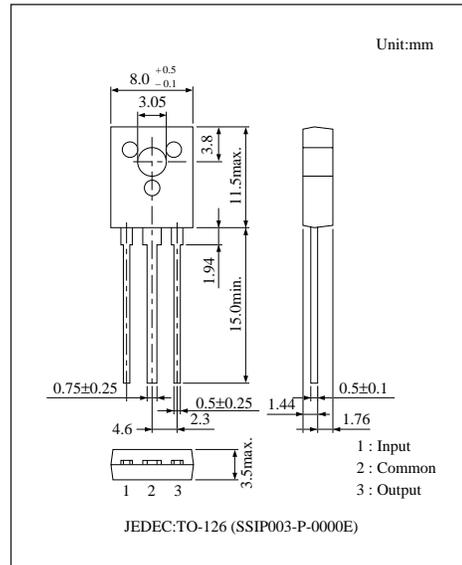# Panasonic

AN78N00 Series

3-pin Positive Output Voltage Regulator (300mA Type)
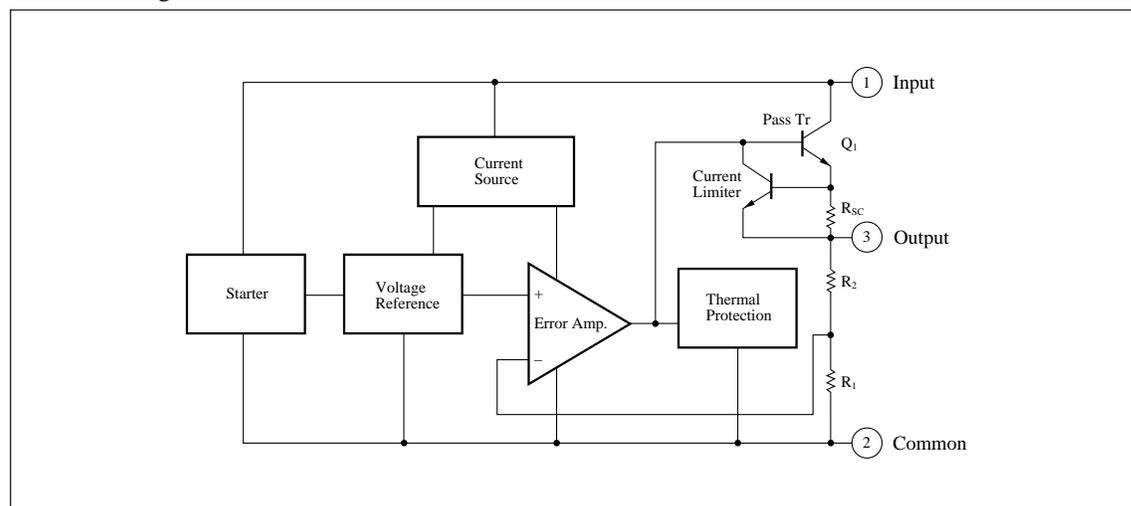
■ Overview

The AN78N00 series is 3-pin fixed positive output voltage regulators. Stabilized fixed output voltage is obtained from unstable DC input voltage without using any external components. 12 types of fixed output voltage are available ; 4V, 5V, 6V, 7V, 8V, 9V, 10V, 12V, 15V, 18V, 20V and 24V. They can be used widely in power circuits with current capacitance up to 300mA.

■ Features

• No external components
• Output voltage : 4V, 5V, 6V, 7V, 8V, 9V, 10V, 12V, 15V,
　　　　　　　　　　18V, 20V, 24V
• Short-circuit current limiting built-in
• Thermal overload protection built-in
• Output transistor safe area compensation

Unit:mm

$8.0 \, ^{+0.5}_{-0.1}$
3.05
3.8
11.5max.
1.94
15.0min.
0.75±0.25
0.5±0.25
2.3
4.6
1.44
0.5±0.1
1.76
3.5max.
1　2　3

1 : Input
2 : Common
3 : Output

JEDEC:TO-126 (SSIP003-P-0000E)

■ Block Diagram

Current
Source

Pass Tr

Q₁

Current
Limiter

R_SC

1　Input

3　Output

Starter

Voltage
Reference

Error Amp.

