

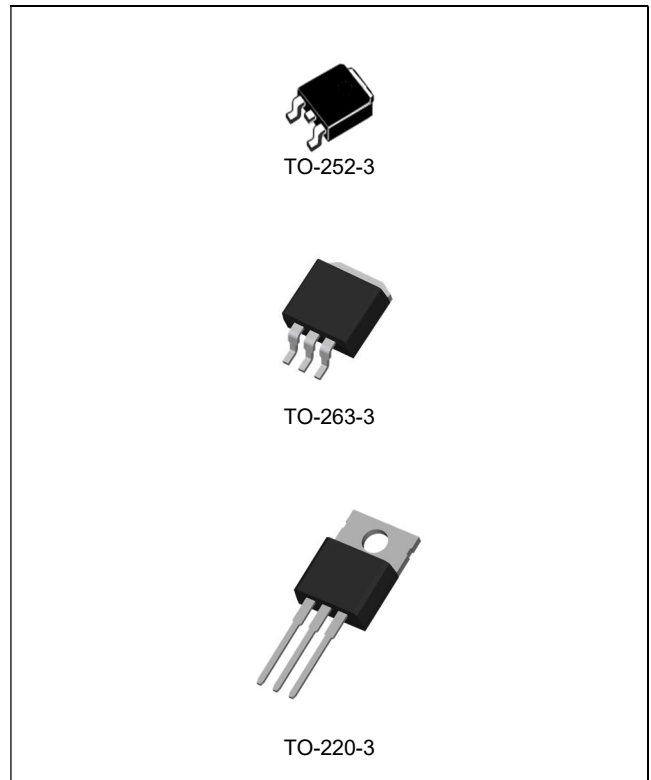
FEATURES

- Output Current up to 1.5A
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation
- Output Voltage of 5V, 6V, 8V, 9V, 12V, 15V, 18V, 20V, and 24V
- Available in TO-252, TO-263 and TO-220 Packages

DESCRIPTION

The series of fixed-Positive voltage monolithic integrated circuit voltage regulator is designed to complement LM78xx series in a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation.

Each of these regulators can deliver up to 1.5A of output current. The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and current and also as the power pass element in precision regulators.



ORDERING INFORMATION

Device	Package
LM78xxRS	TO-252-3L
LM78xxR	TO-263-3L
LM78xxT	TO-220-3L

xx: Output Voltage

ABSOLUTE MAXIMUM RATINGS (Note 1)

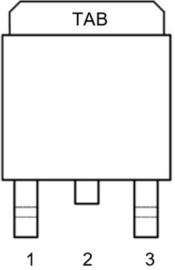
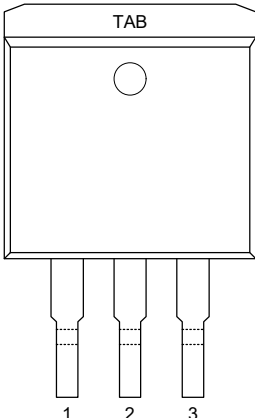
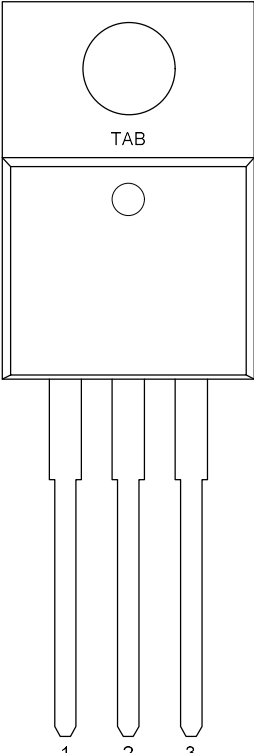
CHARACTERISTIC		SYMBOL	MIN	MAX	UNIT
Input Voltage	$V_{OUT} = 5V \text{ to } 18V$	V_{IN}	-	35	V
	$V_{OUT} = 20V \text{ and } 24V$		-	40	
Maximum Junction Temperature		T_J	-40	125	°C
Storage Temperature		T_{STG}	-65	150	°C

