AN79xxT/AN79xxF Series

3-pin negative output voltage regulator (1 A type)

■ Overview

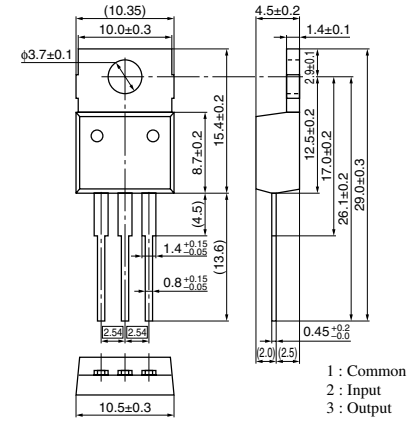
The AN79xxT series and the AN79xxF series are 3-pin, fixed negative output type monolithic voltage regulators.

A stabilized fixed negative output voltage is obtained from an unstable DC input voltage without using any external parts. Eleven types of fixed output voltage are available: –5V, –6V, –7V, –8V, –9V, –10V, –12V, –15V, –18V, –20V and –24V. They can be used widely as power circuits with a current capacity of up to 1A.

■ Features

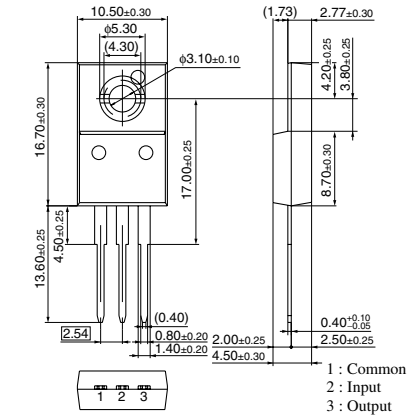
- No external components
- Output voltage: –5V, –6V, –7V, –8V, –9V, –10V, –12V, –15V, –18V, –20V, –24V
- Built-in overcurrent limit circuit
- Built-in thermal overload protection circuit
- Built-in ASO (area of safe operation) protection circuit

AN79xxT series Unit : mm



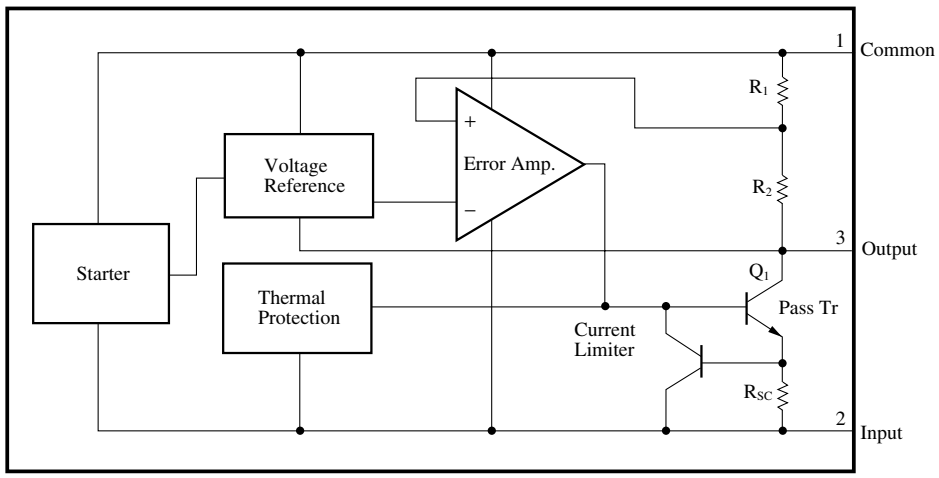
HSIP003-P-0000

AN79xxF series Unit : mm



HSIP003-P-0000A

■ Block Diagram



■ Absolute Maximum Ratings at T_a = 25°C

Parameter		Symbol	Rating	Unit
Input voltage		V_I	−35 *1	V
			−40 *2	V
Power dissipation	AN79xxT series	P_D	15 *3	W
	AN79xxF series		10.25 *3	
Operating ambient temperature		T_{opr}	−30 to +80	°C
Storage temperature		T_{stg}	−55 to +150	°C

*1 AN7905T/F, AN7906T/F, AN7907T/F, AN7908T/F, AN7909T/F, AN7910T/F, AN7912T/F, AN7915T/F, AN7918T/F
*2 AN7920T/F, AN7924T/F
*3 Follow the derating curve. When T_j exceeds 150°C, the internal circuit cuts off the output.

