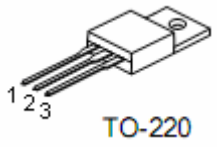
1. Description

This series of fixed-voltage monolithic integrated-circuit voltage regulator is designed for a wide lange 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 1.5 amperes of output current.The internal current limiting and termal shutdown features of these regulators make them essentially immune to overload.

2. Features

- Output current in up to 1.5A
- 3-Terminal regulators
- No external components
- Internal thermal overload protection
- Internal short-circuit current limiting
- High power dissipation capability
- Output transistor safe-area compensation

3. Pinning information



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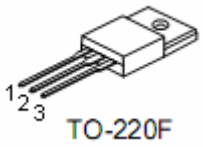

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Pin	Function
1	Input
2	Crcund
3	Output

4. Maximum ratings

Absolute maximum ratings over operating temperature range（unless otherwise noted）

Parameter	78XX	Unit
Input voltage	35	V
Continuous total dissipation at 25℃ free-air temperature	2	W
Continuous total dissipation at （or below）25℃ case temperature	15	W
Operating free-air,case,or virtual junctions temperature range	0～150	ºC
Storage temperature range	-65～150	ºC
Lead temperature 1.6mm（1/16 inch）from case of 10 seconds	260	ºC

Recommended operating conditions

Parameter		Min	Max	Unit
Input voltage V_I	7805	7	25	V
	7806	8	25	
	7808	10.5	25	
	7809	11.5	27	
	7812	14.5	30	
	7815	17.5	30	
Output current,I_O		-	1.5	A
Operating virtual junction temperature,T_J		0	125	℃

5. Electrical characteristics

7805 electrical characteristics at specified virtual junction temperature, V_I=10V, I_0=500mA (unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J=25℃		4.8	5.0	5.2	V
		7.0V≤V_{IN}≤20V 5.0mA≤I_{OUT}≤1.0A，P_{OUT}≤15W		4.75	5.0	5.25	V
Input regulation	Reg line	T_J=25℃	7.0V≤V_{IN}≤25V	-	3	100	mV
			8.0V≤V_{IN}≤12V	-	1	50	mV
Ripple rejection	RR	8V≤V_{IN}≤18V,f=120Hz		62	78	-	dB
Output regulation	Reg load	T_J=25℃	5.0mA≤I_{OUT}≤1.5A	-	15	100	mV
			250mA≤I_{OUT}≤750mA	-	5	50	mV
Output resistance	-	f=1KHZ		-	0.017	-	Ω
Output voltage	$\Delta V_O/\Delta T$	I_{OUT}=5.0mA		-	-1.1	-	mV/℃
Output noise voltage	V_{ON}	10Hz≤f≤100KHz,T_A=25℃		-	40	-	uV
Dropout voltage	V_D	I_{OUT}=1A, T_J=25℃		-	2	-	V
Bias current	I_Q	T_J=25℃		-	5.6	8.0	mA
Bias current change	ΔI_Q	7V≤V_{IN}≤25V		-	-	1.3	mA
		5.0mA≤I_{OUT}≤1 A		-	-	0.5	mA
Short circuit current	I_{SC}	T_A=25℃		-	750	-	mA
Peak current	I_{PK}	T_J=25℃		-	2.2	-	A

*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.

