

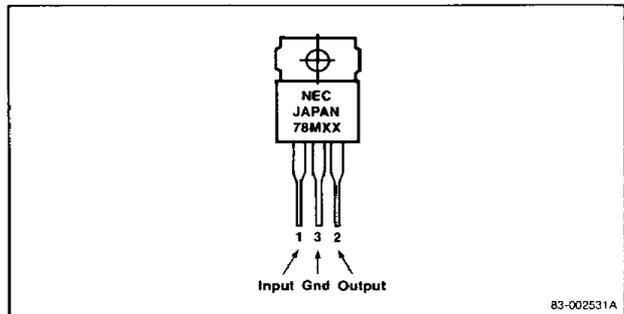
### Description

The  $\mu$ PC78M00 series of three terminal regulators are monolithic positive voltage regulators which feature internal current limiting and thermal shutdown. They are intended for use as fixed voltage regulators in a wide range of applications, including local on-card regulators where distribution with single point regulation is a problem.

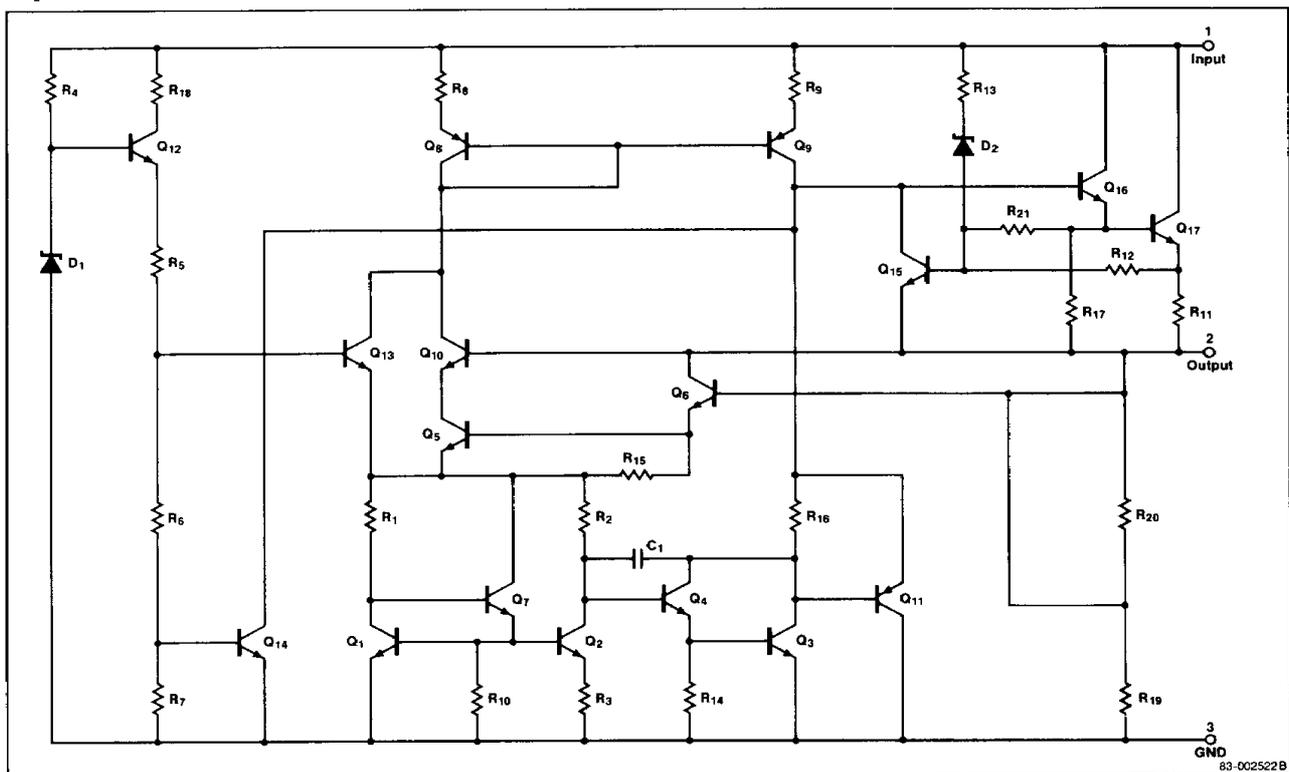
### Features

- Output current in excess of 0.5 A
- No external components required
- Internal thermal overload protection
- Internal short circuit current limiting

