

AN80xx/AN80xxM Series

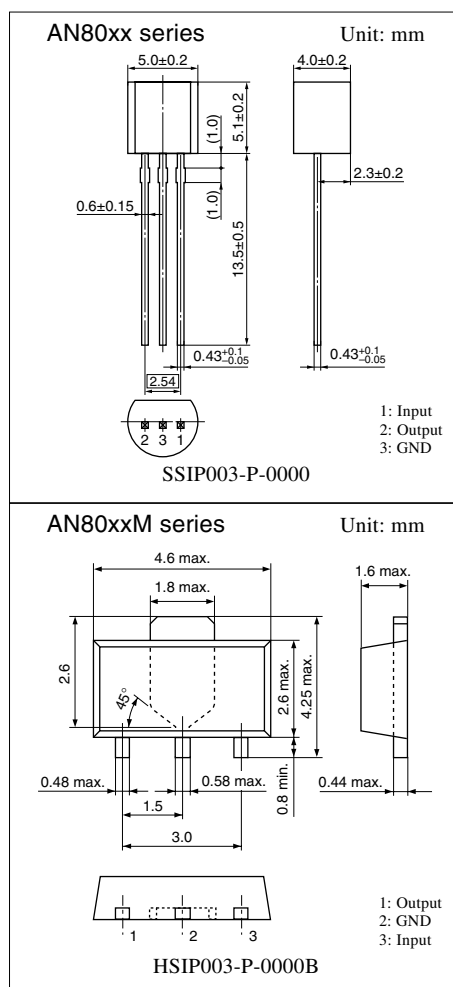
3-pin, positive output, low dropout voltage regulator (50 mA type)

Overview

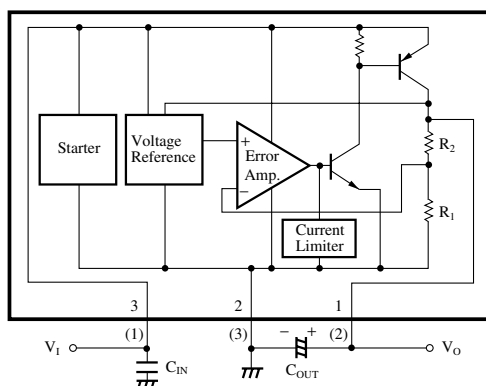
The AN80xx series and the AN80xxM series are 3-pin, low dropout, fixed positive output type monolithic voltage regulators. Since their power consumption can be minimized, they are suitable for battery-used power supply and reference voltage. 13 types of output voltage are available; 2V, 2.5V, 3V, 3.5V (SSIP003-P-0000 only), 4V, 4.5V, 5V, 6V, 7V, 8V, 8.5V, 9V, and 10V.

Features

- Input/output voltage difference: 0.3V max.
- Output current of up to 50mA
- Low bias current: 0.6mA typ.
- Output voltage: 2V, 2.5V, 3V, 3.5V (SSIP003-P-0000 only), 4V, 4.5V, 5V, 6V, 7V, 8V, 8.5V, 9V, and 10V
- Built-in overcurrent protection circuit



Block Diagram (AN80xxM series)



$$R_1 = 5k\Omega$$

$$C_{IN} = 0.33\mu F$$

$$C_{OUT} = 10\mu F$$

Note) The number in () shows the pin number for the AN80xx series.

■ Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter		Symbol	Rating	Unit
Supply voltage		V_I	20	V
Supply current		I_{CC}	100	mA
Power dissipation		P_D	650 *	mW
Operating ambient temperature		T_{opr}	-30 to +80	$^\circ\text{C}$
Storage temperature	AN80xx series	T_{stg}	-55 to +150	$^\circ\text{C}$
	AN80xxM series		-55 to +125	

* AN80xxM series is mounted on standard board (glass epoxy: 20mm × 20mm × t1.7mm with Cu foil of 1cm² or more).

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$

• AN8002, AN8002M (2V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	1.92	2	2.08	V
Line regulation	REG_{IN}	$V_I = 2.5$ to 8V, $T_j = 25^\circ\text{C}$	—	2	40	mV
Load regulation	REG_L	$I_O = 1$ to 40mA, $T_j = 25^\circ\text{C}$	—	7	20	mV
		$I_O = 1$ to 50mA, $T_j = 25^\circ\text{C}$	—	10	25	mV
Minimum input/output voltage difference	$V_{DIF(min)}$	$V_I = 1.9\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.06	0.2	V
		$V_I = 1.9\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.12	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.6	1	mA
Ripple rejection ratio	RR	$V_I = 3$ to 5V, $f = 120\text{Hz}$	62	74	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	60	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.1	—	mV/ $^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 3\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8025, AN8025M (2.5V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	2.4	2.5	2.6	V
Line regulation	REG_{IN}	$V_I = 3$ to 8.5V, $T_j = 25^\circ\text{C}$	—	2.5	50	mV
Load regulation	REG_L	$I_O = 1$ to 40mA, $T_j = 25^\circ\text{C}$	—	8	20	mV
		$I_O = 1$ to 50mA, $T_j = 25^\circ\text{C}$	—	12.5	25	mV
Minimum input/output voltage difference	$V_{DIF(min)}$	$V_I = 2.4\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 2.4\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.12	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.6	1	mA
Ripple rejection ratio	RR	$V_I = 3.5$ to 5.5V, $f = 120\text{Hz}$	60	72	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	65	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.13	—	mV/ $^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 3.5\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$ (continued)

