

### 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.

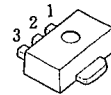
■ PACKAGE OUTLINE

(TO-92)



NJM79L00A

(SOT-89)



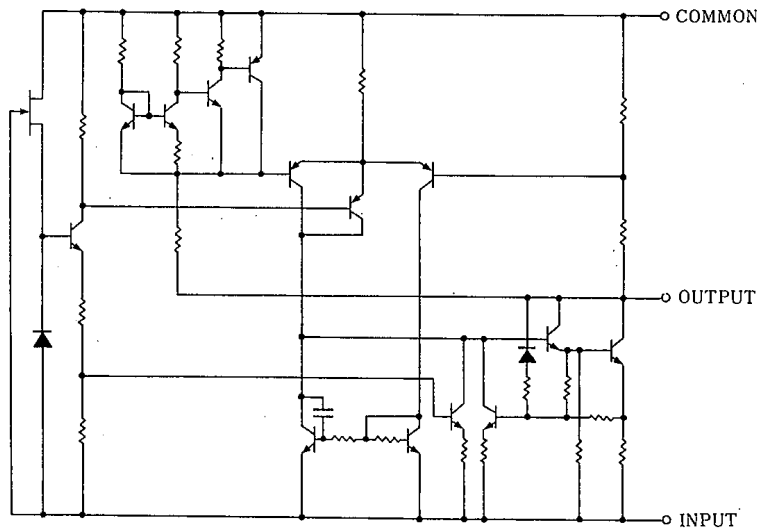
NJM79L00UA

- 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



6

## ■ 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	—	$\mu V$

# NJM79L00

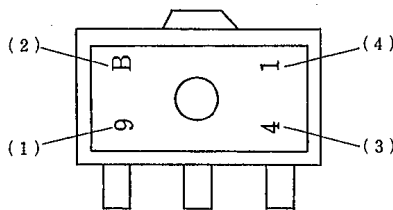
■ ELECTRICAL CHARACTERISTICS ( $C_{IN}=0.33\ \mu\text{F}$ ,  $C_O=1.0\ \mu\text{F}$ ,  $T_j=25^\circ\text{C}$ ) Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP.	MAX.	UNIT
<b>NJM79L06A</b>						
Output Voltage	$V_O$	$V_{IN}=-12\text{V}$ , $I_O=40\text{mA}$	-5.76	-6.0	-6.24	V
Line Regulation	$\Delta V_O-V_{IN}$	$V_{IN}=-8.5\sim-20\text{V}$ , $I_O=40\text{mA}$	—	18	150	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-12\text{V}$ , $I_O=1\sim 100\text{mA}$	—	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	$V_{IN}=-9\sim-19\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1\text{V}_{P-P}$ $f=120\text{Hz}$	40	68	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-12\text{V}$ , $BW=10\text{Hz}\sim 100\text{kHz}$ , $I_O=40\text{mA}$	—	140	—	$\mu\text{V}$
<b>NJM79L08A</b>						
Output Voltage	$V_O$	$V_{IN}=-14\text{V}$ , $I_O=40\text{mA}$	-7.68	-8.0	-8.32	V
Line Regulation	$\Delta V_O-V_{IN}$	$V_{IN}=-10.5\sim-23\text{V}$ , $I_O=40\text{mA}$	—	24	175	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-14\text{V}$ , $I_O=1\sim 100\text{mA}$	—	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	$V_{IN}=-11\sim-21\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1\text{V}_{P-P}$ $f=120\text{Hz}$	39	68	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-14\text{V}$ , $BW=10\text{Hz}\sim 100\text{kHz}$ , $I_O=40\text{mA}$	—	190	—	$\mu\text{V}$
<b>NJM79L09A</b>						
Output Voltage	$V_O$	$V_{IN}=-15\text{V}$ , $I_O=40\text{mA}$	-8.64	-9.0	-9.36	V
Line Regulation	$\Delta V_O-V_{IN}$	$V_{IN}=-11.5\sim-24\text{V}$ , $I_O=40\text{mA}$	—	27	200	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-15\text{V}$ , $I_O=1\sim 100\text{mA}$	—	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	$V_{IN}=-12\sim-22\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1\text{V}_{P-P}$ $f=120\text{Hz}$	38	67	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-15\text{V}$ , $BW=10\text{Hz}\sim 100\text{kHz}$ , $I_O=40\text{mA}$	—	210	—	$\mu\text{V}$
<b>NJM79L12A</b>						
Output Voltage	$V_O$	$V_{IN}=-19\text{V}$ , $I_O=40\text{mA}$	-11.5	-12.0	-12.5	V
Line Regulation	$\Delta V_O-V_{IN}$	$V_{IN}=-14.5\sim-27\text{V}$ , $I_O=40\text{mA}$	—	36	250	mV
Load Regulation	$\Delta V_O-I_O$	$V_{IN}=-19\text{V}$ , $I_O=1\sim 100\text{mA}$	—	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	$V_{IN}=-15\sim-25\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1\text{V}_{P-P}$ $f=120\text{Hz}$	37	64	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-19\text{V}$ , $BW=10\text{Hz}\sim 100\text{kHz}$ , $I_O=40\text{mA}$	—	210	—	$\mu\text{V}$