### Pin Configuration



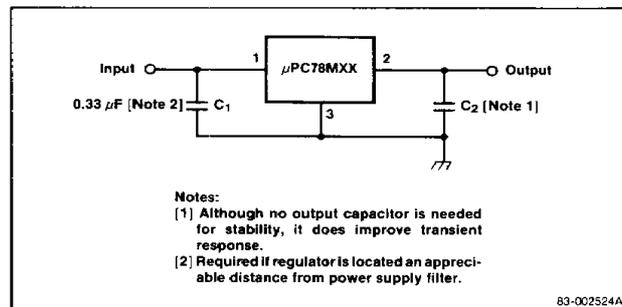
### Equivalent Circuit



**Ordering Information**

Part Number	Package	Operating Temperature Range
μPC78M05H	Plastic SIP	-20°C to +80°C
μPC78M08H	Plastic SIP	-20°C to +80°C
μPC78M10H	Plastic SIP	-20°C to +80°C
μPC78M12H	Plastic SIP	-20°C to +80°C
μPC78M15H	Plastic SIP	-20°C to +80°C
μPC78M18H	Plastic SIP	-20°C to +80°C
μPC78M24H	Plastic SIP	-20°C to +80°C

**Typical Application**



**Absolute Maximum Ratings**

Input Voltage (μPC78M05/08/10/12/15/18)	35 V
Input Voltage (μPC78M24)	40 V
Internal Power Dissipation	Internally Limited
Operating Temperature Range	-20 to +80°C
Storage Temperature Range	-55 to +150°C
Operating Junction Temperature Range	-20 to 125°C

**Comment:** Stress above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**Electrical Characteristics — μPC78M05**

$V_{IN} = 10\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

Parameter	Symbol	Limits			Unit	Test Conditions
		Min.	Typ.	Max.		
Output Voltage	$V_O$	4.8	5.0	5.2	V	$T_J = 25^\circ\text{C}$
		4.75		5.25	V	$7\text{ V} \leq V_{IN} \leq 20\text{ V}$ , $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	$REG_{LN}$		3	100	mV	$T_J = 25^\circ\text{C}$ , $7\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $I_O = 200\text{ mA}$
			1	50	mV	$T_J = 25^\circ\text{C}$ , $8\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $I_O = 200\text{ mA}$
Load Regulation	$REG_L$		20	100	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 500\text{ mA}$
			10	50	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 200\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.5	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.8	mA	$8\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $I_O = 200\text{ mA}$
				0.5	mA	$5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	$V_N$		40		$\mu\text{V}$	$T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	RR	62	80		dB	$T_J = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ , $8\text{ V} \leq V_{IN} \leq 18\text{ V}$ , $I_O = 300\text{ mA}$
Dropout Voltage			2.0		V	$T_A = 25^\circ\text{C}$
Short Circuit Current	$I_{OSHORT}$		250		mA	$T_J = 25^\circ\text{C}$ , $V_{IN} \leq 35\text{ V}$
Peak Output Current	$I_{OPEAK}$		1.0		A	$T_J = 25^\circ\text{C}$
Output Voltage Drift	$\Delta V_O / \Delta T$		-1.0		mV/°C	$I_O = 5\text{ mA}$

### Electrical Characteristics — μPC78M08

$V_{IN} = 14\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

Parameter	Symbol	Limits			Unit	Test Conditions
		Min.	Typ.	Max.		
Output Voltage	$V_O$	7.7	8.0	8.3	V	$T_J = 25^\circ\text{C}$
		7.6		8.4	V	$10.5\text{ V} \leq V_{IN} \leq 23\text{ V}$ , $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		6.0	100	mV	$T_J = 25^\circ\text{C}$ , $10.5\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $I_O = 200\text{ mA}$
			2.0	50	mV	$T_J = 25^\circ\text{C}$ , $11\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $I_O = 200\text{ mA}$
Load Regulation	$REG_L$		25	160	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 500\text{ mA}$
			10	80	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 200\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.6	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.8	mA	$10.5\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $I_O = 200\text{ mA}$
				0.5	mA	$5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	$V_N$		52		$\mu\text{V}$	$T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	RR	56	80		dB	$T_J = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ , $11.5\text{ V} \leq V_{IN} \leq 21.5\text{ V}$ , $I_O = 300\text{ mA}$
Dropout Voltage			2.0		V	$T_A = 25^\circ\text{C}$
Short Circuit Current	$I_{OSHORT}$		250		mA	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35\text{ V}$
Peak Output Current	$I_{OPEAK}$		1.0		A	$T_J = 25^\circ\text{C}$
Output Voltage Drift	$\Delta V_O/\Delta T$		-1.0		mV/ $^\circ\text{C}$	$I_O = 5\text{ mA}$

