

3-TERMINAL NEGATIVE VOLTAGE REGULATOR

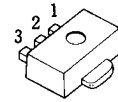
■ GENERAL DESCRIPTION

The NJM79L00 series of 3-Terminal Negative Voltage Regulators is constructed using the New JRC Planar epitaxial process. These regulators employ internal current-limiting, and thermal-shutdown, making them essentially indestructible. If adequate heat sinking is provided, they can deliver up to 100mA output current. They are intended as fixed voltage regulators in a wide range of applications including local or on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power pass elements to make high-current voltage regulators. The NJM79L00 used as a Zener diode/resistor combination replacement, offers an effective output impedance improvement of typically two orders of magnitude, along with lower quiescent current and lower noise.

■ PACKAGE OUTLINE

(TO-92)

(SOT-89)



NJM79L00A

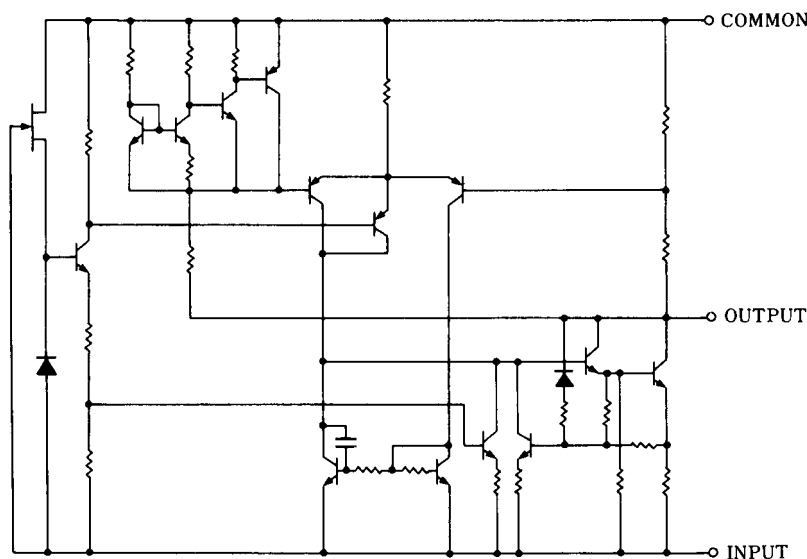
NJM79L00UA

1. COMMON
2. IN
3. OUT

■ FEATURES

- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Excellent Ripple Rejection
- Guarantee'd 100mA Output Current
- Package Outline TO-92, SOT-89
- Bipolar Technology

■ EQUIVALENT CIRCUIT



NJM79L00

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	(79L03A to 79L09A) - 30 (79L12A to 79L15A) - 35 (79L18A to 79L24A) - 40	V V V
Operating Temperature Range	T_{opr}	-40 to +85	°C
Storage Temperature Range	T_{stg}	-40 to +125	°C
Power Dissipation	P_D	(TO92) 500 (SOT89) 350	mW mW

■ ELECTRICAL CHARACTERISTICS ($C_{IN}=0.33\mu F$, $C_O=1.0\mu F$, $T_J=25^\circ C$)

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L03A						
Output Voltage	V_O	$V_{IN}=-10V$, $I_O=40mA$	-2.88	-3.0	-3.12	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-7$ to $-20V$, $I_O=40mA$	-	10	60	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-10V$, $I_O=1$ to $100mA$	-	4	72	mV
Quiescent Current	I_Q	$V_{IN}=-10V$, $I_O=0mA$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-8$ to $-18V$, $I_O=40mA$, $e_{in}=1V_{P-P}$, $f=120Hz$	45	72	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-10V$, $BW=10Hz$ to $100kHz$, $I_O=40mA$	-	70	-	μV
NJM79L05A						
Output Voltage	V_O	$V_{IN}=-10V$, $I_O=40mA$	-4.8	-5.0	-5.2	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-7$ to $-20V$, $I_O=40mA$	-	15	150	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-10V$, $I_O=1$ to $100mA$	-	7	60	mV
Quiescent Current	I_Q	$V_{IN}=-10V$, $I_O=0mA$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-8$ to $-18V$, $I_O=40mA$, $e_{in}=1V_{P-P}$, $f=120Hz$	41	71	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-10V$, $BW=10Hz$ to $100kHz$, $I_O=40mA$	-	120	-	μV

