

## DESCRIPTION

The 7800 series of monolithic Three-Terminal Positive Voltage Regulators employ internal current limiting, thermal shut-down and safe-area compensation, making them essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. They are intended as fixed-voltage regulators in a wide range of applications including local, on-card regulation for elimination of distribution problems associated with single point regulation. In addition to use as fixed voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents and also as the power pass element in precision regulators.

## FEATURES

- Output current in excess of 1 amp
- No external components
- Internal thermal overload protection
- Internal short circuit current limiting
- Output transistor safe-area compensation
- Available in the TO-220 and the TO-3 package
- Output voltages of 5, 6, 8, 12, 14, 15, 18, and 24 volts
- Mil std 883 A, B, C available

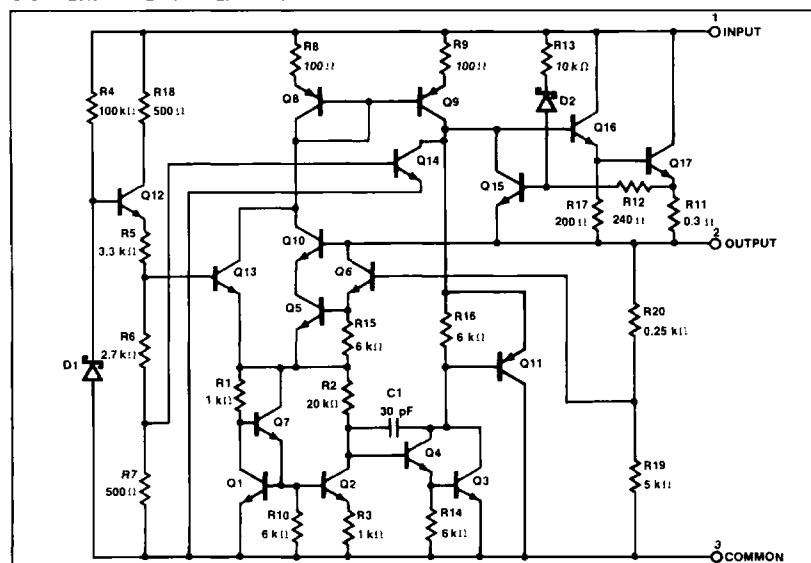
## ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Input voltage		
5V through 12V	35	V
14V through 24V	40	V
Internal power dissipation <sup>1</sup>	Internally limited	
Storage temperature range	-65 to +150	°C
Operating junction temperature range <sup>2</sup>		
7800	-55 to +150	°C
SA7800C	-40 to +85	°C
7800C	0 to +125	°C
Lead temperature		
TO-3 package (soldering, 60 second time limit)	300	°C
TO-220 package (soldering, 60 second time limit)	230	°C

### NOTES

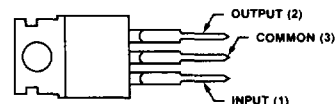
- Thermal resistance of the packages (without a heat sink)  
 Junction to case: TO-3 package 4°C/W; TO-220 package 2°C/W  
 Junction to ambient: TO-3 package 35°C/W; TO-220 package 50°C/W
- Operating ambient temperature range  
 7800 -55°C to +125°C  
 7800C 0°C to +85°C  
 SA7800C -40°C to +85°C

## SCHEMATIC DIAGRAM



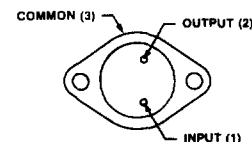
## PIN CONFIGURATION

### U PACKAGE (TO-220)



ORDER INFORMATION	
OUTPUT VOLTAGE	ORDER PART NO.
5V	7805CU/SA7805CU
6V	7806CU/SA7806CU
8V	7808CU/SA7808CU
12V	7812CU/SA7812CU
13.8V	7814CU/SA7814CU
15V	7815CU/SA7815CU
18V	7818CU/SA7818CU
24V	7824CU/SA7824CU

### DA PACKAGE (TO-3)



ORDER INFORMATION	
OUTPUT VOLTAGE	ORDER PART NO.
5V	7805DA/SA7805CDA
6V	7806DA/SA7806CDA
8V	7808DA/SA7808CDA
12V	7812DA/SA7812CDA
13.8V	7814DA/SA7814CDA
15V	7815DA/SA7815CDA
18V	7818DA/SA7818CDA
24V	7824DA/SA7824CDA
5V	7805CDA
6V	7806CDA
8V	7808CDA
12V	7812CDA
13.8V	7814CDA
15V	7815CDA
18V	7818CDA
24V	7824CDA