Thermal
Protection

R₂

R₁

2　Common

+

−

Panasonic

■ Absolute Maximum Ratings (Ta=25˚C)

Parameter	Symbol	Rating	Unit
Input voltage	V_I	35 [*1]	V
		40 [*2]	V
Power dissipation	P_D	8 [*3]	W
Operating ambient temperature	T_{opr}	−20 to +80	˚C
Storage temperature	T_{stg}	−55 to +150	˚C

[*1] AN78N04, AN78N05, AN78N06, AN78N07, AN78N08, AN78N09, AN78N10, AN78N12, AN78N15, AN78N18
[*2] AN78N20, AN78N24
[*3] Follow the derating curve. When T_j exceeds 150˚C, the internal circuit cuts off the output.

■ Electrical Characteristics (Ta=25˚C)

• AN78N04 (4V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25˚C	3.84	4	4.16	V
Output voltage tolerance	V_O	V_I=6.5 to 20V, I_O=5 to 200mA	3.8	——	4.2	V
Line regulation	REG_{IN}	V_I=6.5 to 25V, T_j=25˚C	——	9	40	mV
		V_I=7 to 20V, T_j=25˚C	——	4	20	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25˚C	——	20	80	mV
		I_O=5 to 200mA, T_j=25˚C	——	10	40	mV
Bias current	I_{bias}	T_j=25˚C	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\,(IN)}$	V_I=6.5 to 25V, T_j=25˚C	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\,(L)}$	I_O=1 to 300mA, T_j=25˚C	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	38	——	μV
Ripple rejection ratio	RR	V_I=7 to 17V, I_O=50mA, f=120Hz	62	72	——	dB
Minimum input/output voltage difference	$V_{DIF\,(min.)}$	I_O=300mA, T_j=25˚C	——	2	——	V
Output short circuit current	$I_{O\,(Short)}$	V_I=35V, T_j=25˚C	——	300	——	mA
Peak output current	$I_{O\,(Peak)}$	T_j=25˚C	——	500	——	mA
Output voltage temperature coefficient	ΔV_O/Ta	I_O=5mA, T_j=0 to 125˚C	——	− 0.3	——	mV/˚C

Note 1) The specified condition T_j=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_I=9V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125˚C

■ Electrical Characteristics (Ta=25˚C)

• AN78N05 (5V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	$T_j=25˚C$	4.8	5	5.2	V
Output voltage tolerance	V_O	$V_I=7.5$ to $20V$, $I_O=5$ to $200mA$	4.75	——	5.25	V
Line regulation	REG_{IN}	$V_I=7.5$ to $25V$, $T_j=25˚C$	——	10	50	mV
		$V_I=8$ to $20V$, $T_j=25˚C$	——	5	25	mV
Load regulation	REG_L	$I_O=1$ to $300mA$, $T_j=25˚C$	——	20	100	mV
		$I_O=5$ to $200mA$, $T_j=25˚C$	——	10	50	mV
Bias current	I_{bias}	$T_j=25˚C$	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\,(IN)}$	$V_I=7.5$ to $25V$, $T_j=25˚C$	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\,(L)}$	$I_O=1$ to $300mA$, $T_j=25˚C$	——	——	0.5	mA
Output noise voltage	V_{no}	$f=10Hz$ to $100kHz$	——	40	——	μV
Ripple rejection ratio	RR	$V_I=8$ to $18V$, $I_O=50mA$, $f=120Hz$	62	72	——	dB
Minimum input/output voltage difference	$V_{DIF\,(min.)}$	$I_O=300mA$, $T_j=25˚C$	——	2	——	V
Output short circuit current	$I_{O\,(Short)}$	$V_I=35V$, $T_j=25˚C$	——	300	——	mA
Peak output current	$I_{O\,(Peak)}$	$T_j=25˚C$	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	$I_O=5mA$, $T_j=0$ to $125˚C$	——	− 0.3	——	mV/˚C

Note 1) The specified condition $T_j=25˚C$ 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, $V_I=10V$, $I_O=100mA$, $C_I=0.33μF$, $C_O=0.1μF$, $T_j=0$ to $125˚C$

