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## 3-TERMINAL NEGATIVE VOLTAGE REGULATOR

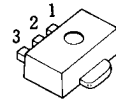
### ■ GENERAL DESCRIPTION

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

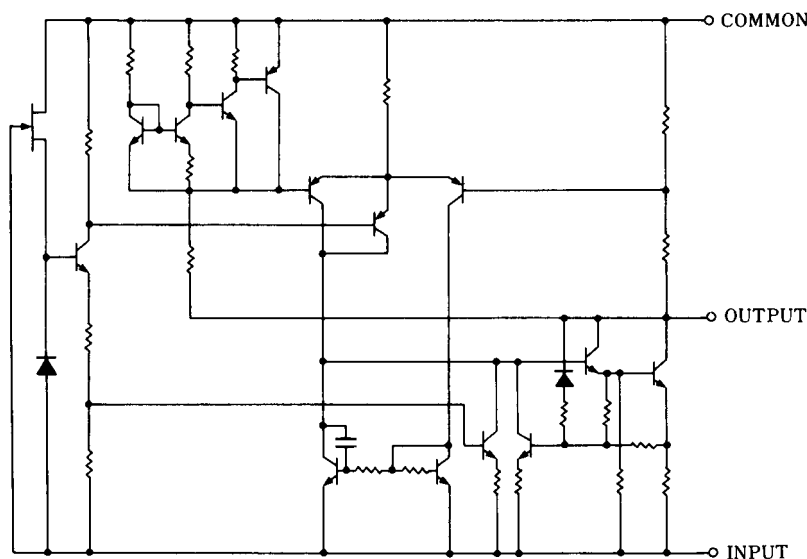
NJM79L00UA

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
<b>NJM79L03A</b>						
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	-	$\mu V$
<b>NJM79L05A</b>						
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	-	$\mu V$

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

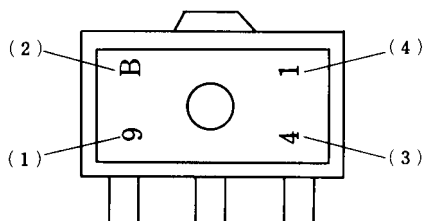
# NJM79L00

## ■ ELECTRICAL CHARACTERISTICS (C<sub>IN</sub>=0.33μF, C<sub>O</sub>=1.0μF, T<sub>J</sub>=25°C)

Measurement is to be conducted in pulse testing.

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

## ■ SOT-89 MARK



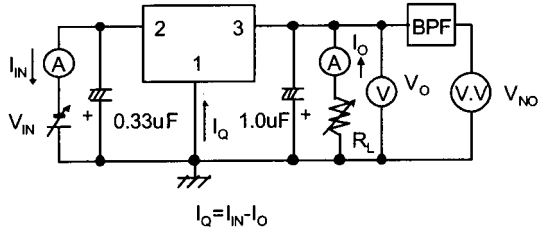
- (1) 9: Negative Output
- (2) Vo Rank
- (3) The end of A. D.
- (4) Production Month

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

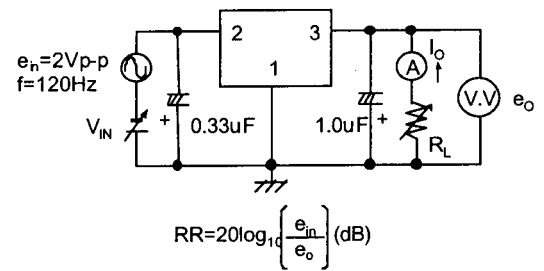
	(1)	(2)
NJM79L03UA	9	B
NJM79L05UA	9	C
NJM79L06UA	9	E
NJM79L08UA	9	G
NJM79L09UA	9	H
NJM79L12UA	9	K
NJM79L15UA	9	L
NJM79L18UA	9	M
NJM79L24UA	9	P

## ■ TEST CIRCUIT

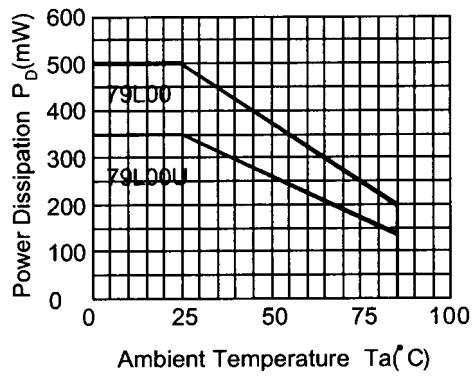
1. Output Voltage, Output Current, Line Regulation, Load Regulation, Quiescent Current, Output Noise Voltage