■ **ELECTRICAL CHARACTERISTICS** ($C_{IN}=0.33\mu\text{F}$, $C_O=1.0\mu\text{F}$, $T_J=25^\circ\text{C}$)

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L06A						
Output Voltage	V_O	$V_{IN}=-12\text{V}$, $I_O=40\text{mA}$	-5.76	-6.0	-6.24	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-8.5$ to -20V , $I_O=40\text{mA}$	-	18	150	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-12\text{V}$, $I_O=1$ to 100mA	-	8	70	mV
Quiescent Current	I_Q	$V_{IN}=-12\text{V}$, $I_O=0\text{mA}$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-9$ to -19V , $I_O=40\text{mA}$, $e_{in}=1V_{P-P}$, $f=120\text{Hz}$	40	68	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-12\text{V}$, $BW=10\text{Hz}$ to 100kHz , $I_O=40\text{mA}$	-	140	-	μV
NJM79L08A						
Output Voltage	V_O	$V_{IN}=-14\text{V}$, $I_O=40\text{mA}$	-7.68	-8.0	-8.32	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-10.5$ to -23V , $I_O=40\text{mA}$	-	24	175	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-14\text{V}$, $I_O=1$ to 100mA	-	10	80	mV
Quiescent Current	I_Q	$V_{IN}=-14\text{V}$, $I_O=0\text{mA}$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-11$ to -21V , $I_O=40\text{mA}$, $e_{in}=1V_{P-P}$, $f=120\text{Hz}$	39	68	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-14\text{V}$, $BW=10\text{Hz}$ to 100kHz , $I_O=40\text{mA}$	-	190	-	μV
NJM79L09A						
Output Voltage	V_O	$V_{IN}=-15\text{V}$, $I_O=40\text{mA}$	-8.64	-9.0	-9.36	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-11.5$ to -24V , $I_O=40\text{mA}$	-	27	200	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-15\text{V}$, $I_O=1$ to 100mA	-	12	90	mV
Quiescent Current	I_Q	$V_{IN}=-15\text{V}$, $I_O=0\text{mA}$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-12$ to -22V , $I_O=40\text{mA}$, $e_{in}=1V_{P-P}$, $f=120\text{Hz}$	38	67	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-15\text{V}$, $BW=10\text{Hz}$ to 100kHz , $I_O=40\text{mA}$	-	210	-	μV
NJM79L12A						
Output Voltage	V_O	$V_{IN}=-19\text{V}$, $I_O=40\text{mA}$	-11.5	-12.0	-12.5	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-14.5$ to -27V , $I_O=40\text{mA}$	-	36	250	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-19\text{V}$, $I_O=1$ to 100mA	-	16	100	mV
Quiescent Current	I_Q	$V_{IN}=-19\text{V}$, $I_O=0\text{mA}$	-	3.5	6.5	mA
Ripple Rejection	RR	$V_{IN}=-15$ to -25V , $I_O=40\text{mA}$, $e_{in}=1V_{P-P}$, $f=120\text{Hz}$	37	64	-	dB
Output Noise Voltage	V_{NO}	$V_{IN}=-19\text{V}$, $BW=10\text{Hz}$ to 100kHz , $I_O=40\text{mA}$	-	210	-	μV

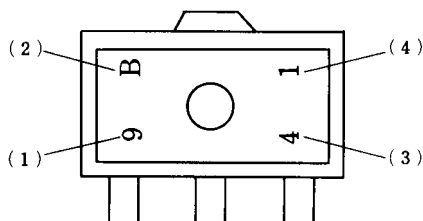
NJM79L00

■ ELECTRICAL CHARACTERISTICS (C_{IN}=0.33μF, C_O=1.0μF, T_J=25°C)