• AN8003, AN8003M (3V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	2.88	3	3.12	V
Line regulation	REG_{IN}	$V_I = 3.5$ to 9V , $T_j = 25^\circ\text{C}$	—	3	50	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	9	25	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	15	30	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 2.9\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 2.9\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.12	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.6	1	mA
Ripple rejection ratio	RR	$V_I = 4$ to 6V , $f = 120\text{Hz}$	58	70	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	70	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.15	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 4\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8035(3.5V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	3.36	3.5	3.64	V
Line regulation	REG_{IN}	$V_I = 4$ to 9.5V , $T_j = 25^\circ\text{C}$	—	3.5	50	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	10	30	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	20	40	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 3.4\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 3.4\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.12	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.6	1	mA
Ripple rejection ratio	RR	$V_I = 4.5$ to 6.5V , $f = 120\text{Hz}$	57	69	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	75	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.2	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 4.5\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8004, AN8004M (4V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	3.84	4	4.16	V
Line regulation	REG_{IN}	$V_I = 4.5$ to 10V , $T_j = 25^\circ\text{C}$	—	3.5	50	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	10	30	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	20	40	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 3.8\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 3.8\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.12	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.6	1	mA
Ripple rejection ratio	RR	$V_I = 5$ to 7V , $f = 120\text{Hz}$	56	67	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	80	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.2	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 5\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$ (continued)

• AN8045, AN8045M (4.5V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	4.32	4.5	4.68	V
Line regulation	REG_{IN}	$V_I = 5 \text{ to } 10.5\text{V}, T_j = 25^\circ\text{C}$	—	4	50	mV
Load regulation	REG_L	$I_O = 1 \text{ to } 40\text{mA}, T_j = 25^\circ\text{C}$	—	11	35	mV
		$I_O = 1 \text{ to } 50\text{mA}, T_j = 25^\circ\text{C}$	—	23	45	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 4.3\text{V}, I_O = 20\text{mA}, T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 4.3\text{V}, I_O = 50\text{mA}, T_j = 25^\circ\text{C}$	—	0.12	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}, T_j = 25^\circ\text{C}$	—	0.7	1	mA
Ripple rejection ratio	RR	$V_I = 5.5 \text{ to } 7.5\text{V}, f = 120\text{Hz}$	54	66	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz to } 100\text{kHz}$	—	85	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30 \text{ to } +125^\circ\text{C}$	—	0.23	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 5.5\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8005, AN8005M (5V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	4.8	5	5.2	V
Line regulation	REG_{IN}	$V_I = 5.5 \text{ to } 11\text{V}, T_j = 25^\circ\text{C}$	—	4.5	50	mV
Load regulation	REG_L	$I_O = 1 \text{ to } 40\text{mA}, T_j = 25^\circ\text{C}$	—	12	40	mV
		$I_O = 1 \text{ to } 50\text{mA}, T_j = 25^\circ\text{C}$	—	25	50	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 4.8\text{V}, I_O = 20\text{mA}, T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 4.8\text{V}, I_O = 50\text{mA}, T_j = 25^\circ\text{C}$	—	0.12	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}, T_j = 25^\circ\text{C}$	—	0.7	1	mA
Ripple rejection ratio	RR	$V_I = 6 \text{ to } 8\text{V}, f = 120\text{Hz}$	52	64	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz to } 100\text{kHz}$	—	95	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30 \text{ to } +125^\circ\text{C}$	—	0.25	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 6\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8006, AN8006M (6V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	5.76	6	6.24	V
Line regulation	REG_{IN}	$V_I = 6.5 \text{ to } 12\text{V}, T_j = 25^\circ\text{C}$	—	5.5	60	mV
Load regulation	REG_L	$I_O = 1 \text{ to } 40\text{mA}, T_j = 25^\circ\text{C}$	—	13	45	mV
		$I_O = 1 \text{ to } 50\text{mA}, T_j = 25^\circ\text{C}$	—	28	55	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 5.8\text{V}, I_O = 20\text{mA}, T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 5.8\text{V}, I_O = 50\text{mA}, T_j = 25^\circ\text{C}$	—	0.13	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}, T_j = 25^\circ\text{C}$	—	0.7	1.2	mA
Ripple rejection ratio	RR	$V_I = 7 \text{ to } 9\text{V}, f = 120\text{Hz}$	51	63	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz to } 100\text{kHz}$	—	105	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30 \text{ to } +125^\circ\text{C}$	—	0.3	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 7\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$ (continued)

