

AN79L00 Series

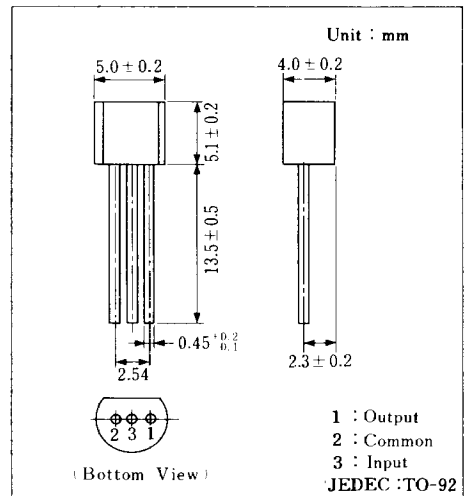
3-Terminal Negative Output Voltage Regulators (100mA Type)

■ Outline

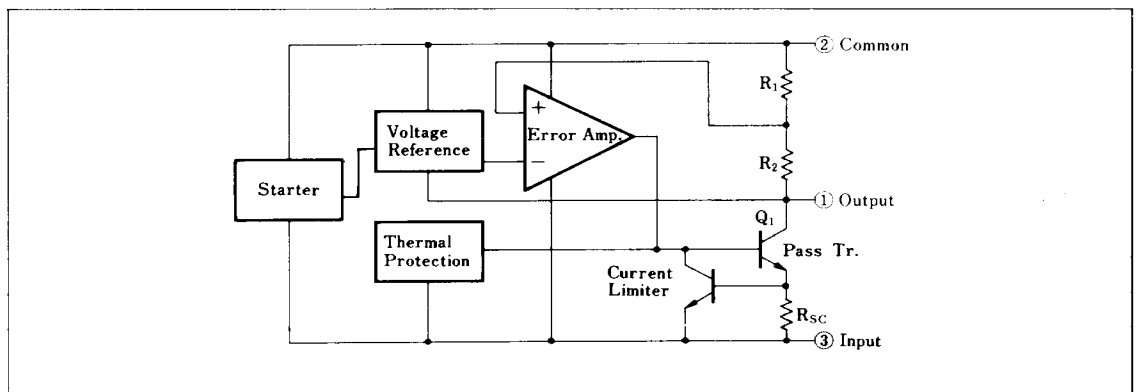
The AN79L00 series is 3-terminal fixed negative output voltage regulator. Stabilized fixed output voltage is obtained from unstable DC input voltage without using any external components. 12 types of output voltage are available, $-4V$, $-5V$, $-6V$, $-7V$, $-8V$, $-9V$, $-10V$, $-12V$, $-15V$, $-18V$, $-20V$ and $-24V$. They can be used widely in power circuits with current capacity up to 100mA.

■ Features

- No external components
- Output current in excess of 100mA
- 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



■ Block Diagram



■ Absolute Maximum Ratings (Ta = 25°C)

Item	Symbol	Rating	Unit
Input Voltage	V _I	-35* ¹	V
		-40* ²	V
Power Dissipation	P _D	650* ³	mW
Operating Ambient Temperature	T _{opr}	-20 ~ +80	°C
Storage Temperature	T _{stg}	-55 ~ +150	°C

*1 AN79L04, AN79L05, AN79L06, AN79L07, AN79L08, AN79L09, AN79L10, AN79L12, AN79L15, AN79L18 *2 AN79L20, AN79L24

*3 Follow the derating curve. When T_J exceeds 150°C, the internal circuit cuts off the output.

■ Electrical Characteristics (Ta = 25°C)

