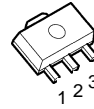


## 3-TERMINAL NEGATIVE VOLTAGE REGULATOR

### ■ 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



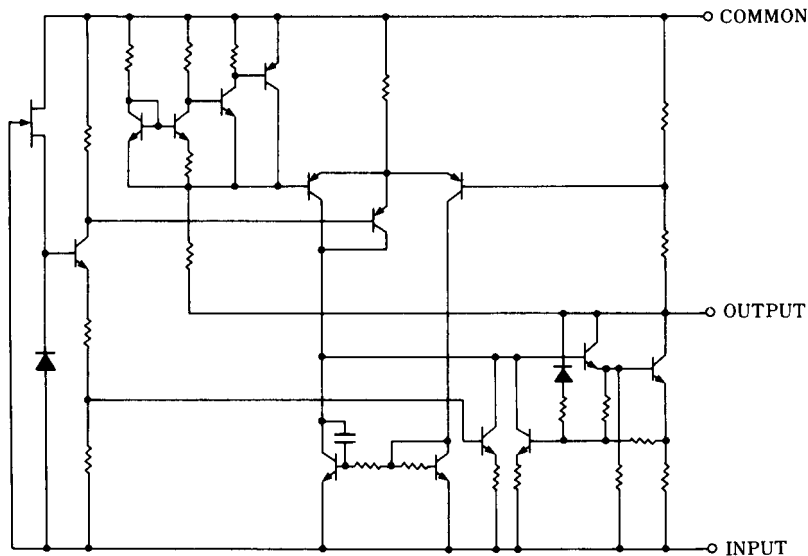
- 1. COMMON
- 2. IN
- 3. OUT

**NJM79L00UA** (SOT-89)

### ■ FEATURES

- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Excellent Ripple Rejection
- Guarantee'd 100mA Output Current
- Output Capacitor recommended electrolytic capacitor
- Bipolar Technology
- Package Outline SOT-89

### ■ EQUIVALENT CIRCUIT



# NJM79L00

## ■ ABSOLUTE MAXIMUM RATINGS

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

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

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

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>NJM79L03UA</b>						
Output Voltage	$V_O$	$V_{IN}=-10\text{V}$ , $I_O=40\text{mA}$	-2.88	-3.0	-3.12	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-7$ to $-20\text{V}$ , $I_O=40\text{mA}$	-	10	60	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-10\text{V}$ , $I_O=1$ to $100\text{mA}$	-	4	72	mV
Quiescent Current	$I_Q$	$V_{IN}=-10\text{V}$ , $I_O=0\text{mA}$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-8$ to $-18\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1V_{P-P}$ , $f=120\text{Hz}$	45	72	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-10\text{V}$ , $BW=10\text{Hz}$ to $100\text{kHz}$ , $I_O=40\text{mA}$	-	70	-	$\mu\text{V}$
<b>NJM79L05UA</b>						
Output Voltage	$V_O$	$V_{IN}=-10\text{V}$ , $I_O=40\text{mA}$	-4.8	-5.0	-5.2	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-7$ to $-20\text{V}$ , $I_O=40\text{mA}$	-	15	150	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-10\text{V}$ , $I_O=1$ to $100\text{mA}$	-	7	60	mV
Quiescent Current	$I_Q$	$V_{IN}=-10\text{V}$ , $I_O=0\text{mA}$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN}=-8$ to $-18\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1V_{P-P}$ , $f=120\text{Hz}$	41	71	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-10\text{V}$ , $BW=10\text{Hz}$ to $100\text{kHz}$ , $I_O=40\text{mA}$	-	120	-	$\mu\text{V}$
<b>NJM79L06UA</b>						
Output Voltage	$V_O$	$V_{IN}=-12\text{V}$ , $I_O=40\text{mA}$	-5.76	-6.0	-6.24	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN}=-8.5$ to $-20\text{V}$ , $I_O=40\text{mA}$	-	18	150	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-12\text{V}$ , $I_O=1$ to $100\text{mA}$	-	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	$V_{IN}=-9$ to $-19\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1V_{P-P}$ , $f=120\text{Hz}$	40	68	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-12\text{V}$ , $BW=10\text{Hz}$ to $100\text{kHz}$ , $I_O=40\text{mA}$	-	140	-	$\mu\text{V}$