**DC ELECTRICAL CHARACTERISTICS**  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$   
unless otherwise specified.

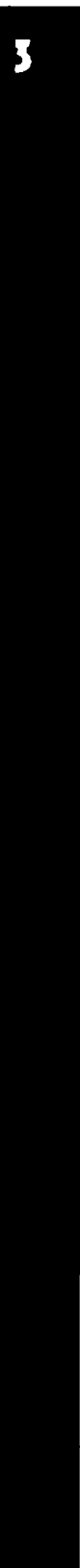
PARAMETER	TEST CONDITIONS	7805 <sup>1</sup>			7805C <sup>1</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub>	Output voltage	$V_{IN} = 10\text{V}$ 4.8   5.0   5.2			$V_{IN} = 10\text{V}$ 4.8   5.0   5.2			V
	Over temp. <sup>1</sup> , $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	8V ≤ V <sub>IN</sub> ≤ 20V 4.65     5.35			7V ≤ V <sub>IN</sub> ≤ 25V 4.75     5.25			V
Line regulation		7V ≤ V <sub>IN</sub> ≤ 25V 3   50			7V ≤ V <sub>IN</sub> ≤ 25V 3   100			mV
		8V ≤ V <sub>IN</sub> ≤ 12V 1   25			8V ≤ V <sub>IN</sub> ≤ 12V 1   50			mV
Load regulation	5mA ≤ I <sub>OUT</sub> ≤ 1.5A 250mA ≤ I <sub>OUT</sub> ≤ 750mA	15   50			15   100			mV
		5   25			5   50			mV
I <sub>CC</sub>		4.2   6.0			4.2   8.0			mA
ΔI <sub>CC</sub>	Over temp. <sup>1</sup> , with line With load, 5mA ≤ I <sub>OUT</sub> ≤ 1.0A	8V ≤ V <sub>IN</sub> ≤ 25V 0.8			7V ≤ V <sub>IN</sub> ≤ 25V 1.3			mA
		0.5			0.5			mA
Output noise voltage	10Hz ≤ f ≤ 100kHz	40			40			μV
Voltage drift		20			20			mV/1000hrs.
Ripple rejection	Over temp. <sup>1</sup> , f = 120Hz	8V ≤ V <sub>IN</sub> ≤ 18V 68   78			8V ≤ V <sub>IN</sub> ≤ 18V 62   78			dB
Dropout voltage	I <sub>OUT</sub> = 1.0A	2.0			2.0			V
Output resistance	f = 1kHz	17			17			mΩ
I <sub>SC</sub>		750			750			mA
Peak output current		2.2			2.2			A
V <sub>OUT</sub>	Output temperature drift	0°C ≤ T <sub>J</sub> ≤ 150°C -1.1			0°C ≤ T <sub>J</sub> ≤ 125°C -1.1			mV/°C

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$   
unless otherwise specified.

PARAMETER	TEST CONDITIONS	7806 <sup>1</sup>			7806C <sup>1</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub>	Output voltage	$V_{IN} = 11\text{V}$ 5.75   6.0   6.25			$V_{IN} = 11\text{V}$ 5.75   6.0   6.25			V
	Over temp. <sup>1</sup> , $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	9V ≤ V <sub>IN</sub> ≤ 21V 5.65     6.35			8V ≤ V <sub>IN</sub> ≤ 21V 5.7     6.3			V
Line regulation		8V ≤ V <sub>IN</sub> ≤ 25V 5   60			8V ≤ V <sub>IN</sub> ≤ 25V 5   120			mV
		9V ≤ V <sub>IN</sub> ≤ 13V 1.5   30			9V ≤ V <sub>IN</sub> ≤ 13V 1.5   60			mV
Load regulation	5mA ≤ I <sub>OUT</sub> ≤ 1.5A 250mA ≤ I <sub>OUT</sub> ≤ 750mA	14   60			14   120			mV
		4   30			4   60			mV
I <sub>CC</sub>		4.3   6.0			4.3   8.0			mA
ΔI <sub>CC</sub>	Over temp. <sup>1</sup> , with line With load, 5mA ≤ I <sub>OUT</sub> ≤ 1.0A	9V ≤ V <sub>IN</sub> ≤ 25V 0.8			8V ≤ V <sub>IN</sub> ≤ 25V 1.3			mA
		0.5			0.5			mA
Output noise voltage	10Hz ≤ f ≤ 100kHz	45			45			μV
Voltage drift		24			24			mV/1000hrs.
Ripple rejection	Over temp. <sup>1</sup> , f = 120Hz	9V ≤ V <sub>IN</sub> ≤ 19V 65   75			9V ≤ V <sub>IN</sub> ≤ 19V 59   75			dB
Dropout voltage	I <sub>OUT</sub> = 1.0A	2.0			2.0			V
Output resistance	f = 1kHz	19			19			mΩ
I <sub>SC</sub>		550			550			mA
Peak output current		2.2			2.2			A
V <sub>OUT</sub>	Output temperature drift	0°C ≤ T <sub>J</sub> ≤ 150°C -0.8			0°C ≤ T <sub>J</sub> ≤ 125°C -0.8			mV/°C