● AN79L04 (-4V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _O	1	T _J = 25°C	-3.84	-4	-4.16	V
Output Voltage Tolerance	V _O	1	V _I = -7 ~ -19V, I _O = 1 ~ 70mA	-3.8		-4.2	V
Line Regulation	REG _{LN}	1	V _I = -6 ~ -20V, T _J = 25°C			80	mV
			V _I = -7 ~ -17V, T _J = 25°C			40	mV
Load Regulation	REG _L	1	I _O = 1 ~ 100mA, T _J = 25°C		10	60	mV
			I _O = 1 ~ 40mA, T _J = 25°C		4.5	30	mV
Bias Current	I _{Bias}	2	T _J = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{Bias(N)}	2	V _I = -7 ~ -19V, T _J = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{Bias(L)}	2	I _O = 1 ~ 40mA, T _J = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		38		μV
Ripple Rejection Ratio	RR	3	V _I = -7 ~ -17V, f = 120Hz, T _a = 25°C	55			dB
Minimum Input/Output Voltage Difference	V _{DIF(min.)}		T _J = 25°C		0.8		V
Output Short Circuit Current	I _{O(Short)}	1	V _I = -35V, T _J = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _O /T _a	1	I _O = 5mA		-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 = -9V, I_O = 40mA, C_I = 2μF, C_O = 1μF and T_J = 0 ~ 125°C

● AN79L05 (-5V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _O	1	T _J = 25°C	-4.8	-5	-5.2	V
Output Voltage Tolerance	V _O	1	V _I = -8 ~ -20V, I _O = 1 ~ 70mA	-4.75		-5.25	V
Line Regulation	REG _{LN}	1	V _I = -7 ~ -21V, T _J = 25°C			100	mV
			V _I = -8 ~ -18V, T _J = 25°C			50	mV
Load Regulation	REG _L	1	I _O = 1 ~ 100mA, T _J = 25°C		11	60	mV
			I _O = 1 ~ 40mA, T _J = 25°C		5	30	mV
Bias Current	I _{Bias}	2	T _J = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{Bias(N)}	2	V _I = -8 ~ -20V, T _J = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{Bias(L)}	2	I _O = 1 ~ 40mA, T _J = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		40		μV
Ripple Rejection Ratio	RR	3	V _I = -8 ~ -18V, f = 120Hz, T _a = 25°C	55			dB
Minimum Input/Output Voltage Difference	V _{DIF(min.)}		T _J = 25°C		0.8		V
Output Short Circuit Current	I _{O(Short)}	1	V _I = -35V, T _J = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _O /T _a	1	I _O = 5mA		-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 = -10V, I_O = 40mA, C_I = 2μF, C_O = 1μF and T_J = 0 ~ 125°C

■ Electrical Characteristics (Ta = 25°C)

● AN79L06 (−6V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _O	1	T _J = 25°C	−5.76	−6	−6.24	V
Output Voltage Tolerance	V _O	1	V _I = −9 ~ −21V, I _O = 1 ~ 70mA	−5.7		−6.3	V
Line Regulation	REG _{LIN}	1	V _I = −8 ~ −22V, T _J = 25°C			120	mV
			V _I = −9 ~ −19V, T _J = 25°C			60	mV
Load Regulation	REG _L	1	I _O = 1 ~ 100mA, T _J = 25°C		12	60	mV
			I _O = 1 ~ 40mA, T _J = 25°C		5.5	30	mV
Bias Current	I _{Bias}	2	T _J = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{Bias(IN)}	2	V _I = −9 ~ −21V, T _J = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{Bias(L)}	2	I _O = 1 ~ 40mA, T _J = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		44		μV
Ripple Rejection Ratio	RR	3	V _I = −9 ~ −19V, f = 120Hz, T _a = 25°C	55			dB
Minimum Input/Output Voltage Difference	V _{OIF(min.)}		T _J = 25°C		0.8		V
Output Short Circuit Current	I _{O(short)}	1	V _I = −35V, T _J = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _O /T _a	1	I _O = 5mA		−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 = 40mA, C_I = 2μF, C_O = 1μF and T_J = 0 ~ 125°C

● AN79L07 (−7V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _O	1	T _J = 25°C	−6.72	−7	−7.28	V
Output Voltage Tolerance	V _O	1	V _I = −10 ~ −22V, I _O = 1 ~ 70mA	−6.65		−7.35	V
Line Regulation	REG _{LIN}	1	V _I = −9 ~ −23V, T _J = 25°C			140	mV
			V _I = −10 ~ −20V, T _J = 25°C			70	mV
Load Regulation	REG _L	1	I _O = 1 ~ 100mA, T _J = 25°C		13	70	mV
			I _O = 1 ~ 40mA, T _J = 25°C		6	40	mV
Bias Current	I _{Bias}	2	T _J = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{Bias(IN)}	2	V _I = −10 ~ −22V, T _J = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{Bias(L)}	2	I _O = 1 ~ 40mA, T _J = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		48		μV
Ripple Rejection Ratio	RR	3	V _I = −10 ~ −20V, f = 120Hz, T _a = 25°C	54			dB
Minimum Input/Output Voltage Difference	V _{OIF(min.)}		T _J = 25°C		0.8		V
Output Short Circuit Current	I _{O(short)}	1	V _I = −35V, T _J = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _O /T _a	1	I _O = 5mA		−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 = −12V, I_O = 40mA, C_O = 1μF and T_J = 0 ~ 125°C