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

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
<b>NJM79L07UA</b>						
Output Voltage	$V_O$	$V_{IN} = -13\text{V}$ , $I_O = 40\text{mA}$	-6.72	-7.0	-7.28	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN} = -9.5 \sim -22\text{V}$ , $I_O = 40\text{mA}$	-	21	160	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN} = -13\text{V}$ , $I_O = 1 \sim 100\text{mA}$	-	9	75	mV
Quiescent Current	$I_Q$	$V_{IN} = -13\text{V}$ , $I_O = 0\text{mA}$	-	3.5	6.0	mA
Ripple Rejection	RR	$V_{IN} = -10 \sim -20\text{V}$ , $I_O = 40\text{mA}$ , $e_{in} = 1\text{V}_{P-P}$ , $f = 120\text{Hz}$	40	68	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN} = -13\text{V}$ , $BW = 10\text{Hz} \sim 100\text{kHz}$ , $I_O = 40\text{mA}$	-	170	-	$\mu\text{V}$
<b>NJM79L08UA</b>						
Output Voltage	$V_O$	$V_{IN} = -14\text{V}$ , $I_O = 40\text{mA}$	-7.68	-8.0	-8.32	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN} = -10.5 \text{ to } -23\text{V}$ , $I_O = 40\text{mA}$	-	24	175	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN} = -14\text{V}$ , $I_O = 1 \text{ to } 100\text{mA}$	-	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	$V_{IN} = -11 \text{ to } -21\text{V}$ , $I_O = 40\text{mA}$ , $e_{in} = 1\text{V}_{P-P}$ , $f = 120\text{Hz}$	39	68	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN} = -14\text{V}$ , $BW = 10\text{Hz} \text{ to } 100\text{kHz}$ , $I_O = 40\text{mA}$	-	190	-	$\mu\text{V}$
<b>NJM79L09UA</b>						
Output Voltage	$V_O$	$V_{IN} = -15\text{V}$ , $I_O = 40\text{mA}$	-8.64	-9.0	-9.36	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN} = -11.5 \text{ to } -24\text{V}$ , $I_O = 40\text{mA}$	-	27	200	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN} = -15\text{V}$ , $I_O = 1 \text{ to } 100\text{mA}$	-	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	$V_{IN} = -12 \text{ to } -22\text{V}$ , $I_O = 40\text{mA}$ , $e_{in} = 1\text{V}_{P-P}$ , $f = 120\text{Hz}$	38	67	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN} = -15\text{V}$ , $BW = 10\text{Hz} \text{ to } 100\text{kHz}$ , $I_O = 40\text{mA}$	-	210	-	$\mu\text{V}$
<b>NJM79L12UA</b>						
Output Voltage	$V_O$	$V_{IN} = -19\text{V}$ , $I_O = 40\text{mA}$	-11.5	-12.0	-12.5	V
Line Regulation	$\Delta V_O - V_{IN}$	$V_{IN} = -14.5 \text{ to } -27\text{V}$ , $I_O = 40\text{mA}$	-	36	250	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN} = -19\text{V}$ , $I_O = 1 \text{ to } 100\text{mA}$	-	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	$V_{IN} = -15 \text{ to } -25\text{V}$ , $I_O = 40\text{mA}$ , $e_{in} = 1\text{V}_{P-P}$ , $f = 120\text{Hz}$	37	64	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN} = -19\text{V}$ , $BW = 10\text{Hz} \text{ to } 100\text{kHz}$ , $I_O = 40\text{mA}$	-	210	-	$\mu\text{V}$

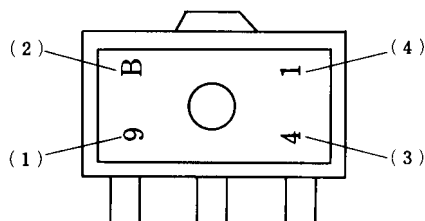
# NJM79L00

## ■ 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>NJM79L15UA</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>NJM79L18UA</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>NJM79L24UA</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



