

## 3-TERMINAL NEGATIVE VOLTAGE REGULATOR

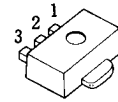
### ■ GENERAL DESCRIPTION

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

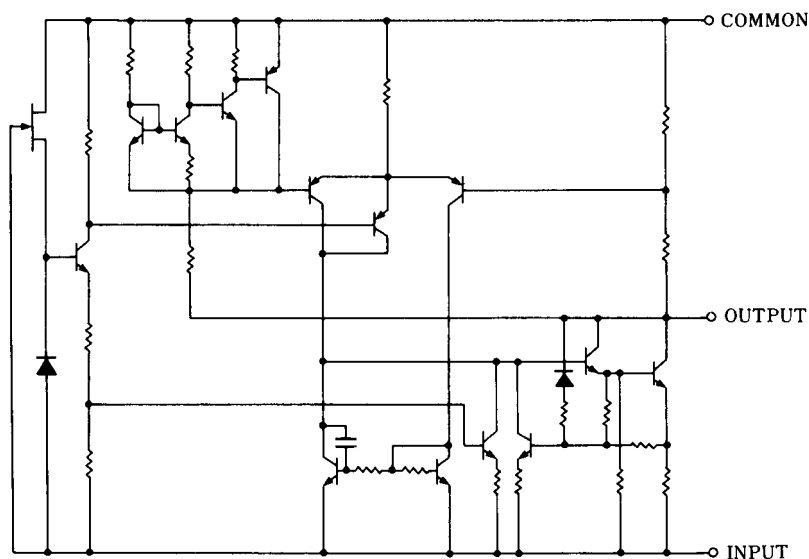
NJM79L00UA

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

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	$\Delta V_O - V_{IN}$	$V_{IN}=-8.5$ 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	-	$\mu\text{V}$
<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	$\Delta V_O - V_{IN}$	$V_{IN}=-10.5$ to $-23\text{V}$ , $I_O=40\text{mA}$	-	24	175	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-14\text{V}$ , $I_O=1$ 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	$V_{IN}=-11$ to $-21\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1V_{P-P}$ , $f=120\text{Hz}$	39	68	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-14\text{V}$ , $BW=10\text{Hz}$ to $100\text{kHz}$ , $I_O=40\text{mA}$	-	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	$\Delta V_O - V_{IN}$	$V_{IN}=-11.5$ to $-24\text{V}$ , $I_O=40\text{mA}$	-	27	200	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-15\text{V}$ , $I_O=1$ 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	$V_{IN}=-12$ to $-22\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1V_{P-P}$ , $f=120\text{Hz}$	38	67	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-15\text{V}$ , $BW=10\text{Hz}$ to $100\text{kHz}$ , $I_O=40\text{mA}$	-	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	$\Delta V_O - V_{IN}$	$V_{IN}=-14.5$ to $-27\text{V}$ , $I_O=40\text{mA}$	-	36	250	mV
Load Regulation	$\Delta V_O - I_O$	$V_{IN}=-19\text{V}$ , $I_O=1$ 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	$V_{IN}=-15$ to $-25\text{V}$ , $I_O=40\text{mA}$ , $e_{in}=1V_{P-P}$ , $f=120\text{Hz}$	37	64	-	dB
Output Noise Voltage	$V_{NO}$	$V_{IN}=-19\text{V}$ , $BW=10\text{Hz}$ to $100\text{kHz}$ , $I_O=40\text{mA}$	-	210	-	$\mu\text{V}$

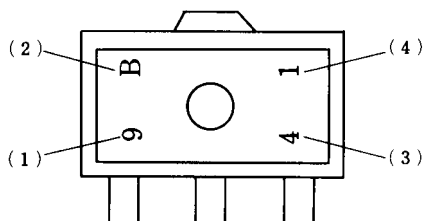
# NJM79L00

## ■ 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>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



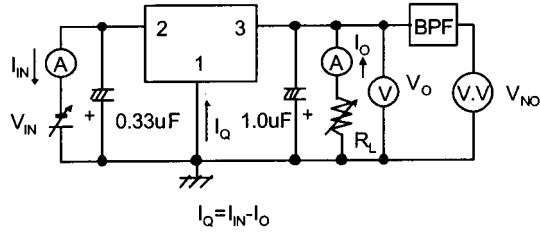
- (1) 9: Negative Output
- (2) Vo Rank
- (3) The end of A. D.
- (4) Production Month

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

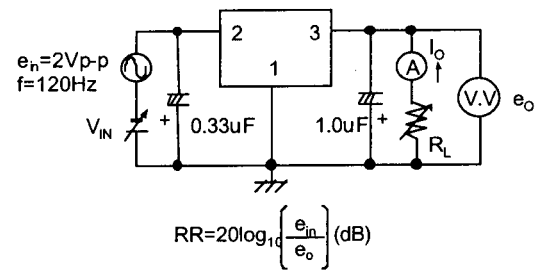
	(1)	(2)
NJM79L03UA	9	B
NJM79L05UA	9	C
NJM79L06UA	9	E
NJM79L08UA	9	G
NJM79L09UA	9	H
NJM79L12UA	9	K
NJM79L15UA	9	L
NJM79L18UA	9	M
NJM79L24UA	9	P