■ Electrical Characteristics (T_a = 25°C)

● AN79L08 (−8V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _o	1	T _j = 25°C	−7.68	−8	−8.32	V
Output Voltage Tolerance	V _o	1	V _i = −11 ~ −23V, I _o = 1 ~ 70mA	−7.6		−8.4	V
Line Regulation	REG _{IN}	1	V _i = −10 ~ −24V, T _j = 25°C			160	mV
			V _i = −11 ~ −21V, T _j = 25°C			80	mV
Load Regulation	REG _L	1	I _o = 1 ~ 100mA, T _j = 25°C		15	80	mV
			I _o = 1 ~ 40mA, T _j = 25°C		7	40	mV
Bias Current	I _{Bias}	2	T _j = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{Bias(N)}	2	V _i = −11 ~ −23V, T _j = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{Bias(L)}	2	I _o = 1 ~ 40mA, T _j = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		52		μV
Ripple Rejection Ratio	RR	3	V _i = −11 ~ −21V, f = 120Hz, T _a = 25°C	54			dB
Minimum Input/Output Voltage Difference	V _{DIF(min.)}		T _j = 25°C		0.8		V
Output Short Circuit Current	I _{O(Short)}	1	V _i = −35V, T _j = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _o /T _a	1	I _o = 5mA, T _j = 0 ~ 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 = −14V, I_o = 40mA, C_i = 2μF, C_o = 1μF and T_j = 0 ~ 125°C

● AN79L09 (−9V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _o	1	T _j = 25°C	−8.64	−9	−9.36	V
Output Voltage Tolerance	V _o	1	V _i = −12 ~ −24V, I _o = 1 ~ 70mA	−8.55		−9.45	V
Line Regulation	REG _{IN}	1	V _i = −11 ~ −25V, T _j = 25°C			160	mV
			V _i = −12 ~ −22V, T _j = 25°C			80	mV
Load Regulation	REG _L	1	I _o = 1 ~ 100mA, T _j = 25°C		16	90	mV
			I _o = 1 ~ 40mA, T _j = 25°C		8	50	mV
Bias Current	I _{Bias}	2	T _j = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{Bias(N)}	2	V _i = −12 ~ −24V, T _j = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{Bias(L)}	2	I _o = 1 ~ 40mA, T _j = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		58		μV
Ripple Rejection Ratio	RR	3	V _i = −12 ~ −22V, f = 120Hz, T _a = 25°C	53			dB
Minimum Input/Output Voltage Difference	V _{DIF(min.)}		T _j = 25°C		0.8		V
Output Short Circuit Current	I _{O(Short)}	1	V _i = −35V, T _j = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _o /T _a	1	I _o = 5mA, T _j = 0 ~ 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 = −15V, I_o = 40mA, C_i = 2μF, C_o = 1μF and T_j = 0 ~ 125°C

■ Electrical Characteristics (Ta = 25°C)