NOTES

- 55°C ≤ T<sub>J</sub> ≤ 150°C for 7800  
0°C ≤ T<sub>J</sub> ≤ 125°C for 7800C
- 40°C ≤ T<sub>J</sub> ≤ +125°C for SA7800C



**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

PARAMETER	TEST CONDITIONS	78081			7808C1			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp., $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 14\text{V}$			$V_{IN} = 14\text{V}$			V
		7.7	8.0	8.3	7.7	8.0	8.3	V
Line regulation		$10.5\text{V} \leq V_{IN} \leq 23\text{V}$			$10.5\text{V} \leq V_{IN} \leq 23\text{V}$			mV
		6	80		6	160		mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	$11\text{V} \leq V_{IN} \leq 17\text{V}$			$11\text{V} \leq V_{IN} \leq 17\text{V}$			mV
		2	40		2	80		mV
I <sub>CC</sub>			4.3	6.0		4.3	8.0	mA
ΔI <sub>CC</sub>	Over temp., <sup>1</sup> with line	$11.5\text{V} \leq V_{IN} \leq 25\text{V}$			$10.5\text{V} \leq V_{IN} \leq 25\text{V}$			mA
	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$			0.8			1.0	mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$		52			52		μV
Voltage drift				32			32	mV/1000hrs.
Ripple rejection	Over temp., <sup>1</sup> $f = 120\text{Hz}$	$11.5\text{V} \leq V_{IN} \leq 21.5\text{V}$			$11.5\text{V} \leq V_{IN} \leq 21.5\text{V}$			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$		2.0			2.0		V
Output resistance	$f = 1\text{kHz}$		16			16		mΩ
I <sub>SC</sub>			450			450		mA
Peak output current			2.2			2.2		A
V <sub>OUT</sub> Output temperature drift	$I_{OUT} = 5\text{mA}$	$0^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$			$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$			mV/°C
			-0.8			-0.8		

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

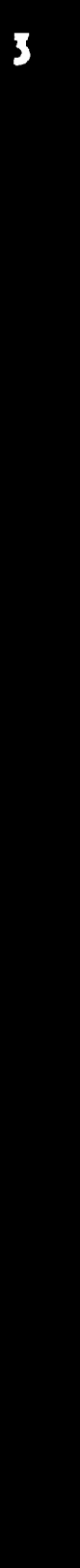
PARAMETER	TEST CONDITIONS	78121			7812C1			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp., <sup>1</sup> $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 19\text{V}$			$V_{IN} = 19\text{V}$			V
		11.5	12.0	12.5	11.5	12.0	12.5	V
Line regulation		$15.5\text{V} \leq V_{IN} \leq 27\text{V}$			$14.5\text{V} \leq V_{IN} \leq 27\text{V}$			mV
		11.4		12.6	11.4		12.6	mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	$14.5\text{V} \leq V_{IN} \leq 30\text{V}$			$14.5\text{V} \leq V_{IN} \leq 30\text{V}$			mV
		10	120		10	240		mV
I <sub>CC</sub>		$16\text{V} \leq V_{IN} \leq 22\text{V}$			$16\text{V} \leq V_{IN} \leq 22\text{V}$			mV
		3	60		3	120		mV
I <sub>CC</sub>			4.3	6.0		4.3	8.0	mA
ΔI <sub>CC</sub>	Over temp., <sup>1</sup> with line	$15\text{V} \leq V_{IN} \leq 30\text{V}$			$14.5\text{V} \leq V_{IN} \leq 30\text{V}$			mA
	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$			0.8			1.0	mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$		75			75		μV
Voltage drift				48			48	mV/1000hrs.
Ripple rejection	Over temp., <sup>1</sup> $f = 120\text{Hz}$	$15\text{V} \leq V_{IN} \leq 25\text{V}$			$15\text{V} \leq V_{IN} \leq 25\text{V}$			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$		2.0			2.0		V
Output resistance	$f = 1\text{kHz}$		18			18		mΩ
I <sub>SC</sub>			350			350		mA
Peak output current			2.2			2.2		A
V <sub>OUT</sub> Output temperature drift	$I_{OUT} = 5\text{mA}$	$0^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$			$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$			mV/°C
			-1.0			-1.0		

