GL79XX Series NEGATIVE VOLTAGE REGULATOR

Description

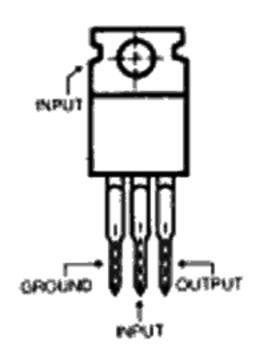
The GL79XX series of fixed output negative voltage regulators are intended as complements to the popular GL78XX series devices. Available in fixed output voltage options from -5 to -24 Volts, these regulators employ internal current limiting, thermal shutdown, and safe-area compensation-making them remarkably rugged under most operating conditions. With adequate heat-sinking they can deliver output currents in excess of 1.0A.

Features

- High Line Regulation
- High Load Regulation
- Good Ripple Rejection (70dB)
- Low Temperature Coefficient of Output (-1.0mV/°C)
- Wide Range Input Voltage
- · Low Input Bias Current
- Low Output Noise
- Output Current in Exess of 1A

Pin Configuration

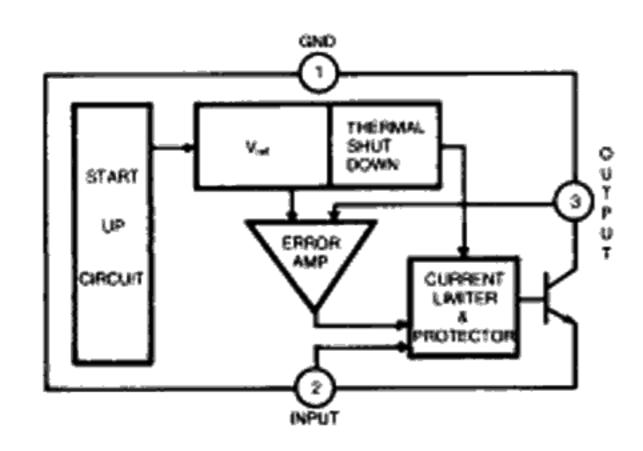
(Top View)



Type No/Voltage

GL7905	-5.0 Volts
GL7909	-9.0 Volts
GL7912	-12.0 Volts
GL7915	-15.0 Volts
GL7924	-24.0 Volts

Block Diagram



Maximum Ratings (TA=25°C)

Input Voltage

(-5V Through -15V) -35V (-24V) -40V • Output Current 2.2A

Power Dissipation Internally Limitted
 Operating Junction 0°C to +150°C Temp.

Storage Temp. -65°C to +150°C
 Lead Temp. 230°C

(Soldering, 10S)

GL7905 Electrical Characteristics ($T_A = 25$ °C)

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES		UNIT
***************************************				MIN.	MAX.	
Output Voltage (1)	V ₀₁	T,=25°C, Vn=-10V, L=500mA		-5.2	~4.8	٧
Output Voltage (2)	V ₀₂	-20V≤V _m	-20V≤V _m ≤-7V, 5.0mA≤l _o ≤1.0A		-4.75	٧
	ΔV ₀₁		-25V <v<sub>m<-7V, I₀=100mA</v<sub>		50	mV
Line Regulation	ΔV ₀₂	T,=25°C	-12V <vm<-8v, l="100mA</td"><td></td><td>25</td><td>mV</td></vm<-8v,>		25	mV
Line Inogulation	ΔV ₀₃	1 ', 23 3	-25V <v<sub>m<-7V, I_o=500mA</v<sub>		100	mV
	ΔV ₀₄	1 1	-12V <v<sub>m<-8V, I_o=500mA</v<sub>		60	mV
Load Regulation	ΔV ₀₆	T _i =25°C	5.0mA≤l ₀ ≤1.5A, V _m =-10V		100	mV
evan reginarion	ΔV ₀₆		250mA <l₀<750ma, v<sub="">m=-10V</l₀<750ma,>		50	m∀
Quiescent Current	٩	T,=25°C, V,=-10V, L,=500mA			2.0	mA
Quiescent Current Change	Δl _{Q1}	-25V <v<sub>m</v<sub>	-25V < V _m < -17V, I _o = 500mA		1.3	mA
Total Committee	Δl _{O2}	V _m =-10V	', 5mA≤l _o ≤1.5A		0.5	mA
Output Noise Voltage	N _o	V _m =-10V, I _o =500mA 10Hz≤1≤100KHz			80	μV
Ripple Rejection	R _R	T _i =25°C, V _i =1V _[max] , 120Hz, I _o =20mA, -18V <v<sub>in<-8V</v<sub>		54		dB
Input-Output Voltage Differential	V _d	T _I =25°C.	T ₁ =25°C, I ₆ =1.0A		1.1(TYP)	ν

