

# AN7800/AN7800F Series

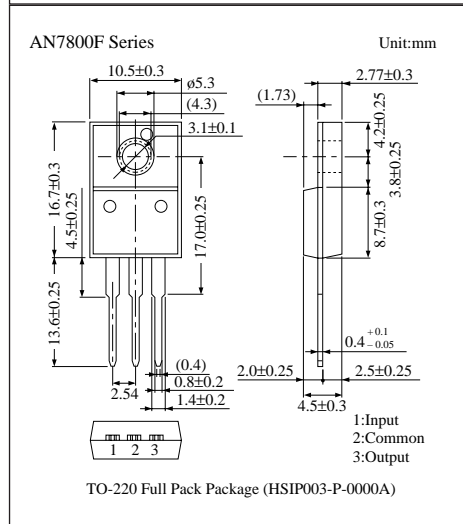
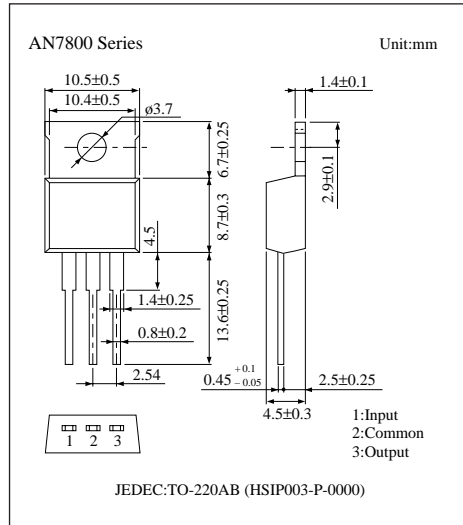
## 3-pin Positive Output Voltage Regulator (1A Type)

### ■ Overview

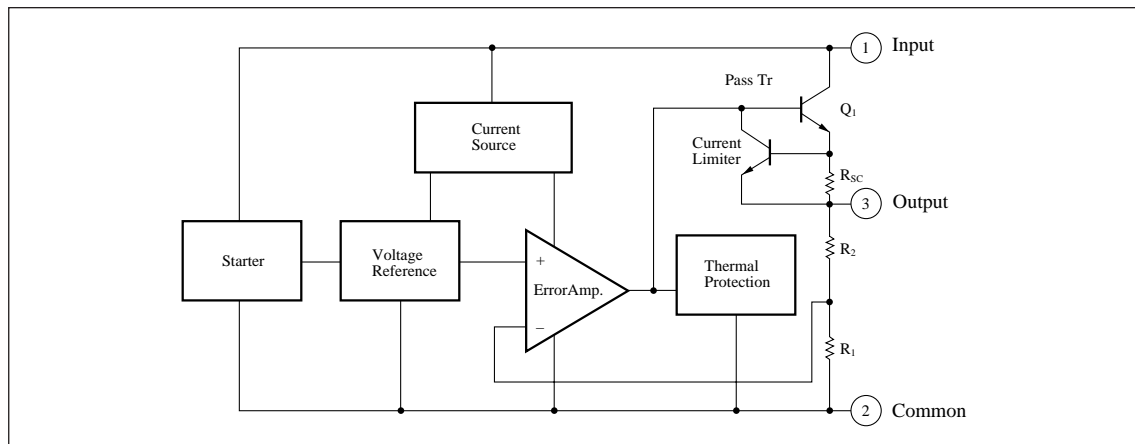
The AN7800 series and the AN7800F series are 3-pin fixed positive output voltage regulators. Stabilized fixed output voltage is obtained from unstable DC input voltage without using external components. 11 types of fixed output voltage are available, 5V, 6V, 7V, 8V, 9V, 10V, 12V, 15V, 18V, 20V and 24V. They can be used widely in power circuits with current capacity up to 1A.

### ■ Features

- No external components
- Output voltage: 5V, 6V, 7V, 8V, 9V, 10V, 12V, 15V, 18V, 20V, 24V
- Internal short-circuit current limiting
- Internal thermal overload protection
- Output transistor safe area compensation



### ■ Block Diagram



## ■ Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input voltage		V <sub>I</sub>	35 *1	V
			40 *2	V
Power dissipation	AN7800 Series	P <sub>D</sub>	15 *3	W
	AN7800F Series		10.25 *3	
Operating ambient temperature		T <sub>opr</sub>	-30 to+80	°C
Storage temperature		T <sub>stg</sub>	-55 to+150	°C

\*1 AN7805/F, AN7806/F, AN7807/F, AN7808/F, AN7809/F, AN7810/F, AN7812/F, AN7815/F, AN7818/F

\*2 AN7820/F, AN7824/F

\*3 Follow the derating curve. When T<sub>j</sub> exceeds 150°C, the internal circuit cuts off output.