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

PARAMETER	TEST CONDITIONS	7814 <sup>1</sup>			7814C <sup>1</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp. <sup>1</sup> $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 22\text{V}$ 13.3   13.8   14.3			$V_{IN} = 22\text{V}$ 13.3   13.8   14.3			V
		$17.5\text{V} \leq V_{IN} \leq 29\text{V}$ 13.15     14.45			$16.5\text{V} \leq V_{IN} \leq 29\text{V}$ 13.15     14.95			V
Line regulation		$16.5\text{V} \leq V_{IN} \leq 30\text{V}$   10   140			$16.5\text{V} \leq V_{IN} \leq 30\text{V}$   10   280			mV
		$19\text{V} \leq V_{IN} \leq 25\text{V}$   3   70			$19\text{V} \leq V_{IN} \leq 25\text{V}$   3   140			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$							mV
								mV
I <sub>CC</sub>		4.3   6.0			4.3   8.0			mA
ΔI <sub>CC</sub>	Over temp. <sup>1</sup> with line	$17\text{V} \leq V_{IN} \leq 30\text{V}$     0.8			$16.5\text{V} \leq V_{IN} \leq 30\text{V}$     1.0			mA
	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	0.5			0.5			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$	85			85			μV
Voltage drift		56			56			mV/1000hrs.
Ripple rejection	Over temp. <sup>1</sup> $f = 120\text{Hz}$	$17\text{V} \leq V_{IN} \leq 27\text{V}$ 54   70			$17\text{V} \leq V_{IN} \leq 27\text{V}$ 60   70			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$	2.0			2.0			V
Output resistance	$f = 1\text{kHz}$	18			18			mΩ
I <sub>SC</sub>		350			350			mA
Peak output current		2.2			2.2			A
V <sub>OUT</sub> Output temperature drift	$I_{OUT} = 5\text{mA}$	$0^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$ 1.0			$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ 1.0			mV/°C

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

PARAMETER	TEST CONDITIONS	7815 <sup>1</sup>			7815C <sup>1</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp. <sup>1</sup> $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 23\text{V}$ 14.4   15.0   15.6			$V_{IN} = 23\text{V}$ 14.4   15.0   15.6			V
		$18.5\text{V} \leq V_{IN} \leq 30\text{V}$ 14.25     15.75			$17.5\text{V} \leq V_{IN} \leq 30\text{V}$ 14.25     15.75			V
Line regulation		$17.5\text{V} \leq V_{IN} \leq 30\text{V}$   11   150			$17.5\text{V} \leq V_{IN} \leq 30\text{V}$   11   300			mV
		$20\text{V} \leq V_{IN} \leq 26\text{V}$   3   75			$20\text{V} \leq V_{IN} \leq 26\text{V}$   3   150			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$							mV
								mV
I <sub>CC</sub>		4.4   6.0			4.4   8.0			mA
ΔI <sub>CC</sub>	Over temp. <sup>1</sup> with line	$18.5\text{V} \leq V_{IN} \leq 30\text{V}$     0.8			$17.5\text{V} \leq V_{IN} \leq 30\text{V}$     1.0			mA
	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	0.5			0.5			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$	90			90			μV
Voltage drift		60			60			mV/1000hrs.
Ripple rejection	Over temp. <sup>1</sup> $f = 120\text{Hz}$	$18.5\text{V} \leq V_{IN} \leq 28.5\text{V}$ 60   70			$18.5\text{V} \leq V_{IN} \leq 28.5\text{V}$ 54   70			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$	2.0			2.0			V
Output resistance	$f = 1\text{kHz}$	19			19			mΩ
I <sub>SC</sub>		230			230			mA
Peak output current		2.1			2.1			A
V <sub>OUT</sub> Output temperature drift	$I_{OUT} = 5\text{mA}$	$0^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$ -1.0			$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ -1.0			mV/°C



**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

PARAMETER	TEST CONDITIONS	7818 <sup>1</sup>			7818C <sup>1</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
$V_{OUT}$ Output voltage	Over temp. <sup>1</sup> , $1\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 27\text{V}$ 17.3   18.0   18.7			$V_{IN} = 27\text{V}$ 17.3   18.0   18.7			V
		$22\text{V} \leq V_{IN} \leq 33\text{V}$ 17.1     18.9			$21\text{V} \leq V_{IN} \leq 33\text{V}$ 17.1     18.9			V
Line regulation		$21\text{V} \leq V_{IN} \leq 33\text{V}$   15   180			$21\text{V} \leq V_{IN} \leq 33\text{V}$   15   360			mV
		$24\text{V} \leq V_{IN} \leq 30\text{V}$ 5   90			$24\text{V} \leq V_{IN} \leq 30\text{V}$ 5   180			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	12   180			12   360			mV
		4   90			4   180			mV
$I_{CC}$		4.5   6.0			4.5   8.0			mA
$\Delta I_{CC}$	Over temp. <sup>1</sup> , with line	$22\text{V} \leq V_{IN} \leq 33\text{V}$     0.8			$21\text{V} \leq V_{IN} \leq 33\text{V}$     1.0			mA
	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	0.5			0.5			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$	110			110			$\mu\text{V}$
Voltage drift		72			72			mV/1000hrs.
Ripple rejection	Over temp. <sup>1</sup> , $f = 120\text{Hz}$	$22\text{V} \leq V_{IN} \leq 32\text{V}$ 59   69			$22\text{V} \leq V_{IN} \leq 32\text{V}$ 53   69			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$	2.0			2.0			V
Output resistance	$f = 1\text{kHz}$	22			22			$\text{m}\Omega$
$I_{SC}$		200			200			mA
Peak output current		2.1			2.1			A
$V_{OUT}$ Output temperature drift	$I_{OUT} = 5\text{mA}$	$0^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$   -1.0			$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$   -1.0			$\text{mV}/^\circ\text{C}$