GL7909 Electrical Characteristics ($T_{\lambda} = 25$ °C)

PARAMETER	SYMBOL	TEST CONDITIONS		VAL	UNIT	
11000000	01111002			MIN.	MAX.	0.0.
Output Voltage (1)	Voi	T _i =26°C, V _n =-15V, I _o =500mA		-9.35	-8.65	٧
Output Voltage (2)	ν ₀₅	-24V≤V _{sn}	<-11.5V, 5.0mA≤l _o ≤1.0A	-9.55	-8 55	٧
	ΔV ₀₁		~26V4Vm4~11.5V, Io=100mA		90	mV
Line Regulation	∆V ₀₂	T,=25°C	-18V <v<sub>e<-12V, I_o=100mA</v<sub>		45	mV
Live rregulation	ΔV ₀₃	1 ., 20 0	-26V <v<sub>al<-11.5V, l_o=500mA</v<sub>		180	mV
	△V ₀₄	1 1	-18V <v<sub>et<-12V, I_o=500mA</v<sub>		90	mV
Load Regulation	Δ٧ ₀₅	T ₁ =25°C	5.0mA≤l _o ≤1.5A, V _{is} =-15V		180	mV
coad regulation	Δν ₀₆	1,-00	250mA <i<sub>0<750mA, V_n=-15V</i<sub>		90	ωV
Quiescent Current	lo	T,=25°C, V,n=-15V, I,=500mA			3	mA
Quiescent Current Change	۵ان	-26V≤V _n	<-11 5V, I _o =500mA		1.0	- mA
delication Control Control	Δloz	Vn=-15V	, 5mA <l₀<1.5a< td=""><td></td><td>0.5</td><td>mA</td></l₀<1.5a<>		0.5	mA
Output Noise Voltage	N _o	V _m =-15V. l _o =500mA 10Hz≤f≤100KHz			120	μV
Ripple Rejection	P _R	T _j =25°C, V _i =1V _(mms) , 120Hz, I _o =20mA, -22V < V _m < -12V		54		dB
Input-Output Voltage Differential	V _d	T,=25°C.	T ₁ =25°C, I ₀ =1.0A		1.1(TYP)	v

GL7912 Electrical Characteristics (T_A = 25°C)

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES		UNIT
r Aricans (En	SIMBOL			MIN.	MAX.	
Output Voltage (1)	V ₀₁	T ₁ =25°C, V _n =-19V, I ₀ =500mA		-125	-115	ν
Output Voltage (2)	V ₀₂	-27V≤V _n ≤-14.5V. 5.0mA≤I _o ≤1.0A		-125	-114	٧
Line Regulation	ΔV ₀₁		-30V < V _a < -14 5V, I ₀ = 100mA		120	mV
	ΔV ₀₂	T,=25°C	-22V < V _m < -16V, I _o = 100mA		60	mV
	∆V ₀₃	1,,-25	-30V < V _n < -14 5V, I _o = 500mA		240	mΨ
	∆V ₀₄	1	-22V <v<sub>m<-16V, l_o=500mA</v<sub>		120	mV
Load Regulation	ΔV ₀₅	T,=25*C	5 0mA <l<sub>0<1 5A, V_m=-19V</l<sub>		240	mV
coso negulation	Δνοε	1,-200	250mA <i<sub>0<750mA, V_m=-19V</i<sub>		120	m۷
Quiescent Current	6	T,=25°C, V,=-19V, I,=500mA			3	mA
Quiescent Current Change	ΔΙ ₀₁	-30V <v,< td=""><td colspan="2">-30V≤V_{in}≤-14 5V, I_p=500mA</td><td>10</td><td>mΑ</td></v,<>	-30V≤V _{in} ≤-14 5V, I _p =500mA		10	mΑ
Quescent outen onerge	Δl _{Q2}	V _m =-19\	/, 5mA≤l ₆ <1 5A		0.5	mA
Output Noise Voltage	N _o	V _m =-19V, I _o =500mA 10Hz≤f≤100KHz			150	μ٧
Ripple Rejection	R _A	T _i =25°C, V _i =1V _{imal} , 120Hz, I _o =20mA. -25V <v<sub>o<-15V</v<sub>		54		dB
Input-Output Voltage Differential	V _a	T,-25°C, Io-1 OA			1.1(TYP)	٧