## ■ Electrical Characteristics (Ta=25°C)

### • AN7805/7805F (5V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V <sub>O</sub>	T <sub>j</sub> =25°C	4.8	5	5.2	V
Output voltage tolerance	V <sub>O</sub>	V <sub>I</sub> =8 to 20V, I <sub>O</sub> =5mA to 1A, T <sub>j</sub> =0 to 125°C, P <sub>D</sub> ≤*	4.75	—	5.25	V
Line regulation	REG <sub>IN</sub>	V <sub>I</sub> =7.5 to 25V, T <sub>j</sub> =25°C	—	3	100	mV
		V <sub>I</sub> =8 to 12V, T <sub>j</sub> =25°C	—	1	50	mV
Load regulation	REG <sub>L</sub>	I <sub>O</sub> =5mA to 1.5A, T <sub>j</sub> =25°C	—	15	100	mV
		I <sub>O</sub> =250 to 750mA, T <sub>j</sub> =25°C	—	5	50	mV
Bias current	I <sub>bias</sub>	T <sub>j</sub> =25°C	—	3.9	8	mA
Input bias current change	ΔI <sub>bias (IN)</sub>	V <sub>I</sub> =7.5 to 25V, T <sub>j</sub> =25°C	—	—	1.3	mA
Load bias current change	ΔI <sub>bias (L)</sub>	I <sub>O</sub> =5mA to 1A, T <sub>j</sub> =25°C	—	—	0.5	mA
Output noise voltage	V <sub>no</sub>	f=10Hz to 100kHz	—	40	—	μV
Ripple rejection ratio	RR	V <sub>I</sub> =8 to 18V, I <sub>O</sub> =100mA, f=120Hz	62	—	—	dB
Minimum input/output voltage difference	V <sub>DIF (min.)</sub>	I <sub>O</sub> =1A, T <sub>j</sub> =25°C	—	2	—	V
Output impedance	Z <sub>O</sub>	f=1kHz	—	17	—	mΩ
Output short circuit current	I <sub>O (Short)</sub>	V <sub>I</sub> =25V, T <sub>j</sub> =25°C	—	700	—	mA
Peak output current	I <sub>O (Peak)</sub>	T <sub>j</sub> =25°C	—	2	—	A
Output voltage temperature coefficient	ΔV <sub>O</sub> /Ta	I <sub>O</sub> =5mA, T <sub>j</sub> =0 to 125°C	—	-0.3	—	mV/°C

Note 1) The specified condition T<sub>j</sub>=25°C means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified, V<sub>I</sub>=10V, I<sub>O</sub>=500mA, C<sub>I</sub>=0.33μF and C<sub>O</sub>=0.1μF.

\* AN7800 Series:15W, AN7800F Series:10.25W

## ■ Electrical Characteristics (Ta=25°C)

### • AN7806/7806F (6V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	5.75	6	6.25	V
Output voltage tolerance	$V_O$	$V_i=9$ to 21V, $I_O=5\text{mA}$ to 1A, $T_j=0$ to 125°C, $P_D \leq *$	5.7	—	6.3	V
Line regulation	$REG_{IN}$	$V_i=8.5$ to 25V, $T_j=25^\circ\text{C}$	—	5	120	mV
		$V_i=9$ to 13V, $T_j=25^\circ\text{C}$	—	1.5	60	mV
Load regulation	$REG_L$	$I_O=5\text{mA}$ to 1.5A, $T_j=25^\circ\text{C}$	—	14	120	mV
		$I_O=250$ to 750mA, $T_j=25^\circ\text{C}$	—	4	60	mV
Bias current	$I_{bias}$	$T_j=25^\circ\text{C}$	—	3.9	8	mA
Input bias current change	$\Delta I_{bias (IN)}$	$V_i=8.5$ to 25V, $T_j=25^\circ\text{C}$	—	—	1.3	mA
Load bias current change	$\Delta I_{bias (L)}$	$I_O=5\text{mA}$ to 1A, $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{no}$	$f=10\text{Hz}$ to 100kHz	—	40	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_i=9$ to 19V, $I_O=100\text{mA}$ , $f=120\text{Hz}$	59	—	—	dB
Minimum input/output voltage difference	$V_{DIF (min.)}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	17	—	$\text{m}\Omega$
Output short circuit current	$I_{O (Short)}$	$V_i=25\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{O (Peak)}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to 125°C	—	-0.4	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_i=11\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_i=0.33\mu\text{F}$  and  $C_o=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

