

NJM7900

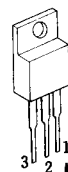
The NJM7900 series of Monolithic 3-Terminal Negative Regulators is constructed using the New JRC Planar epitaxial process. These negative regulators are intended as complements to the popular NJM7800 series of positive voltage regulators, and they are available in the same voltage options from -5 to -24V . The 7900 series employ internal current-limiting, safe-area protection, and thermal shutdown, making the virtually indestructible.

■ Features

- Output Current In Excess of 1A
- No External Components
- Internal Thermal Overload Protection
- Internal Short circuit current limiting

■ Package Outline

(TO-220)

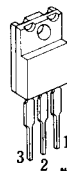


1. OUT
2. IN
3. COMMON

NJM79XXA

The radiation fin is connected to Pin 2.

(TO-220F)



NJM79XXFA

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

Parameter	Symbol	Maximum Rating		Unit
Input Voltage	V_{IN}	7905 ~ 7909	-35	V
		7912 ~ 7915	-35	
		7918 ~ 7924	-40	
Storage Temperature Range	T_{stg}	$-40 \sim +125$		$^\circ\text{C}$
Operating Temperature Range	Operating Junction Temperature	T_j	$-30 \sim +125$	$^\circ\text{C}$
	Operating Ambient Temperature	T_{opr}	$-30 \sim +75$	
Power Dissipation	P_D	16 ($T_c \leq 45^\circ\text{C}$)		W

■ Thermal Characteristics

Thermal Resistance	Junction-to-Ambient Temperature	θ_{ja}	70(TO-220) 60(TO-220F)	$^\circ\text{C/W}$
	Junction-to-Case	θ_{jc}	5	

■ Electrical Characteristics ($T_j = 25^\circ\text{C}$, $C_{IN} = 2.2\mu\text{F}$, $C_O = 1.0\mu\text{F}$)

Measurement is to be conducted in pulse testing.

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
NJM7905A/FA						
Output Voltage	V_O	$V_{IN} = -10\text{V}$, $I_O = 0.5\text{A}$	-4.8	-5.0	-5.2	V
Quiescent Current	I_O	$V_{IN} = -10\text{V}$, $I_O = 0\text{mA}$	—	2.2	5.0	mA
Load Regulation	$\Delta V_O - I_O$	$V_{IN} = -10\text{V}$, $I_O = 0.005 \sim 1.5\text{A}$	—	50	80	mV
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN} = -7 \sim -25\text{V}$, $I_O = 0.5\text{A}$	—	5	50	mV
Ripple Rejection	RR	$V_{IN} = -10\text{V}$, $I_O = 0.5\text{A}$, $e_{in} = 2\text{V}_{p-p}$, $f = 120\text{Hz}$	54	73	—	dB
Output Noise Voltage	V_{NO}	$V_{IN} = -10\text{V}$, $I_O = 0.5\text{A}$, $\text{BW} = 10\text{Hz} \sim 100\text{kHz}$	—	105	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$	$V_{IN} = -10\text{V}$, $I_O = 5\text{mA}$	—	-0.4	—	mV/ $^\circ\text{C}$

■ Electrical Characteristics ($T_j=25^{\circ}\text{C}$, $C_{IN}=2.2\mu\text{F}$, $C_O=1.0\mu\text{F}$)

Measurement is to be conducted in pulse testing.