■ **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
<b>NJM79L15A</b>						
Output Voltage	$V_O$	$V_{IN}=-23\text{V}$ , $I_O=40\text{mA}$	-14.4	-15.0	-15.6	V
Line Regulation	$\Delta V_O/V_{IN}$	$V_{IN}=-17.5\sim-30\text{V}$ , $I_O=40\text{mA}$	—	45	300	mV
Load Regulation	$\Delta V_O/I_O$	$V_{IN}=-23\text{V}$ , $I_O=1\sim 100\text{mA}$	—	20	150	mV
Quiescent Current	$I_Q$	$V_{IN}=-23\text{V}$ , $I_O=0\text{mA}$	—	3.5	6.5	mA
Ripple Rejection	RR	$V_{IN}=-18.5\sim-28.5\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1\text{V}_{P-P}$ $f=120\text{Hz}$	34	63	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-23\text{V}$ , $BW=10\text{Hz}\sim 100\text{kHz}$ , $I_O=40\text{mA}$	—	340	—	$\mu\text{V}$
<b>NJM79L18A</b>						
Output Voltage	$V_O$	$V_{IN}=-27\text{V}$ , $I_O=40\text{mA}$	-17.3	-18.0	-18.7	V
Line Regulation	$\Delta V_O/V_{IN}$	$V_{IN}=-20.7\sim-33\text{V}$ , $I_O=40\text{mA}$	—	54	325	mV
Load Regulation	$\Delta V_O/I_O$	$V_{IN}=-27\text{V}$ , $I_O=1\sim 100\text{mA}$	—	23	170	mV
Quiescent Current	$I_Q$	$V_{IN}=-27\text{V}$ , $I_O=0\text{mA}$	—	3.5	6.5	mA
Ripple Rejection	RR	$V_{IN}=-23\sim-33\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1\text{V}_{P-P}$ , $f=120\text{Hz}$	33	60	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-27\text{V}$ , $BW=10\text{Hz}\sim 100\text{Kz}$ , $I_O=40\text{mA}$	—	410	—	$\mu\text{V}$
<b>NJM79L24A</b>						
Output Voltage	$V_O$	$V_{IN}=-33\text{V}$ , $I_O=40\text{mA}$	-23.0	-24.0	-25.0	V
Line Regulation	$\Delta V_O/V_{IN}$	$V_{IN}=-27\sim-38\text{V}$ , $I_O=40\text{mA}$	—	72	350	mV
Load Regulation	$\Delta V_O/I_O$	$V_{IN}=-33\text{V}$ , $I_O=1\sim 100\text{mA}$	—	30	200	mV
Quiescent Current	$I_Q$	$V_{IN}=-33\text{V}$ , $I_O=0\text{mA}$	—	3.5	6.5	mA
Ripple Rejection	RR	$V_{IN}=-29\sim-35\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1\text{V}_{P-P}$ , $f=120\text{Hz}$	31	55	—	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-33\text{V}$ , $BW=10\text{Hz}\sim 100\text{kHz}$ , $I_O=40\text{mA}$	—	550	—	$\mu\text{V}$