• AN78N06 (6V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	$T_j=25˚C$	5.75	6	6.25	V
Output voltage tolerance	V_O	$V_I=8.5$ to $20V$, $I_O=5$ to $200mA$	5.7	——	6.3	V
Line regulation	REG_{IN}	$V_I=8.5$ to $25V$, $T_j=25˚C$	——	11	60	mV
		$V_I=9$ to $20V$, $T_j=25˚C$	——	6	30	mV
Load regulation	REG_L	$I_O=1$ to $300mA$, $T_j=25˚C$	——	20	120	mV
		$I_O=5$ to $200mA$, $T_j=25˚C$	——	10	60	mV
Bias current	I_{bias}	$T_j=25˚C$	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\,(IN)}$	$V_I=8.5$ to $25V$, $T_j=25˚C$	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\,(L)}$	$I_O=1$ to $300mA$, $T_j=25˚C$	——	——	0.5	mA
Output noise voltage	V_{no}	$f=10Hz$ to $100kHz$	——	45	——	μV
Ripple rejection ratio	RR	$V_I=9$ to $19V$, $I_O=50mA$, $f=120Hz$	59	70	——	dB
Minimum input/output voltage difference	$V_{DIF\,(min.)}$	$I_O=300mA$, $T_j=25˚C$	——	2	——	V
Output short circuit current	$I_{O\,(Short)}$	$V_I=35V$, $T_j=25˚C$	——	300	——	mA
Peak output current	$I_{O\,(Peak)}$	$T_j=25˚C$	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	$I_O=5mA$, $T_j=0$ to $125˚C$	——	− 0.4	——	mV/˚C

Note 1) The specified condition $T_j=25˚C$ 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, $V_I=11V$, $I_O=100mA$, $C_I=0.33μF$, $C_O=0.1μF$, $T_j=0$ to $125˚C$

■ Electrical Characteristics (Ta=25˚C)

• AN78N07(7V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25˚C	6.7	7	7.3	V
Output voltage tolerance	V_O	V_I=9.5 to 20V, I_O=5 to 200mA	6.65	——	7.35	V
Line regulation	REG_{IN}	V_I=9.5 to 25V, T_j=25˚C	——	12	70	mV
		V_I=10 to 20V, T_j=25˚C	——	7	35	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25˚C	——	20	140	mV
		I_O=5 to 200mA, T_j=25˚C	——	10	70	mV
Bias current	I_{bias}	T_j=25˚C	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\ (IN)}$	V_I=9.5 to 25V, T_j=25˚C	——	——	0.8	mA
Load vias current fluctuation	$\Delta I_{bias\ (L)}$	I_O=1 to 300mA, T_j=25˚C	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	50	——	μV
Ripple rejection ratio	RR	V_I=10 to 20V, I_O=50mA, f=120Hz	57	69	——	dB
Minimum input/output voltage difference	$V_{DIF\ (min.)}$	I_O=300mA, T_j=25˚C	——	2	——	V
Output short circuit current	$I_{O\ (Short)}$	V_I=35V, T_j=25˚C	——	300	——	mA
Peak output current	$I_{O\ (Peak)}$	T_j=25˚C	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	I_O=5mA, T_j=0 to 125˚C	——	– 0.4	——	mV/˚C

Note 1) The specified condition T_j=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_I=12V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125˚C

• AN78N08 (8V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25˚C	7.7	8	8.3	V
Output voltage tolerance	V_O	V_I=10.5 to 23V, I_O=5 to 200mA	7.6	——	8.4	V
Line regulation	REG_{IN}	V_I=10.5 to 25V, T_j=25˚C	——	13	80	mV
		V_I=12 to 23V, T_j=25˚C	——	8	40	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25˚C	——	25	160	mV
		I_O=5 to 200mA, T_j=25˚C	——	10	80	mV
Bias current	I_{bias}	T_j=25˚C	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\ (IN)}$	V_I=10.5 to 25V, T_j=25˚C	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\ (L)}$	I_O=1 to 300mA, T_j=25˚C	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	55	——	μV
Ripple rejection ratio	RR	V_I=11 to 21V, I_O=50mA, f=120Hz	56	69	——	dB
Minimum input/output voltage difference	$V_{DIF\ (min.)}$	I_O=300mA, T_j=25˚C	——	2	——	V
Output short circuit current	$I_{O\ (Short)}$	V_I=35V, T_j=25˚C	——	300	——	mA
Peak output current	$I_{O\ (Peak)}$	T_j=25˚C	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	I_O=5mA, T_j=0 to 125˚C	——	– 0.4	——	mV/˚C