■ Electrical Characteristics at T_a = 25°C

• AN7905T, AN7905F (−5V type)

Parameter	Symbol	Conditions	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 to −20V, I_O = 5mA to 1A, $P_D \leq$ *	−4.75	—	−5.25	V
Line regulation	REG_{IN}	V_I = −7 to −25V, T_j = 25°C	—	3	100	mV
		V_I = −8 to −12V, T_j = 25°C	—	1	50	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	10	100	mV
		I_O = 250 to 750mA, T_j = 25°C	—	3	50	mV
Bias current	I_{bias}	T_j = 25°C	—	2	4	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = −7 to −25V, T_j = 25°C	—	—	1.3	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	40	—	μV
Ripple rejection ratio	RR	V_I = −8 to −18V, I_O = 100mA, f = 120Hz	62	74	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	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 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 = −10V, I_O = 500mA, C_I = 2μF, C_O = 1μF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

■ Electrical Characteristics at T_a = 25°C (continued)

• AN7906T, AN7906F (–6V type)

Parameter	Symbol	Conditions	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 to –21V, I_O = 5mA to 1A, $P_D \leq$ *	–5.7	—	–6.3	V
Line regulation	REG_{IN}	V_I = –8 to –25V, T_j = 25°C	—	4	120	mV
		V_I = –9 to –13V, T_j = 25°C	—	1.5	60	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	10	120	mV
		I_O = 250 to 750mA, T_j = 25°C	—	3	60	mV
Bias current	I_{bias}	T_j = 25°C	—	2	4	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –8 to –25V, T_j = 25°C	—	—	1.3	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	44	—	μV
Ripple rejection ratio	RR	V_I = –9 to –19V, I_O = 100mA, f = 120Hz	60	73	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	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 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 = –11V, I_O = 500mA, C_I = 2μF, C_O = 1μF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

• AN7907T, AN7907F (–7V type)

Parameter	Symbol	Conditions	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 to –22V, I_O = 5mA to 1A, $P_D \leq$ *	–6.65	—	–7.35	V
Line regulation	REG_{IN}	V_I = –9 to –25V, T_j = 25°C	—	5	140	mV
		V_I = –10 to –14V, T_j = 25°C	—	1.5	70	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	140	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	70	mV
Bias current	I_{bias}	T_j = 25°C	—	2	4	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –9 to –25V, T_j = 25°C	—	—	1.3	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	48	—	μV
Ripple rejection ratio	RR	V_I = –10 to –20V, I_O = 100mA, f = 120Hz	58	72	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	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 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 = –12V, I_O = 500mA, C_I = 2μF, C_O = 1μF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

■ Electrical Characteristics at T_a = 25°C (continued)

• AN7908T, AN7908F (–8V type)

Parameter	Symbol	Conditions	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 to –23V, I_O = 5mA to 1A, $P_D \leq$ *	–7.6	—	–8.4	V
Line regulation	REG_{IN}	V_I = –10.5 to –25V, T_j = 25°C	—	6	160	mV
		V_I = –11 to –17V, T_j = 25°C	—	2	80	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	160	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	80	mV
Bias current	I_{bias}	T_j = 25°C	—	2.2	4.5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –10.5 to –25V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	52	—	µV
Ripple rejection ratio	RR	V_I = –11 to –21V, I_O = 100mA, f = 120Hz	56	71	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	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 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 = –14V, I_O = 500mA, C_I = 2µF, C_O = 1µF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

• AN7909T, AN7909F (–9V type)

Parameter	Symbol	Conditions	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 = 5mA to 1A, $P_D \leq$ *	–8.55	—	–9.45	V
Line regulation	REG_{IN}	V_I = –11.5 to –26V, T_j = 25°C	—	7	180	mV
		V_I = –12 to –18V, T_j = 25°C	—	2	90	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	180	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	90	mV
Bias current	I_{bias}	T_j = 25°C	—	2.2	4.5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –11.5 to –26V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	58	—	µV
Ripple rejection ratio	RR	V_I = –12 to –22V, I_O = 100mA, f = 120Hz	56	71	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	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 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 = –15V, I_O = 500mA, C_I = 2µF, C_O = 1µF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

■ Electrical Characteristics at T_a = 25°C (continued)

• AN7910T, AN7910F (–10V type)