**This specification applies only for dc power dissipation permitted by absolute maximum ratings.

7806 electrical characteristics at specified virtual junction temperature,V_I=11V, ,I_0=500mA (unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J=25℃		5.75	6.0	6.25	V
		8.0V≤V_{IN}≤21V 5.0mA≤I_{OUT}≤1.0A，P_{OUT}≤15W		5.7	6.0	6.3	V
Input regulation	Reg line	T_J=25℃	8.0V≤V_{IN}≤25V	-	5	120	mV
			9.0V≤V_{IN}≤13V	-	1.5	60	mV
Ripple rejection	RR	9V≤V_{IN}≤19V,f=120Hz		59	75	-	dB
Output regulation	Reg load	T_J=25℃	5.0mA≤I_{OUT}≤1.5A	-	14	120	mV
			250mA≤I_{OUT}≤750mA	-	4	60	mV
Output resistance	-	f=1KHZ		-	0.019	-	Ω
Output voltage	$\Delta V_O/\Delta T$	I_{OUT}=5.0mA		-	-0.8	-	mV/℃
Output noise voltage	V_{ON}	10Hz≤f≤100KHz,T_A=25℃		-	45	-	uV
Dropout voltage	V_D	I_{OUT}=1A, T_J=25℃		-	2	-	V
Bias current	I_Q	T_J=25℃		-	5.7	8.0	mA
Bias current change	ΔI_Q	8V≤V_{IN}≤25V		-	-	1.3	mA
		5.0mA≤I_{OUT}≤1 A		-	-	0.5	mA
Short circuit current	I_{SC}	T_A=25℃		-	550	-	mA
Peak current	I_{PK}	T_J=25℃		-	2.2	-	A

*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.

**This specification applies only for dc power dissipation permitted by absolute maximum ratings.

7808 electrical characteristics at specified virtual junction temperature,V_I=14V, ,I_0=500mA (unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J=25℃		7.7	8.0	8.3	V
		10.5V≤V_{IN}≤23V 5.0mA≤I_{OUT}≤1.0A，P_{OUT}≤15W		7.6	8.0	8.4	V
Input regulation	Reg line	T_J=25℃	10.5V≤V_{IN}≤25V	-	6	160	mV
			11V≤V_{IN}≤17V	-	2	80	mV
Ripple rejection	RR	11.5V≤V_{IN}≤21.5V,f=120Hz		55	72	-	dB
Output regulation	Reg load	T_J=25℃	5.0mA≤I_{OUT}≤1.5A	-	12	160	mV
			250mA≤I_{OUT}≤750mA	-	4	80	mV
Output resistance	-	f=1KHZ		-	0.016	-	Ω
Output voltage	$\Delta V_O/\Delta T$	I_{OUT}=5.0mA		-	-0.8	-	mV/℃
Output noise voltage	V_{ON}	10Hz≤f≤100KHz,T_A=25℃		-	52	-	uV
Dropout voltage	V_D	I_{OUT}=1A, T_J=25℃		-	2	-	V
Bias current	I_Q	T_J=25℃		-	5.7	8.0	mA
Bias current change	ΔI_Q	10.5V≤V_{IN}≤25V		-	-	1.0	mA
		5.0mA≤I_{OUT}≤1 A		-	-	0.5	mA
Short circuit current	I_{SC}	T_A=25℃		-	450	-	mA
Peak current	I_{PK}	T_J=25℃		-	2.2	-	A

*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.

**This specification applies only for dc power dissipation permitted by absolute maximum ratings.

7809 electrical characteristics at specified virtual junction temperature,V_I=16V, ,I_0=500mA (unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J=25℃		8.65	9.0	9.35	V
		11.5V≤V_{IN}≤24V 5.0mA≤I_{OUT}≤1.0A，P_{OUT}≤15W		8.55	9.0	9.45	V
Input regulation	Reg line	T_J=25℃	11.5V≤V_{IN}≤27V	-	7	180	mV
			13V≤V_{IN}≤19V	-	2	90	mV
Ripple rejection	RR	12V≤V_{IN}≤22V,f=120Hz		55	70	-	dB
Output regulation	Reg load	T_J=25℃	5.0mA≤I_{OUT}≤1.5A	-	12	180	mV
			250mA≤I_{OUT}≤750mA	-	4	90	mV
Output resistance	-	f=1KHZ		-	0.018	-	Ω
Output voltage	$\Delta V_O/\Delta T$	I_{OUT}=5.0mA		-	-1.0	-	mV/℃
Output noise voltage	V_{ON}	10Hz≤f≤100KHz,T_A=25℃		-	60	-	uV
Dropout voltage	V_D	I_{OUT}=1A, T_J=25℃		-	2	-	V
Bias current	I_Q	T_J=25℃		-	5.7	8.0	mA
Bias current change	ΔI_Q	11.5V≤V_{IN}≤27V		-	-	1.0	mA
		5.0mA≤I_{OUT}≤1 A		-	-	0.5	mA
Short circuit current	I_{SC}	T_A=25℃		-	400	-	mA
Peak current	I_{PK}	T_J=25℃		-	2.2	-	A

*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.
**This specification applies only for dc power dissipation permitted by absolute maximum ratings.