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

PARAMETER	TEST CONDITIONS	7824 <sup>1</sup>			7824C <sup>1</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
$V_{OUT}$ Output voltage	Over temp. <sup>1</sup> , $1\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 33\text{V}$ 23.0   24.0   25.0			$V_{IN} = 33\text{V}$ 23.0   24.0   25.0			V
		$28\text{V} \leq V_{IN} \leq 38\text{V}$ 22.8     25.2			$28\text{V} \leq V_{IN} \leq 38\text{V}$ 22.8     25.2			V
Line regulation		$27\text{V} \leq V_{IN} \leq 38\text{V}$   18   240			$27\text{V} \leq V_{IN} \leq 38\text{V}$   18   480			mV
		$30\text{V} \leq V_{IN} \leq 36\text{V}$ 6   120			$30\text{V} \leq V_{IN} \leq 36\text{V}$ 6   240			mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	12   240			12   480			mV
		4   120			4   240			mV
$I_{CC}$		4.6   6.0			4.6   8.0			mA
$\Delta I_{CC}$	Over temp. <sup>1</sup> , with line	$28\text{V} \leq V_{IN} \leq 38\text{V}$     0.8			$27\text{V} \leq V_{IN} \leq 38\text{V}$     1.0			mA
	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	0.5			0.5			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$	170			170			$\mu\text{V}$
Voltage drift		96			96			mV/1000hrs.
Ripple rejection	Over temp. <sup>1</sup> , $f = 120\text{Hz}$	$28\text{V} \leq V_{IN} \leq 38\text{V}$ 56   66			50   66			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$	2.0			2.0			V
Output resistance	$f = 1\text{kHz}$	28			28			$\text{m}\Omega$
$I_{SC}$		150			150			mA
Peak output current		2.1			2.1			A
$V_{OUT}$ Output temperature drift	$I_{OUT} = 5\text{mA}$	$0^\circ\text{C} \leq T_J \leq 150^\circ\text{C}$   -1.5			$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$   -1.5			$\text{mV}/^\circ\text{C}$

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

PARAMETER	TEST CONDITIONS	SA7805C <sup>2</sup>			SA7806C <sup>2</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp. <sup>2</sup> , $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 10\text{V}$			$V_{IN} = 11\text{V}$			V
		4.8	5.0	5.2	5.75	6.0	6.25	V
Line regulation		$7\text{V} \leq V_{IN} \leq 25\text{V}$			$8\text{V} \leq V_{IN} \leq 25\text{V}$			mV
		4.65		5.35	5.65		6.35	mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	$7\text{V} \leq V_{IN} \leq 25\text{V}$			$8\text{V} \leq V_{IN} \leq 25\text{V}$			mV
			3	100		5	120	mV
I <sub>CC</sub>		$8\text{V} \leq V_{IN} \leq 12\text{V}$			$9\text{V} \leq V_{IN} \leq 13\text{V}$			mV
			1	50		1.5	60	mV
ΔI <sub>CC</sub>	Over temp. <sup>2</sup> , with line With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	$7\text{V} \leq V_{IN} \leq 25\text{V}$			$8\text{V} \leq V_{IN} \leq 25\text{V}$			mA
			0.8			0.8		mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$		40			45	μV	
Voltage drift				20			24	mV/1000hrs.
Ripple rejection	Over temp. <sup>2</sup> , $f = 120\text{Hz}$	$8\text{V} \leq V_{IN} \leq 18\text{V}$			$9\text{V} \leq V_{IN} \leq 19\text{V}$			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$		2.0			2.0	V	
Output resistance	$f = 1\text{kHz}$		17			19	mΩ	
I <sub>SC</sub>			750			550	mA	
Peak output current			2.2			2.2	A	
V <sub>OUT</sub> Output temperature drift	$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ $I_{OUT} = 5\text{mA}$		-1.1			-0.8	mV/°C	