Parameter	Symbol	Conditions	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 = 5mA to 1A, $P_D \leq$ *	–9.5	—	–10.5	V
Line regulation	REG_{IN}	V_I = –12.5 to –27V, T_j = 25°C	—	8	200	mV
		V_I = –13 to –19V, T_j = 25°C	—	2.5	100	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	200	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	100	mV
Bias current	I_{bias}	T_j = 25°C	—	2.5	5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –12.5 to –27V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	64	—	µV
Ripple rejection ratio	RR	V_I = –13 to –23V, I_O = 100mA, f = 120Hz	56	71	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	I_O = 5mA, T_j = 0 to 125°C	—	– 0.7	—	mV/°C

Note 1) The specified condition T_j = 25°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 = –16V, I_O = 500mA, C_I = 2µF, C_O = 1µF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

• AN7912T, AN7912F (–12V type)

Parameter	Symbol	Conditions	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 = 5mA to 1A, $P_D \leq$ *	–11.4	—	–12.6	V
Line regulation	REG_{IN}	V_I = –14.5 to –30V, T_j = 25°C	—	10	240	mV
		V_I = –16 to –22V, T_j = 25°C	—	3	120	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	240	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	120	mV
Bias current	I_{bias}	T_j = 25°C	—	2.5	5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –14.5 to –30V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	75	—	µV
Ripple rejection ratio	RR	V_I = –15 to –25V, I_O = 100mA, f = 120Hz	55	70	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	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 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 = –19V, I_O = 500mA, C_I = 2µF, C_O = 1µF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

■ Electrical Characteristics at T_a = 25°C (continued)

• AN7915T, AN7915F (−15V type)

Parameter	Symbol	Conditions	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 −30V, I_O = 5mA to 1A, $P_D \leq$ *	−14.25	—	−15.75	V
Line regulation	REG_{IN}	V_I = −17.5 to −30V, T_j = 25°C	—	11	300	mV
		V_I = −20 to −26V, T_j = 25°C	—	3	150	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	300	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	150	mV
Bias current	I_{bias}	T_j = 25°C	—	2.5	5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = −17.5 to −30V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	90	—	μV
Ripple rejection ratio	RR	V_I = −18.5 to −28.5V, I_O = 100mA, f = 120Hz	54	69	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	I_O = 5mA, T_j = 0 to 125°C	—	− 0.9	—	mV/°C

Note 1) The specified condition T_j = 25°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 = −23V, I_O = 500mA, C_I = 2μF, C_O = 1μF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

• AN7918T, AN7918F (−18V type)

Parameter	Symbol	Conditions	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 = −21 to −33V, I_O = 5mA to 1A, $P_D \leq$ *	−17.1	—	−18.9	V
Line regulation	REG_{IN}	V_I = −21 to −33V, T_j = 25°C	—	15	360	mV
		V_I = −24 to −30V, T_j = 25°C	—	5	180	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°°C	—	12	360	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	180	mV
Bias current	I_{bias}	T_j = 25°C	—	2.5	5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = −21 to −33V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	110	—	μV
Ripple rejection ratio	RR	V_I = −22 to −32V, I_O = 100mA, f = 120Hz	53	68	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	I_O = 5mA, T_j = 0 to 125°C	—	−1	—	mV/°C

Note 1) The specified condition T_j = 25°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 = −27V, I_O = 500mA, C_I = 2μF, C_O = 1μF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

■ Electrical Characteristics at T_a = 25°C (continued)

• AN7920T, AN7920F (–20V type)

Parameter	Symbol	Conditions	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 = 5mA to 1A, $P_D \leq$ *	–19	—	–21	V
Line regulation	REG_{IN}	V_I = –23 to –35V, T_j = 25°C	—	16	400	mV
		V_I = –26 to –32V, T_j = 25°C	—	5.5	200	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	400	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	200	mV
Bias current	I_{bias}	T_j = 25°C	—	3	5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –23 to –35V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	135	—	µV
Ripple rejection ratio	RR	V_I = –24 to –34V, I_O = 100mA, f = 120Hz	52	67	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	I_O = 5mA, T_j = 0 to 125°C	—	–1	—	mV/°C

Note 1) The specified condition T_j = 25°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 = –29V, I_O = 500mA, C_I = 2µF, C_O = 1µF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

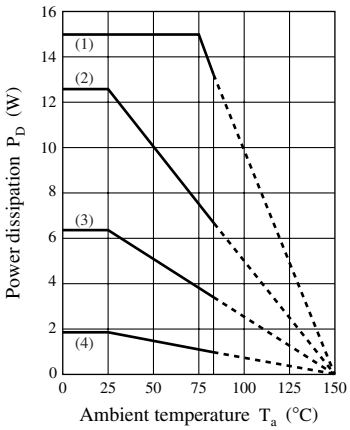
• AN7924T, AN7924F (–24V type)

