

The ML7800/A series are three terminal positive voltage regulators for applications that require a regulated supply of fixed output voltage and current in excess of 1A.

These regulators available in four fixed output voltage options from 5V, 12V, 15V and 18V. They feature output short circuit protection, thermal shutdown and safe area compensation making them remarkably rugged under most operating conditions.

CASE TO-220B



1. INPUT
2. GROUND
3. OUTPUT

FEATURES

- Output current in excess of 1A
- Output short-circuit protection
- Output transistor safe-area compensation
- Internal thermal overload protection
- No external component required
- No external adjustment required
- Output voltage tolerances of $\pm 5\%$ (ML7800A) and $\pm 10\%$ (ML7800 without A suffix) over the temperature range

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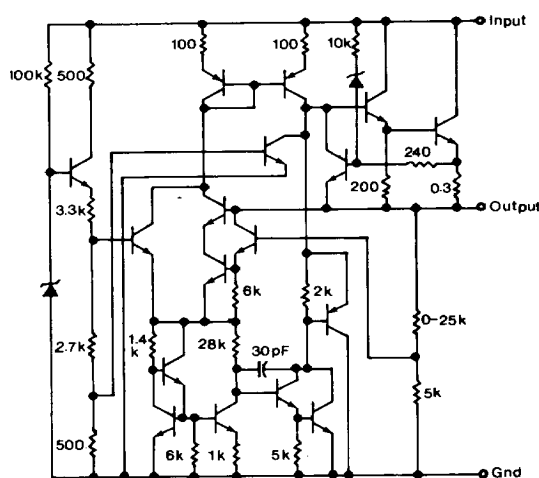
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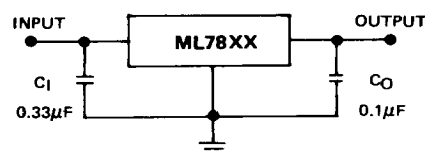
ABSOLUTE MAXIMUM RATINGS:

Input Voltage	V_I	35V
Power Dissipation	P_{tot}	Internally limited
Operating Junction Temperature Range	T_j	0 to +150°C
Storage Temperature Range	T_{stg}	-65 to +150°C

EQUIVALENT CIRCUIT



STANDARD APPLICATION



The input voltage must remain at least 2V above the output voltage.

C_1 is required if regulator is located at appreciable distance from power supply filter.

C_0 is for improvement of transient response only, it is not needed for stability.



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ML7800/A series

1A POSITIVE VOLTAGE REGULATORS

ML7805/A ELECTRICAL CHARACTERISTICS: ($V_I = 10V$, $I_O = 500mA$, $0^\circ C < T_J < +125^\circ C$ unless otherwise noted)

PARAMETER	SYMBOL	ML7805A			ML7805			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX		
Output Voltage	V_O	4.8	5.0	5.2	4.6	5.0	5.4	V	$T_J = +25^\circ C$
Line Regulation	ΔV_O		7	50				mV	$T_J = +25^\circ C$ $I_O = 100mA$ $7V \leq V_I \leq 25V$ $8V \leq V_I \leq 12V$
			2	25				mV	
Load Regulation	ΔV_O		35	100		35	100	mV	$T_J = +25^\circ C$ $I_O = 500mA$ $7V \leq V_I \leq 25V$ $8V \leq V_I \leq 12V$
			8	50		8	50	mV	
Load Regulation	ΔV_O		11	100		11	100	mV	$T_J = +25^\circ C$ $5.0mA \leq I_O \leq 1.5A$ $250mA \leq I_O \leq 750mA$
			4	50		4	50	mV	
Output Voltage	V_O	4.75		5.25	4.5		5.5	V	$7V \leq V_I \leq 20V$ $5mA \leq I_O \leq 1A$, $P \leq 15W$
Quiescent Current	I_Q		4	8		4	8	mA	$T_J = +25^\circ C$
Quiescent Current Change	ΔI_Q			1.3			1.3	mA	$7V \leq V_I \leq 25V$
				0.5			0.5	mA	$5mA \leq I_O \leq 1A$
Output Noise Voltage	$\overline{E_n}$		40			40		μV	$T_A = +25^\circ C$ $10Hz \leq f \leq 100kHz$
Long Term Stability	$\Delta V_O / \Delta t$			20			20	mV/1kHrs	
Ripple Rejection	$\Delta V_I / \Delta V_O$		70			70		dB	$I_O = 20mA$ $f = 120Hz$
Input-Output Voltage Differential	$V_I - V_O$		2			2		V	$I_O = 1A$ $T_J = +25^\circ C$
Output Resistance	R_O		30			30		$m\Omega$	$I_O = 500mA$
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_A$		-1			-1		mV/ $^\circ C$	$I_O = 5mA$ $0^\circ C \leq T_A \leq +125^\circ C$