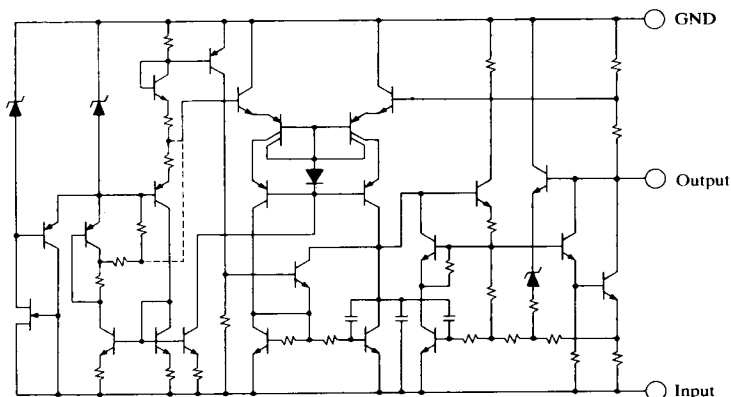
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
NJM7906A/FA						
Output Voltage	V_O	$V_{IN}=-11\text{V}$, $I_O=0.5\text{A}$	-5.75	-6.0	-6.25	V
Quiescent Current	I_Q	$V_{IN}=11\text{V}$, $I_O=0\text{mA}$	—	2.2	5.0	mA
Load Regulation	$\Delta V_O \cdot I_O$	$V_{IN}=-11\text{V}$, $I_O=0.005\sim 1.5\text{A}$	—	50	90	mV
Line Regulation	$\Delta V_O \cdot V_{IN}$	$V_{IN}=-8\sim -25\text{V}$, $I_O=0.5\text{A}$	—	5	60	mV
Ripple Rejection	RR	$V_{IN}=-11\text{V}$, $I_O=0.5\text{A}$, $e_{in}=2V_{p-p}$, $f=120\text{Hz}$	54	72	—	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-11\text{V}$, $I_O=0.5\text{A}$, $BW=10\text{Hz}\sim 100\text{kHz}$	—	135	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$V_{IN}=-11\text{V}$, $I_O=5\text{mA}$	—	-0.5	—	mV/ $^{\circ}\text{C}$
NJM7908A/FA						
Output Voltage	V_O	$V_{IN}=-14\text{V}$, $I_O=0.5\text{A}$	-7.7	-8.0	-8.3	V
Quiescent Current	I_Q	$V_{IN}=-14\text{V}$, $I_O=0\text{mA}$	—	2.2	5.0	mA
Load Regulation	$\Delta V_O \cdot I_O$	$V_{IN}=-14\text{V}$, $I_O=0.005\sim 1.5\text{A}$	—	60	110	mV
Line Regulation	$\Delta V_O \cdot V_{IN}$	$V_{IN}=-10.5\sim -25\text{V}$, $I_O=0.5\text{A}$	—	8	80	mV
Ripple Rejection	RR	$V_{IN}=-14\text{V}$, $I_O=0.5\text{A}$, $e_{in}=2V_{p-p}$, $f=120\text{Hz}$	54	68	—	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-14\text{V}$, $I_O=0.5\text{A}$, $BW=10\text{Hz}\sim 100\text{kHz}$	—	180	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$V_{IN}=-14\text{V}$, $I_O=5\text{mA}$	—	-0.7	—	mV/ $^{\circ}\text{C}$
NJM7909A/FA						
Output Voltage	V_O	$V_{IN}=-15\text{V}$, $I_O=0.5\text{A}$	-8.65	-9.0	-9.35	V
Quiescent Current	I_Q	$V_{IN}=-15\text{V}$, $I_O=0\text{mA}$	—	2.2	5.0	mA
Load Regulation	$\Delta V_O \cdot I_O$	$V_{IN}=-15\text{V}$, $I_O=0.005\sim 1.5\text{A}$	—	60	120	mV
Line Regulation	$\Delta V_O \cdot V_{IN}$	$V_{IN}=-11.5\sim -25\text{V}$, $I_O=0.5\text{A}$	—	8	90	mV
Ripple Rejection	RR	$V_{IN}=-15\text{V}$, $I_O=0.5\text{A}$, $e_{in}=2V_{p-p}$, $f=120\text{Hz}$	54	67	—	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-15\text{V}$, $I_O=0.5\text{A}$, $BW=10\text{Hz}\sim 100\text{kHz}$	—	195	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$V_{IN}=-15\text{V}$, $I_O=5\text{mA}$	—	-0.8	—	mV/ $^{\circ}\text{C}$
NJM7912A/FA						
Output Voltage	V_O	$V_{IN}=-19\text{V}$, $I_O=0.5\text{A}$	-11.5	-12.0	-12.5	V
Quiescent Current	I_Q	$V_{IN}=-19\text{V}$, $I_O=0\text{mA}$	—	2.7	6.0	mA
Load Regulation	$\Delta V_O \cdot I_O$	$V_{IN}=-19\text{V}$, $I_O=0.005\sim 0.5\text{A}$	—	60	150	mV
Line Regulation	$\Delta V_O \cdot V_{IN}$	$V_{IN}=-14.5\sim -30\text{V}$, $I_O=0.5\text{A}$	—	3	120	mV
Ripple Rejection	RR	$V_{IN}=-19\text{V}$, $I_O=0.5\text{A}$, $e_{in}=2V_{p-p}$, $f=120\text{Hz}$	54	71	—	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-19\text{V}$, $I_O=0.5\text{A}$, $BW=10\text{Hz}\sim 100\text{kHz}$	—	230	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$V_{IN}=-19\text{V}$, $I_O=5\text{mA}$	—	-0.4	—	mV/ $^{\circ}\text{C}$

■ Electrical Characteristics ($T_i=25^\circ\text{C}$, $C_{IN}=2.2\mu\text{F}$, $C_O=1.0\mu\text{F}$)

Measurement is to be conducted in pulse testing.