■ **SOT-89 MARK**



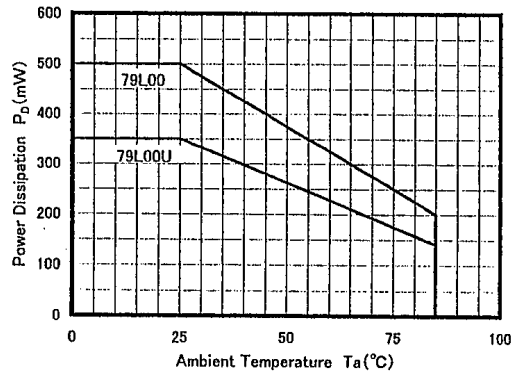
- (1)9: Negative Output
- (2)Vo Rank
- (3)The end of A.D.
- (4)Production Month

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



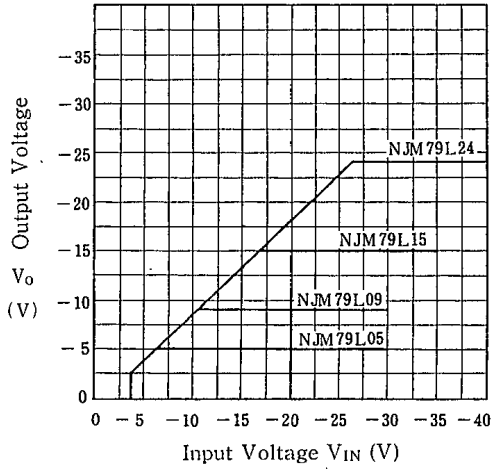
## ■ POWER DISSIPATION VS. AMBIENT TEMPERATURE



## ■ TYPICAL CHARACTERISTICS

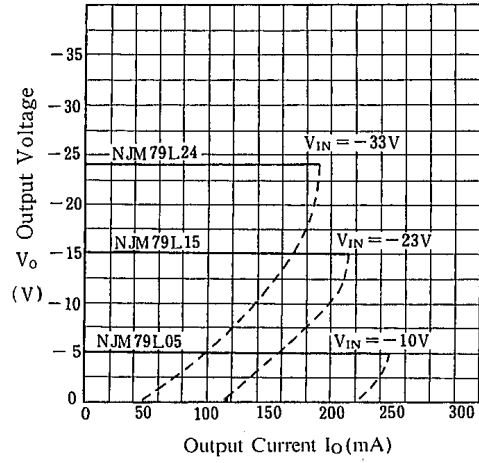
### NJM79L00 Input Voltage vs. Output Voltage