Note 1) The specified condition T_j=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_I=14V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125˚C

■ Electrical Characteristics (Ta=25˚C)

• AN78N09 (9V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	$T_j=25˚C$	8.65	9	9.35	V
Output voltage tolerance	V_O	$V_I=11.5$ to 24V, $I_O=5$ to 200mA	8.55	——	9.45	V
Line regulation	REG_{IN}	$V_I=11.5$ to 25V, $T_j=25˚C$	——	14	90	mV
		$V_I=13$ to 24V, $T_j=25˚C$	——	9	45	mV
Load regulation	REG_L	$I_O=1$ to 300mA, $T_j=25˚C$	——	25	180	mV
		$I_O=5$ to 200mA, $T_j=25˚C$	——	10	90	mV
Bias current	I_{bias}	$T_j=25˚C$	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\ (IN)}$	$V_I=11.5$ to 25V, $T_j=25˚C$	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\ (L)}$	$I_O=1$ to 300mA, $T_j=25˚C$	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	60	——	μV
Ripple rejection ratio	RR	$V_I=12$ to 22V, $I_O=50mA$, f=120Hz	56	68	——	dB
Minimum input/output voltage difference	$V_{DIF\ (min.)}$	$I_O=300mA$, $T_j=25˚C$	——	2	——	V
Output short circuit current	$I_{O\ (Short)}$	$V_I=35V$, $T_j=25˚C$	——	300	——	mA
Peak output current	$I_{O\ (Peak)}$	$T_j=25˚C$	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	$I_O=5mA$, $T_j=0$ to 125˚C	——	– 0.5	——	mV/˚C

Note 1) The specified condition $T_j=25˚C$ 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, $V_I=15V$, $I_O=100mA$, $C_I=0.33μF$, $C_O=0.1μF$, $T_j=0$ to 125˚C

• AN78N10 (10V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	$T_j=25˚C$	9.6	10	10.4	V
Output voltage tolerance	V_O	$V_I=12.5$ to 25V, $I_O=5$ to 200mA	9.5	——	10.5	V
Line regulation	REG_{IN}	$V_I=12.5$ to 30V, $T_j=25˚C$	——	15	100	mV
		$V_I=13$ to 25V, $T_j=25˚C$	——	10	50	mV
Load regulation	REG_L	$I_O=1$ to 300mA, $T_j=25˚C$	——	25	200	mV
		$I_O=5$ to 200mA, $T_j=25˚C$	——	10	100	mV
Bias current	I_{bias}	$T_j=25˚C$	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\ (IN)}$	$V_I=12.5$ to 30V, $T_j=25˚C$	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\ (L)}$	$I_O=1$ to 300mA, $T_j=25˚C$	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	70	——	μV
Ripple rejection ratio	RR	$V_I=13$ to 23V, $I_O=50mA$, f=120Hz	56	68	——	dB
Minimum input/output voltage difference	$V_{DIF\ (min.)}$	$I_O=300mA$, $T_j=25˚C$	——	2	——	V
Output short circuit current	$I_{O\ (Short)}$	$V_I=35V$, $T_j=25˚C$	——	300	——	mA
Peak output current	$I_{O\ (Peak)}$	$T_j=25˚C$	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	$I_O=5mA$, $T_j=0$ to 125˚C	——	– 0.5	——	mV/˚C

Note 1) The specified condition $T_j=25˚C$ 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, $V_I=16V$, $I_O=100mA$, $C_I=0.33μF$, $C_O=0.1μF$, $T_j=0$ to 125˚C

■ Electrical Characteristics (Ta=25˚C)

• AN78N12 (12V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25˚C	11.5	12	12.5	V
Output voltage tolerance	V_O	V_I=14.5 to 27V, I_O=5 to 200mA	11.4	——	12.6	V
Line regulation	REG_{IN}	V_I=14.5 to 30V, T_j=25˚C	——	15	100	mV
		V_I=16 to 27V, T_j=25˚C	——	10	50	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25˚C	——	25	240	mV
		I_O=5 to 200mA, T_j=25˚C	——	10	120	mV
Bias current	I_{bias}	T_j=25˚C	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\,(IN)}$	V_I=14.5 to 30V, T_j=25˚C	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\,(L)}$	I_O=1 to 300mA, T_j=25˚C	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	80	——	μV
Ripple rejection ratio	RR	V_I=15 to 25V, I_O=50mA, f=120Hz	55	67	——	dB
Minimum input/output voltage difference	$V_{DIF\,(min.)}$	I_O=300mA, T_j=25˚C	——	2	——	V
Output short circuit current	$I_{O\,(Short)}$	V_I=35V, T_j=25˚C	——	300	——	mA
Peak output current	$I_{O\,(Peak)}$	T_j=25˚C	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	I_O=5mA, T_j=0 to 125˚C	——	– 0.6	——	mV/˚C