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

PARAMETER	TEST CONDITIONS	SA7808C <sup>2</sup>			SA7812C <sup>2</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp. <sup>2</sup> , $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 14\text{V}$			$V_{IN} = 19\text{V}$			V
		7.7	8.0	8.3	11.5	12.0	12.5	V
Line regulation		$10.5\text{V} \leq V_{IN} \leq 23\text{V}$			$14.5\text{V} \leq V_{IN} \leq 27\text{V}$			mV
		7.6		8.4	11.4		12.6	mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	$10.5\text{V} \leq V_{IN} \leq 25\text{V}$			$14.5\text{V} \leq V_{IN} \leq 30\text{V}$			mV
			6	160		10	240	mV
I <sub>CC</sub>		$11\text{V} \leq V_{IN} \leq 17\text{V}$			$16\text{V} \leq V_{IN} \leq 22\text{V}$			mV
			2	80		3	120	mV
ΔI <sub>CC</sub>	Over temp. <sup>2</sup> , with line With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$	$7\text{V} \leq V_{IN} \leq 25\text{V}$			$8\text{V} \leq V_{IN} \leq 25\text{V}$			mA
			0.8			0.8		mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$		52			75	μV	
Voltage drift				32			48	mV/1000hrs.
Ripple rejection	Over temp. <sup>2</sup> , $f = 120\text{Hz}$	$11.5\text{V} \leq V_{IN} \leq 21.5\text{V}$			$15\text{V} \leq V_{IN} \leq 25\text{V}$			dB
Dropout voltage	$I_{OUT} = 1.0\text{A}$		2.0			2.0	V	
Output resistance	$f = 1\text{kHz}$		16			18	mΩ	
I <sub>SC</sub>			450			350	mA	
Peak output current			2.2			2.2	A	
V <sub>OUT</sub> Output temperature drift	$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ $I_{OUT} = 5\text{mA}$		-0.8			-1.0	mV/°C	

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

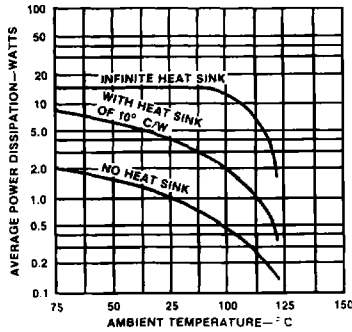
PARAMETER	TEST CONDITIONS	SA7814C <sup>2</sup>			SA7815C <sup>2</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp. <sup>2</sup> $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 22\text{V}$			$V_{IN} = 23\text{V}$			V
		13.3	13.8	14.3	14.4	15.0	15.6	V
Line regulation		$16.5\text{V} \leq V_{IN} \leq 29\text{V}$			$17.5 \leq V_{IN} \leq 30\text{V}$			mV
		13.15		14.95	14.25		15.75	mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	$16.5\text{V} \leq V_{IN} \leq 30\text{V}$			$17.5\text{V} \leq V_{IN} \leq 30\text{V}$			mV
			10	280		11	300	mV
I <sub>CC</sub>	Over temp. <sup>2</sup> with line	$19\text{V} \leq V_{IN} \leq 25\text{V}$			$20\text{V} \leq V_{IN} \leq 26\text{V}$			mV
			3	140		3	150	mV
I <sub>CC</sub>	Over temp. <sup>2</sup> with line							mV
			12	280		12	150	mV
I <sub>CC</sub>	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$							mV
			4	140		4	75	mV
I <sub>CC</sub>			4.3	8.0		4.4	8.0	mA
I <sub>CC</sub>	Over temp. <sup>2</sup> with line	$16.5\text{V} \leq V_{IN} \leq 30\text{V}$			$17.5\text{V} \leq V_{IN} \leq 30\text{V}$			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$							mA
			0.8			0.8		mA
Voltage drift								μV
			85			90		μV
Ripple rejection	Over temp. <sup>2</sup> $f = 120\text{Hz}$							mV/1000hrs.
				56			60	mV/1000hrs.
Dropout voltage	$I_{OUT} = 1.0\text{A}$	$17\text{V} \leq V_{IN} \leq 27\text{V}$			$18.5\text{V} \leq V_{IN} \leq 28.5\text{V}$			dB
		60	70		60	70		dB
Output resistance	$f = 1\text{kHz}$							V
			2.0			2.0		V
I <sub>SC</sub>	Peak output current							mΩ
			18			19		mΩ
V <sub>OUT</sub> Output temperature drift	$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ $I_{OUT} = 5\text{mA}$							mA
			350			230		mA
V <sub>OUT</sub> Output temperature drift								A
			2.2			2.1		A
V <sub>OUT</sub> Output temperature drift								mV/°C
			-1.0			-1.0		mV/°C

**DC ELECTRICAL CHARACTERISTICS** (Cont'd)  $I_{OUT} = 500\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_{OUT} = 0.1\mu\text{F}$ ,  $T_J = 25^\circ\text{C}$  unless otherwise specified.