● AN79L10 (−10V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _o	1	T _j = 25°C	−9.6	−10	−10.4	V
Output Voltage Tolerance	V _o	1	V _i = −13 ~ −25V, I _o = 1 ~ 70mA	−9.5		−10.5	V
Line Regulation	REG _{LN}	1	V _i = −12 ~ −26V, T _j = 25°C			160	mV
			V _i = −13 ~ −23V, T _j = 25°C			80	mV
Load Regulation	REG _L	1	I _o = 1 ~ 100mA, T _j = 25°C		17	100	mV
			I _o = 1 ~ 40mA, T _j = 25°C		9	50	mV
Bias Current	I _{Bias}	2	T _j = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{BiasIN}	2	V _i = −13 ~ −25V, T _j = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{BiasL}	2	I _o = 1 ~ 40mA, T _j = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		65		μV
Ripple Rejection Ratio	RR	3	V _i = −13 ~ −23V, f = 120Hz, T _a = 25°C	53			dB
Minimum Input-Output Voltage Difference	V _{DIF(min.)}		T _j = 25°C		0.8		V
Output Short Circuit Current	I _{O(Short)}	1	V _i = −35V, T _j = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _o /T _a	1	I _o = 5mA		−0.7		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 = 40mA, C_i = 2μF, C_o = 1μF and T_j = 0 ~ 125°C

● AN79L12 (−12V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V _o	1	T _j = 25°C	−11.5	−12	−12.5	V
Output Voltage Tolerance	V _o	1	V _i = −15 ~ −27V, I _o = 1 ~ 70mA	−11.4		−12.6	V
Line Regulation	REG _{LN}	1	V _i = −14.5 ~ −30V, T _j = 25°C			200	mV
			V _i = −15 ~ −25V, T _j = 25°C			100	mV
Load Regulation	REG _L	1	I _o = 1 ~ 100mA, T _j = 25°C		20	100	mV
			I _o = 1 ~ 40mA, T _j = 25°C		10	50	mV
Bias Current	I _{Bias}	2	T _j = 25°C		3	5	mA
Input Bias Current Fluctuation	ΔI _{BiasIN}	2	V _i = −15 ~ −27V, T _j = 25°C			0.5	mA
Load Bias Current Fluctuation	ΔI _{BiasL}	2	I _o = 1 ~ 40mA, T _j = 25°C			0.1	mA
Output Noise Voltage	V _{no}	1	f = 10Hz ~ 100kHz, T _a = 25°C		75		μV
Ripple Rejection Ratio	RR	3	V _i = −15 ~ −25V, f = 120Hz, T _a = 25°C	52			dB
Minimum Input-Output Voltage Difference	V _{DIF(min.)}		T _j = 25°C		0.8		V
Output Short Circuit Current	I _{O(Short)}	1	V _i = −35V, T _j = 25°C		200		mA
Output Voltage Temperature Coefficient	ΔV _o /T _a	1	I _o = 5mA		−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 = −19V, I_o = 40mA, C_i = 2μF, C_o = 1μF and T_j = 0 ~ 125°C

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

● AN79L15 (−15V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V_o	1	$T_j = 25^\circ\text{C}$	−14.4	−15	−15.6	V
Output Voltage Tolerance	V_o	1	$V_i = -18 \sim -28\text{V}$, $I_o = 1 \sim 70\text{mA}$	−14.25		−15.75	V
Line Regulation	REG_{IN}	1	$V_i = -17.5 \sim -33\text{V}$, $T_j = 25^\circ\text{C}$			200	mV
			$V_i = -18 \sim -28\text{V}$, $T_j = 25^\circ\text{C}$			100	mV
Load Regulation	REG_L	1	$I_o = 1 \sim 100\text{mA}$, $T_j = 25^\circ\text{C}$		25	130	mV
			$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$		12	60	mV
Bias Current	I_{Bias}	2	$T_j = 25^\circ\text{C}$		3	5	mA
Input Bias Current Fluctuation	$\Delta I_{\text{Bias(IN)}}$	2	$V_i = -18 \sim -30\text{V}$, $T_j = 25^\circ\text{C}$			0.5	mA
Load Bias Current Fluctuation	$\Delta I_{\text{Bias(L)}}$	2	$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$			0.1	mA
Output Noise Voltage	V_{no}	1	$f = 10\text{Hz} \sim 100\text{kHz}$, $T_a = 25^\circ\text{C}$		90		μV
Ripple Rejection Ratio	RR	3	$V_i = -18 \sim -28\text{V}$, $f = 120\text{Hz}$, $T_a = 25^\circ\text{C}$	51			dB
Minimum Input/Output Voltage Difference	$V_{\text{DIF(min.)}}$		$T_j = 25^\circ\text{C}$		0.8		V
Output Short Circuit Current	$I_{\text{O(Short)}}$	1	$V_i = -35\text{V}$, $T_j = 25^\circ\text{C}$		200		mA
Output Voltage Temperature Coefficient	$\Delta V_o/T_a$	1	$I_o = 5\text{mA}$		−0.9		mV/°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, $V_i = -23\text{V}$, $I_o = 40\text{mA}$, $C_i = 2\mu\text{F}$, $C_o = 1\mu\text{F}$ and $T_j = 0 \sim 125^\circ\text{C}$