Note 1) The specified condition T_j=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_I=19V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125˚C

• AN78N15 (15V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25˚C	14.4	15	15.6	V
Output voltage tolerance	V_O	V_I=17.5 to 20V, I_O=5 to 200mA	14.25	——	15.75	V
Line regulation	REG_{IN}	V_I=17.5 to 25V, T_j=25˚C	——	16	100	mV
		V_I=20 to 30V, T_j=25˚C	——	11	50	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25˚C	——	25	300	mV
		I_O=5 to 200mA, T_j=25˚C	——	10	150	mV
Bias current	I_{bias}	T_j=25˚C	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\,(IN)}$	V_I=17.5 to 30V, T_j=25˚C	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\,(L)}$	I_O=1 to 300mA, T_j=25˚C	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	80	——	μV
Ripple rejection ratio	RR	V_I=18.5 to 28.5V, I_O=50mA, f=120Hz	54	66	——	dB
Minimum input/output voltage difference	$V_{DIF\,(min.)}$	I_O=300mA, T_j=25˚C	——	2	——	V
Output short circuit current	$I_{O\,(Short)}$	V_I=35V, T_j=25˚C	——	300	——	mA
Peak output current	$I_{O\,(Peak)}$	T_j=25˚C	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	I_O=5mA, T_j=0 to 125˚C	——	– 0.8	——	mV/˚C

Note 1) The specified condition T_j=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_I=23V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125˚C

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■ Electrical Characteristics (Ta=25°C)

• AN78N18 (18V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25°C	17.3	18	18.7	V
Output voltage tolerance	V_O	V_I=21to 33V, I_O=5 to 200mA	17.1	—	18.9	V
Line regulation	REG_{IN}	V_I=21to 33V, T_j=25°C	—	18	100	mV
		V_I=22 to 33V, T_j=25°C	—	13	50	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25°C	—	30	360	mV
		I_O=5 to 200mA, T_j=25°C	—	10	180	mV
Bias current	I_{bias}	T_j=25°C	—	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias (IN)}$	V_I=21 to 33V, T_j=25°C	—	—	0.8	mA
Load bias current fluctuation	$\Delta I_{bias (L)}$	I_O=1 to 300mA, T_j=25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	—	90	—	μV
Ripple rejection ratio	RR	V_I=22 to 32V, I_O=50mA, f=120Hz	53	65	—	dB
Minimum input/output voltage difference	$V_{DIF (min.)}$	I_O=300mA, T_j=25°C	—	2	—	V
Output short circuit current	$I_{O (Short)}$	V_I=35V, T_j=25°C	—	300	—	mA
Peak output current	$I_{O (Peak)}$	T_j=25°C	—	500	—	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	I_O=5mA, T_j=0 to 125°C	—	−1.0	—	mV/°C

Note 1) The specified condition T_j=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_I=27V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125°C

• AN78N20 (20V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25°C	19.2	20	20.8	V
Output voltage tolerance	V_O	V_I=23 to 35V, I_O=5 to 200mA	19.0	—	21	V
Line regulation	REG_{IN}	V_I=23 to 35V, T_j=25°C	—	19	100	mV
		V_I=24 to 35V, T_j=25°C	—	14	50	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25°C	—	30	400	mV
		I_O=5 to 200mA, T_j=25°C	—	10	200	mV
Bias current	I_{bias}	T_j=25°C	—	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias (IN)}$	V_I=23 to 35V, T_j=25°C	—	—	0.8	mA
Load bias current fluctuation	$\Delta I_{bias (L)}$	I_O=1 to 300mA, T_j=25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	—	100	—	μV
Ripple rejection ratio	RR	V_I=24 to 34V, I_O=50mA, f=120Hz	52	64	—	dB
Minimum input/output voltage difference	$V_{DIF (min.)}$	I_O=300mA, T_j=25°C	—	2	—	V
Output short circuit current	$I_{O (Short)}$	V_I=35V, T_j=25°C	—	300	—	mA
Peak output current	$I_{O (Peak)}$	T_j=25°C	—	500	—	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	I_O=5mA, T_j=0 to 125°C	—	−1.2	—	mV/°C