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L15A						
Output Voltage	V _O	V _{IN} =23V, I _O =40mA	-14.4	-15.0	-15.6	V
Line Regulation	ΔV _O - V _{IN}	V _{IN} =17.5 to -30V, I _O =40mA	-	45	300	mV
Load Regulation	ΔV _O - I _O	V _{IN} =23V, I _O =1 to 100mA	-	20	150	mV
Quiescent Current	I _Q	V _{IN} =23V, I _O =0mA	-	3.5	6.5	mA
Ripple Rejection	RR	V _{IN} =18.5 to -28.5V, I _O =40mA, e _{in} =1V _{P-P} , f=120Hz	34	63	-	dB
Output Noise Voltage	V _{NO}	V _{IN} =23V, BW=10Hz to 100kHz, I _O =40mA	-	340	-	μV
NJM79L18A						
Output Voltage	V _O	V _{IN} =27V, I _O =40mA	-17.3	-18.0	-18.7	V
Line Regulation	ΔV _O - V _{IN}	V _{IN} =20.7 to -33V, I _O =40mA	-	54	325	mV
Load Regulation	ΔV _O - I _O	V _{IN} =27V, I _O =1 to 100mA	-	23	170	mV
Quiescent Current	I _Q	V _{IN} =27V, I _O =0mA	-	3.5	6.5	mA
Ripple Rejection	RR	V _{IN} =23 to -33V, I _O =40mA, e _{in} =1V _{P-P} , f=120Hz	33	60	-	dB
Output Noise Voltage	V _{NO}	V _{IN} =27V, BW=10Hz to 100kHz, I _O =40mA	-	410	-	μV
NJM79L24A						
Output Voltage	V _O	V _{IN} =33V, I _O =40mA	-23.0	-24.0	-25.0	V
Line Regulation	ΔV _O - V _{IN}	V _{IN} =27 to -38V, I _O =40mA	-	72	350	mV
Load Regulation	ΔV _O - I _O	V _{IN} =33V, I _O =1 to 100mA	-	30	200	mV
Quiescent Current	I _Q	V _{IN} =33V, I _O =0mA	-	3.5	6.5	mA
Ripple Rejection	RR	V _{IN} =29 to -35V, I _O =40mA, e _{in} =1V _{P-P} , f=120Hz	31	55	-	dB
Output Noise Voltage	V _{NO}	V _{IN} =33V, BW=10Hz to 100kHz, I _O =40mA	-	550	-	μV

■ SOT-89 MARK



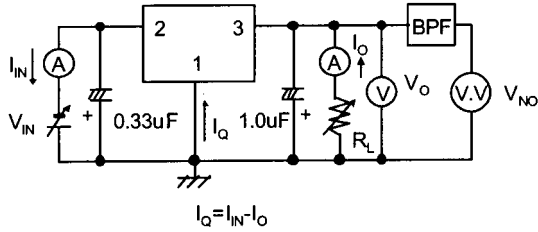
- (1) 9: Negative Output
- (2) Vo Rank
- (3) The end of A. D.
- (4) Production Month

Oct. ...X
Nov. ...Y
Dec. ...Z

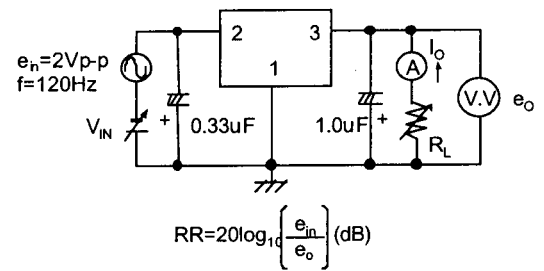
	(1)	(2)
NJM79L03UA	9	B
NJM79L05UA	9	C
NJM79L06UA	9	E
NJM79L08UA	9	G
NJM79L09UA	9	H
NJM79L12UA	9	K
NJM79L15UA	9	L
NJM79L18UA	9	M
NJM79L24UA	9	P

■ TEST CIRCUIT

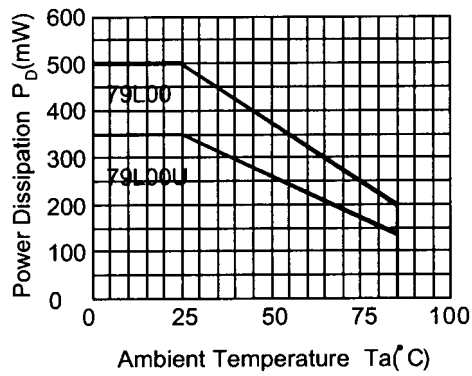
1. Output Voltage, Output Current, Line Regulation, Load Regulation, Quiescent Current, Output Noise Voltage