● AN79L18 (−18V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V_o	1	$T_j = 25^\circ\text{C}$	−17.3	−18	−18.7	V
Output Voltage Tolerance	V_o	1	$V_i = -21 \sim -33\text{V}$, $I_o = 1 \sim 70\text{mA}$	−17.1		−18.9	V
Line Regulation	REG_{IN}	1	$V_i = -21 \sim -33\text{V}$, $T_j = 25^\circ\text{C}$			200	mV
			$V_i = -21 \sim -32\text{V}$, $T_j = 25^\circ\text{C}$			100	mV
Load Regulation	REG_L	1	$I_o = 1 \sim 100\text{mA}$, $T_j = 25^\circ\text{C}$		30	160	mV
			$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$		15	80	mV
Bias Current	I_{Bias}	2	$T_j = 25^\circ\text{C}$		3	5	mA
Input Bias Current Fluctuation	$\Delta I_{\text{Bias(IN)}}$	2	$V_i = -21 \sim -33\text{V}$, $T_j = 25^\circ\text{C}$			0.5	mA
Load Bias Current Fluctuation	$\Delta I_{\text{Bias(L)}}$	2	$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$			0.1	mA
Output Noise Voltage	V_{no}	1	$f = 10\text{Hz} \sim 100\text{kHz}$, $T_a = 25^\circ\text{C}$		110		μV
Ripple Rejection Ratio	RR	3	$V_i = -22 \sim -32\text{V}$, $f = 120\text{Hz}$, $T_a = 25^\circ\text{C}$	50			dB
Minimum Input/Output Voltage Difference	$V_{\text{DIF(min.)}}$		$T_j = 25^\circ\text{C}$		0.8		V
Output Short Circuit Current	$I_{\text{O(Short)}}$	1	$V_i = -35\text{V}$, $T_j = 25^\circ\text{C}$		200		mA
Output Voltage Temperature Coefficient	$\Delta V_o/T_a$	1	$I_o = 5\text{mA}$		−1		mV/°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, $V_i = -27\text{V}$, $I_o = 40\text{mA}$, $C_i = 2\mu\text{F}$, $C_o = 1\mu\text{F}$ and $T_j = 0 \sim 125^\circ\text{C}$

Electrical Characteristics (Ta = 25°C)

● AN79L20 (−20V Type)

Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V_o	1	$T_j = 25^\circ\text{C}$	−19.2	−20	−20.8	V
Output Voltage Tolerance	V_o	1	$V_i = -23 \sim -35\text{V}$, $I_o = 1 \sim 70\text{mA}$	−19		−21	V
Line Regulation	REG_{LN}	1	$V_i = -23 \sim -35\text{V}$, $T_j = 25^\circ\text{C}$			200	mV
			$V_i = -24 \sim -34\text{V}$, $T_j = 25^\circ\text{C}$			100	mV
Load Regulation	REG_{L}	1	$I_o = 1 \sim 100\text{mA}$, $T_j = 25^\circ\text{C}$		35	180	mV
			$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$		17	90	mV
Bias Current	I_{Bias}	2	$T_j = 25^\circ\text{C}$		3	5	mA
Input Bias Current Fluctuation	$\Delta I_{\text{Bias(IN)}}$	2	$V_i = -23 \sim -35\text{V}$, $T_j = 25^\circ\text{C}$			0.5	mA
Load Bias Current Fluctuation	$\Delta I_{\text{Bias(L)}}$	2	$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$			0.1	mA
Output Noise Voltage	V_{no}	1	$f = 10\text{Hz} \sim 100\text{kHz}$, $T_a = 25^\circ\text{C}$		135		μV
Ripple Rejection Ratio	RR	3	$V_i = -24 \sim -34\text{V}$, $f = 120\text{Hz}$, $T_a = 25^\circ\text{C}$	49			dB
Minimum Input-Output Voltage Difference	$V_{\text{DIF(min.)}}$		$T_j = 25^\circ\text{C}$		0.8		V
Output Short Circuit Current	$I_{\text{O(Short)}}$	1	$V_i = -35\text{V}$, $T_j = 25^\circ\text{C}$		200		mA
Output Voltage Temperature Coefficient	$\Delta V_o/T_a$	1	$I_o = 5\text{mA}$		−1		mV/°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, $V_i = -29\text{V}$, $I_o = 40\text{mA}$, $C_i = 2\mu\text{F}$, $C_o = 1\mu\text{F}$ and $T_j = 0 \sim 125^\circ\text{C}$

