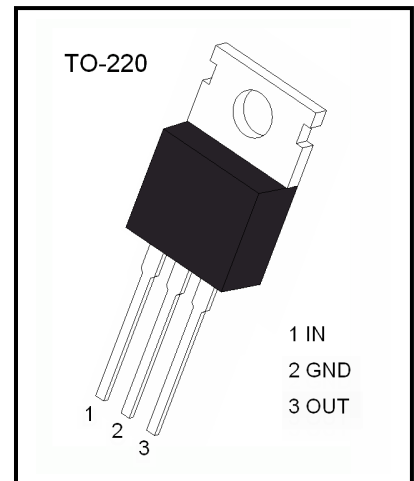


Features

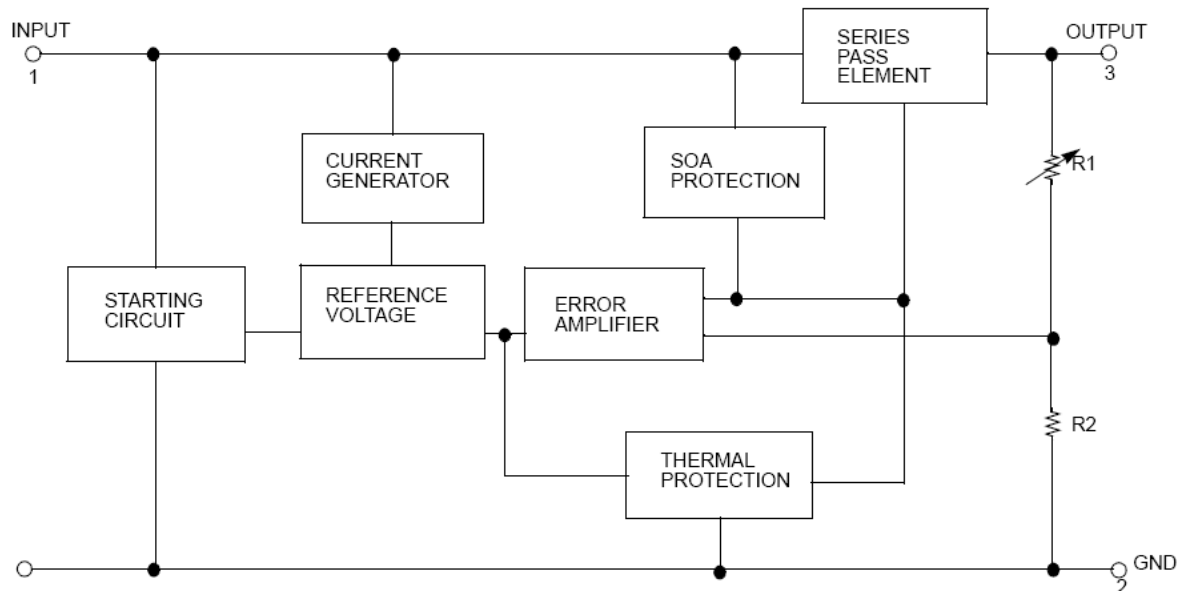
- Output Current up to 0.5A
- Output Voltages of 5, 6, 8, 9, 12, 15, 18, 24V
- Internal Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating area (SOA)Protection

Description

The L78XX three-terminal positive regulators are available in the TO-220 package with several fixed output voltages making it useful in a wide range of applications.



Internal Block Diagram



Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{IN}	Input Voltage	(for $V_O = 5V$ to $18V$)	35	V
		(for $V_O = 24V$)	40	
$R_{\theta JC}$	Thermal Resistance Junction-Case		5	$^{\circ}C/W$
$R_{\theta JA}$	Thermal Resistance Junction-Air ($T_a = +25^{\circ}C$)		65	$^{\circ}C/W$
T_{OPR}	Operating Junction Temperature Range		0 ~ 125	$^{\circ}C$
T_{STG}	Storage Temperature Range		-65 ~ +150	$^{\circ}C$

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7805)

