sub>I</sub> = 23 V, I<sub>O</sub> = 40 mA, C<sub>I</sub> = 0.33  $\mu$ F, C<sub>O</sub> = 0.1  $\mu$ F,  $-40^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAB), 0 $^{\circ}$ C < T<sub>J</sub> < +125 $^{\circ}$ C (for MC78LXXAC), unless otherwise noted.)

		M	C78L15AC,	AB	
Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T <sub>J</sub> = +25°C)	Vo	14.4	15	15.6	Vdc
Line Regulation $(T_J = +25^{\circ}C, I_O = 40 \text{ mA})$	Reg <sub>line</sub>				mV
$17.5 \text{ Vdc} \le V_{\text{I}} \le 30 \text{ Vdc}$ $20 \text{ Vdc} \le V_{\text{I}} \le 30 \text{ Vdc}$		_	130 110	300 250	
Load Regulation $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 100 \text{ mA})$ $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 40 \text{ mA})$	Reg <sub>load</sub>	_ _	25 12	150 75	mV
Output Voltage $(17.5 \text{ Vdc} \le \text{V}_{\text{I}} \le 30 \text{ Vdc}, 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 40 \text{ mA})$ $(\text{V}_{\text{I}} = 23 \text{ V}, 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA})$	Vo	14.25 14.25	- -	15.75 15.75	Vdc
Input Bias Current $(T_J = +25^{\circ}C)$ $(T_J = +125^{\circ}C)$	IB	- -	4.4 -	6.5 6.0	mA
Input Bias Current Change (20 Vdc $\leq$ V <sub>I</sub> $\leq$ 30 Vdc) (1.0 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA)	ΔIIB	_ _	_ _	1.5 0.1	mA
Output Noise Voltage $(T_A = +25^{\circ}C, 10 \text{ Hz} \le f \le 100 \text{ kHz})$	V <sub>n</sub>	_	90	_	μV
Ripple Rejection (I <sub>O</sub> = 40 mA, f = 120 Hz, 18.5 V $\leq$ V <sub>I</sub> $\leq$ 28.5 V, T <sub>J</sub> = +25°C)	RR	34	39	_	dB
Dropout Voltage $(T_J = +25^{\circ}C)$	VI – VO	_	1.7	_	Vdc

# **ELECTRICAL CHARACTERISTICS** (V<sub>I</sub> = 27 V, I<sub>O</sub> = 40 mA, C<sub>I</sub> = $0.33 \, \mu\text{F}$ , C<sub>O</sub> = $0.1 \, \mu\text{F}$ , $0^{\circ}\text{C} < \text{T}_{\text{J}} < +125^{\circ}\text{C}$ , unless otherwise noted.)

			MC78L18AC		
Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage (T <sub>J</sub> = +25°C)	VO	17.3	18	18.7	Vdc
Line Regulation $ (T_J = +25^{\circ}C, I_O = 40 \text{ mA}) $ $ 21.4 \text{ Vdc} \le V_I \le 33 \text{ Vdc} $ $ 20.7 \text{ Vdc} \le V_I \le 33 \text{ Vdc} $ $ 22 \text{ Vdc} \le V_I \le 33 \text{ Vdc} $ $ 21 \text{ Vdc} \le V_I \le 33 \text{ Vdc} $ $ 21 \text{ Vdc} \le V_I \le 33 \text{ Vdc} $	Reg <sub>line</sub>	-	45 35	325 275	mV
Load Regulation $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 100 \text{ mA})$ $(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 40 \text{ mA})$	Regload	_ _	30 15	170 85	mV
Output Voltage $ (21.4 \text{ Vdc} \le \text{V}_{\text{I}} \le 33 \text{ Vdc}, \ 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 40 \text{ mA}) \\ (20.7 \text{ Vdc} \le \text{V}_{\text{I}} \le 33 \text{ Vdc}, \ 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 40 \text{ mA}) \\ (\text{V}_{\text{I}} = 27 \text{ V}, \ 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA}) \\ (\text{V}_{\text{I}} = 27 \text{ V}, \ 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA}) $	Vo	17.1 17.1	-	18.9 18.9	Vdc
Input Bias Current $(T_J = +25^{\circ}C)$ $(T_J = +125^{\circ}C)$	I <sub>IB</sub>	_ _	3.1	6.5 6.0	mA
Input Bias Current Change (22 Vdc $\leq$ V $_{I}$ $\leq$ 33 Vdc) (21 Vdc $\leq$ V $_{I}$ $\leq$ 33 Vdc) (1.0 mA $\leq$ I $_{O}$ $\leq$ 40 mA)	ΔIIB	_ _ _	_ _	1.5 0.1	mA
Output Noise Voltage $(T_A = +25^{\circ}C, 10 \text{ Hz} \le f \le 100 \text{ kHz})$	V <sub>n</sub>	_	150	-	μV
Ripple Rejection (I <sub>O</sub> = 40 mA, f = 120 Hz, 23 V $\leq$ V <sub>I</sub> $\leq$ 33 V, T <sub>J</sub> = +25°C)	RR	33	48	-	dB
Dropout Voltage (T <sub>J</sub> = +25°C)	VI – VO	-	1.7	_	Vdc

