



## 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.

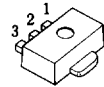
### ■ PACKAGE OUTLINE

(TO-92)



NJM79L00A

(SOT-89)



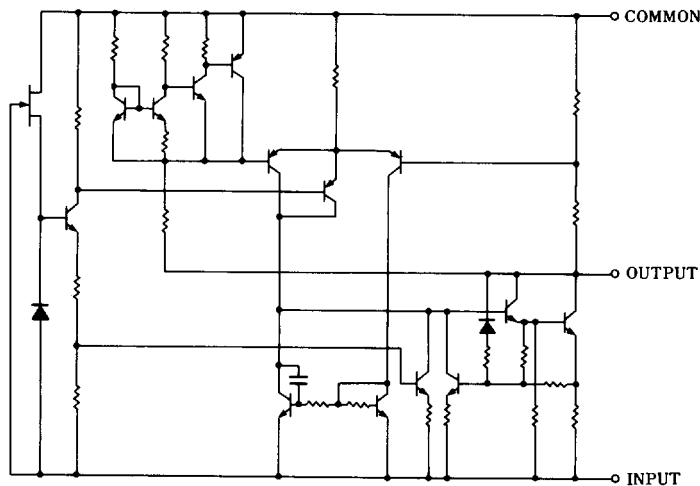
NJM79L00UA

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





# ■ 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 | $T_{opr}$ | -30 ~ +75              | °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      | $\Delta V_O-I_O$    | $V_{IN}=-10V$ , $I_O=1\sim100mA$                                    | —     | 4    | 72    | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-10V$ , $I_O=0mA$                                           | —     | 3.5  | 6.0   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-8\sim-18V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ ,<br>$f=120Hz$ | 45    | 72   | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-10V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$                    | —     | 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      | $\Delta V_O-I_O$    | $V_{IN}=-10V$ , $I_O=1\sim100mA$                                    | —     | 7    | 60    | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-10V$ , $I_O=0mA$                                           | —     | 3.5  | 6.0   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-8\sim-18V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ ,<br>$f=120Hz$ | 41    | 71   | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-10V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$                    | —     | 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.

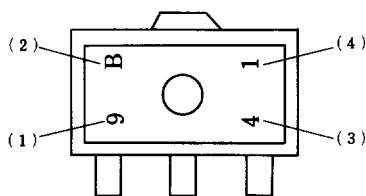
| PARAMETER            | SYMBOL              | TEST CONDITION                                                     | MIN   | TYP.  | MAX.  | UNIT    |
|----------------------|---------------------|--------------------------------------------------------------------|-------|-------|-------|---------|
| <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      | $\Delta V_O-I_O$    | $V_{IN}=-12V$ , $I_O=1\sim 100mA$                                  | —     | 8     | 70    | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-12V$ , $I_O=0mA$                                          | —     | 3.5   | 6.0   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-9\sim-19V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$<br>$f=120Hz$  | 40    | 68    | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-12V$ , $BW=10Hz\sim 100kHz$ , $I_O=40mA$                  | —     | 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      | $\Delta V_O-V_{IN}$ | $V_{IN}=-10.5\sim-23V$ , $I_O=40mA$                                | —     | 24    | 175   | mV      |
| Load Regulation      | $\Delta V_O-I_O$    | $V_{IN}=-14V$ , $I_O=1\sim 100mA$                                  | —     | 10    | 80    | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-14V$ , $I_O=0mA$                                          | —     | 3.5   | 6.0   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-11\sim-21V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$<br>$f=120Hz$ | 39    | 68    | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-14V$ , $BW=10Hz\sim 100kHz$ , $I_O=40mA$                  | —     | 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      | $\Delta V_O-V_{IN}$ | $V_{IN}=-11.5\sim-24V$ , $I_O=40mA$                                | —     | 27    | 200   | mV      |
| Load Regulation      | $\Delta V_O-I_O$    | $V_{IN}=-15V$ , $I_O=1\sim 100mA$                                  | —     | 12    | 90    | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-15V$ , $I_O=0mA$                                          | —     | 3.5   | 6.0   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-12\sim-22V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$<br>$f=120Hz$ | 38    | 67    | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-15V$ , $BW=10Hz\sim 100kHz$ , $I_O=40mA$                  | —     | 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      | $\Delta V_O-V_{IN}$ | $V_{IN}=-14.5\sim-27V$ , $I_O=40mA$                                | —     | 36    | 250   | mV      |
| Load Regulation      | $\Delta V_O-I_O$    | $V_{IN}=-19V$ , $I_O=1\sim 100mA$                                  | —     | 16    | 100   | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-19V$ , $I_O=0mA$                                          | —     | 3.5   | 6.5   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-15\sim-25V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$<br>$f=120Hz$ | 37    | 64    | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-19V$ , $BW=10Hz\sim 100kHz$ , $I_O=40mA$                  | —     | 210   | —     | $\mu V$ |