(Refer to test circuit , $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$, $I_O = 1.0\text{A}$, $V_I = 10\text{V}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Output Voltage	V_O	$I_O = 5\text{mA} \sim 1.0\text{A}$, $P_O \leq 15\text{W}$ $V_I = 7 \sim 20\text{V}$		4.75	5.0	5.25	V
Line Regulation(Note)	ΔV_O	$T_J = 25^{\circ}\text{C}$	$V_I = 7\text{V} \sim 25\text{V}$			100	mV
			$V_I = 8\text{V} \sim 12\text{V}$			50	
Load Regulation(Note)	ΔV_O	$T_J = 25^{\circ}\text{C}$	$I_O = 5.0\text{mA} \sim 1.5\text{A}$			100	mV
			$I_O = 250\text{mA} \sim 750\text{mA}$			50	
Quiescent Current	I_Q	$T_J = 25^{\circ}\text{C}$				8.0	mA
Quiescent Current Change	ΔI_Q	$I_O = 5.0\text{mA} \sim 1.0\text{A}$				0.5	mA
		$V_I = 7 \sim 25\text{V}$				1.3	
Output Voltage Drift	$\Delta V / \Delta T$	$I_O = 5\text{mA}$			-0.8		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$			42		$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_I = 8 \sim 18\text{V}$			80		dB
Dropout Voltage	V_D	$T_J = 25^{\circ}\text{C}$, $I_O = 1.0\text{A}$			2		V
Short Circuit Current	I_{SC}	$T_J = 25^{\circ}\text{C}$, $V_I = 35\text{V}$			230		mA
Peak Current	I_{PK}	$T_J = 25^{\circ}\text{C}$			2.0		A

Notes:

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.

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7806)

(Refer to test circuit , $0^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 1.0\text{A}$, $V_i = 11\text{V}$, $C_i = 0.33\mu\text{F}$, $C_o = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Output Voltage	V_o	$I_o = 5.0\text{mA} \sim 1.0\text{A}$, $P_o \leq 15\text{W}$ $V_i = 7 \sim 20\text{V}$		5.7	6.0	6.3	V
Line Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$	$V_i = 8\text{V} \sim 25\text{V}$			120	mV
			$V_i = 9\text{V} \sim 13\text{V}$			60	
Load Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$	$I_o = 5.0\text{mA} \sim 1.5\text{A}$			120	mV
			$I_o = 250\text{mA} \sim 750\text{mA}$			60	
Quiescent Current	I_Q	$T_j = 25^{\circ}\text{C}$				8.0	mA
Quiescent Current Change	ΔI_Q	$I_o = 5.0\text{mA} \sim 1.0\text{A}$				0.5	mA
		$V_i = 8 \sim 25\text{V}$				1.3	
Output Voltage Drift	$\Delta V / \Delta T$	$I_o = 5\text{mA}$			-0.8		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$			45		$\mu\text{V}/V_o$
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_i = 9 \sim 19\text{V}$			80		dB
Dropout Voltage	V_D	$I_o = 1.0\text{A}$, $T_j = 25^{\circ}\text{C}$			2		V
Short Circuit Current	I_{SC}	$V_i = 35\text{V}$, $T_j = 25^{\circ}\text{C}$			250		mA
Peak Current	I_{PK}	$T_j = 25^{\circ}\text{C}$			2.0		A

Notes:

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.

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7808)

(Refer to test circuit , $0^{\circ}\text{C} < T_J < 125^{\circ}\text{C}$, $I_O = 1.0\text{A}$, $V_I = 14\text{V}$, $C_I = 0.33\mu\text{F}$, $C_O = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Output Voltage	V_O	$I_O = 5.0\text{mA} \sim 1.0\text{A}$, $P_O \leq 15\text{W}$ $V_I = 10.5 \sim 23\text{V}$		7.6	8.0	8.4	V
Line Regulation(Note)	ΔV_O	$T_J = 25^{\circ}\text{C}$	$V_I = 10.5\text{V} \sim 25\text{V}$			160	mV
			$V_I = 11.5\text{V} \sim 17\text{V}$			80	
Load Regulation(Note)	ΔV_O	$T_J = 25^{\circ}\text{C}$	$I_O = 5.0\text{mA} \sim 1.5\text{A}$			160	mV
			$I_O = 250\text{mA} \sim 750\text{mA}$			80	
Quiescent Current	I_Q	$T_J = 25^{\circ}\text{C}$				8.0	mA
Quiescent Current Change	ΔI_Q	$I_O = 5.0\text{mA} \sim 1.0\text{A}$				0.5	mA
		$V_I = 10.5 \sim 25\text{V}$				1.0	
Output Voltage Drift	$\Delta V / \Delta T$	$I_O = 5.0\text{mA}$			-0.8		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$			52		$\mu\text{V}/V_O$
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_I = 11.5 \sim 21.5\text{V}$			80		dB
Dropout Voltage	V_D	$I_O = 1.0\text{A}$, $T_J = 25^{\circ}\text{C}$			2		V
Short Circuit Current	I_{SC}	$T_J = 25^{\circ}\text{C}$, $V_I = 35\text{V}$			230		mA
Peak Current	I_{PK}	$T_J = 25^{\circ}\text{C}$			2.0		A

Notes:

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.