# **ELECTRICAL CHARACTERISTICS** (V<sub>I</sub> = 33 V, I<sub>O</sub> = 40 mA, C<sub>I</sub> = 0.33 $\mu$ F, C<sub>O</sub> = 0.1 $\mu$ F, 0°C < T<sub>J</sub> < +125°C, unless otherwise noted.)

			MC78L24AC		
Characteristics	Symbol	Min	Тур	Max	Unit
Output Voltage $(T_J = +25^{\circ}C)$	Vo	23	24	25	Vdc
Line Regulation (T <sub>J</sub> = +25°C, I <sub>O</sub> = 40 mA)	Reg <sub>line</sub>				mV
27.5 Vdc ≤ V <sub>I</sub> ≤ 38 Vdc		_	_	_	
$28 \text{ Vdc} \le \text{V}_1 \le 80 \text{ Vdc}$		_	50	300	
27 Vdc ≤ V <sub>I</sub> ≤ 38 Vdc		_	60	350	
Load Regulation	Reg <sub>load</sub>				mV
$(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 100 \text{ mA})$		-	40	200	
$(T_J = +25^{\circ}C, 1.0 \text{ mA} \le I_O \le 40 \text{ mA})$		_	20	100	
Output Voltage (28 Vdc $\leq$ V <sub>I</sub> $\leq$ 38 Vdc, 1.0 mA $\leq$ I <sub>O</sub> $\leq$ 40 mA)	Vo				Vdc
$(27 \text{ Vdc} \le \text{V}_{\parallel} \le 38 \text{ Vdc}, 1.0 \text{ mA} \le \text{I}_{\square} \le 40 \text{ mA})$ $(28 \text{ Vdc} \le \text{V}_{\parallel} = 33 \text{ Vdc}, 1.0 \text{ mA} \le \text{I}_{\square} \le 70 \text{ mA})$		22.8	_	25.2	
$(27 \text{ Vdc} \le \text{V}_{\text{I}} \le 33 \text{ Vdc}, 1.0 \text{ mA} \le \text{I}_{\text{O}} \le 70 \text{ mA})$		22.8	_	25.2	
Input Bias Current	I <sub>IB</sub>				mA
$(T_J = +25^{\circ}C)$	.5	_	3.1	6.5	
$(T_J = +125^{\circ}C)$		_	_	6.0	
Input Bias Current Change	ΔI <sub>IB</sub>				mA
(28 Vdc ≤ V <sub>I</sub> ≤ 38 Vdc)	.5	_	_	1.5	
$(1.0 \text{ mA} \le I_{\text{O}} \le 40 \text{ mA})$		_	_	0.1	
Output Noise Voltage	V <sub>n</sub>	_	200	-	μV
$(T_A = +25^{\circ}C, 10 \text{ Hz} \le f \le 100 \text{ kHz})$					
Ripple Rejection (I <sub>O</sub> = 40 mA,	RR	31	45	-	dB
$f = 120 \text{ Hz}, 29 \text{ V} \le \text{ V}_{1} \le 35 \text{ V}, \text{T}_{3} = +25^{\circ}\text{C}$					
Dropout Voltage	VI – VO	-	1.7	-	Vdc
$(T_J = +25^{\circ}C)$					