Note 1) The specified condition T_j=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_I=29V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125°C

Panasonic

■ Electrical Characteristics (Ta=25°C)

• AN78N24 (24V Type)

Parameter	Symbol	Condition	min	typ	max	Unit
Output voltage	V_O	T_j=25°C	23	24	25	V
Output voltage tolerance	V_O	V_I=27 to 38V, I_O=5 to 200mA	22.8	——	25.2	V
Line regulation	REG_{IN}	V_I=27 to 38V, T_j=25°C	——	20	100	mV
		V_I=28 to 38V, T_j=25°C	——	15	50	mV
Load regulation	REG_L	I_O=1 to 300mA, T_j=25°C	——	30	480	mV
		I_O=5 to 200mA, T_j=25°C	——	10	240	mV
Bias current	I_{bias}	T_j=25°C	——	2.8	5	mA
Input bias current fluctuation	$\Delta I_{bias\,(IN)}$	V_I=27 to 38V, T_j=25°C	——	——	0.8	mA
Load bias current fluctuation	$\Delta I_{bias\,(L)}$	I_O=1 to 300mA, T_j=25°C	——	——	0.5	mA
Output noise voltage	V_{no}	f=10Hz to 100kHz	——	110	——	μV
Ripple rejection ratio	RR	V_I=28 to 38V, I_O=50mA, f=120Hz	50	63	——	dB
Minimum input/output voltage difference	$V_{DIF\,(min.)}$	I_O=300mA, T_j=25°C	——	2	——	V
Output short circuit current	$I_{O\,(Short)}$	V_I=35V, T_j=25°C	——	300	——	mA
Peak output current	$I_{O\,(Peak)}$	T_j=25°C	——	500	——	mA
Output voltage temperature coefficient	$\Delta V_O/Ta$	I_O=5mA, T_j=0 to 125°C	——	−1.5	——	mV/°C

Note 1) The specified condition T_j=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_I=33V, I_O=100mA, C_I=0.33μF, C_O=0.1μF, T_j=0 to 125°C
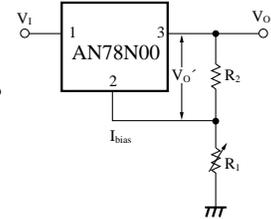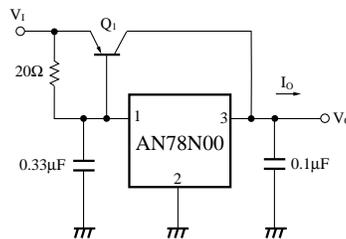
■ Basic Regulator Circuit
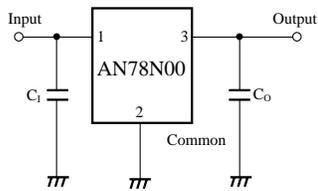
C_I : is set when the input line is long.

C_O : improves the transient response.

■ Application Circuit

$$|V_O| = V_O{}' + \left(I_{bias} + \frac{V_O{}'}{R_2} \right) R_1$$

■ Characteristic Curve

P_D–Ta (AN78M00 Series)

Power Dissipation P_D (W) vs Ambient Temperature Ta (°C)

(1) Infinite Heat Sink
(2) 5°C/W Heat Sink
(3) 15°C/W Heat Sink
(4) Without Heat Sink

$V_{DIF(min.)}$–T_j

Minimum Input/Output Voltage Difference $V_{DIF(min.)}$ (V) vs Junction Temperature T_j (°C)

I_O=300mA
I_O=100mA
I_O=20mA
I_O=0

Input Transient Response

AN78N05

Output Voltage Fluctuation (mV) / Input Voltage V_I (V) vs Time t (μs)

Load Transient Response

AN78N05

Output Voltage Fluctuation (V) / Load Current I_O (A) vs Time t (μs)

RR– f

AN78N05

Ripple Rejection Ratio RR (dB) vs Frequency f (Hz)