### • AN7807/7807F (7V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	6.7	7	7.3	V
Output voltage tolerance	$V_O$	$V_i=10$ to 22V, $I_O=5\text{mA}$ to 1A, $T_j=0$ to 125°C, $P_D \leq *$	6.6	—	7.4	V
Line regulation	$REG_{IN}$	$V_i=9.5$ to 25V, $T_j=25^\circ\text{C}$	—	5	140	mV
		$V_i=10$ to 15V, $T_j=25^\circ\text{C}$	—	1.5	70	mV
Load regulation	$REG_L$	$I_O=5\text{mA}$ to 1.5A, $T_j=25^\circ\text{C}$	—	14	140	mV
		$I_O=250$ to 750mA, $T_j=25^\circ\text{C}$	—	4	70	mV
Bias current	$I_{bias}$	$T_j=25^\circ\text{C}$	—	3.9	8	mA
Input bias current change	$\Delta I_{bias (IN)}$	$V_i=9.5$ to 25V, $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{bias (L)}$	$I_O=5\text{mA}$ to 1A, $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{no}$	$f=10\text{Hz}$ to 100kHz	—	46	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_i=10$ to 20V, $I_O=100\text{mA}$ , $f=120\text{Hz}$	57	—	—	dB
Minimum input/output voltage difference	$V_{DIF (min.)}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	16	—	$\text{m}\Omega$
Output short circuit current	$I_{O (Short)}$	$V_i=25\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{O (Peak)}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to 125°C	—	-0.5	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_i=12\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_i=0.33\mu\text{F}$  and  $C_o=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

## ■ Electrical Characteristics (Ta=25°C)

### • AN7808/7808F (8V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	7.7	8	8.3	V
Output voltage tolerance	$V_O$	$V_I=11$ to 23V, $I_O=5\text{mA}$ to 1A, $T_j=0$ to 125°C, $P_D \leq^*$	7.6	—	8.4	V
Line regulation	$REG_{IN}$	$V_I=10.5$ to 25V, $T_j=25^\circ\text{C}$	—	6	160	mV
		$V_I=11$ to 17V, $T_j=25^\circ\text{C}$	—	2	80	mV
Load regulation	$REG_L$	$I_O=5\text{mA}$ to 1.5A, $T_j=25^\circ\text{C}$	—	12	160	mV
		$I_O=250$ to 750mA, $T_j=25^\circ\text{C}$	—	4	80	mV
Bias current	$I_{bias}$	$T_j=25^\circ\text{C}$	—	3.9	8	mA
Input bias current change	$\Delta I_{bias (IN)}$	$V_I=10.5$ to 25V, $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{bias (L)}$	$I_O=5\text{mA}$ to 1A, $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{no}$	$f=10\text{Hz}$ to 100kHz	—	52	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_I=11.5$ to 21.5V, $I_O=100\text{mA}$ , $f=120\text{Hz}$	56	—	—	dB
Minimum input/output voltage difference	$V_{DIF (min.)}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	16	—	$\text{m}\Omega$
Output short circuit current	$I_{O (Short)}$	$V_I=25\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{O (Peak)}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/Ta$	$I_O=5\text{mA}$ , $T_j=0$ to 125°C	—	-0.5	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_I=14\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_I=0.33\mu\text{F}$  and  $C_O=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