7812 electrical characteristics at specified virtual junction temperature,V_I=19V, ,I_0=500mA (unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J=25℃		11.5	12.0	12.5	V
		14.5V≤V_{IN}≤27V 5.0mA≤I_{OUT}≤1.0A，P_{OUT}≤15W		11.4	12.0	12.6	V
Input regulation	Reg line	T_J=25℃	14.5V≤V_{IN}≤30V	-	10	240	mV
			16V≤V_{IN}≤22V	-	3	120	mV
Ripple rejection	RR	15V≤V_{IN}≤25V,f=120Hz		55	71	-	dB
Output regulation	Reg load	T_J=25℃	5.0mA≤I_{OUT}≤1.5A	-	12	240	mV
			250mA≤I_{OUT}≤750mA	-	4	120	mV
Output resistance	-	f=1KHZ		-	0.018	-	Ω
Output voltage	$\Delta V_O/\Delta T$	I_{OUT}=5.0mA		-	-1.0	-	mV/℃
Output noise voltage	V_{ON}	10Hz≤f≤100KHz,T_A=25℃		-	75	-	uV
Dropout voltage	V_D	I_{OUT}=1A, T_J=25℃		-	2	-	V
Bias current	I_Q	T_J=25℃		-	5.7	8.0	mA
Bias current change	ΔI_Q	14.5V≤V_{IN}≤30V		-	-	1.0	mA
		5.0mA≤I_{OUT}≤1 A		-	-	0.5	mA
Short circuit current	I_{SC}	T_A=25℃		-	350	-	mA
Peak current	I_{PK}	T_J=25℃		-	2.2	-	A

*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.
**This specification applies only for dc power dissipation permitted by absolute maximum ratings.

7815 electrical characteristics at specified virtual junction temperature,V_I=23V, ,I_0=500mA (unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ	Max	Unit
Output voltage	V_{OUT}	T_J=25℃		14.4	15.0	15.6	V
		17.5V≤V_{IN}≤30V 5.0mA≤I_{OUT}≤1.0A，P_{OUT}≤15W		14.25	15.0	15.75	V
Input regulation	Reg line	T_J=25℃	17.5V≤V_{IN}≤30V	-	12	300	mV
			20V≤V_{IN}≤26V	-	3	150	mV
Ripple rejection	RR	18.5V≤V_{IN}≤28.5V,f=120Hz		54	70	-	dB
Output regulation	Reg load	T_J=25℃	5.0mA≤I_{OUT}≤1.5A	-	12	300	mV
			250mA≤I_{OUT}≤750mA	-	4	150	mV
Output resistance	-	f=1KHZ		-	0.019	-	Ω
Output voltage	$\Delta V_O/\Delta T$	I_{OUT}=5.0mA		-	-1.0	-	mV/℃
Output noise voltage	V_{ON}	10Hz≤f≤100KHz,T_A=25℃		-	90	-	uV
Dropout voltage	V_D	I_{OUT}=1A, T_J=25℃		-	2	-	V
Bias current	I_Q	T_J=25℃		-	5.7	8.0	mA
Bias current change	ΔI_Q	17.5V≤V_{IN}≤30V		-	-	1.0	mA
		5.0mA≤I_{OUT}≤1 A		-	-	0.5	mA
Short circuit current	I_{SC}	T_A=25℃		-	230	-	mA
Peak current	I_{PK}	T_J=25℃		-	2.1	-	A

*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.

**This specification applies only for dc power dissipation permitted by absolute maximum ratings.

6. Typical characteristics

For a positive regulator a 0.33 –uF bypass capacitor should be used on the input terminals.While not necessary for stability,an output capacitor of 0.1uF may be used to improve the transient response of the regulator.These capacitors should be on or as near as possible to the regulator terminals.