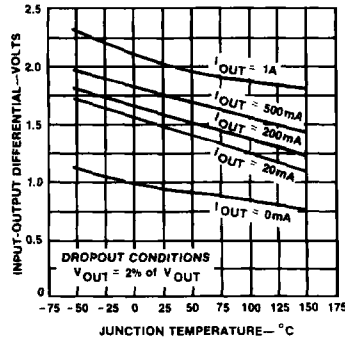
PARAMETER	TEST CONDITIONS	SA7818C <sup>2</sup>			SA7824C <sup>2</sup>			UNIT
		Min	Typ	Max	Min	Typ	Max	
V <sub>OUT</sub> Output voltage	Over temp. <sup>2</sup> $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$ , $P_D \leq 15\text{W}$	$V_{IN} = 27\text{V}$			$V_{IN} = 33\text{V}$			V
		17.3	18.0	18.7	23.0	24.0	25.0	V
Line regulation		$21\text{V} \leq V_{IN} \leq 33\text{V}$			$28\text{V} \leq V_{IN} \leq 38\text{V}$			mV
		17.1		18.9	22.8		25.2	mV
Load regulation	$5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$ $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$	$21\text{V} \leq V_{IN} \leq 33\text{V}$			$27\text{V} \leq V_{IN} \leq 38\text{V}$			mV
			15	360		18	480	mV
I <sub>CC</sub>	Over temp. <sup>2</sup> with line	$24\text{V} \leq V_{IN} \leq 30\text{V}$			$30\text{V} \leq V_{IN} \leq 36\text{V}$			mV
			5	180		6	240	mV
I <sub>CC</sub>	Over temp. <sup>2</sup> with line							mA
			12	360		12	480	mA
I <sub>CC</sub>	With load, $5\text{mA} \leq I_{OUT} \leq 1.0\text{A}$							mA
			4	180		4	240	mA
I <sub>CC</sub>			4.5	8.0		4.6	8.0	mA
I <sub>CC</sub>	Over temp. <sup>2</sup> with line	$21\text{V} \leq V_{IN} \leq 33\text{V}$			$27\text{V} \leq V_{IN} \leq 38\text{V}$			mA
Output noise voltage	$10\text{Hz} \leq f \leq 100\text{kHz}$							mA
			0.8			0.8		mA
Voltage drift								μV
			110			170		μV
Ripple rejection	Over temp. <sup>2</sup> $f = 120\text{Hz}$							mV/1000hrs.
				72			96	mV/1000hrs.
Dropout voltage	$I_{OUT} = 1.0\text{A}$	$22\text{V} \leq V_{IN} \leq 32\text{V}$			$27\text{V} \leq V_{IN} \leq 38\text{V}$			dB
		59	69		56	66		dB
Output resistance	$f = 1\text{kHz}$							V
			2.0			2.0		V
I <sub>SC</sub>	Peak output current							mΩ
			22			28		mΩ
V <sub>OUT</sub> Output temperature drift	$0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ $I_{OUT} = 5\text{mA}$							mA
			200			150		mA
V <sub>OUT</sub> Output temperature drift								A
			2.1			2.1		A
V <sub>OUT</sub> Output temperature drift								mV/°C
			-1.0			-1.5		mV/°C

TYPICAL PERFORMANCE CHARACTERISTICS

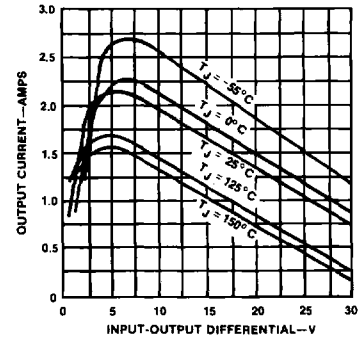
MAXIMUM AVERAGE POWER DISSIPATION AS A FUNCTION OF AMBIENT TEMPERATURE (TO-220, 7800C)