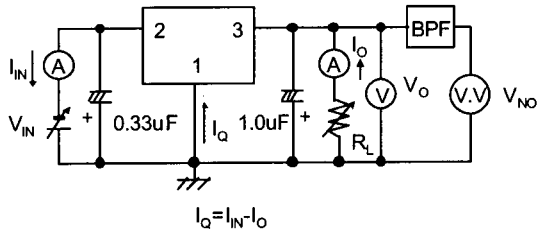
- (1) 9: Negative Output
- (2) Vo Rank
- (3) The end of A. D.
- (4) Production Month

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

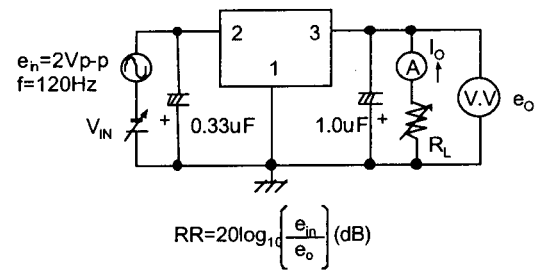
	(1)	(2)
NJM79L03UA	9	B
NJM79L05UA	9	C
NJM79L06UA	9	E
NJM79L07UA	9	F
NJM79L08UA	9	G
NJM79L09UA	9	H
NJM79L12UA	9	K
NJM79L15UA	9	L
NJM79L18UA	9	M
NJM79L24UA	9	P

## ■ TEST CIRCUIT

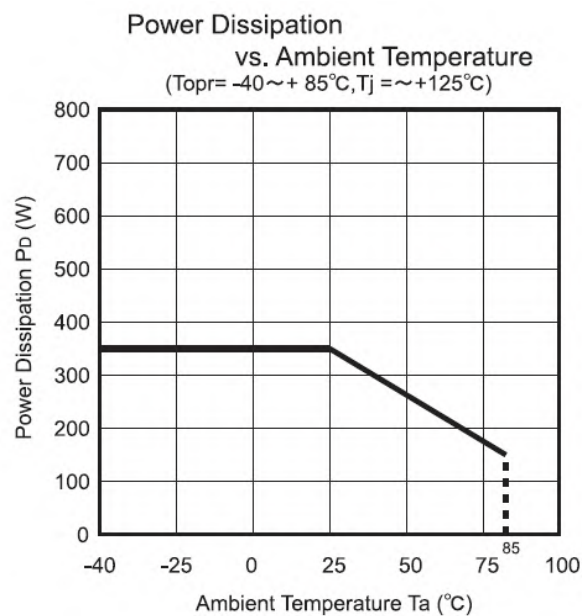
1. Output Voltage, Output Current, Line Regulation, Load Regulation, Quiescent Current, Output Noise Voltage



2. Ripple Rejection



## ■ POWER DISSIPATION VS. AMBIENT TEMPERATURE

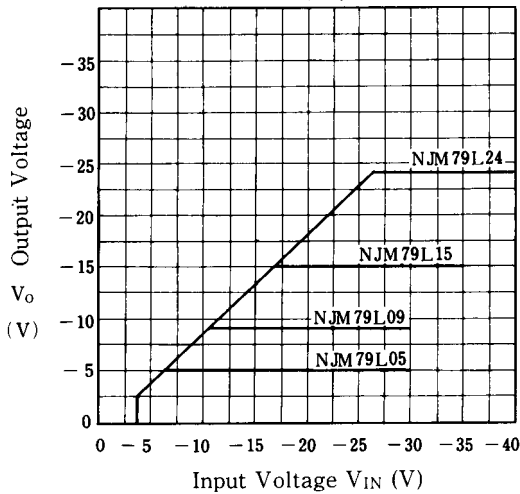


# NJM79L00

## ■ TYPICAL CHARACTERISTICS

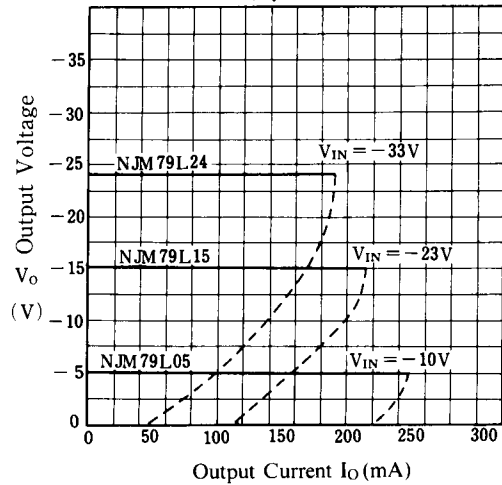
**NJM79L00 Input Voltage vs. Output Voltage**