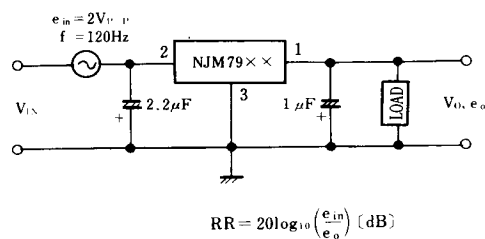
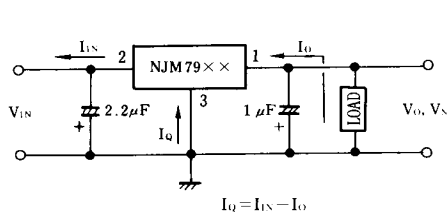
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
NJM7915A/FA						
Output Voltage	V_O	$V_{IN}=-23\text{V}$, $I_O=0.5\text{A}$	-14.4	-15.0	-15.6	V
Quiescent Current	I_Q	$V_{IN}=-23\text{V}$, $I_O=0\text{mA}$	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	$V_{IN}=-23\text{V}$, $I_O=0.005\sim 1.5\text{A}$	—	60	180	mV
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=-17.5\sim -30\text{V}$, $I_O=0.5\text{A}$	—	3	150	mV
Ripple Rejection	RR	$V_{IN}=-23\text{V}$, $I_O=0.5\text{A}$, $e_{in}=2V_{p-p}$, $f=120\text{Hz}$	54	70	—	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-23\text{V}$, $I_O=0.5\text{A}$, $BW=10\text{Hz}\sim 100\text{kHz}$	—	260	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$V_{IN}=-23\text{V}$, $I_O=5\text{mA}$	—	-0.5	—	mV/ $^\circ\text{C}$
NJM7918A/FA						
Output Voltage	V_O	$V_{IN}=-27\text{V}$, $I_O=0.5\text{A}$	-17.3	-18.0	-18.7	V
Quiescent Current	I_Q	$V_{IN}=-27\text{V}$, $I_O=0\text{mA}$	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	$V_{IN}=-27\text{V}$, $I_O=0.005\sim 1.5\text{A}$	—	60	210	mV
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=-21\sim -33\text{V}$, $I_O=0.5\text{A}$	—	4	180	mV
Ripple Rejection	RR	$V_{IN}=-27\text{V}$, $I_O=0.5\text{A}$, $e_{in}=2V_{p-p}$, $f=120\text{Hz}$	54	69	—	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-27\text{V}$, $I_O=0.5\text{A}$, $BW=10\text{Hz}\sim 100\text{kHz}$	—	300	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$V_{IN}=-27\text{V}$, $I_O=5\text{mA}$	—	-0.6	—	mV/ $^\circ\text{C}$
NJM7924A/FA						
Output Voltage	V_O	$V_{IN}=-33\text{V}$, $I_O=0.5\text{A}$	-23.0	-24.0	-25.0	V
Quiescent Current	I_Q	$V_{IN}=-33\text{V}$, $I_O=0\text{mA}$	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	$V_{IN}=-33\text{V}$, $I_O=0.005\sim 1.5\text{A}$	—	60	270	mV
Line Regulation	ΔV_O-V_{IN}	$V_{IN}=-27\sim -38\text{V}$, $I_O=0.5\text{A}$	—	5	240	mV
Ripple Rejection	RR	$V_{IN}=-33\text{V}$, $I_O=0.5\text{A}$, $e_{in}=2V_{p-p}$, $f=120\text{Hz}$	54	66	—	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-33\text{V}$, $I_O=0.5\text{A}$, $BW=10\text{Hz}\sim 100\text{kHz}$	—	360	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	$V_{IN}=-33\text{V}$, $I_O=5\text{mA}$	—	-0.8	—	mV/ $^\circ\text{C}$

■ Equivalent Circuit

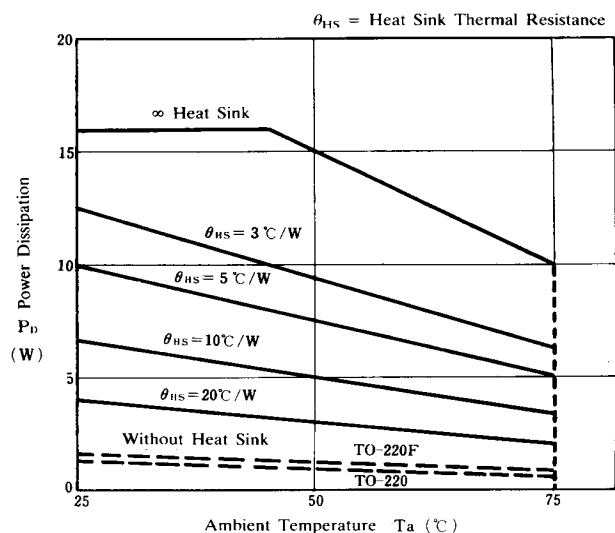


■ Test Circuit

1. Output Voltage, Line Regulation, Load Regulation, Quiescent Current, Average Temperature Coefficient of Output Voltage, Output Noise Voltage
2. Ripple Rejection