• AN8007, AN8007M (7V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	6.72	7	7.28	V
Line regulation	REG_{IN}	$V_I = 7.5$ to 13V , $T_j = 25^\circ\text{C}$	—	6.5	70	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	14	50	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	31	60	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 6.8\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 6.8\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.13	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.7	1.3	mA
Ripple rejection ratio	RR	$V_I = 8$ to 10V , $f = 120\text{Hz}$	50	62	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	120	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.35	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 8\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8008, AN8008M (8V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	7.68	8	8.32	V
Line regulation	REG_{IN}	$V_I = 8.5$ to 14V , $T_j = 25^\circ\text{C}$	—	7.5	80	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	15	55	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	34	65	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 7.8\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 7.8\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.14	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.7	1.3	mA
Ripple rejection ratio	RR	$V_I = 9$ to 11V , $f = 120\text{Hz}$	49	61	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	135	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	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 within so short a test time (within 10ms) that the characteristic value drift due to the chip junction temperature rise can be ignored.

Note 2) Unless otherwise specified, $V_I = 9\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8085, AN8085M (8.5V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	8.16	8.50	8.84	V
Line regulation	REG_{IN}	$V_I = 9$ to 14.5V , $T_j = 25^\circ\text{C}$	—	8.3	90	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	16	60	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	36	70	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 8.3\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 8.3\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.14	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.8	1.4	mA
Ripple rejection ratio	RR	$V_I = 9.5$ to 11.5V , $f = 120\text{Hz}$	48	60	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	140	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.43	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 9.5\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

■ Electrical Characteristics at $T_a = 25^\circ\text{C}$ (continued)

• AN8009, AN8009M (9V type)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	8.64	9	9.36	V
Line regulation	REG_{IN}	$V_I = 9.5$ to 15V , $T_j = 25^\circ\text{C}$	—	9	100	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	17	70	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	37	75	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 8.8\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 8.8\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.14	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.8	1.4	mA
Ripple rejection ratio	RR	$V_I = 10$ to 12V , $f = 120\text{Hz}$	47	59	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	150	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	0.45	—	$\text{mV}/^\circ\text{C}$

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

Note 2) Unless otherwise specified, $V_I = 10\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

• AN8010, AN8010M (10V type)

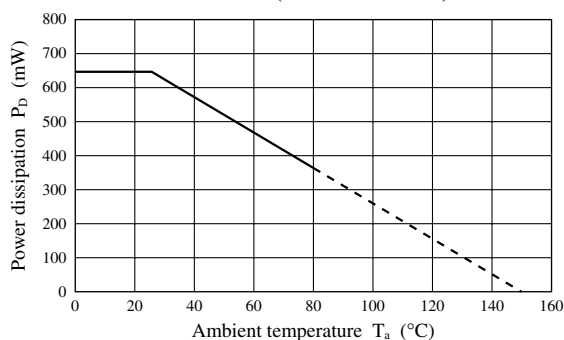
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output voltage	V_O	$T_j = 25^\circ\text{C}$	9.6	10	10.4	V
Line regulation	REG_{IN}	$V_I = 10.5$ to 16V , $T_j = 25^\circ\text{C}$	—	10	100	mV
Load regulation	REG_L	$I_O = 1$ to 40mA , $T_j = 25^\circ\text{C}$	—	18	75	mV
		$I_O = 1$ to 50mA , $T_j = 25^\circ\text{C}$	—	40	85	mV
Minimum input/output voltage difference	$V_{\text{DIF}(\text{min})}$	$V_I = 9.8\text{V}$, $I_O = 20\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.07	0.2	V
		$V_I = 9.8\text{V}$, $I_O = 50\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.14	0.3	V
Bias current	I_{Bias}	$I_O = 0\text{mA}$, $T_j = 25^\circ\text{C}$	—	0.8	1.4	mA
Ripple rejection ratio	RR	$V_I = 11$ to 13V , $f = 120\text{Hz}$	46	58	—	dB
Output noise voltage	V_{no}	$f = 10\text{Hz}$ to 100kHz	—	165	—	μV
Output voltage temperature coefficient	$\Delta V_O/T_a$	$T_j = -30$ to $+125^\circ\text{C}$	—	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 within so short a test time (within 10ms) that the characteristic value drift due to the chip junction temperature rise can be ignored.