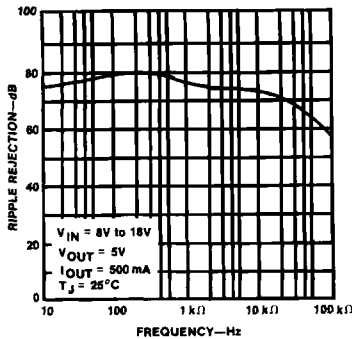
DROPOUT VOLTAGE AS A FUNCTION OF JUNCTION TEMPERATURE



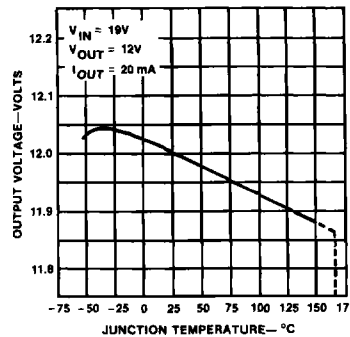
PEAK OUTPUT CURRENT AS A FUNCTION OF INPUT/OUTPUT DIFFERENTIAL VOLTAGE



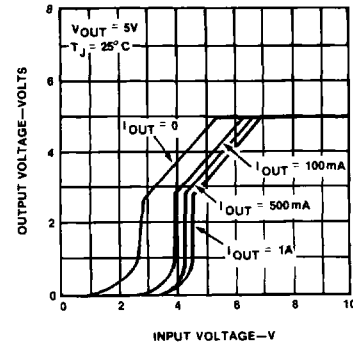
RIPPLE REJECTION AS A FUNCTION OF FREQUENCY



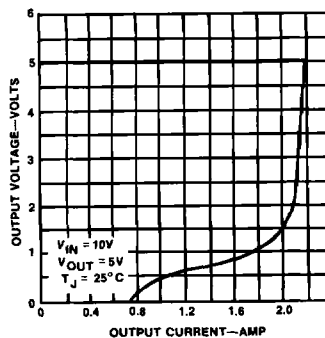
OUTPUT VOLTAGE AS A FUNCTION OF JUNCTION TEMPERATURE



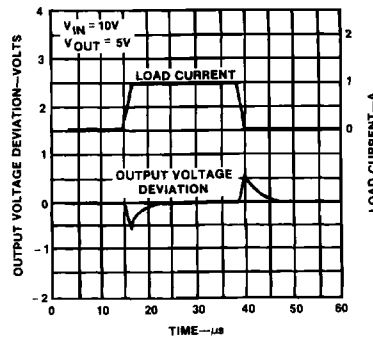
DROPOUT CHARACTERISTICS



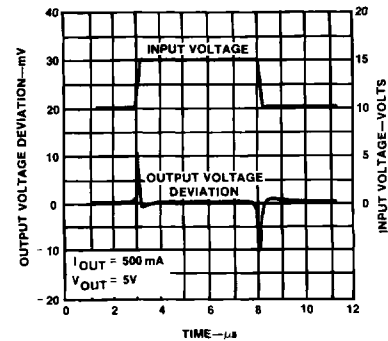
CURRENT LIMITING CHARACTERISTICS



LOAD TRANSIENT RESPONSE

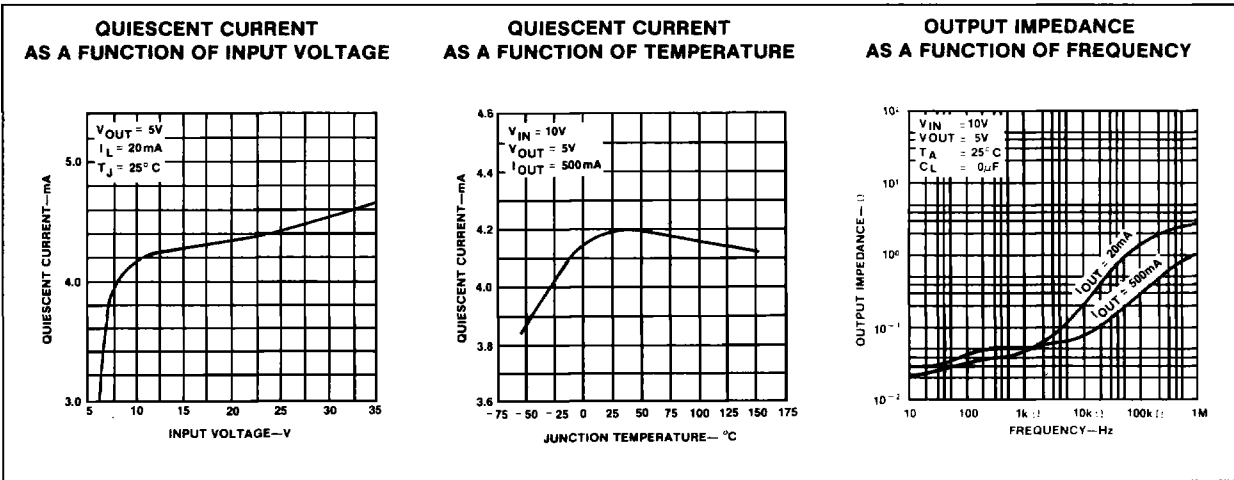


LINE TRANSIENT RESPONSE





TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)



EQUIVALENT TEST CIRCUITS