2. Ripple Rejection



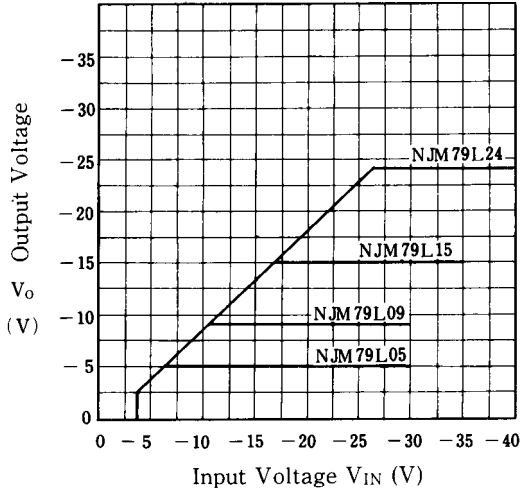
■ POWER DISSIPATION VS. AMBIENT TEMPERATURE



■ TYPICAL CHARACTERISTICS

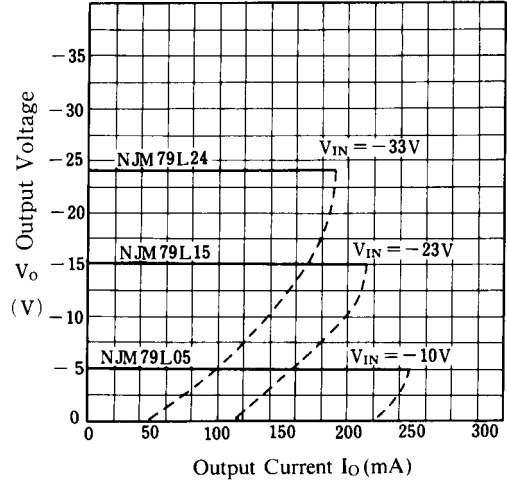
NJM79L00 Input Voltage vs. Output Voltage

($I_o = 40\text{mA}$, $T_j = 25^\circ\text{C}$)



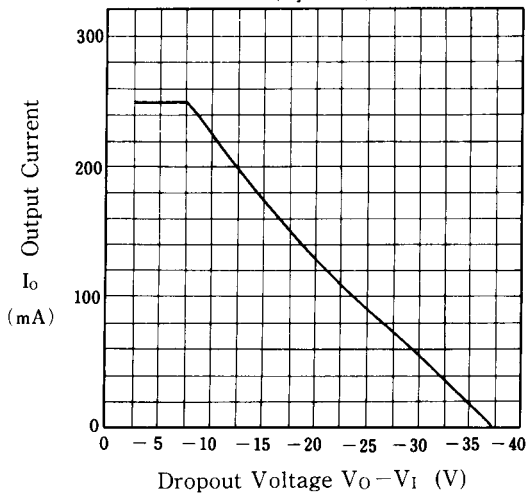
NJM79L05/15/24 Load Characteristics

($T_j = 25^\circ\text{C}$)

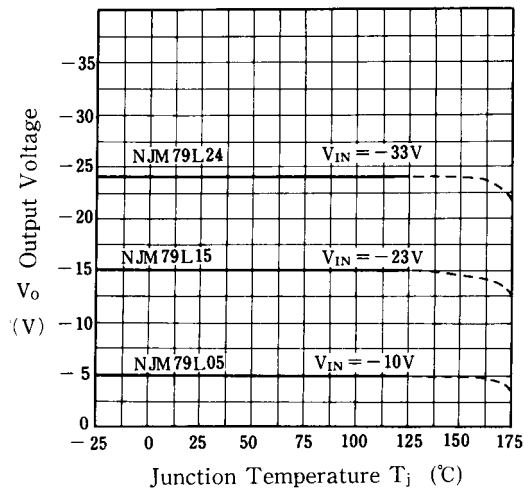


NJM79L00 Series Short Circuit Current

($T_j = 25^\circ\text{C}$)