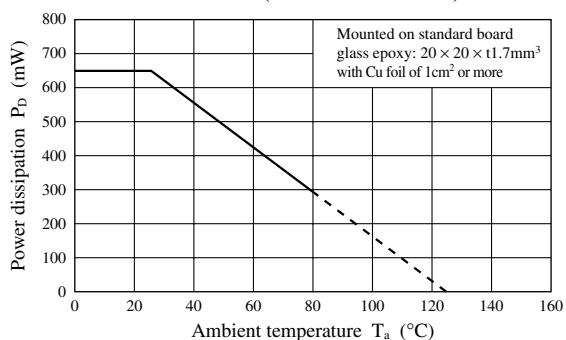
Note 2) Unless otherwise specified, $V_I = 11\text{V}$, $I_O = 20\text{mA}$ and $C_O = 10\mu\text{F}$.

■ Main Characteristics

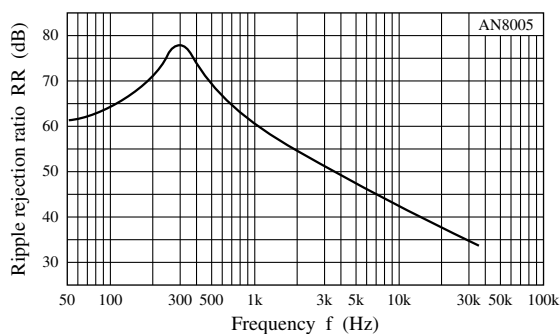
$P_D - T_a$ (AN80xx series)



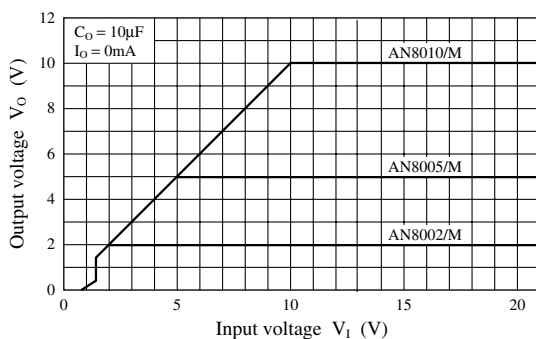
$P_D - T_a$ (AN80xxM series)



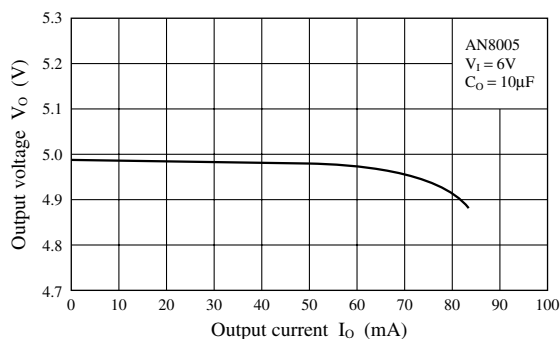
$RR - f$



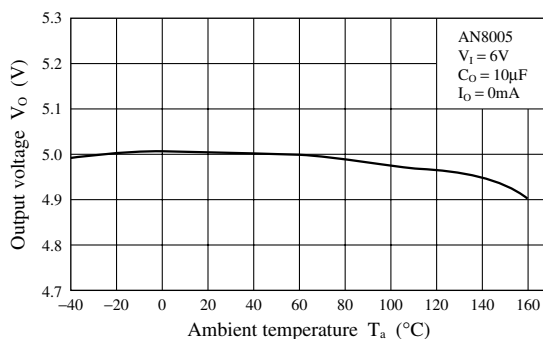
$V_O - V_I$

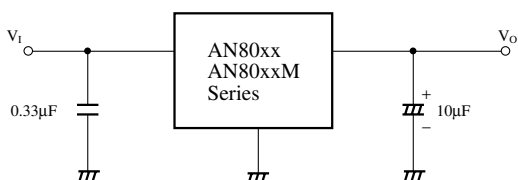


$V_O - I_O$



$V_O - T_a$



■ Application Circuit Example

- AN80xx and AN80xxM series have their internal gain increased in order to improve performance. When the power line on the output side is long, use a capacitor of $10\mu\text{F}$.
Also, the capacitor on the output side should be attached as close to the IC as possible.
- When using at a low temperature, it is recommended to use the capacitors with low internal impedance (for example, tantalum capacitor) for output capacitors.

Request for your special attention and precautions in using the technical information and semiconductors described in this material

- (1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.
- (2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.
- (3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
 - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
 - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.
- (6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.
- (7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

Please read the following notes before using the datasheets

- A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.
- B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.
- C. These materials are solely intended for a customer's individual use.
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.