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



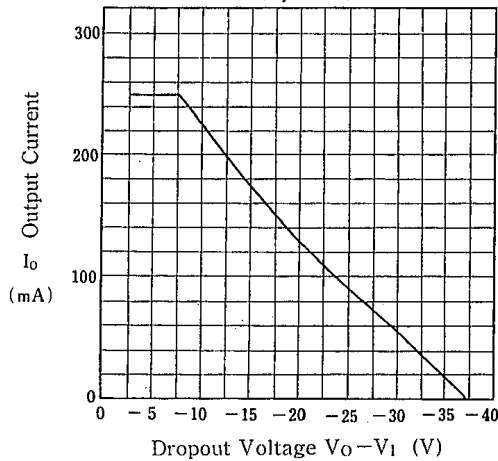
### NJM79L05/15/24 Load Characteristics

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

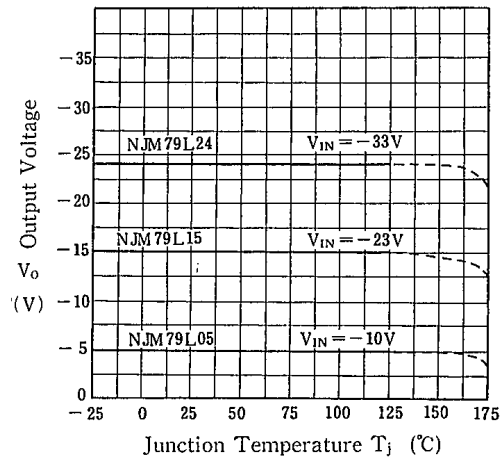


### NJM79L00 Series Short Circuit Current

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

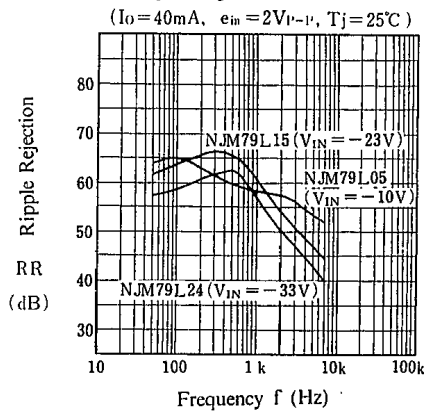


### NJM79L05/12/24 Output Voltage vs. Junction Temperature



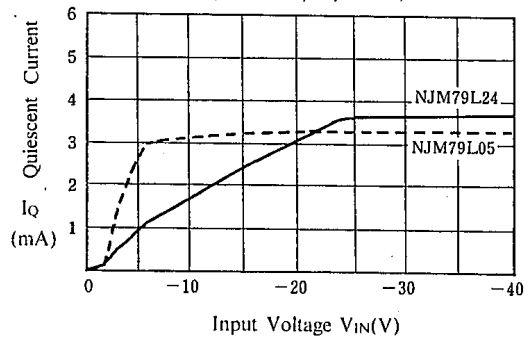
### NJM79L05/15/24 Ripple Rejection vs. Frequency

( $I_o = 40\text{mA}$ ,  $e_m = 2\text{V}_{r-p}$ ,  $T_j = 25^\circ\text{C}$ )



### Quiescent Current vs. Input Voltage

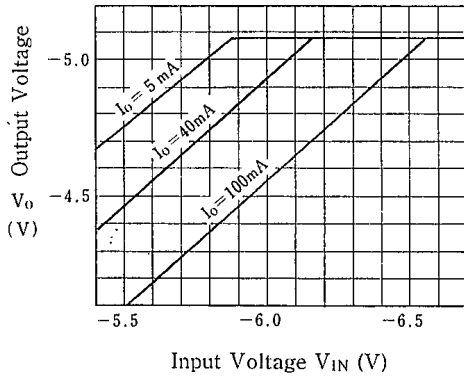
( $I_o = 0\text{mA}$ ,  $T_j = 25^\circ\text{C}$ )



## ■ TYPICAL CHARACTERISTICS

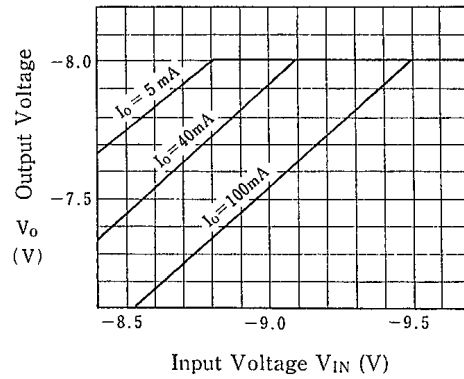
### NJM79L05 Dropout Characteristics

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

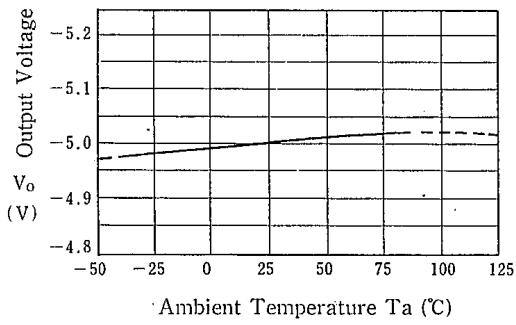


### NJM79L08 Dropout Characteristics

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



### NJM79L05 Output Voltage vs. Temperature



### NJM79L08 Output Voltage vs. Temperature