### • AN7809/7809F (9V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	8.65	9	9.35	V
Output voltage tolerance	$V_O$	$V_I=12$ to 24V, $I_O=5\text{mA}$ to 1A, $T_j=0$ to 125°C, $P_D \leq^*$	8.55	—	9.45	V
Line regulation	$REG_{IN}$	$V_I=11.5$ to 26V, $T_j=25^\circ\text{C}$	—	7	180	mV
		$V_I=12$ to 18V, $T_j=25^\circ\text{C}$	—	2	90	mV
Load regulation	$REG_L$	$I_O=5\text{mA}$ to 1.5A, $T_j=25^\circ\text{C}$	—	12	180	mV
		$I_O=250$ to 750mA, $T_j=25^\circ\text{C}$	—	4	90	mV
Bias current	$I_{bias}$	$T_j=25^\circ\text{C}$	—	3.9	8	mA
Input bias current change	$\Delta I_{bias (IN)}$	$V_I=11.5$ to 26V, $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{bias (L)}$	$I_O=5\text{mA}$ to 1A, $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{no}$	$f=10\text{Hz}$ to 100kHz	—	57	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_I=12$ to 22V, $I_O=100\text{mA}$ , $f=120\text{Hz}$	56	—	—	dB
Minimum input/output voltage difference	$V_{DIF (min.)}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	16	—	$\text{m}\Omega$
Output short circuit current	$I_{O (Short)}$	$V_I=26\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{O (Peak)}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/Ta$	$I_O=5\text{mA}$ , $T_j=0$ to 125°C	—	-0.5	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_I=15\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_I=0.33\mu\text{F}$  and  $C_O=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

## ■ Electrical Characteristics (Ta=25°C)

### • AN7810/7810F (10V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	9.6	10	10.4	V
Output voltage tolerance	$V_O$	$V_i=13$ to $25\text{V}$ , $I_O=5\text{mA}$ to $1\text{A}$ , $T_j=0$ to $125^\circ\text{C}$ , $P_D \leq *$	9.5	—	10.5	V
Line regulation	REG <sub>IN</sub>	$V_i=12.5$ to $27\text{V}$ , $T_j=25^\circ\text{C}$	—	8	200	mV
		$V_i=13$ to $19\text{V}$ , $T_j=25^\circ\text{C}$	—	2.5	100	mV
Load regulation	REG <sub>L</sub>	$I_O=5\text{mA}$ to $1.5\text{A}$ , $T_j=25^\circ\text{C}$	—	12	200	mV
		$I_O=250$ to $750\text{mA}$ , $T_j=25^\circ\text{C}$	—	4	100	mV
Bias current	$I_{\text{bias}}$	$T_j=25^\circ\text{C}$	—	3.9	8	mA
Input bias current change	$\Delta I_{\text{bias (IN)}}$	$V_i=12.5$ to $27\text{V}$ , $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{\text{bias (L)}}$	$I_O=5\text{mA}$ to $1\text{A}$ , $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{\text{no}}$	$f=10\text{Hz}$ to $100\text{kHz}$	—	63	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_i=13$ to $23\text{V}$ , $I_O=100\text{mA}$ , $f=120\text{Hz}$	56	—	—	dB
Minimum input/output voltage difference	$V_{\text{DIF (min.)}}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	16	—	$\text{m}\Omega$
Output short circuit current	$I_{O(\text{Short})}$	$V_i=27\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{O(\text{Peak})}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to $125^\circ\text{C}$	—	-0.6	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_i=16\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_1=0.33\mu\text{F}$  and  $C_O=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

### • AN7812/7812F (12V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	11.5	12	12.5	V
Output voltage tolerance	$V_O$	$V_i=15$ to $27\text{V}$ , $I_O=5\text{mA}$ to $1\text{A}$ , $T_j=0$ to $125^\circ\text{C}$ , $P_D \leq *$	11.4	—	12.6	V
Line regulation	REG <sub>IN</sub>	$V_i=14.5$ to $30\text{V}$ , $T_j=25^\circ\text{C}$	—	10	240	mV
		$V_i=16$ to $22\text{V}$ , $T_j=25^\circ\text{C}$	—	3	120	mV
Load regulation	REG <sub>L</sub>	$I_O=5\text{mA}$ to $1.5\text{A}$ , $T_j=25^\circ\text{C}$	—	12	240	mV
		$I_O=250$ to $750\text{mA}$ , $T_j=25^\circ\text{C}$	—	4	120	mV
Bias current	$I_{\text{bias}}$	$T_j=25^\circ\text{C}$	—	4	8	mA
Input bias current change	$\Delta I_{\text{bias (IN)}}$	$V_i=14.5$ to $30\text{V}$ , $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{\text{bias (L)}}$	$I_O=5\text{mA}$ to $1\text{A}$ , $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{\text{no}}$	$f=10\text{Hz}$ to $100\text{kHz}$	—	75	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_i=15$ to $25\text{V}$ , $I_O=100\text{mA}$ , $f=120\text{Hz}$	55	—	—	dB
Minimum input/output voltage difference	$V_{\text{DIF (min.)}}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	18	—	$\text{m}\Omega$
Output short circuit current	$I_{O(\text{Short})}$	$V_i=30\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{O(\text{Peak})}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to $125^\circ\text{C}$	—	-0.8	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_i=19\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_1=0.33\mu\text{F}$  and  $C_O=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