### Electrical Characteristics — μPC78M10

$V_{IN} = 17\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

Parameter	Symbol	Limits			Unit	Test Conditions
		Min.	Typ.	Max.		
Output Voltage	$V_O$	9.6	10	10.4	V	$T_J = 25^\circ\text{C}$
		9.5		10.5	V	$12.5\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		1.0	100	mV	$T_J = 25^\circ\text{C}$ , $12.5\text{ V} \leq V_{IN} \leq 28\text{ V}$ , $I_O = 200\text{ mA}$
			2.0	50	mV	$T_J = 25^\circ\text{C}$ , $14\text{ V} \leq V_{IN} \leq 28\text{ V}$ , $I_O = 200\text{ mA}$
Load Regulation	$REG_L$		25	200	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 500\text{ mA}$
			10	100	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 200\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.5	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.8	mA	$12.5\text{ V} \leq V_{IN} \leq 28\text{ V}$ , $I_O = 200\text{ mA}$
				0.5	mA	$5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	$V_N$		70		$\mu\text{V}$	$T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	RR	55	80		dB	$T_J = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ , $13\text{ V} \leq V_{IN} \leq 23\text{ V}$ , $I_O = 300\text{ mA}$
Dropout Voltage			2.0		V	$T_A = 25^\circ\text{C}$
Short Circuit Current	$I_{OSHORT}$		250		mA	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35\text{ V}$
Peak Output Current	$I_{OPEAK}$		1.0		A	$T_J = 25^\circ\text{C}$
Output Voltage Drift	$\Delta V_O/\Delta T$		-1.0		mV/ $^\circ\text{C}$	$I_O = 5\text{ mA}$

**Electrical Characteristics — μPC78M12**

$V_{IN} = 19\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

Parameter	Symbol	Limits			Unit	Test Conditions
		Min.	Typ.	Max.		
Output Voltage	$V_O$	11.5	12.0	12.5	V	$T_J = 25^\circ\text{C}$
		11.4		12.6	V	$14.5\text{ V} \leq V_{IN} \leq 27\text{ V}$ , $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		8.0	100	mV	$T_J = 25^\circ\text{C}$ , $14.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ , $I_O = 200\text{ mA}$
			2.0	50	mV	$T_J = 25^\circ\text{C}$ , $16\text{ V} \leq V_{IN} \leq 30\text{ V}$ , $I_O = 200\text{ mA}$
Load Regulation	$REG_L$		25	240	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 500\text{ mA}$
			10	120	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 200\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.8	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.8	mA	$14.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ , $I_O = 200\text{ mA}$
				0.5	mA	$5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	$V_N$		75		$\mu\text{V}$	$T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection		55	80		dB	$T_J = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ , $15\text{ V} \leq V_{IN} \leq 25\text{ V}$ , $I_O = 300\text{ mA}$
Dropout Voltage			2.0		V	$T_A = 25^\circ\text{C}$
Short Circuit Current	$I_{SHORT}$		250		mA	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35\text{ V}$
Peak Output Current	$I_{OPEAK}$		1.0		A	$T_J = 25^\circ\text{C}$
Output Voltage Drift	$\Delta V_O/\Delta T$		-1.0		mV/°C	$I_O = 5\text{ mA}$

**Electrical Characteristics — μPC78M15**

$V_{IN} = 23\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

Parameter	Symbol	Limits			Unit	Test Conditions
		Min.	Typ.	Max.		
Output Voltage	$V_O$	14.4	15	15.6	V	$T_J = 25^\circ\text{C}$
		14.25		15.75	V	$17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ , $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	$REG_{IN}$		10	100	mV	$T_J = 25^\circ\text{C}$ , $17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ , $I_O = 200\text{ mA}$
			3.0	50	mV	$T_J = 25^\circ\text{C}$ , $20\text{ V} \leq V_{IN} \leq 30\text{ V}$ , $I_O = 200\text{ mA}$
Load Regulation	$REG_L$		25	300	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 500\text{ mA}$
			10	150	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 200\text{ mA}$
Quiescent Current	$I_{BIAS}$		4.8	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.8	mA	$17.5\text{ V} \leq V_{IN} \leq 30\text{ V}$ , $I_O = 200\text{ mA}$
				0.5	mA	$5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	$V_N$		90		$\mu\text{V}$	$T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	RR	54	70		dB	$T_J = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ , $18.5\text{ V} \leq V_{IN} \leq 28.5\text{ V}$ , $I_O = 300\text{ mA}$
Dropout Voltage			2.0		V	$T_A = 25^\circ\text{C}$
Short Circuit Current	$I_{SHORT}$		250		mA	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35\text{ V}$
Peak Output Current	$I_{OPEAK}$		1.0		A	$T_J = 25^\circ\text{C}$
Output Voltage Drift	$\Delta V_O/\Delta T$		-1.0		mV/°C	$I_O = 5\text{ mA}$