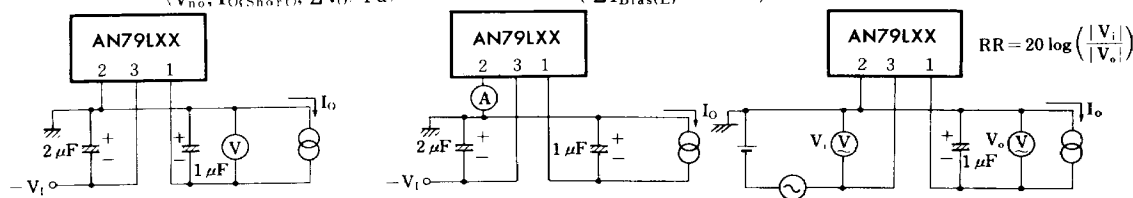
● AN79L24 (−24V Type)

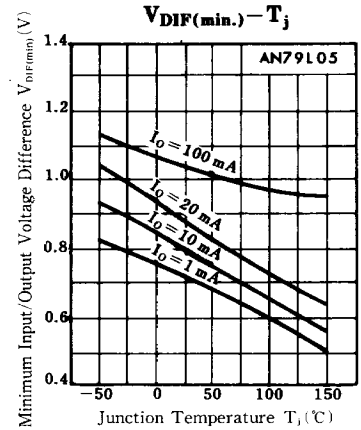
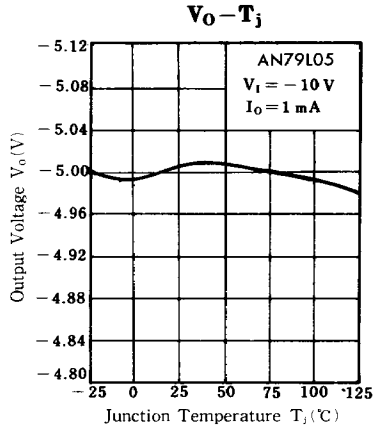
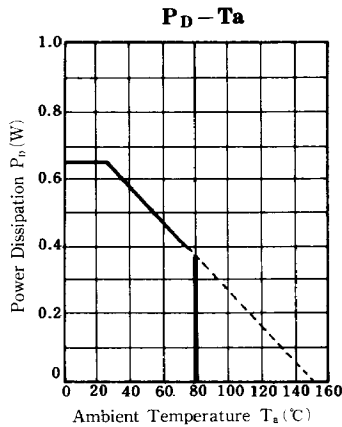
Item	Symbol	Test Circuit	Condition	min.	typ.	max.	Unit
Output Voltage	V_o	1	$T_j = 25^\circ\text{C}$	−23	−24	−25	V
Output Voltage Tolerance	V_o	1	$V_i = -27 \sim -38\text{V}$, $I_o = 1 \sim 70\text{mA}$	−22.8		−25.2	V
Line Regulation	REG_{LN}	1	$V_i = -27 \sim -38\text{V}$, $T_j = 25^\circ\text{C}$			200	mV
			$V_i = -27 \sim -37\text{V}$, $T_j = 25^\circ\text{C}$			100	mV
Load Regulation	REG_{L}	1	$I_o = 1 \sim 100\text{mA}$, $T_j = 25^\circ\text{C}$		40	200	mV
			$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$		20	100	mV
Bias Current	I_{Bias}	2	$T_j = 25^\circ\text{C}$		3	5	mA
Input Bias Current Fluctuation	$\Delta I_{\text{Bias(IN)}}$	2	$V_i = -27 \sim -38\text{V}$, $T_j = 25^\circ\text{C}$			0.5	mA
Load Bias Current Fluctuation	$\Delta I_{\text{Bias(L)}}$	2	$I_o = 1 \sim 40\text{mA}$, $T_j = 25^\circ\text{C}$			0.1	mA
Output Noise Voltage	V_{no}	1	$f = 10\text{Hz} \sim 100\text{kHz}$, $T_a = 25^\circ\text{C}$		170		μV
Ripple Rejection Ratio	RR	3	$V_i = -28 \sim -38\text{V}$, $f = 120\text{Hz}$, $T_a = 25^\circ\text{C}$	49			dB
Minimum Input-Output Voltage Difference	$V_{\text{DIF(min.)}}$		$T_j = 25^\circ\text{C}$		0.8		V
Output Short Circuit Current	$I_{\text{O(Short)}}$	1	$V_i = -35\text{V}$, $T_j = 25^\circ\text{C}$		200		mA
Output Voltage Temperature Coefficient	$\Delta V_o/T_a$	1	$I_o = 5\text{mA}$		−1		mV/°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.