## ■ Electrical Characteristics (Ta=25°C)

### • AN7815/7815F (15V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	14.4	15	15.6	V
Output voltage tolerance	$V_O$	$V_I=18$ to $30\text{V}$ , $I_O=5\text{mA}$ to $1\text{A}$ , $T_j=0$ to $125^\circ\text{C}$ , $P_D \leq *$	14.25	—	15.75	V
Line regulation	$\text{REG}_{\text{IN}}$	$V_I=17.5$ to $30\text{V}$ , $T_j=25^\circ\text{C}$	—	11	300	mV
		$V_I=20$ to $26\text{V}$ , $T_j=25^\circ\text{C}$	—	3	150	mV
Load regulation	$\text{REG}_{\text{L}}$	$I_O=5\text{mA}$ to $1.5\text{A}$ , $T_j=25^\circ\text{C}$	—	12	300	mV
		$I_O=250$ to $750\text{mA}$ , $T_j=25^\circ\text{C}$	—	4	150	mV
Bias current	$I_{\text{bias}}$	$T_j=25^\circ\text{C}$	—	4	8	mA
Input bias current change	$\Delta I_{\text{bias (IN)}}$	$V_I=17.5$ to $30\text{V}$ , $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{\text{bias (L)}}$	$I_O=5\text{mA}$ to $1\text{A}$ , $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{\text{no}}$	$f=10\text{Hz}$ to $100\text{kHz}$	—	90	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_I=18.5$ to $28.5\text{V}$ , $f=120\text{Hz}$	54	—	—	dB
Minimum input/output voltage difference	$V_{\text{DIF (min.)}}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	19	—	$\text{m}\Omega$
Output short circuit current	$I_{\text{O (Short)}}$	$V_I=30\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{\text{O (Peak)}}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to $125^\circ\text{C}$	—	-1	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_I=23\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_I=0.33\mu\text{F}$  and  $C_O=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

### • AN7818/7818F (18V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	17.3	18	18.7	V
Output voltage tolerance	$V_O$	$V_I=21$ to $33\text{V}$ , $I_O=5\text{mA}$ to $1\text{A}$ , $T_j=0$ to $125^\circ\text{C}$ , $P_D \leq *$	17.1	—	18.9	V
Line regulation	$\text{REG}_{\text{IN}}$	$V_I=21$ to $33\text{V}$ , $T_j=25^\circ\text{C}$	—	14	360	mV
		$V_I=24$ to $30\text{V}$ , $T_j=25^\circ\text{C}$	—	4	180	mV
Load regulation	$\text{REG}_{\text{L}}$	$I_O=5\text{mA}$ to $1.5\text{A}$ , $T_j=25^\circ\text{C}$	—	12	360	mV
		$I_O=250$ to $750\text{mA}$ , $T_j=25^\circ\text{C}$	—	4	180	mV
Bias current	$I_{\text{bias}}$	$T_j=25^\circ\text{C}$	—	4.1	8	mA
Input bias current change	$\Delta I_{\text{bias (IN)}}$	$V_I=21$ to $33\text{V}$ , $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{\text{bias (L)}}$	$I_O=5\text{mA}$ to $1\text{A}$ , $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{\text{no}}$	$f=10\text{Hz}$ to $100\text{kHz}$	—	110	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_I=22$ to $32\text{V}$ , $I_O=100\text{mA}$ , $f=120\text{Hz}$	53	—	—	dB
Minimum input/output voltage difference	$V_{\text{DIF (min.)}}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	16	—	$\text{m}\Omega$
Output short circuit current	$I_{\text{O (Short)}}$	$V_I=35\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{\text{O (Peak)}}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to $125^\circ\text{C}$	—	-1.1	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_I=27\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_I=0.33\mu\text{F}$  and  $C_O=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