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



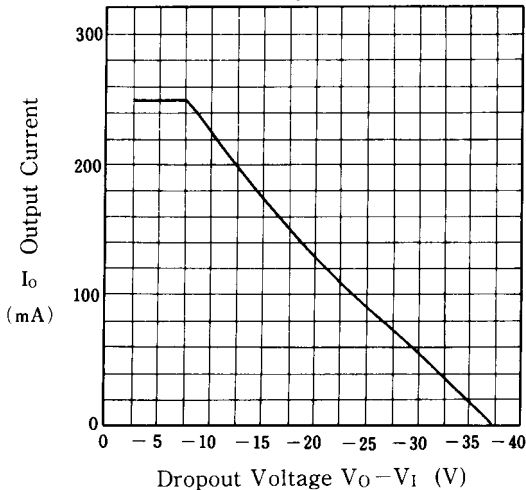
**NJM79L05/15/24 Load Characteristics**

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

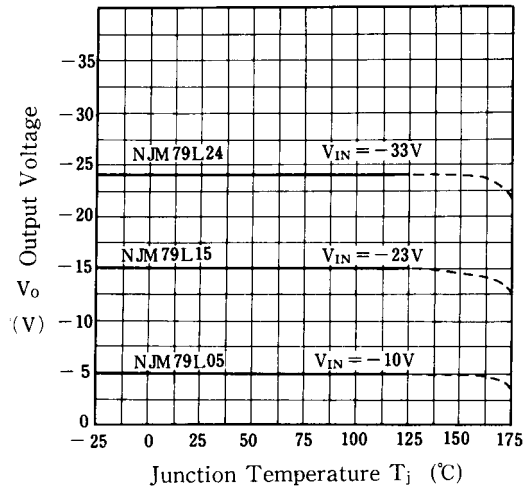


**NJM79L00 Series Short Circuit Current**

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

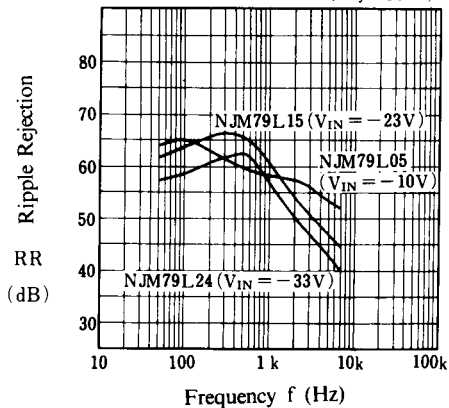


**NJM79L05/12/24 Output Voltage vs. Junction Temperature**



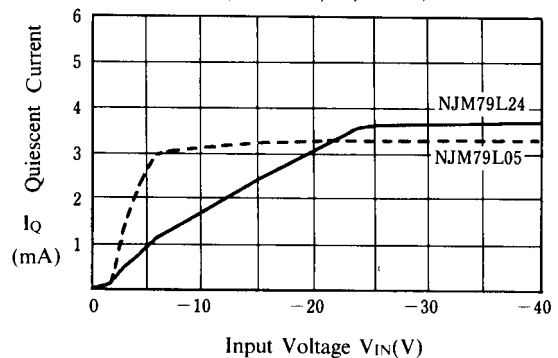
**NJM79L05/15/24 Ripple Rejection vs. Frequency**

