

## 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.

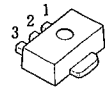
## ■ PACKAGE OUTLINE

(TO-92)



NJM79L00A

(SOT-89)



NJM79L00A

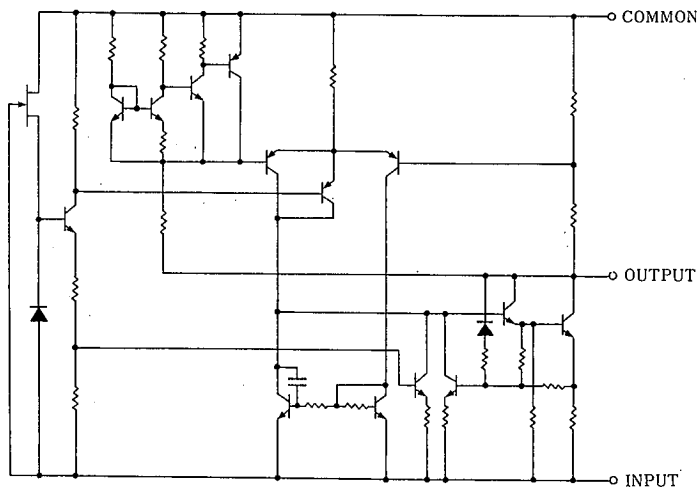
1. COMMON
2. IN
3. OUT

## ■ FEATURES

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

TO-92, SOT-89

## ■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$V_{IN}$	(79L03A~79L09A) - 30	V
		(79L12A~79L15A) - 35	V
		(79L18A~79L24A) - 40	V
Operating Temperature Range	$T_{opr}$	-40 ~ +85	°C
Storage Temperature Range	$T_{stg}$	-40 ~ +125	°C
Power Dissipation	$P_D$	(TO92) 500	mW
		(SOT89) 350	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	$\Delta V_O-V_{IN}$	$V_{IN}=-7 \sim -20V$ , $I_O=40mA$	—	10	60	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-10V$ , $I_O=1 \sim 100mA$	—	4	72	mV
Quiescent Current	$I_Q$	$V_{IN}=-10V$ , $I_O=0mA$	—	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-8 \sim -18V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ , $f=120Hz$	45	72	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-10V$ , $BW=10Hz \sim 100kHz$ , $I_O=40mA$	—	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	$\Delta V_O-V_{IN}$	$V_{IN}=-7 \sim -20V$ , $I_O=40mA$	—	15	150	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-10V$ , $I_O=1 \sim 100mA$	—	7	60	mV
Quiescent Current	$I_Q$	$V_{IN}=-10V$ , $I_O=0mA$	—	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-8 \sim -18V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ , $f=120Hz$	41	71	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-10V$ , $BW=10Hz \sim 100kHz$ , $I_O=40mA$	—	120	—	$\mu V$

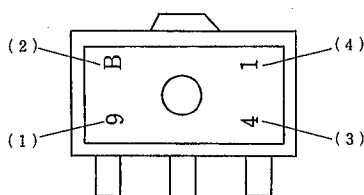
■ ELECTRICAL CHARACTERISTICS ( $C_{IN}=0.33\ \mu F$ ,  $C_O=1.0\ \mu F$ ,  $T_j=25^\circ C$ ) Measurement is to be conducted in pulse testing.

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	$\Delta V_O-V_{IN}$	$V_{IN}=-8.5\sim-20V$ , $I_O=40mA$	—	18	150	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-12V$ , $I_O=1\sim100mA$	—	8	70	mV
Quiescent Current	$I_Q$	$V_{IN}=-12V$ , $I_O=0mA$	—	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-9\sim-19V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ $f=120Hz$	40	68	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-12V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$	—	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	$\Delta V_O-V_{IN}$	$V_{IN}=-10.5\sim-23V$ , $I_O=40mA$	—	24	175	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-14V$ , $I_O=1\sim100mA$	—	10	80	mV
Quiescent Current	$I_Q$	$V_{IN}=-14V$ , $I_O=0mA$	—	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-11\sim-21V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ $f=120Hz$	39	68	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-14V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$	—	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	$\Delta V_O-V_{IN}$	$V_{IN}=-11.5\sim-24V$ , $I_O=40mA$	—	27	200	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-15V$ , $I_O=1\sim100mA$	—	12	90	mV
Quiescent Current	$I_Q$	$V_{IN}=-15V$ , $I_O=0mA$	—	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-12\sim-22V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ $f=120Hz$	38	67	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-15V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$	—	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	$\Delta V_O-V_{IN}$	$V_{IN}=-14.5\sim-27V$ , $I_O=40mA$	—	36	250	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-19V$ , $I_O=1\sim100mA$	—	16	100	mV
Quiescent Current	$I_Q$	$V_{IN}=-19V$ , $I_O=0mA$	—	3.5	6.5	mA
Ripple Rejection	RR	$V_{IN}=-15\sim-25V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ $f=120Hz$	37	64	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-19V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$	—	210	—	$\mu V$