ML7812/A ELECTRICAL CHARACTERISTICS: ($V_I = 19V$, $I_O = 500mA$, $0^\circ C < T_J < +125^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	ML7812A			ML7812			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX		
Output Voltage	V_O	11.5	12	12.5	11.1	12	12.9	V	$T_J = +25^\circ C$
Line Regulation	ΔV_O		13	120				mV	$T_J = +25^\circ C$ $I_O = 100mA$ $14.5V \leq V_I \leq 30V$ $16.0V \leq V_I \leq 22V$
			6	60				mV	
Load Regulation	ΔV_O		55	240		55	240	mV	$T_J = +25^\circ C$ $I_O = 500mA$ $14.5V \leq V_I \leq 30V$ $16.0V \leq V_I \leq 22V$
			24	120		24	120	mV	
Load Regulation	ΔV_O		46	240		46	240	mV	$T_J = +25^\circ C$ $5.0mA \leq I_O \leq 1.5A$ $250mA \leq I_O \leq 750mA$
			17	120		17	120	mV	
Output Voltage	V_O	11.4		12.6	10.8		13.2	V	$14.5V \leq V_I \leq 27V$ $5mA \leq I_O \leq 1A$, $P \leq 15W$
Quiescent Current	I_Q		4	8		4	8	mA	$T_J = +25^\circ C$
Quiescent Current Change	ΔI_Q			1			1	mA	$14.5V \leq V_I \leq 30V$
				0.5			0.5	mA	$5mA \leq I_O \leq 1A$
Output Noise Voltage	$\overline{E_n}$		75			75		μV	$T_A = +25^\circ C$ $10Hz \leq f \leq 100kHz$
Long Term Stability	$\Delta V_O / \Delta t$			48			48	mV/1kHrs	
Ripple Rejection	$\Delta V_I / \Delta V_O$		61			61		dB	$I_O = 20mA$ $f = 120Hz$
Input-Output Voltage Differential	$V_I - V_O$		2			2		V	$I_O = 1A$ $T_J = +25^\circ C$
Output Resistance	R_O		75			75		$m\Omega$	$I_O = 500mA$
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_A$		-1			-1		mV/ $^\circ C$	$I_O = 5mA$ $0^\circ C \leq T_A \leq +125^\circ C$

ML7800/A series

1A POSITIVE VOLTAGE REGULATORS

ML7815/A ELECTRICAL CHARACTERISTICS: ($V_I = 23V$, $I_O = 500mA$, $0^\circ C < T_J < +125^\circ C$ unless otherwise noted)

PARAMETER	SYMBOL	ML7815A			ML7815			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX		
Output Voltage	V_O	14.4	15	15.6	13.8	15	16.2	V	$T_J = +25^\circ C$
Line Regulation	ΔV_O		14	150				mV	$T_J = +25^\circ C$ $I_O = 100mA$ $17.5V \leq V_I \leq 30V$ $20.0V \leq V_I \leq 26V$
			6	75				mV	
Load Regulation	ΔV_O		57	300		57	300	mV	$T_J = +25^\circ C$ $I_O = 500mA$ $17.5V \leq V_I \leq 30V$ $20.0V \leq V_I \leq 26V$
			27	150		27	150	mV	
Load Regulation	ΔV_O		68	300		68	300	mV	$T_J = +25^\circ C$ $5.0mA \leq I_O \leq 1.5A$ $250mA \leq I_O \leq 750mA$
			25	150		25	150	mV	
Output Voltage	V_O	14.25		15.75	13.5		16.5	V	$17.5V \leq V_I \leq 30V$ $5mA \leq I_O \leq 1A$, $P \leq 15W$
Quiescent Current	I_Q		4	8		4	8	mA	$T_J = +25^\circ C$
Quiescent Current Change	ΔI_Q			1			1	mA	$17.5V \leq V_I \leq 30V$ $5.0mA \leq I_O \leq 1A$
				0.5			0.5	mA	
Output Noise Voltage	$\overline{E_n}$		90			90		μV	$T_A = +25^\circ C$ $10Hz \leq f \leq 100kHz$
Long Term Stability	$\Delta V_O / \Delta t$			60			60	mV/1KHrs	
Ripple Rejection	$\Delta V_I / \Delta V_O$		60			60		dB	$I_O = 20mA$ $f = 120Hz$
Input-Output Voltage Differential	$V_I - V_O$		2			2		V	$I_O = 1A$ $T_J = +25^\circ C$
Output Resistance	R_O		95			95		$m\Omega$	$I_O = 500mA$
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_A$		-1			-1		$mV/^\circ C$	$I_O = 5mA$ $0^\circ C \leq T_A \leq +125^\circ C$