Figure 1. Dropout Characteristics 8.0 MC78L05AC  $V_{out} = 5.0 \text{ V}$ V<sub>O</sub>, OUTPUT VOLTAGE (V) 3.0  $T_J = 25^{\circ}C$  $I_0 = 1.0 \text{ mA}$  $I_O = 40 \text{ mA}$ I<sub>O</sub> = 100 mA 0 0 2.0 4.0 6.0 8.0 10 V<sub>I</sub>, INPUT VOLTAGE (V)

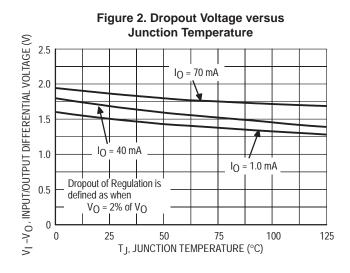
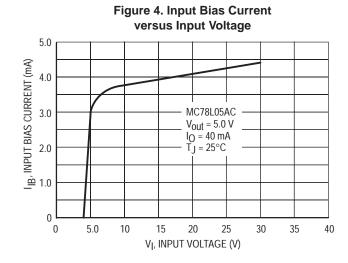


Figure 3. Input Bias Current versus **Ambient Temperature** 4.2 I<sub>IB</sub>, INPUT BIAS CURRENT (mA) 4.0 3.8 3.6 3.4 3.2 MC78L05AC  $V_{I} = 10 \text{ V}$  $\dot{V_0} = 5.0 \text{ V}$ 3.0  $I_{O} = 40 \text{ mA}$ 0 0 25 50 75 100 125 TA, AMBIENT TEMPERATURE (°C)



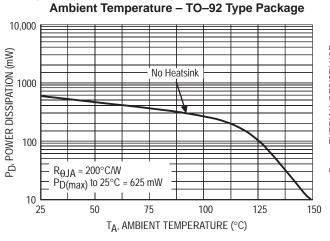


Figure 5. Maximum Average Power Dissipation versus

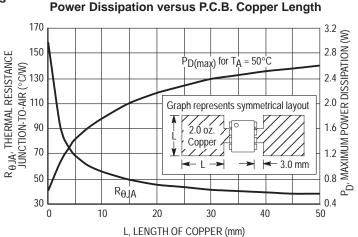


Figure 6. SOP-8 Thermal Resistance and Maximum

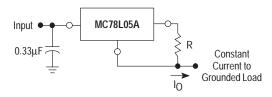
#### **APPLICATIONS INFORMATION**

#### **Design Considerations**

The MC78L00A Series of fixed voltage regulators are designed with Thermal Overload Protection that shuts down the circuit when subjected to an excessive power overload condition. Internal Short Circuit Protection limits the maximum current the circuit will pass.

In many low current applications, compensation capacitors are not required. However, it is recommended that the regulator input be bypassed with a capacitor if the regulator is connected to the power supply filter with long wire lengths, or if the output load capacitance is large. The

Figure 7. Current Regulator



The MC78L00 regulators can also be used as a current source when connected as above. In order to minimize dissipation the MC78L05C is chosen in this application. Resistor R determines the current as follows:

$$I_O = \frac{5.0 \text{ V}}{R} + I_B$$

I<sub>IB</sub> = 3.8 mA over line and load changes

For example, a 100 mA current source would require R to be a 50  $\Omega$ , 1/2 W resistor and the output voltage compliance would be the input voltage less 7 V.

input bypass capacitor should be selected to provide good high–frequency characteristics to insure stable operation under all load conditions. A 0.33  $\mu F$  or larger tantalum, mylar, or other capacitor having low internal impedance at high frequencies should be chosen.The bypass capacitor should be mounted with the shortest possible leads directly across the regulators input terminals. Good construction techniques should be used to minimize ground loops and lead resistance drops since the regulator has no external sense lead. Bypassing the output is also recommended.