## ■ Electrical Characteristics (Ta=25°C)

### • AN7820/7820F (20V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	19.2	20	20.8	V
Output voltage Tolerance	$V_O$	$V_i=24$ to $35\text{V}$ , $I_O=5\text{mA}$ to $1\text{A}$ , $T_j=0$ to $125^\circ\text{C}$ , $P_D \leq *$	19	—	21	V
Line regulation	$\text{REG}_{\text{IN}}$	$V_i=23$ to $35\text{V}$ , $T_j=25^\circ\text{C}$	—	15	400	mV
		$V_i=26$ to $32\text{V}$ , $T_j=25^\circ\text{C}$	—	5	200	mV
Load regulation	$\text{REG}_{\text{L}}$	$I_O=5\text{mA}$ to $1.5\text{A}$ , $T_j=25^\circ\text{C}$	—	12	400	mV
		$I_O=250$ to $750\text{mA}$ , $T_j=25^\circ\text{C}$	—	4	200	mV
Bias current	$I_{\text{bias}}$	$T_j=25^\circ\text{C}$	—	4.1	8	mA
Input bias current change	$\Delta I_{\text{bias (IN)}}$	$V_i=23$ to $35\text{V}$ , $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{\text{bias (L)}}$	$I_O=5\text{mA}$ to $1\text{A}$ , $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{\text{no}}$	$f=10\text{Hz}$ to $100\text{kHz}$	—	110	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_i=24$ to $34\text{V}$ , $I_O=100\text{mA}$ , $f=120\text{Hz}$	53	—	—	dB
Minimum input/output voltage difference	$V_{\text{DIF (min.)}}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	22	—	$\text{m}\Omega$
Output short circuit current	$I_{\text{O (Short)}}$	$V_i=35\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{\text{O (Peak)}}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to $125^\circ\text{C}$	—	-1.2	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

Note 2) When not specified,  $V_i=29\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_1=0.33\mu\text{F}$  and  $C_0=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