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



**Quiescent Current vs. Input Voltage**

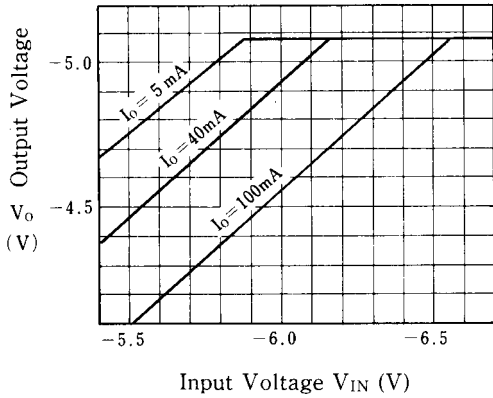
( $I_o = 0\text{mA}$ ,  $T_j = 25^\circ\text{C}$ )



## ■ TYPICAL CHARACTERISTICS

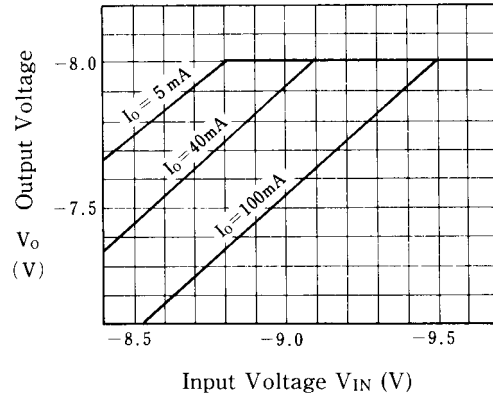
### NJM79L05 Dropout Characteristics

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

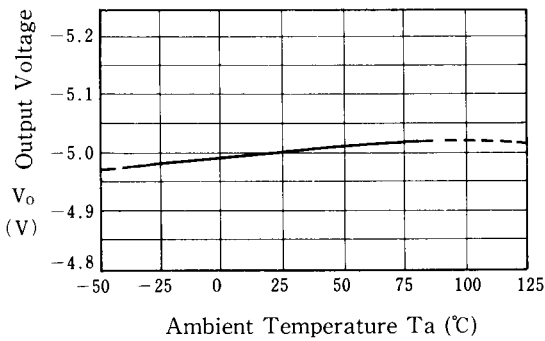


### NJM79L08 Dropout Characteristics

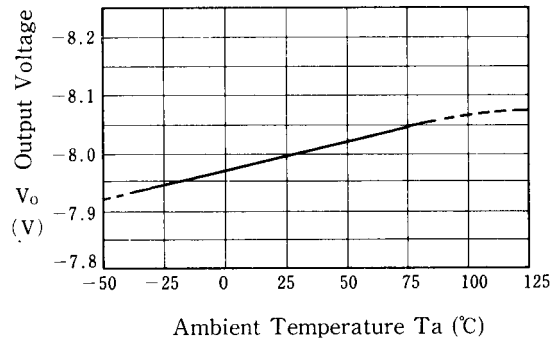
( $T_j = 25^\circ\text{C}$ )



### NJM79L05 Output Voltage vs. Temperature

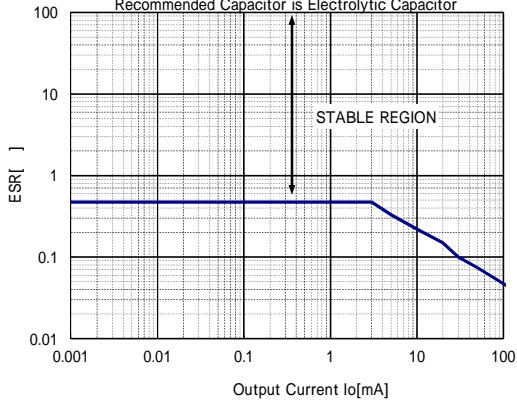


### NJM79L08 Output Voltage vs. Temperature



## NJM79L00 Equivalent Series Resistance vs. Output Current

$V_{in}$  = Output voltage of the conditions described in the ELECTRICAL CHARACTERISTICS  
 $T_a = 25^\circ\text{C}$ ,  $C_{in} = 0.33\mu\text{F}$ ,  $C_o = 1.0\mu\text{F}$  (Ceramic capacitor)  
 Recommended Capacitor is Electrolytic Capacitor



**[CAUTION]**

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