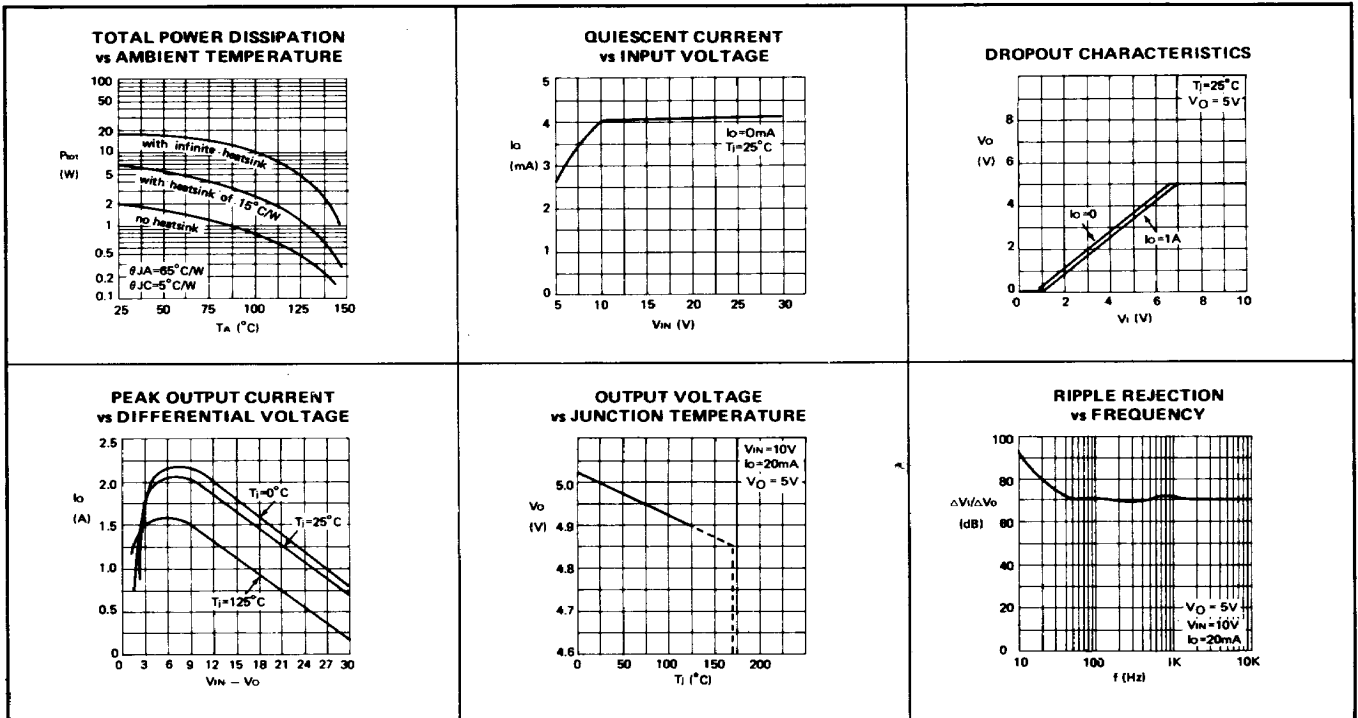
ML7818/A ELECTRICAL CHARACTERISTICS ($V_I = 27V$, $I_O = 500mA$, $0^\circ C < T_J < +125^\circ C$, unless otherwise noted)