### • AN7824/7824F (24V Type)

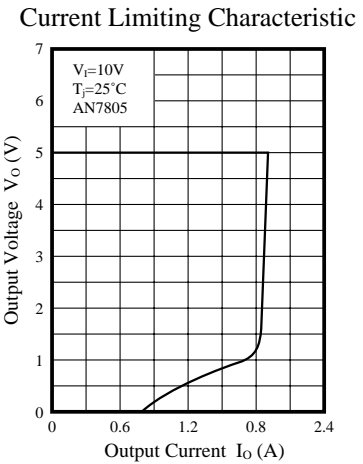
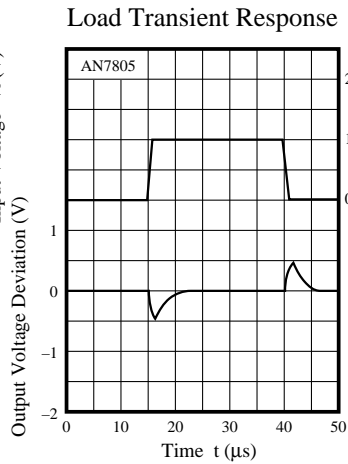
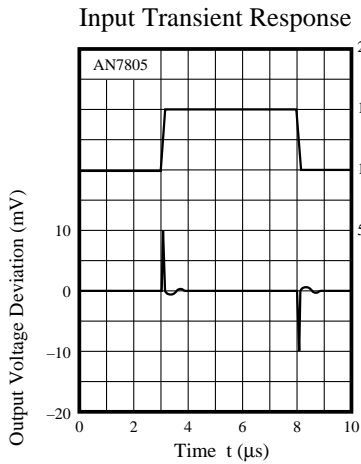
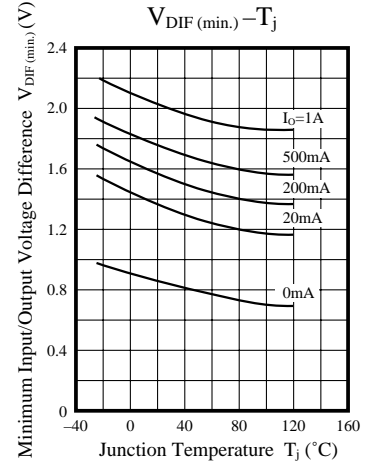
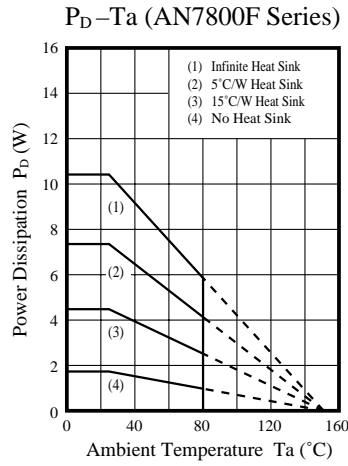
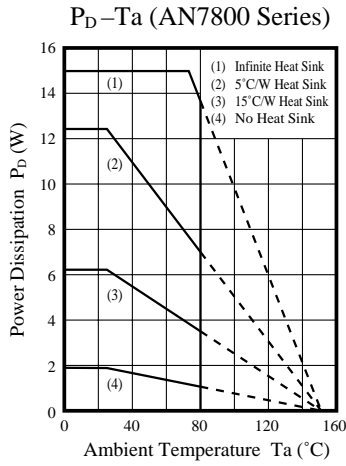
Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	$V_O$	$T_j=25^\circ\text{C}$	23	24	25	V
Output voltage tolerance	$V_O$	$V_i=28$ to $38\text{V}$ , $I_O=5\text{mA}$ to $1\text{A}$ , $T_j=0$ to $125^\circ\text{C}$ , $P_D \leq *$	22.8	—	25.2	V
Line regulation	$\text{REG}_{\text{IN}}$	$V_i=27$ to $38\text{V}$ , $T_j=25^\circ\text{C}$	—	18	480	mV
		$V_i=30$ to $36\text{V}$ , $T_j=25^\circ\text{C}$	—	6	240	mV
Load regulation	$\text{REG}_{\text{L}}$	$I_O=5\text{mA}$ to $1.5\text{A}$ , $T_j=25^\circ\text{C}$	—	12	480	mV
		$I_O=250$ to $750\text{mA}$ , $T_j=25^\circ\text{C}$	—	4	240	mV
Bias current	$I_{\text{bias}}$	$T_j=25^\circ\text{C}$	—	4.1	8	mA
Input bias current change	$\Delta I_{\text{bias (IN)}}$	$V_i=27$ to $38\text{V}$ , $T_j=25^\circ\text{C}$	—	—	1	mA
Load bias current change	$\Delta I_{\text{bias (L)}}$	$I_O=5\text{mA}$ to $1\text{A}$ , $T_j=25^\circ\text{C}$	—	—	0.5	mA
Output noise voltage	$V_{\text{no}}$	$f=10\text{Hz}$ to $100\text{kHz}$	—	170	—	$\mu\text{V}$
Ripple rejection ratio	RR	$V_i=28$ to $38\text{V}$ , $I_O=100\text{mA}$ , $f=120\text{Hz}$	50	—	—	dB
Minimum input/output voltage difference	$V_{\text{DIF (min.)}}$	$I_O=1\text{A}$ , $T_j=25^\circ\text{C}$	—	2	—	V
Output impedance	$Z_O$	$f=1\text{kHz}$	—	28	—	$\text{m}\Omega$
Output short circuit current	$I_{\text{O (Short)}}$	$V_i=38\text{V}$ , $T_j=25^\circ\text{C}$	—	700	—	mA
Peak output current	$I_{\text{O (Peak)}}$	$T_j=25^\circ\text{C}$	—	2	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	$I_O=5\text{mA}$ , $T_j=0$ to $125^\circ\text{C}$	—	-1.4	—	$\text{mV}/^\circ\text{C}$

Note 1) The specified condition  $T_j=25^\circ\text{C}$  means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.

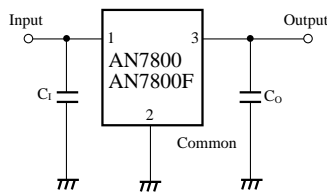
Note 2) When not specified,  $V_i=33\text{V}$ ,  $I_O=500\text{mA}$ ,  $C_1=0.33\mu\text{F}$  and  $C_0=0.1\mu\text{F}$ .

\* AN7800 Series:15W, AN7800F Series:10.25W

## ■ Characteristic Curve



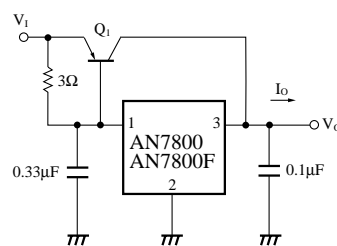
## ■ Basic Regulator Circuit



$C_1$  is set when the input line is long.  
 $C_o$  improves the transient response.

## ■ Application Circuit

### 1) Current Boost Circuit



### 2) Adjustable Output Regulator