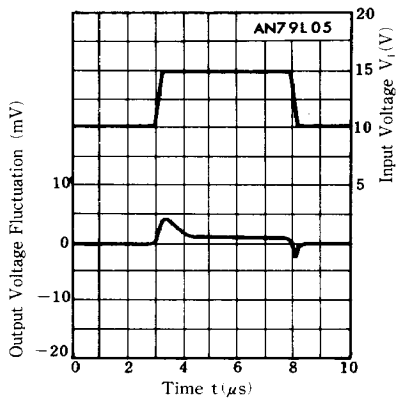
Note 2: When not specified, $V_i = -33\text{V}$, $I_o = 40\text{mA}$, $C_i = 2\mu\text{F}$, $C_o = 1\mu\text{F}$ and $T_j = 0 \sim 125^\circ\text{C}$

Test Circuit 1 (V_o , REG_{LN} , REG_{L}) **Test Circuit 2** (I_{Bias} , $\Delta I_{\text{Bias(IN)}}$, $\Delta I_{\text{Bias(L)}}$) **Test Circuit 3** (RR)

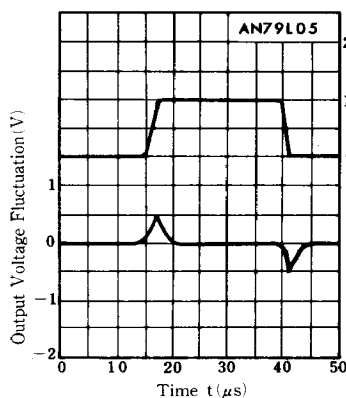




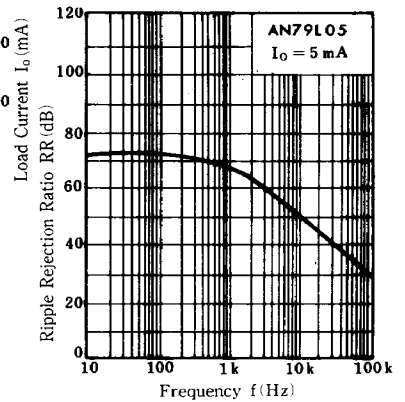
Input Response Characteristic



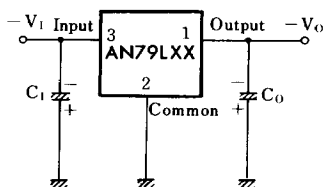
Load Response Characteristic



$RR - f$

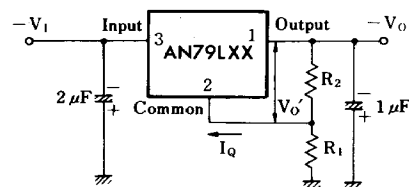


Basic Regulator Circuit



C_1 is connected when the input line is long. $2\mu\text{F}$
 C_0 improves the transient Response. $1\mu\text{F}$

Application Circuit



$$|V_O| = V_O' \left(1 + \frac{R_1}{R_2} \right) + I_Q R_1$$