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7809)

(Refer to test circuit , $0^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 1.0\text{A}$, $V_i = 15\text{V}$, $C_i = 0.33\mu\text{F}$, $C_o = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Output Voltage	V_o	$I_o = 5.0\text{mA} \sim 1.0\text{A}$, $P_o \leq 15\text{W}$ $V_i = 11.5 \sim 24\text{V}$	8.45	9.0	9.55	V
Line Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$ $V_i = 11.5\text{V} \sim 25\text{V}$			180	mV
		$V_i = 12\text{V} \sim 17\text{V}$			90	
Load Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$ $I_o = 5.0\text{mA} \sim 1.5\text{A}$			180	mV
		$I_o = 250\text{mA} \sim 750\text{mA}$			90	
Quiescent Current	I_Q	$T_j = 25^{\circ}\text{C}$			8.0	mA
Quiescent Current Change	ΔI_Q	$I_o = 5.0\text{mA} \sim 1.0\text{A}$			0.5	mA
		$V_i = 11.5 \sim 26\text{V}$			1.3	
Output Voltage Drift	$\Delta V / \Delta T$	$I_o = 5.0\text{mA}$		-0.8		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$		52		$\mu\text{V}/V_o$
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_i = 13 \sim 23\text{V}$		80		dB
Dropout Voltage	V_D	$I_o = 1.0\text{A}$, $T_j = 25^{\circ}\text{C}$		2		V
Short Circuit Current	I_{SC}	$T_j = 25^{\circ}\text{C}$, $V_i = 35\text{V}$		250		mA
Peak Current	I_{PK}	$T_j = 25^{\circ}\text{C}$		2.0		A

Notes:

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.

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7812)

(Refer to test circuit , $0^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 1.0\text{A}$, $V_i = 19\text{V}$, $C_i = 0.33\mu\text{F}$, $C_o = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Output Voltage	V_o	$I_o = 5.0\text{mA} \sim 1.0\text{A}$, $P_o \leq 15\text{W}$ $V_i = 14.5 \sim 27\text{V}$	11.4	12	12.6	V
Line Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$ $V_i = 14.5\text{V} \sim 30\text{V}$			240	mV
		$V_i = 16\text{V} \sim 22\text{V}$			120	
Load Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$ $I_o = 5.0\text{mA} \sim 1.5\text{A}$			240	mV
		$I_o = 250\text{mA} \sim 750\text{mA}$			120	
Quiescent Current	I_Q	$T_j = 25^{\circ}\text{C}$			8.0	mA
Quiescent Current Change	ΔI_Q	$I_o = 5.0\text{mA} \sim 1.0\text{A}$			0.5	mA
		$V_i = 14.5 \sim 30\text{V}$			1.0	
Output Voltage Drift	$\Delta V / \Delta T$	$I_o = 5.0\text{mA}$		-1.0		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$		75		$\mu\text{V}/V_o$
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_i = 15 \sim 25\text{V}$		80		dB
Dropout Voltage	V_D	$I_o = 1.0\text{A}$, $T_j = 25^{\circ}\text{C}$,		2		V
Short Circuit Current	I_{SC}	$V_i = 35\text{V}$, $T_j = 25^{\circ}\text{C}$		230		mA
Peak Current	I_{PK}	$T_j = 25^{\circ}\text{C}$		2.0		A

Notes:

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.

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7815)

(Refer to test circuit , $0^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 1.0\text{A}$, $V_i = 23\text{V}$, $C_i = 0.33\mu\text{F}$, $C_o = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Output Voltage	V_o	$I_o = 5.0\text{mA} \sim 1.0\text{A}$, $P_o \leq 15\text{W}$ $V_i = 17.5 \sim 30\text{V}$		14.25	15	15.75	V
Line Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$	$V_i = 17.5\text{V} \sim 30\text{V}$			300	mV
			$V_i = 20\text{V} \sim 26\text{V}$			150	
Load Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$	$I_o = 5.0\text{mA} \sim 1.5\text{A}$			300	mV
			$I_o = 250\text{mA} \sim 750\text{mA}$			150	
Quiescent Current	I_Q	$T_j = 25^{\circ}\text{C}$				8.0	mA
Quiescent Current Change	ΔI_Q	$I_o = 5.0\text{mA} \sim 1.0\text{A}$				0.5	mA
		$V_i = 17.5 \sim 30\text{V}$				1.0	
Output Voltage Drift	$\Delta V / \Delta T$	$I_o = 5.0\text{mA}$			-1.0		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$			100		$\mu\text{V}/V_o$
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_i = 18.5 \sim 28.5\text{V}$			70		dB
Dropout Voltage	V_D	$I_o = 1.0\text{A}$, $T_j = 25^{\circ}\text{C}$			2		V
Short Circuit Current	I_{SC}	$V_i = 35\text{V}$, $T_j = 25^{\circ}\text{C}$			230		mA
Peak Current	I_{PK}	$T_j = 25^{\circ}\text{C}$			2.0		A