Note 1. Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

ORDERING INFORMATION

VOUT	Package	Order No.	Description	Supplied As	Status
5.0V	TO-252-3L	LM7805RS	1.5A, Fixed	Tape & Reel	Active
	TO-263-3L	LM7805R	1.5A, Fixed	Tape & Reel	Active
	TO-220-3L	LM7805T	1.5A, Fixed	Tube	Active
6.0V	TO-252-3L	LM7806RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7806R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7806T	1.5A, Fixed	Tube	Active
8.0V	TO-252-3L	LM7808RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7808R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7808T	1.5A, Fixed	Tube	Contact us
9.0V	TO-252-3L	LM7809RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7809R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7809T	1.5A, Fixed	Tube	Active
12V	TO-252-3L	LM7812RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7812R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7812T	1.5A, Fixed	Tube	Active
15V	TO-252-3L	LM7815RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7815R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7815T	1.5A, Fixed	Tube	Active
18V	TO-252-3L	LM7818RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7818R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7818T	1.5A, Fixed	Tube	Contact us
20V	TO-252-3L	LM7820RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7820R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7820T	1.5A, Fixed	Tube	Contact us
24V	TO-252-3L	LM7824RS	1.5A, Fixed	Tape & Reel	Contact us
	TO-263-3L	LM7824R	1.5A, Fixed	Tape & Reel	Contact us
	TO-220-3L	LM7824T	1.5A, Fixed	Tube	Active

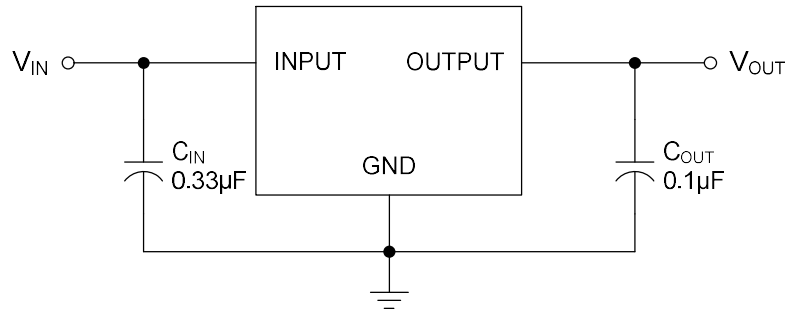
PIN CONFIGURATION

		
TO-252	TO-263	TO-220

PIN DESCRIPTION

Pin No.			Pin Name	Pin Function
TO-252	TO-263	TO-220		
1	1	1	INPUT	Input Voltage
2	2	2	GND	Ground (Common)
3	3	3	OUTPUT	Output Voltage
TAB	TAB	TAB	TAB	Connect to GND. Attached to heatsink for thermal relief for TO-220 package or put a copper plane connected to this pin as a thermal relief for TO-263 package.

TYPICAL APPLICATION CIRCUITS



- * C_{IN} required for stability. Value given may be increased.
- ** C_{OUT} may be used to improve the transient response of the regulator. It should be located as close as possible to the regulator. Value given may be increased.

ELECTRICAL CHARACTERISTICS: LM7805

Specifications with standard type face are for $T_J = 25^\circ\text{C}$, and those with **boldface type** apply over $T_J = 0^\circ\text{C}$ to 125°C . Conditions are $V_{IN} = 10\text{V}$, $I_{OUT} = 500\text{mA}$, $C_{IN} = 0.33\mu\text{F}$, $C_{OUT} = 0.1\mu\text{F}$, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS (Note 3)	MIN	TYP	MAX	UNIT
Output Voltage (Note 4)	V_{OUT}		4.80	5.0	5.20	V
		$7\text{V} \leq V_{IN} \leq 20\text{V}$, $5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	4.75	5.0	5.25	
Line Regulation	ΔV_{LINE}	$7\text{V} \leq V_{IN} \leq 25\text{V}$	-	-	100	mV
		$8.0\text{V} \leq V_{IN} \leq 12\text{V}$	-	-	50	
Load Regulation	ΔV_{LOAD}	$5.0\text{mA} \leq I_{OUT} \leq 1.5\text{A}$	-	-	100	mV
		$0.25\text{A} \leq I_{OUT} \leq 0.75\text{A}$	-	-	50	
Dropout Voltage	V_D	$I_{OUT} = 1.0\text{A}$	-	2.0	-	V
Bias Current	I_B		-	-	8.0	mA
Bias Current Change	ΔI_B	$7\text{V} \leq V_{IN} \leq 25\text{V}$	-	-	1.3	mA
		$5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	-	-	0.5	

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by the *Absolute Maximum Ratings*.