2. Ripple Rejection



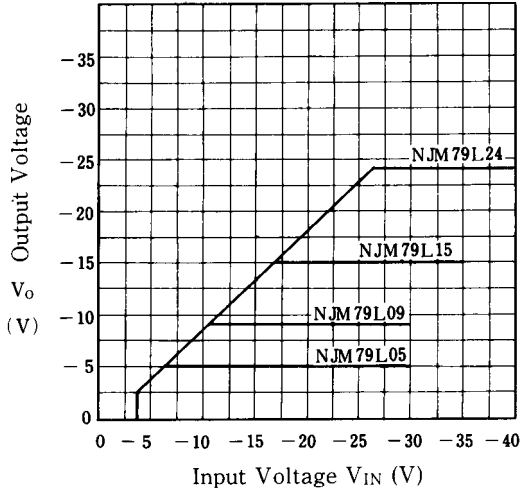
## ■ POWER DISSIPATION VS. AMBIENT TEMPERATURE



## ■ TYPICAL CHARACTERISTICS

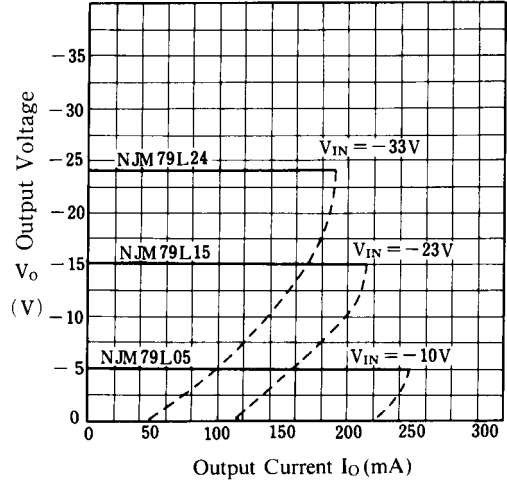
### NJM79L00 Input Voltage vs. Output Voltage