Notes:

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.

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7818)

(Refer to test circuit ,0°C < T_j < 125°C, I_o = 1.0A, V_i = 26V, C_i= 0.33μF, C_o= 0.1μF, unless otherwise specified)

Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Output Voltage	V _o	I _o = 5.0mA ~ 1.0A ,P _o ≤15W V _i = 20.5 ~ 33V		17.1	18	18.9	V
Line Regulation(Note)	ΔV _o	T _j = 25°C	V _i = 21V ~ 33V			360	mV
			V _i = 24V ~ 30V			180	
Load Regulation(Note)	ΔV _o	T _j = 25°C	I _o = 5.0mA ~ 1.5A			360	mV
			I _o = 250mA ~ 750mA			180	
Quiescent Current	I _q	T _j = 25°C				8.0	mA
Quiescent Current Change	ΔI _q	I _o = 5.0mA ~ 1.0A				0.5	mA
		V _i = 21 ~ 33V				1.0	
Output Voltage Drift	ΔV / ΔT	I _o = 5.0mA			-1.2		mV/°C
Output Noise Voltage	V _N	f = 10Hz ~ 100KHz			100		μV/V _o
Ripple Rejection	RR	f = 120Hz, V _i = 22 ~ 32V			70		dB
Dropout Voltage	V _D	I _o = 1.0A, T _j =25°C			2		V
Short Circuit Current	I _{SC}	V _i = 35V, T _j =25°C			250		mA
Peak Current	I _{PK}	T _j =25°C			2.0		A

Notes:

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.

L7800 SERIES 3-Terminal 1.5A Positive Voltage Regulator

Electrical Characteristics (L7824)

(Refer to test circuit , $0^{\circ}\text{C} < T_j < 125^{\circ}\text{C}$, $I_o = 1.0\text{A}$, $V_i = 33\text{V}$, $C_i = 0.33\mu\text{F}$, $C_o = 0.1\mu\text{F}$, unless otherwise specified)

Parameter	Symbol	Conditions		Value			Unit
				Min	Typ	Max	
Output Voltage	V_o	$I_o = 5.0\text{mA} \sim 1.0\text{A}$, $P_o \leq 15\text{W}$ $V_i = 27 \sim 38\text{V}$		22.8	24	25.2	V
Line Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$	$V_i = 27\text{V} \sim 38\text{V}$			480	mV
			$V_i = 30\text{V} \sim 36\text{V}$			240	
Load Regulation(Note)	ΔV_o	$T_j = 25^{\circ}\text{C}$	$I_o = 5.0\text{mA} \sim 1.5\text{A}$			480	mV
			$I_o = 250\text{mA} \sim 750\text{mA}$			240	
Quiescent Current	I_Q	$T_j = 25^{\circ}\text{C}$				8.0	mA
Quiescent Current Change	ΔI_Q	$I_o = 5.0\text{mA} \sim 1.0\text{A}$				0.5	mA
		$V_i = 27 \sim 38\text{V}$				0.8	
Output Voltage Drift	$\Delta V / \Delta T$	$I_o = 5.0\text{mA}$			-1.5		mV/ $^{\circ}\text{C}$
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$			170		$\mu\text{V}/V_o$
Ripple Rejection	RR	$f = 120\text{Hz}$, $V_i = 28 \sim 38\text{V}$			70		dB
Dropout Voltage	V_D	$I_o = 1.0\text{A}$, $T_j = 25^{\circ}\text{C}$			2		V
Short Circuit Current	I_{SC}	$V_i = 35\text{V}$, $T_j = 25^{\circ}\text{C}$			230		mA
Peak Current	I_{PK}	$T_j = 25^{\circ}\text{C}$			2.0		A

Notes:

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.