ELECTRICAL CHARACTERISTICS: LM7806

Specifications with standard type face are for $T_J = 25^\circ\text{C}$, and those with **boldface type** apply over $T_J = 0^\circ\text{C}$ to 125°C . Conditions are $V_{IN} = 11\text{V}$, $I_{OUT} = 500\text{mA}$, $C_{IN} = 0.33\mu\text{F}$, $C_{OUT} = 0.1\mu\text{F}$, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS (Note 3)	MIN	TYP	MAX	UNIT
Output Voltage (Note 4)	V_{OUT}		5.76	6.0	6.24	V
		$8\text{V} \leq V_{IN} \leq 21\text{V}$, $5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	5.70	6.0	6.30	
Line Regulation	ΔV_{LINE}	$8\text{V} \leq V_{IN} \leq 25\text{V}$	-	-	120	mV
		$9\text{V} \leq V_{IN} \leq 13\text{V}$	-	-	60	
Load Regulation	ΔV_{LOAD}	$5.0\text{mA} \leq I_{OUT} \leq 1.5\text{A}$	-	-	120	mV
		$0.25\text{A} \leq I_{OUT} \leq 0.75\text{A}$	-	-	60	
Dropout Voltage	V_D	$I_{OUT} = 1.0\text{A}$	-	2.0	-	V
Bias Current	I_B		-	-	8.0	mA
Bias Current Change	ΔI_B	$8.0\text{V} \leq V_{IN} \leq 25\text{V}$	-	-	1.3	mA
		$5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	-	-	0.5	

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by the *Absolute Maximum Ratings*.

ELECTRICAL CHARACTERISTICS: LM7809

Specifications with standard type face are for $T_J = 25^\circ\text{C}$, and those with **boldface type** apply over $T_J = 0^\circ\text{C}$ to 125°C . Conditions are $V_{IN} = 15\text{V}$, $I_{OUT} = 500\text{mA}$, $C_{IN} = 0.33\mu\text{F}$, $C_{OUT} = 0.1\mu\text{F}$, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS (Note 3)	MIN	TYP	MAX	UNIT
Output Voltage (Note 4)	V_{OUT}		8.64	9.0	9.36	V
		$11.5\text{V} \leq V_{IN} \leq 24\text{V}$, $5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	8.55	9.0	9.45	
Line Regulation	ΔV_{LINE}	$11.5\text{V} \leq V_{IN} \leq 26\text{V}$	-	-	180	mV
		$11.5\text{V} \leq V_{IN} \leq 17\text{V}$	-	-	90	
Load Regulation	ΔV_{LOAD}	$5.0\text{mA} \leq I_{OUT} \leq 1.5\text{A}$	-	-	180	mV
		$0.25\text{A} \leq I_{OUT} \leq 0.75\text{A}$	-	-	90	
Dropout Voltage	V_D	$I_{OUT} = 1.0\text{A}$	-	2.0	-	V
Bias Current	I_B		-	-	8.0	mA
Bias Current Change	ΔI_B	$11.5\text{V} \leq V_{IN} \leq 26\text{V}$	-	-	1.3	mA
		$5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	-	-	0.5	

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by the *Absolute Maximum Ratings*.