Parameter	Symbol	Conditions	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 = 5mA ~ 1A, $P_D \leq$ *	–22.8	—	–25.2	V
Line regulation	REG_{IN}	V_I = –27 to –38V, T_j = 25°C	—	18	480	mV
		V_I = –30 to –36V, T_j = 25°C	—	6	240	mV
Load regulation	REG_L	I_O = 5mA to 1.5A, T_j = 25°C	—	12	480	mV
		I_O = 250 to 750mA, T_j = 25°C	—	4	240	mV
Bias current	I_{bias}	T_j = 25°°C	—	3	5	mA
Bias current fluctuation to input	$\Delta I_{bias(IN)}$	V_I = –27 to –38V, T_j = 25°C	—	—	1	mA
Bias current fluctuation to load	$\Delta I_{bias(L)}$	I_O = 5mA to 1A, T_j = 25°C	—	—	0.5	mA
Output noise voltage	V_{no}	f = 10Hz to 100kHz, T_a = 25°C	—	170	—	µV
Ripple rejection ratio	RR	V_I = –28 to –38V, I_O = 100mA, f = 120Hz	50	65	—	dB
Minimum input/output voltage difference	$V_{DIF(min)}$	I_O = 1A, T_j = 25°C	—	1.1	—	V
Peak output current	$I_{O(Peak)}$	T_j = 25°C	—	2.1	—	A
Output voltage temperature coefficient	$\Delta V_O/T_a$	I_O = 5mA, T_j = 0 to 125°C	—	–1	—	mV/°C

Note 1) The specified condition T_j = 25°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 = –33V, I_O = 500mA, C_I = 2µF, C_O = 1µF and T_j = 0 to 125°C
* AN79xxT series: 15W, AN79xxF series: 10.25W

■ Main Characteristics

P_D — T_a (AN79xxT series)

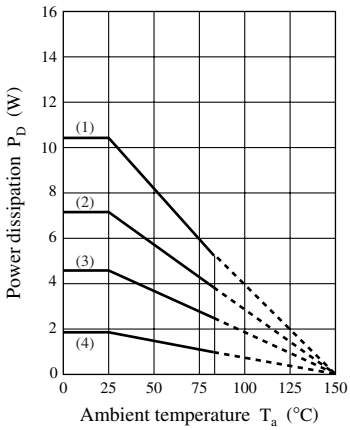


Thermal resistance value:
$R_{th(j-c)}$ = 5°C/W (max.)
$R_{th(j-a)}$ = 65°C/W (max.)

Installation condition to heat sink
Tightening torque 6kg·cm
Heat radiation compound used

(1) Infinite heat sink: 15.0W
(2) 5°C/W heat sink: 12.5W
(3) 15°C/W heat sink: 6.3W
(4) Without heat sink: 1.923W

P_D — T_a (AN79xxF series)

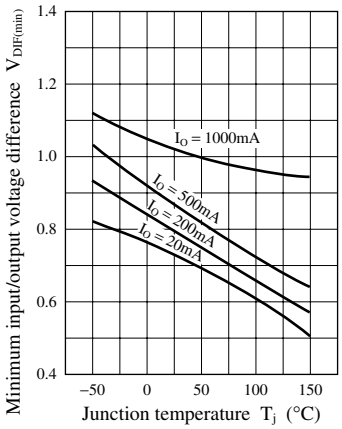


Thermal resistance value:
$R_{th(j-c)}$ = 12.2°C/W (max.)
$R_{th(j-a)}$ = 65°C/W (max.)

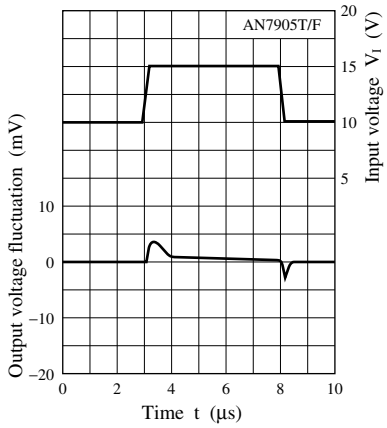
Installation condition to heat sink
Tightening torque 6kg·cm
Heat radiation compound used

(1) Infinite heat sink: 10.25W
(2) 5°C/W heat sink: 7.3W
(3) 15°C/W heat sink: 4.5W
(4) Without heat sink: 1.923W