Figure 8. ± 15 V Tracking Voltage Regulator

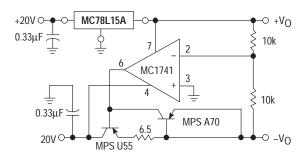
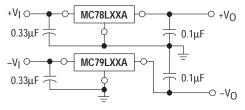


Figure 9. Positive and Negative Regulator



#### **ORDERING INFORMATION**

Device	Operating Temperature Range	Package	Shipping
MC78LXXACD*		SOP-8	98 Units / Rail
MC78LXXACDR2*		SOP-8 / Tape & Reel	2500 Units / Tape & Reel
MC78LXXACP	T <sub>J</sub> = 0° to +125°C	TO-92	2000 Units / Bag
MC78LXXACPRA / MC78LXXACPRE		TO-92 / Tape & Reel	2000 Units / Tape & Reel
MC78LXXACPRM / MC78LXXACPRP		TO-92 / Ammo Pack	2000 Units / Ammo Pack
MC78LXXABD*		SOP-8	98 Units / Rail
MC78LXXABDR2*		SOP-8 / Tape & Reel	2500 Units / Tape & Reel
MC78LXXABP*	$T_J = -40^{\circ} \text{ to } +125^{\circ}\text{C}$	TO-92	2000 Units / Bag
MC78LXXABPRA / MC78LXXABPRE		TO-92 / Tape & Reel	2000 Units / Tape & Reel
MC78LXXABPRM / MC78LXXABPRP		TO-92 / Ammo Pack	2000 Units / Ammo Pack

XX indicates nominal voltage

<sup>\*</sup>Available in 5, 8, 9, 12 and 15 V devices.

#### PACKAGE DIMENSIONS

# P SUFFIX

PLASTIC PACKAGE CASE 29-04 ISSUE AD

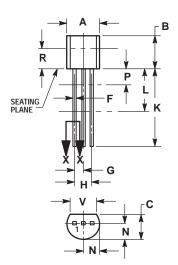
> (SOP-8) D SUFFIX

#### KAGE

- NOTES:

  1. DIMENSIONING AND TOLERANCING PER ANSI
  VIA FM 1002
- 2. CONTROLLING DIMENSION: INCH.
- CONTOUR OF PACKAGE BEYOND DIMENSION R
   IS UNCONTROLLED.
- DIMENSION F APPLIES BETWEEN P AND L.
   DIMENSION D AND J APPLY BETWEEN L AND K
   MINIMUM. LEAD DIMENSION IS UNCONTROLLED
   IN P AND BEYOND DIMENSION K MINIMUM.

	INCHES		MILLIN	IETERS
DIM	MIN	MAX	MIN	MAX
Α	0.175	0.205	4.45	5.20
В	0.170	0.210	4.32	5.33
С	0.125	0.165	3.18	4.19
D	0.016	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
Н	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500		12.70	
L	0.250		6.35	
N	0.080	0.105	2.04	2.66
Р		0.100		2.54
R	0.115		2.93	
٧	0.135		3.43	





# PLASTIC PACKAGE CASE 751–05 ISSUE R B A B A SEATING PLANE D O.25 O.10 B O.25 O.25 O.30 C A SEATING PLANE D O.25 O.30 B O.25 O.30 C D O.30 O.30

#### NOTES

- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
- 2. DIMENSIONS ARE IN MILLIMETERS.
- 3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
- 4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
- 5. DIMENSION B DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS			
DIM	MIN	MAX		
Α	1.35	1.75		
A1	0.10	0.25		
В	0.35	0.49		
С	0.18	0.25		
D	4.80	5.00		
Ε	3.80	4.00		
е	1.27	BSC		
Н	5.80	6.20		
h	0.25	0.50		
L	0.40	1.25		
θ	0 °	7 °		

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