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



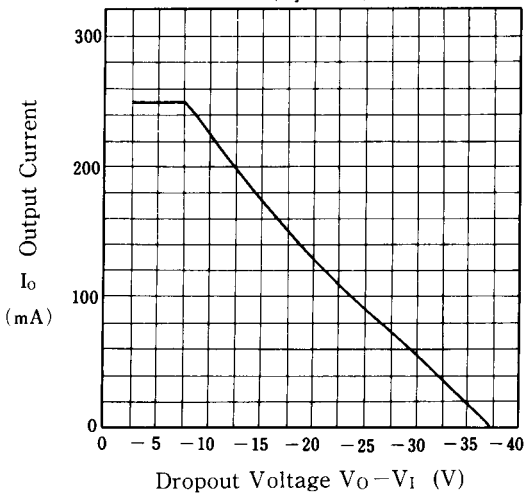
### NJM79L05/15/24 Load Characteristics

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

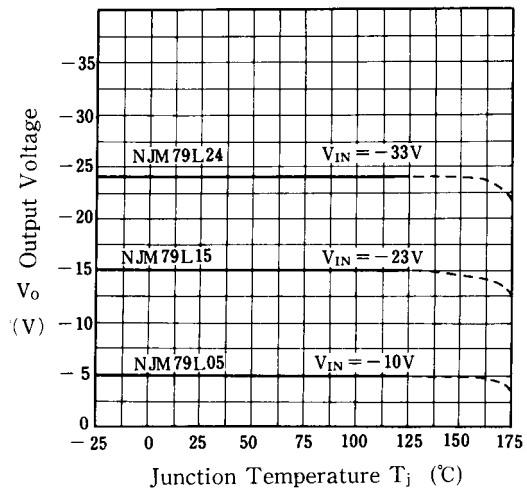


### NJM79L00 Series Short Circuit Current

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

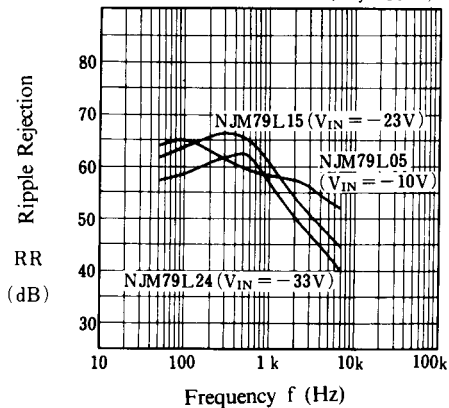


### NJM79L05/12/24 Output Voltage vs. Junction Temperature



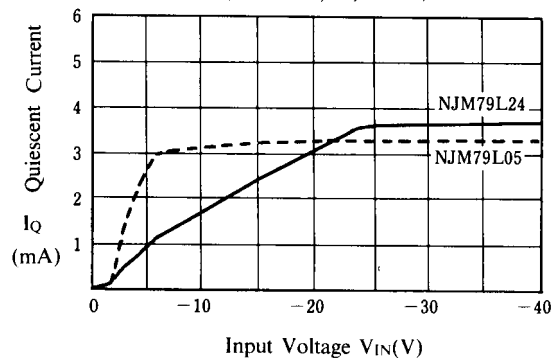
### NJM79L05/15/24 Ripple Rejection vs. Frequency

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



### Quiescent Current vs. Input Voltage

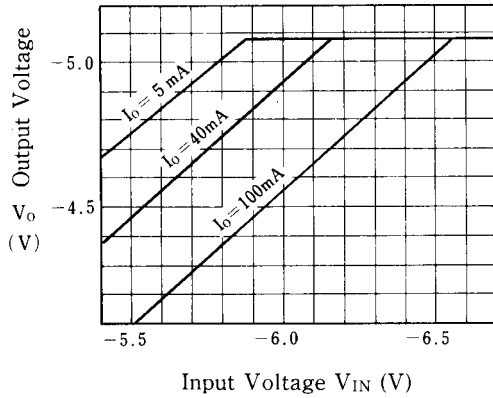
( $I_o = 0\text{mA}$ ,  $T_j = 25^\circ\text{C}$ )



## ■ TYPICAL CHARACTERISTICS

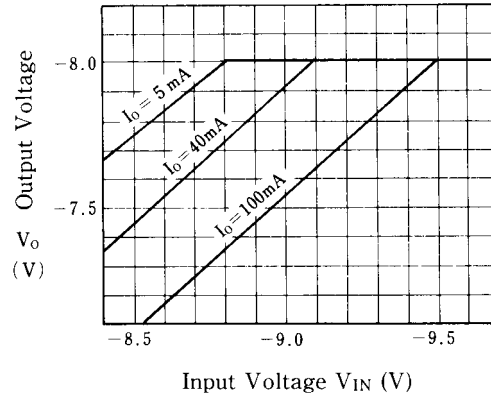
### NJM79L05 Dropout Characteristics

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

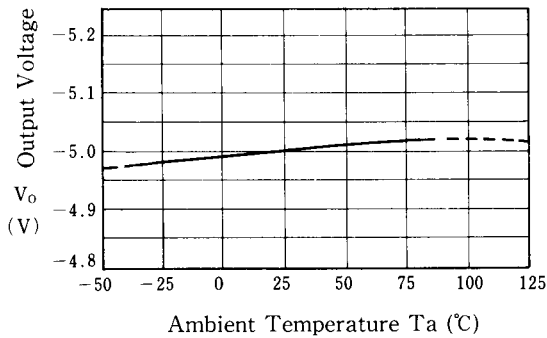


### NJM79L08 Dropout Characteristics

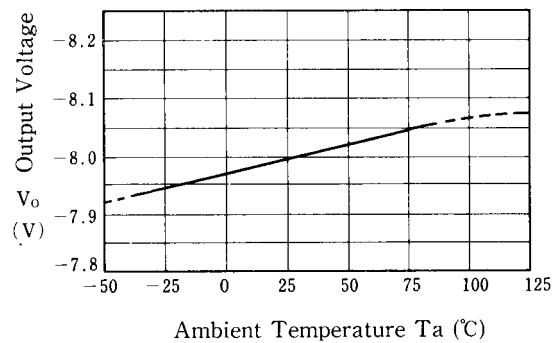
( $T_j = 25^\circ\text{C}$ )



### NJM79L05 Output Voltage vs. Temperature



### NJM79L08 Output Voltage vs. Temperature



**[CAUTION]**

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