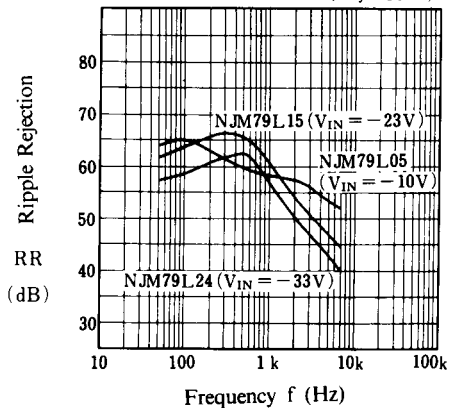


NJM79L05/12/24 Output Voltage vs. Junction Temperature



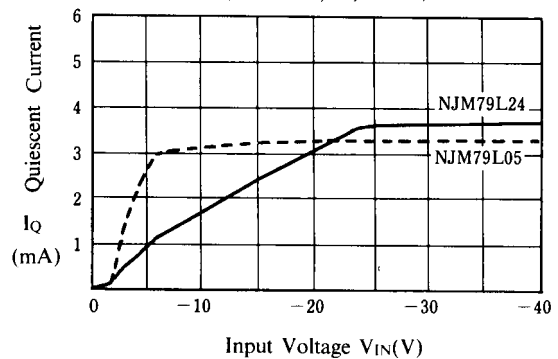
NJM79L05/15/24 Ripple Rejection vs. Frequency

($I_o = 40\text{mA}$, $e_{in} = 2\text{VP-P}$, $T_j = 25^\circ\text{C}$)



Quiescent Current vs. Input Voltage

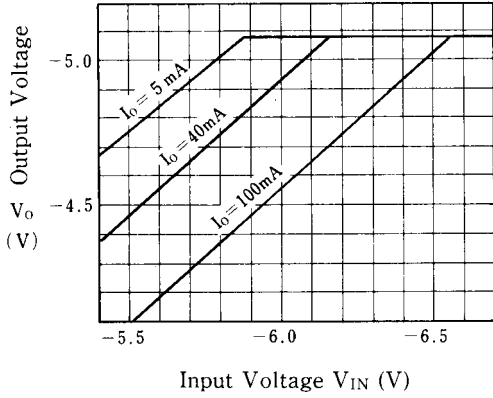
($I_o = 0\text{mA}$, $T_j = 25^\circ\text{C}$)



■ TYPICAL CHARACTERISTICS

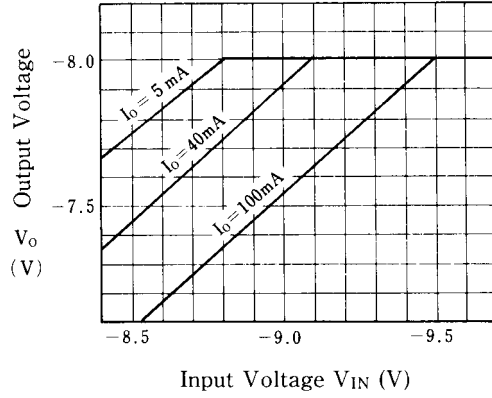
NJM79L05 Dropout Characteristics

($T_j = 25^\circ\text{C}$)

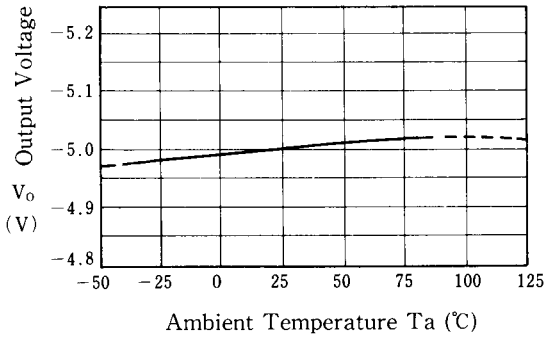


NJM79L08 Dropout Characteristics

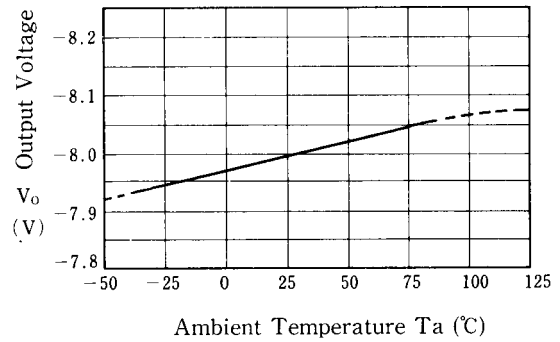
($T_j = 25^\circ\text{C}$)



NJM79L05 Output Voltage vs. Temperature



NJM79L08 Output Voltage vs. Temperature



[CAUTION]

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