GL7915 Electrical Characteristics ($T_A = 25$ °C)

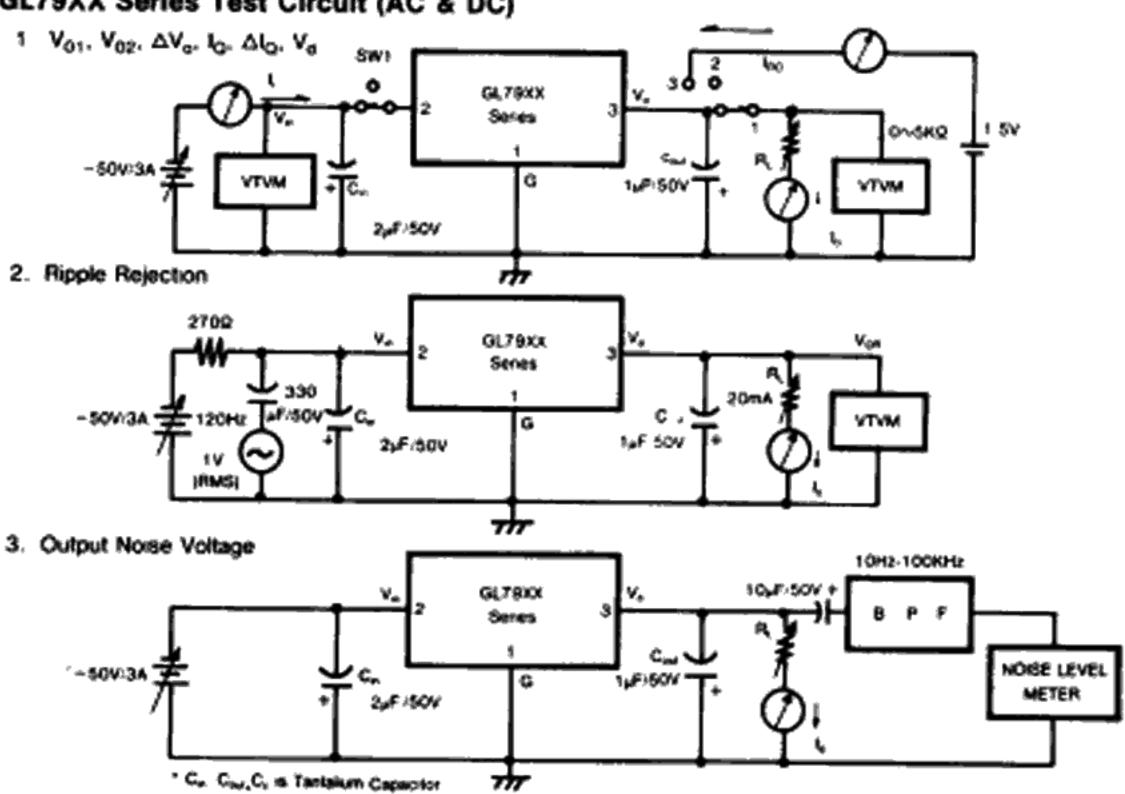
PARAMETER	SYMBOL	TEST CONDITIONS		VAL	บทเร	
PANAMETER	STWIBOL			MIN	MAX	
Output Voltage (1)	V ₀₁	T,=25°C, V _n =-23V, I _o =500mA		-15.6	-14.4	٧
Output Voltage (2)	V ₀₂	-30V≤V _m ≤-17.5V, 5 0mA≤l _o ≤1.0A		-15.75	-14.25	٧
	Δ٧01		-30V < V _m < -17.5V, I _o = 100mA		150	mV
Line Regulation	ΔV _{O2}	T,=25°C	-26V < V _m < -20V, I _o = 100mA		75	mV
	ΔV _{cos}	1,-200	-30V≤V _{in} ≤-17.5V, I _o =500mA		300	m۷
	Δ٧οι		-26V4V _m 4-20V, I _o =500mA		150	mV
Load Regulation	Δνος	T,=25°C	5.0mA <i<sub>0<1 5A, V_m=-23V</i<sub>		300	mV
CORD PEGURION	ΔV ₀₈		250mA≤l _o ≤750mA, V _{in} =-23V		150	mV
Quiescent Current	10	T,=25°C, V _m =-23V, I _o =500mA			3	mA
Quiescent Current Change	Δίο,	-30V <v,< td=""><td><-17 5V, l₀=500mA</td><td></td><td>1.0</td><td>mA</td></v,<>	<-17 5V, l₀=500mA		1.0	mA
Guesceil Cureil Crimige	Δίος	V _{in} =-23V, 5mA≤l ₆ ≤1.5A			0.5	mA
Output Noise Voltage	N _o	V _m =-23V, I _o =500mA 10Hz≤f≤100KHz			180	μ۷
Ripple Rejection	A _R	$T_j=25$ °C, $V_j=1V_{jmnj}$, 120Hz, $I_0=20$ mA, -28.5V $\leq V_{jn} \leq -18.5$ V		54		dB
Input-Output Voltage Differential	V _d	T,=25°C.	T,=25°C, I ₀ =1.0A		1.1(TYP)	v