## ■ ELECTRICAL CHARACTERISTICS (C<sub>IN</sub>=0.33 μF, C<sub>O</sub>=1.0 μF, 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~-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> =1~100mA	—	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~-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~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~-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> =1~100mA	—	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~-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~100Kz, 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~-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> =1~100mA	—	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~-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~100kHz, I <sub>O</sub> =40mA	—	550	—	μV

## ■ SOT-89 MARK

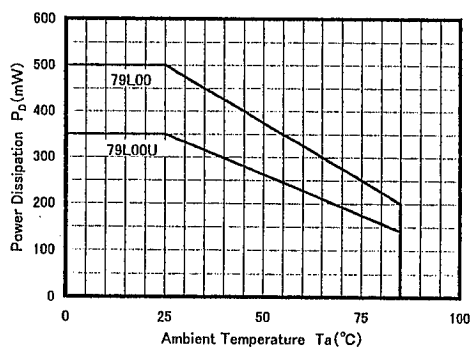


- (1): Negative Output  
 (2)V<sub>O</sub> Rank  
 (3)The end of A.D.  
 (4)Production Month

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

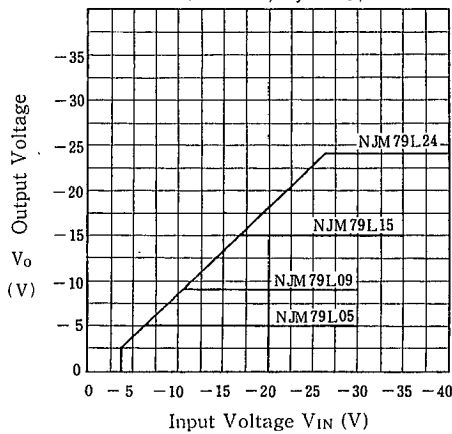
	(1)	(2)
NJM79L03UA	9	B
NJM79L05UA	9	C
NJM79L06UA	9	E
NJM79L08UA	9	G
NJM79L09UA	9	H
NJM79L12UA	9	K
NJM79L15UA	9	L
NJM79L18UA	9	M
NJM79L24UA	9	P

## ■ POWER DISSIPATION VS. AMBIENT TEMPERATURE

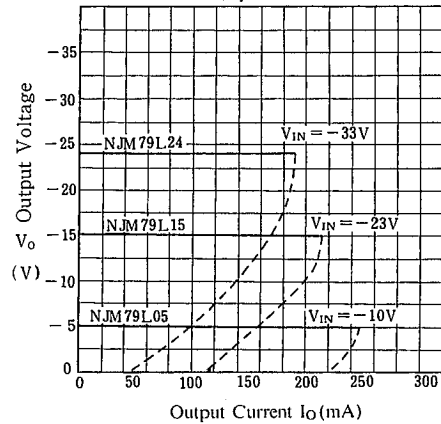


## ■ TYPICAL CHARACTERISTICS

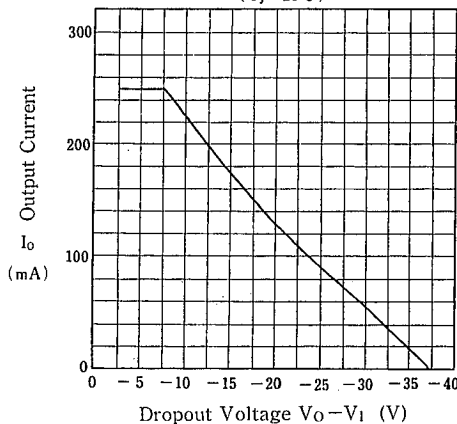
**NJM79L00 Input Voltage  
vs. Output Voltage**  
( $I_o = 40\text{mA}$ ,  $T_j = 25^\circ\text{C}$ )