## ■ 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>NJM79L15A</b>     |                     |                                                                          |       |       |       |         |
| Output Voltage       | $V_O$               | $V_{IN}=-23V$ , $I_O=40mA$                                               | -14.4 | -15.0 | -15.6 | V       |
| Line Regulation      | $\Delta V_O/V_{IN}$ | $V_{IN}=-17.5\sim-30V$ , $I_O=40mA$                                      | —     | 45    | 300   | mV      |
| Load Regulation      | $\Delta V_O/I_O$    | $V_{IN}=-23V$ , $I_O=1\sim100mA$                                         | —     | 20    | 150   | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-23V$ , $I_O=0mA$                                                | —     | 3.5   | 6.5   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-18.5\sim-28.5V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ ,<br>$f=120Hz$ | 34    | 63    | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-23V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$                         | —     | 340   | —     | $\mu V$ |
| <b>NJM79L18A</b>     |                     |                                                                          |       |       |       |         |
| Output Voltage       | $V_O$               | $V_{IN}=-27V$ , $I_O=40mA$                                               | -17.3 | -18.0 | -18.7 | V       |
| Line Regulation      | $\Delta V_O/V_{IN}$ | $V_{IN}=-20.7\sim-33V$ , $I_O=40mA$                                      | —     | 54    | 325   | mV      |
| Load Regulation      | $\Delta V_O/I_O$    | $V_{IN}=-27V$ , $I_O=1\sim100mA$                                         | —     | 23    | 170   | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-27V$ , $I_O=0mA$                                                | —     | 3.5   | 6.5   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-23\sim-33V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ ,<br>$f=120Hz$     | 33    | 60    | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-27V$ , $BW=10Hz\sim100Kz$ , $I_O=40mA$                          | —     | 410   | —     | $\mu V$ |
| <b>NJM79L24A</b>     |                     |                                                                          |       |       |       |         |
| Output Voltage       | $V_O$               | $V_{IN}=-33V$ , $I_O=40mA$                                               | -23.0 | -24.0 | -25.0 | V       |
| Line Regulation      | $\Delta V_O/V_{IN}$ | $V_{IN}=-27\sim-38V$ , $I_O=40mA$                                        | —     | 72    | 350   | mV      |
| Load Regulation      | $\Delta V_O/I_O$    | $V_{IN}=-33V$ , $I_O=1\sim100mA$                                         | —     | 30    | 200   | mV      |
| Quiescent Current    | $I_Q$               | $V_{IN}=-33V$ , $I_O=0mA$                                                | —     | 3.5   | 6.5   | mA      |
| Ripple Rejection     | RR                  | $V_{IN}=-29\sim-35V$ , $I_O=40mA$ , $e_{in}=1V_{P-P}$ ,<br>$f=120Hz$     | 31    | 55    | —     | dB      |
| Output Noise Voltage | $V_{NO}$            | $V_{IN}=-33V$ , $BW=10Hz\sim100kHz$ , $I_O=40mA$                         | —     | 550   | —     | $\mu V$ |

## ■ SOT-89 MARK



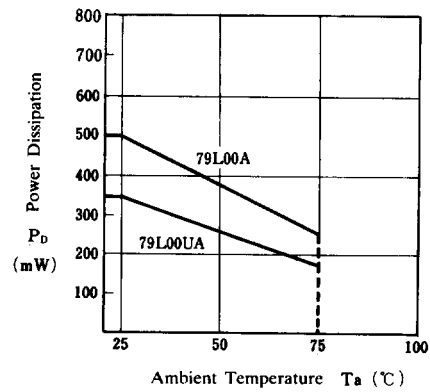
- (1) 9: Negative Output  
(2) B: Rank  
(3) 4: The end of A.D.  
(4) 1: Production Month

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

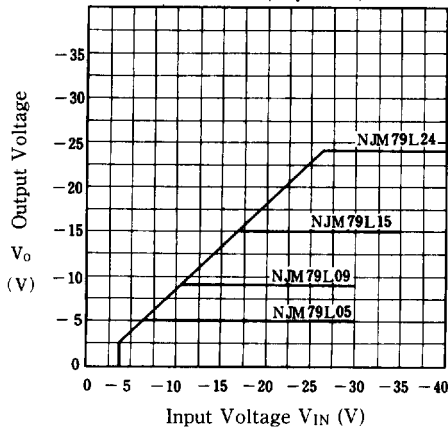




## ■ TYPICAL CHARACTERISTICS

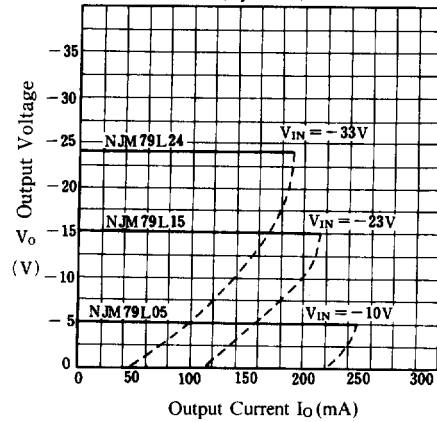
**NJM79L00 Input Voltage  
vs. Output Voltage**