ELECTRICAL CHARACTERISTICS: LM7812

Specifications with standard type face are for $T_J = 25^\circ\text{C}$, and those with **boldface type** apply over $T_J = 0^\circ\text{C}$ to 125°C . Conditions are $V_{IN} = 19\text{V}$, $I_{OUT} = 500\text{mA}$, $C_{IN} = 0.33\mu\text{F}$, $C_{OUT} = 0.1\mu\text{F}$, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS (Note 3)	MIN	TYP	MAX	UNIT
Output Voltage (Note 4)	V_{OUT}		11.5	12	12.5	V
		$14.5\text{V} \leq V_{IN} \leq 27\text{V}$, $5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	11.4	12	12.6	
Line Regulation	ΔV_{LINE}	$14.5\text{V} \leq V_{IN} \leq 30\text{V}$	-	-	240	mV
		$16\text{V} \leq V_{IN} \leq 22\text{V}$	-	-	120	
Load Regulation	ΔV_{LOAD}	$5.0\text{mA} \leq I_{OUT} \leq 1.5\text{A}$	-	-	240	mV
		$0.25\text{A} \leq I_{OUT} \leq 0.75\text{A}$	-	-	120	
Dropout Voltage	V_D	$I_{OUT} = 1.0\text{A}$	-	2.0	-	V
Bias Current	I_B		-	-	8.0	mA
Bias Current Change	ΔI_B	$14.5\text{V} \leq V_{IN} \leq 30\text{V}$	-	-	1.3	mA
		$5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	-	-	0.5	

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by the *Absolute Maximum Ratings*.

ELECTRICAL CHARACTERISTICS: LM7815

Specifications with standard type face are for $T_J = 25^\circ\text{C}$, and those with **boldface type** apply over $T_J = 0^\circ\text{C}$ to 125°C . Conditions are $V_{IN} = 23\text{V}$, $I_{OUT} = 500\text{mA}$, $C_{IN} = 0.33\mu\text{F}$, $C_{OUT} = 0.1\mu\text{F}$, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS (Note 3)	MIN	TYP	MAX	UNIT
Output Voltage (Note 4)	V_{OUT}		14.4	15	15.6	V
		$17.5\text{V} \leq V_{IN} \leq 30\text{V}$, $5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	14.25	15	15.75	
Line Regulation	ΔV_{LINE}	$17.5\text{V} \leq V_{IN} \leq 30\text{V}$	-	-	300	mV
		$20\text{V} \leq V_{IN} \leq 26\text{V}$	-	-	150	
Load Regulation	ΔV_{LOAD}	$5.0\text{mA} \leq I_{OUT} \leq 1.5\text{A}$	-	-	300	mV
		$0.25\text{A} \leq I_{OUT} \leq 0.75\text{A}$	-	-	150	
Dropout Voltage	V_D	$I_{OUT} = 1.0\text{A}$	-	2.0	-	V
Bias Current	I_B		-	-	8.0	mA
Bias Current Change	ΔI_B	$17.5\text{V} \leq V_{IN} \leq 30\text{V}$	-	-	1.3	mA
		$5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	-	-	0.5	

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by the *Absolute Maximum Ratings*.

ELECTRICAL CHARACTERISTICS: LM7824

Specifications with standard type face are for $T_J = 25^\circ\text{C}$, and those with **boldface type** apply over $T_J = 0^\circ\text{C}$ to 125°C . Conditions are $V_{IN} = 33\text{V}$, $I_{OUT} = 500\text{mA}$, $C_{IN} = 0.33\mu\text{F}$, $C_{OUT} = 0.1\mu\text{F}$, unless otherwise noted.

PARAMETER	SYMBOL	TEST CONDITIONS (Note 3)	MIN	TYP	MAX	UNIT
Output Voltage (Note 4)	V_{OUT}		23	24	25	V
		$27\text{V} \leq V_{IN} \leq 38\text{V}$, $5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	22.8	24	25.2	
Line Regulation	ΔV_{LINE}	$27\text{V} \leq V_{IN} \leq 38\text{V}$	-	-	480	mV
		$30\text{V} \leq V_{IN} \leq 36\text{V}$	-	-	240	
Load Regulation	ΔV_{LOAD}	$5.0\text{mA} \leq I_{OUT} \leq 1.5\text{A}$	-	-	480	mV
		$0.25\text{A} \leq I_{OUT} \leq 0.75\text{A}$	-	-	240	
Dropout Voltage	V_D	$I_{OUT} = 1.0\text{A}$	-	2.0	-	V
Bias Current	I_B		-	-	8.0	mA
Bias Current Change	ΔI_B	$27\text{V} \leq V_{IN} \leq 38\text{V}$	-	-	1.3	mA
		$5.0\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	-	-	0.5	

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by the *Absolute Maximum Ratings*.

TYPICAL OPERATING CHARACTERISTICS

T.B.D.

APPLICATION INFORMATION

T.B.D.

REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.