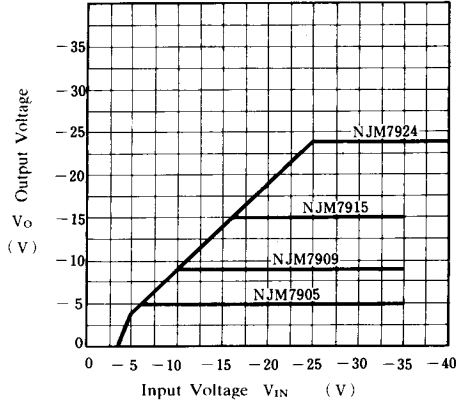
■ Power Dissipation vs. Ambient Temperature



■ Typical Characteristics

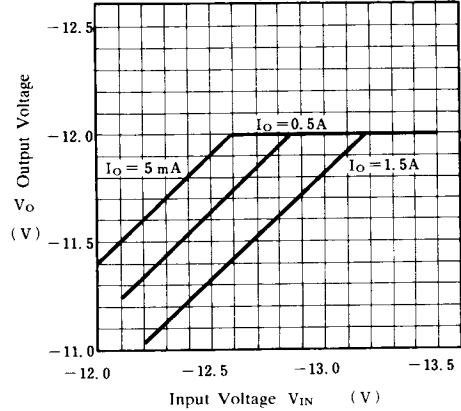
NJM7900 Output Voltage vs. Low Input Voltage

($I_O = 0.5A$, $T_j = 25^\circ C$)



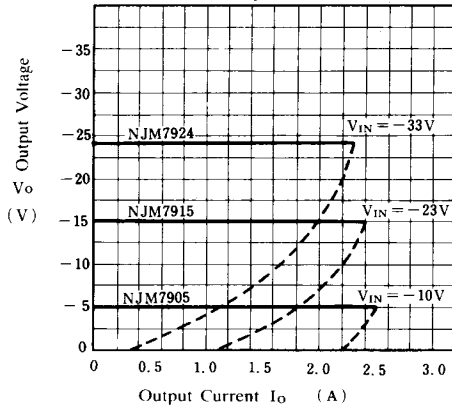
NJM7912 Output Voltage vs. Low Input Voltage

($T_j = 25^\circ C$)



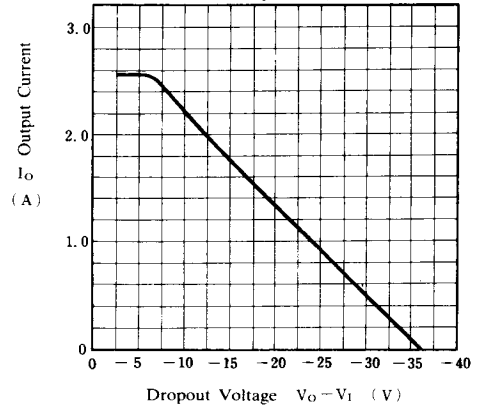
NJM7905/15/24 Load Characteristics

($T_j = 25^\circ C$)

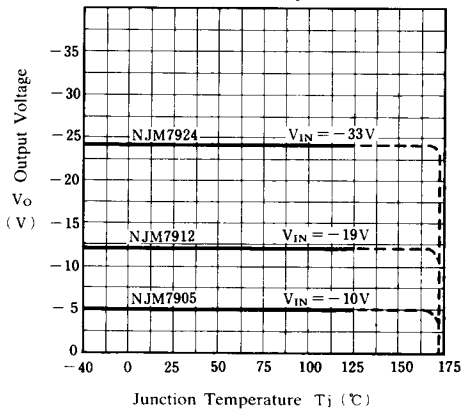


NJM7900 Series Short Circuit Output Current

($T_j = 25^\circ C$)



NJM7905/12/24 Output Voltage vs. Ambient Temperature



NJM7905/15/24 Ripple Rejection vs. Frequency

($I_O = 500mA$, $e_{IN} = 2V_{p-p}$, $T_j = 25^\circ C$)