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



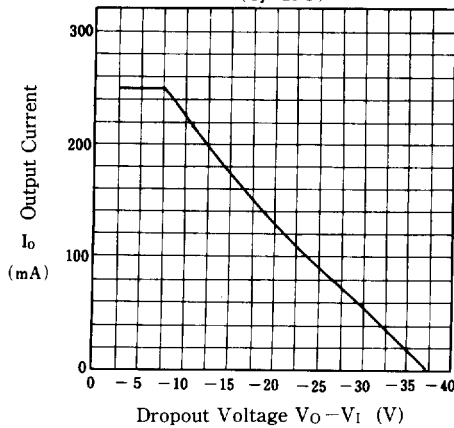
**NJM79L05/15/24 Load Characteristics**

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

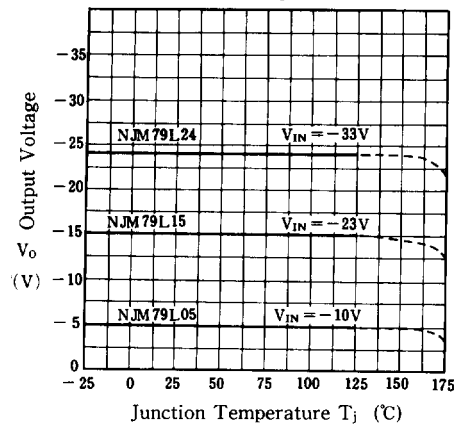


**NJM79L00 Series Short Circuit Current**

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

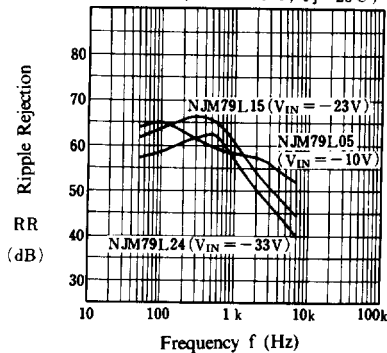


**NJM79L05/12/24 Output Voltage  
vs. Junction Temperature**



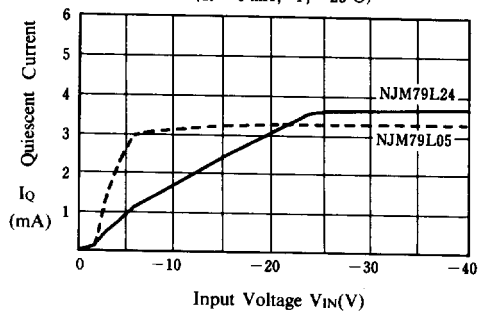
**NJM79L05/15/24 Ripple Rejection  
vs. Frequency**

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



**Quiescent Current vs. Input Voltage**

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

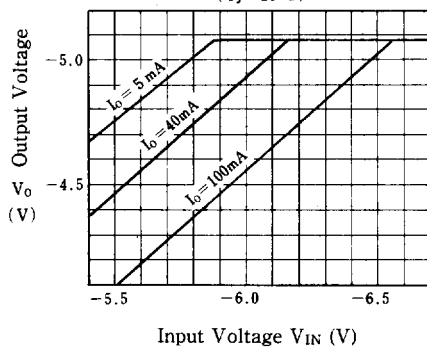




## ■ TYPICAL CHARACTERISTICS

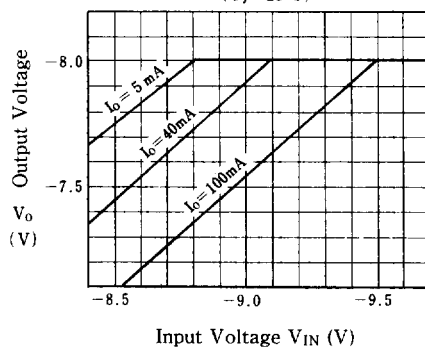
**NJM79L05 Dropout Characteristics**

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

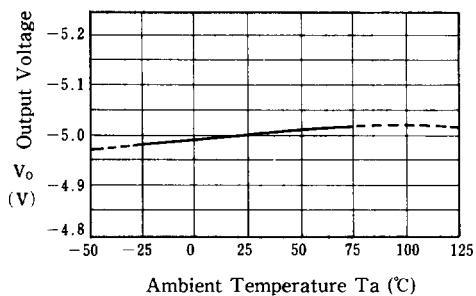


**NJM79L08 Dropout Characteristics**

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



**NJM79L05 Output Voltage vs. Temperature**



**NJM79L08 Output Voltage vs. Temperature**