### Electrical Characteristics — μPC78M18

$V_{IN} = 27\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

Parameter	Symbol	Limits			Unit	Test Conditions
		Min.	Typ.	Max.		
Output Voltage	$V_O$	17.3	18.0	18.7	V	$T_J = 25^\circ\text{C}$
		17.1		18.9	V	$21\text{ V} \leq V_{IN} \leq 33\text{ V}$ , $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG <sub>LN</sub>		10	100	mV	$T_J = 25^\circ\text{C}$ , $21\text{ V} \leq V_{IN} \leq 33\text{ V}$ , $I_O = 200\text{ mA}$
			4.0	50	mV	$T_J = 25^\circ\text{C}$ , $24\text{ V} \leq V_{IN} \leq 30\text{ V}$
Load Regulation	REG <sub>L</sub>		30	360	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 500\text{ mA}$
			10	180	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 200\text{ mA}$
Quiescent Current	I <sub>BIAS</sub>		4.8	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.8	mA	$27\text{ V} \leq V_{IN} \leq 38\text{ V}$
				0.5	mA	$5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	$V_N$		100		μV	$T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection	RR	53	70		dB	$T_J = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ , $22\text{ V} \leq V_{IN} \leq 32\text{ V}$ , $I_O = 300\text{ mA}$
Dropout Voltage			2.0		V	$T_A = 25^\circ\text{C}$
Short Circuit Current	I <sub>SHORT</sub>		250		mA	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35\text{ V}$
Peak Output Current	I <sub>OPEAK</sub>		1.0		A	$T_J = 25^\circ\text{C}$
Output Voltage Drift	$\Delta V_O/\Delta T$		-1.0		mV/°C	$I_O = 5\text{ mA}$

### Electrical Characteristics — μPC78M24

$V_{IN} = 27\text{ V}$ ,  $I_O = 350\text{ mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

Parameter	Symbol	Limits			Unit	Test Conditions
		Min.	Typ.	Max.		
Output Voltage	$V_O$	23	24	25	V	$T_J = 25^\circ\text{C}$
		22.8		25.2	V	$27\text{ V} \leq V_{IN} \leq 38\text{ V}$ , $5\text{ mA} \leq I_O \leq 350\text{ mA}$
Line Regulation	REG <sub>LN</sub>		10	100	mV	$T_J = 25^\circ\text{C}$ , $27\text{ V} \leq V_{IN} \leq 38\text{ V}$ , $I_O = 200\text{ mA}$
			5.0	50	mV	$T_J = 25^\circ\text{C}$ , $28\text{ V} \leq V_{IN} \leq 38\text{ V}$
Load Regulation	REG <sub>L</sub>		30	480	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 500\text{ mA}$
			10	240	mV	$T_J = 25^\circ\text{C}$ , $5\text{ mA} \leq I_O \leq 200\text{ mA}$
Quiescent Current	I <sub>BIAS</sub>		5.0	6.0	mA	$T_J = 25^\circ\text{C}$
Quiescent Current Change	$\Delta I_{BIAS}$			0.8	mA	$27\text{ V} \leq V_{IN} \leq 38\text{ V}$ , $I_O = 200\text{ mA}$
				0.5	mA	$5\text{ mA} \leq I_O \leq 350\text{ mA}$
Output Noise Voltage	$V_N$		170		μV	$T_A = 25^\circ\text{C}$ , $10\text{ Hz} \leq f \leq 100\text{ kHz}$
Ripple Rejection		50	70		dB	$T_J = 25^\circ\text{C}$ , $f = 120\text{ Hz}$ , $28\text{ V} \leq V_{IN} \leq 38\text{ V}$ , $I_O = 300\text{ mA}$
Dropout Voltage			2.0		V	$T_A = 25^\circ\text{C}$
Short Circuit Current	I <sub>SHORT</sub>		250		mA	$T_J = 25^\circ\text{C}$ , $V_{IN} = 35\text{ V}$
Peak Output Current	I <sub>OPEAK</sub>		1.0		A	$T_J = 25^\circ\text{C}$
Output Voltage Drift	$\Delta V_O/\Delta T$		-1.2		mV/°C	$I_O = 5\text{ mA}$ , $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$

**Operating Characteristics**

$T_A = 25^\circ\text{C}$