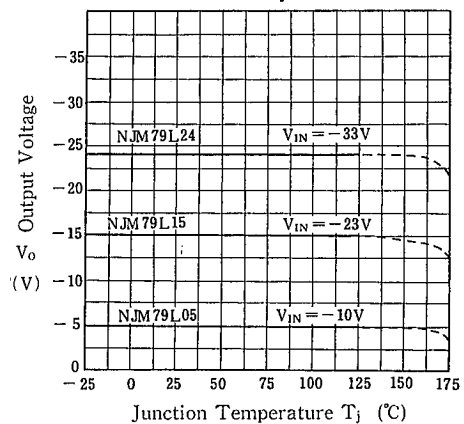
**NJM79L05/15/24 Load Characteristics**  
( $T_j = 25^\circ\text{C}$ )



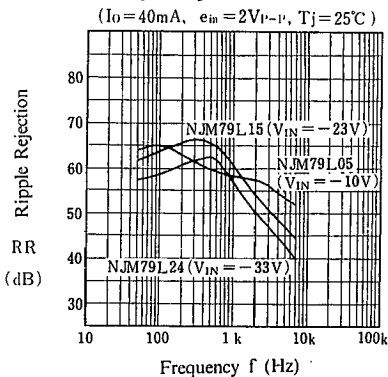
**NJM79L00 Series Short Circuit Current**  
( $T_j = 25^\circ\text{C}$ )



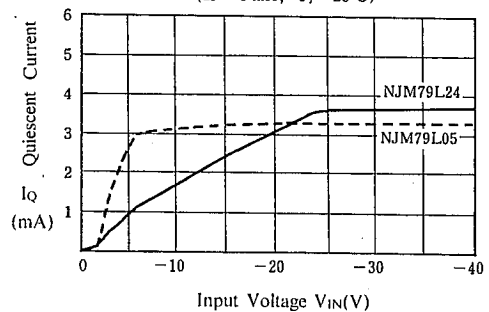
**NJM79L05/12/24 Output Voltage  
vs. Junction Temperature**



**NJM79L05/15/24 Ripple Rejection  
vs. Frequency**  
( $I_o = 40\text{mA}$ ,  $e_{in} = 2\text{Vr-p}$ ,  $T_j = 25^\circ\text{C}$ )



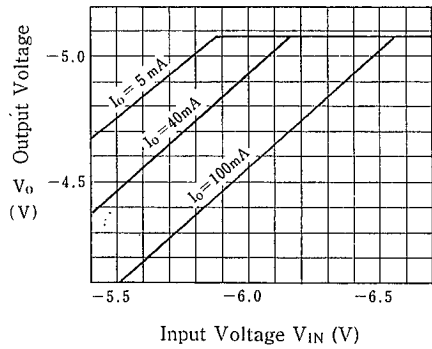
**Quiescent Current vs. Input Voltage**  
( $I_o = 0\text{mA}$ ,  $T_j = 25^\circ\text{C}$ )



■ TYPICAL CHARACTERISTICS

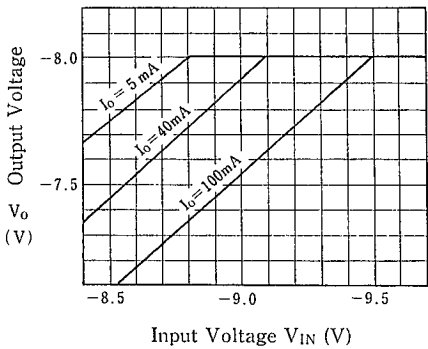
NJM79L05 Dropout Characteristics

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

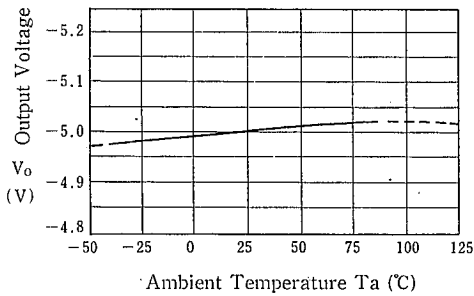


NJM79L08 Dropout Characteristics

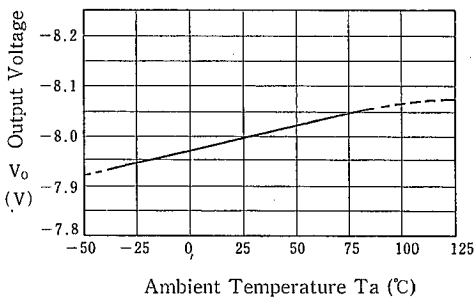
( $T_j = 25^\circ\text{C}$ )



NJM79L05 Output Voltage vs. Temperature



NJM79L08 Output Voltage vs. Temperature



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# MEMO

## [CAUTION]

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