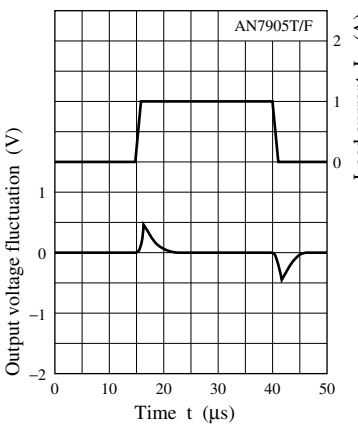
$V_{DIF(min)}$ — T_j



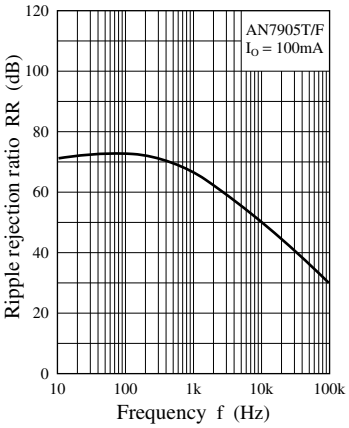
Input transient response



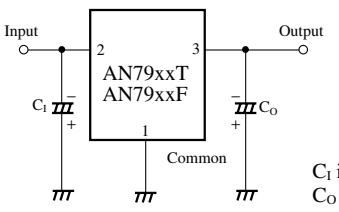
Load transient response



RR — f



■ Basic Regulator Circuit



C_I is necessary when the input line is long.
C_O improves the transient response.

■ Usage Notes

1. Cautions for a basic circuit

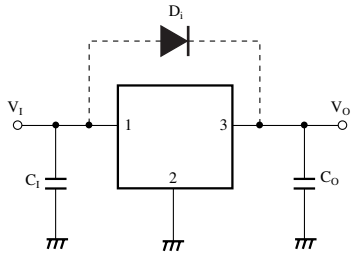


Figure 1

C_I: When a wiring from a smoothing circuit to a three-pin regulator is long, it is likely to oscillate at output. A capacitor of 0.1µF to 0.47µF should be connected near an input pin.

C_O: Deadly needed to prevent from oscillation (0.33µF to 1.0µF). It is recommended to use a capacitor of a small internal impedance (ex. tantalum capacitor) when using it under a low temperature.

When any sudden change of load current is likely to occur, connect an electrolytic capacitor of 10µF to 100µF to improve a transitional response of output voltage.

D_i: Normally unnecessary. But add it in the case that there is a residual voltage at the output capacitor Co even after switching off the supply power because a current is likely to flow into an output pin of the IC and damage the IC.

2. Other caution items

1) Short-circuit between the input pin and GND pin

If the input pin is short-circuitted to GND or is cut off when a large capacitance capacitor has been connected to the IC's load, a voltage of a capacitor connected to an output pin is applied between input/output of the IC and this likely results in damage of the IC. It is necessary, therefore, to connect a diode, as shown in figure 2, to counter the reverse bias between input/output pins.

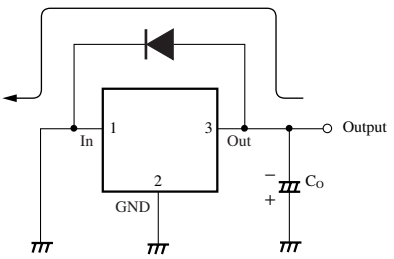


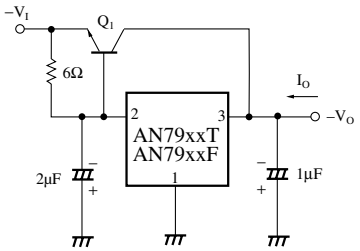
Figure 2

2) Floating of GND pin

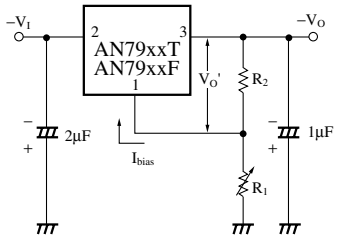
If a GND pin is made floating in an operating mode, an unstabilized input voltage is outputted. In this case, a thermal protection circuit inside the IC does not normally operate. In this state, if the load is short-circuited or overloaded, it is likely to damage the IC.

■ Application Circuit Examples

1. Current bootstrap circuit



2. Adjustable output regulator



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

Note) V_O varies due to sample to sample variation of I_{bias} . Never fail to adjust individually with R_1 .