GL7924 Electrical Characteristics (T_A = 25°C)

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PARAMETER	SYMBOL	TEST CONDITIONS		VALUES		UNIT
				MIN	MAX.	
Output Voltage (1)	V ₀₁	T ₁ =25°C, V _m =-33V, I ₀ =600mA		-25	-23	٧
Output Voltage (2)	V ₀₂	-38V <v,,< td=""><td><-27V, 5 0mA<l<sub>0<=1.0A</l<sub></td><td>-25 2</td><td>-228</td><td>٧</td></v,,<>	<-27V, 5 0mA <l<sub>0<=1.0A</l<sub>	-25 2	-228	٧
Line Regulation	ΔV ₀₁		-38V <v<sub>m<-27V, I_o=100mA</v<sub>	1	240	mV
	∆V ₀₂	T,=25°C	-36V <v<sub>n<-30V, I_p=100mA</v<sub>		120	mV
	∇Λ ⁰³	,	-38V <v<sub>m<-27V, I_o=500mA</v<sub>		480	mV
	Δ٧04	<u> </u>	-36V≤V _n ≤-30V, I _o =500mA		240	m۷
Load Regulation	∆V ₀₅	T,=25°C	5.0mA≤l _o ≤1.5A, V _m =-33V		480	mV
	ΔV ₀₆] ' 20 0]	250mA≤l ₀ ≤750mA, V _m =-33V		240	mV
Quiescent Current	6	T _i =25°C, V _n =-33V, I _o =500mA			3	mA
Quiescent Current Change	∆ان	-38V≼V _a	<-27V, I₀=500mA		1.0	mA
	VIOS	V _{en} =-33V	, 5mA≤l _o ≤1.5A		0.5	mA
Output Noise Voltage	No	V _m =-33V, I _o =500mA 10Hz≤f≤100KHz			270	μV
Ripple Rejection	R _p	T _j =25°C, V _i =1V _(ma) , 120Hz, I ₀ =20mA, -38V <v<sub>e<-28V</v<sub>		54		ďΒ
Input-Output Voltage Differential	V _d	T,=25°C. 1,=1 0A			1 1(TYP)	v

*GL79XX Series Test Circuit (AC & DC)



TYPICAL CHARACTERISTICS (TA + +25°C unless otherwise noted.)