PARAMETER	SYMBOL	ML7818A			ML7818			UNIT	TEST CONDITIONS
		MIN	TYP	MAX	MIN	TYP	MAX		
Output Voltage	V_O	17.3	18	18.7	16.6	18	19.4	V	$T_J = +25^\circ C$
Line Regulation	ΔV_O		25	180				mV	$T_J = +25^\circ C$ $I_O = 100mA$ $21V \leq V_I \leq 33V$ $24V \leq V_I \leq 30V$
			10	90				mV	
Load Regulation	ΔV_O		90	360		90	360	mV	$T_J = +25^\circ C$ $I_O = 500mA$ $21V \leq V_I \leq 33V$ $24V \leq V_I \leq 30V$
			50	180		50	180	mV	
Load Regulation	ΔV_O		110	360		110	360	mV	$T_J = +25^\circ C$ $5.0mA \leq I_O \leq 1A$ $250mA \leq I_O \leq 750mA$
			55	180		55	180	mV	
Output Voltage	V_O	17.1		18.9	16.2		19.8	V	$21V \leq V_I \leq 33V$ $5mA \leq I_O \leq 1A$, $P \leq 15W$
Quiescent Current	I_Q		5	8		5	8	mA	$T_J = +25^\circ C$
Quiescent Current Change	ΔI_Q			1			1	mA	$21V \leq V_I \leq 33V$ $5.0mA \leq I_O \leq 1A$
				0.5			0.5	mA	
Output Noise Voltage	$\overline{E_n}$		110			110		μV	$T_A = +25^\circ C$ $10Hz \leq f \leq 100kHz$
Long Term Stability	$\Delta V_O / \Delta t$			72			72	mV/1kHrs	
Ripple Rejection	$\Delta V_I / \Delta V_O$		59			59		dB	$I_O = 20mA$ $f = 120Hz$
Input-Output Voltage Differential	$V_I - V_O$		2			2		V	$I_O = 1A$ $T_J = +25^\circ C$
Output Resistance	R_O		110			110		$m\Omega$	$I_O = 500mA$
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_A$		-1			-1		$mV/^\circ C$	$I_O = 5mA$ $0^\circ C \leq T_A \leq +125^\circ C$

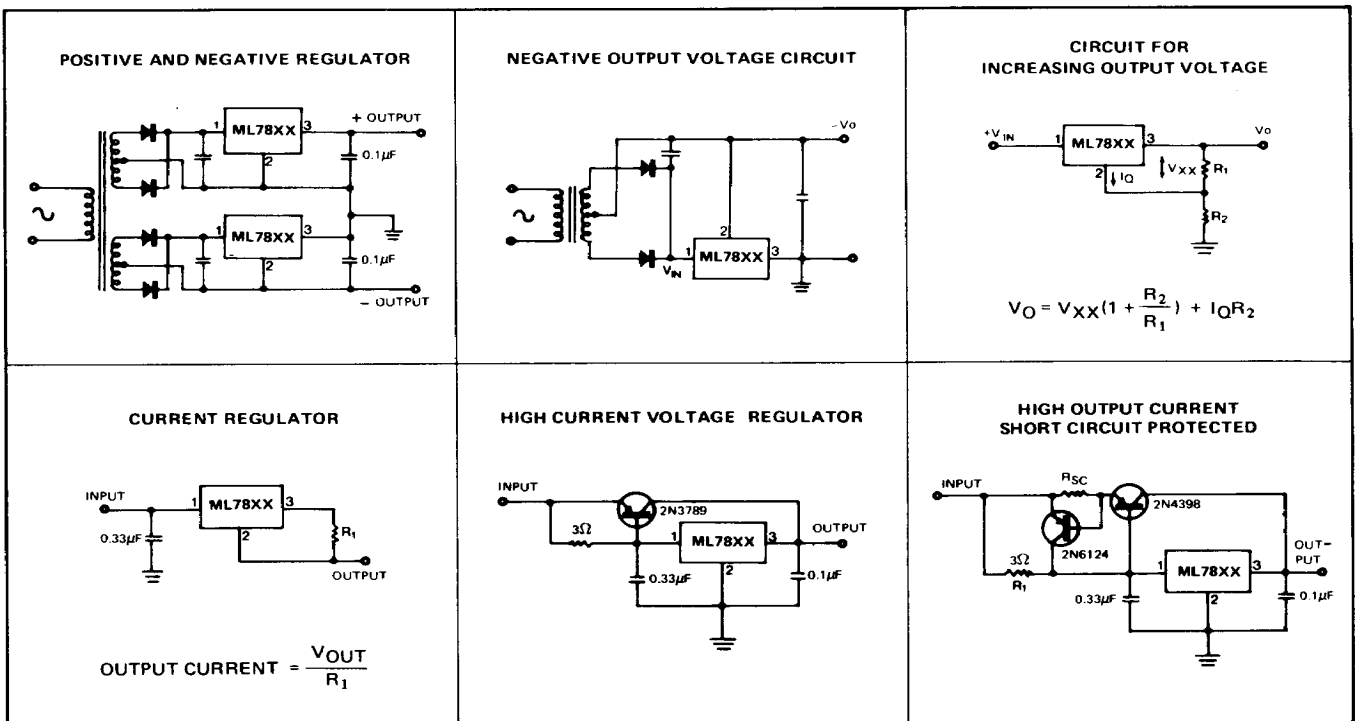
ML7800/A series

1A POSITIVE VOLTAGE REGULATORS

TYPICAL CHARACTERISTICS OF ML78XX series



CIRCUIT APPLICATIONS OF ML78XX series



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