FIGURE 1 - AVERAGE CASE POWER DISSIPATION AS A FUNCTION OF AMBIENT TEMPERATURE (TO-220)

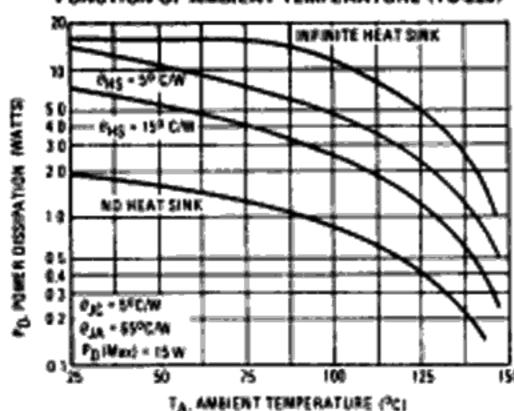


FIGURE 2 — PEAK OUTPUT CURRENT AS A FUNCTION OF INPUT-OUTPUT DIFFERENTIAL VOLTAGE

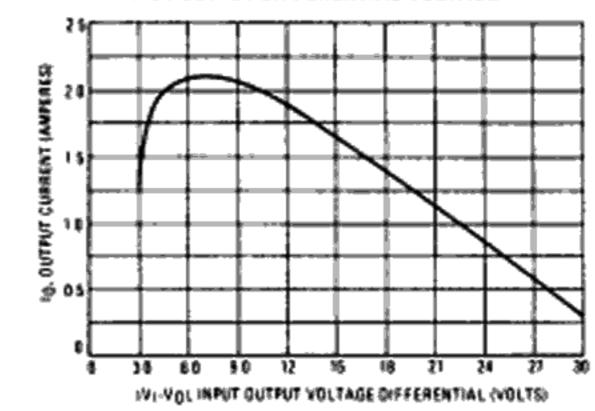


FIGURE 3 - RIPPLE REJECTION AS A FUNCTION OF FREQUENCY

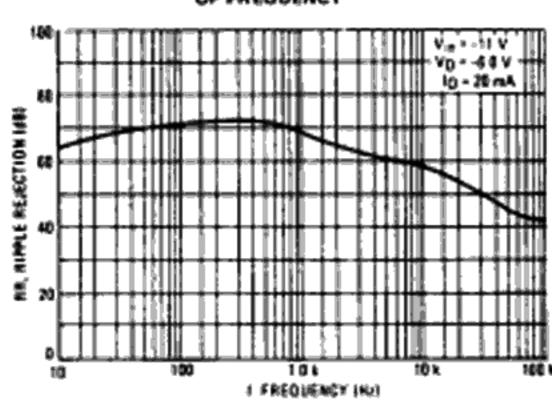


FIGURE 4 - RIPPLE REJECTION AS A FUNCTION OF OUTPUT VOLTAGES

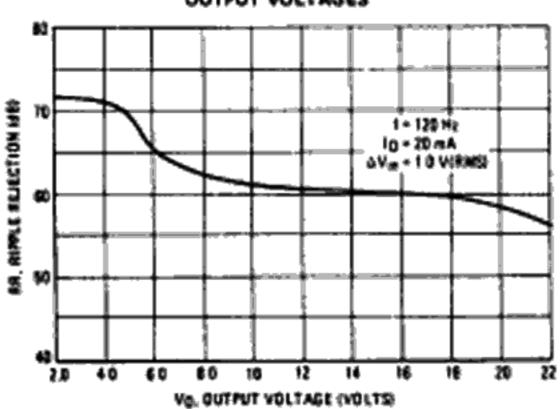


FIGURE 5 -- OUTPUT VOLTAGE AS A FUNCTION OF JUNCTION TEMPERATURE