## ■ TEST CIRCUIT

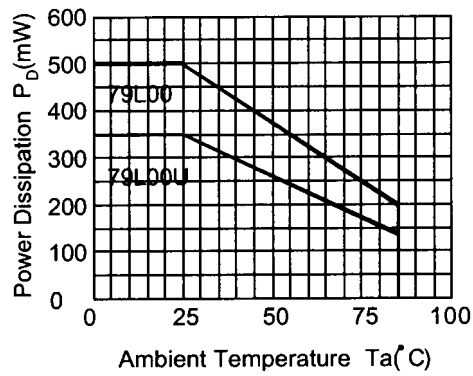
1. Output Voltage, Output Current, Line Regulation, Load Regulation, Quiescent Current, Output Noise Voltage



2. Ripple Rejection



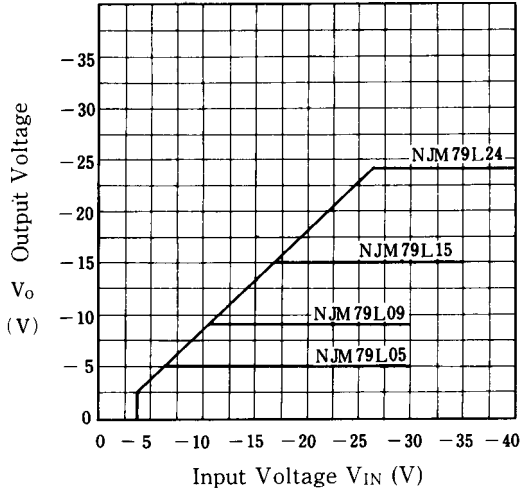
## ■ POWER DISSIPATION VS. AMBIENT TEMPERATURE



## ■ TYPICAL CHARACTERISTICS

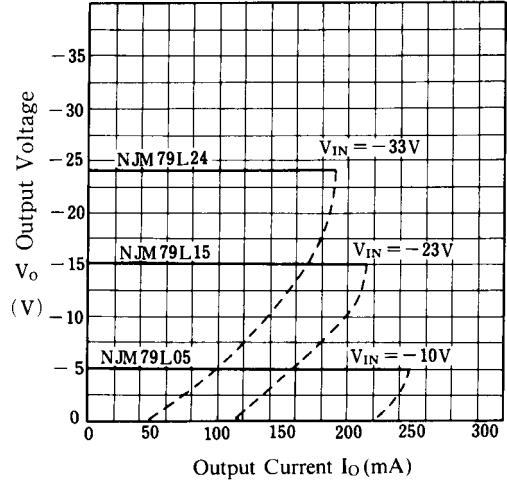
### NJM79L00 Input Voltage vs. Output Voltage

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



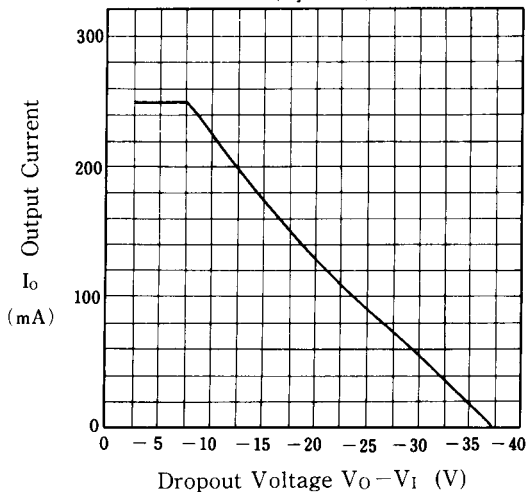
### NJM79L05/15/24 Load Characteristics

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

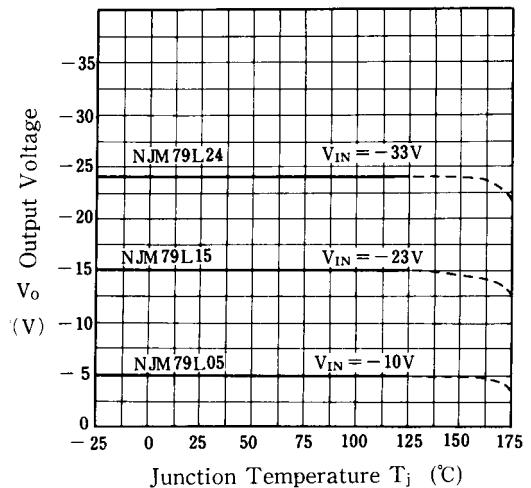


### NJM79L00 Series Short Circuit Current

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

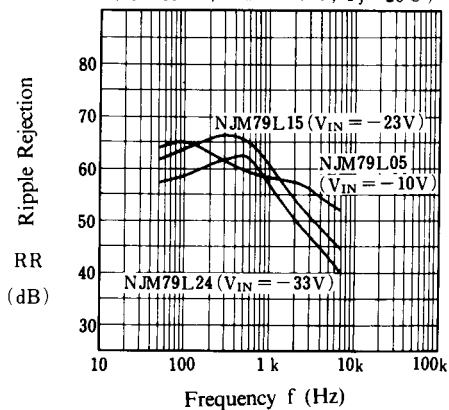


### NJM79L05/12/24 Output Voltage vs. Junction Temperature



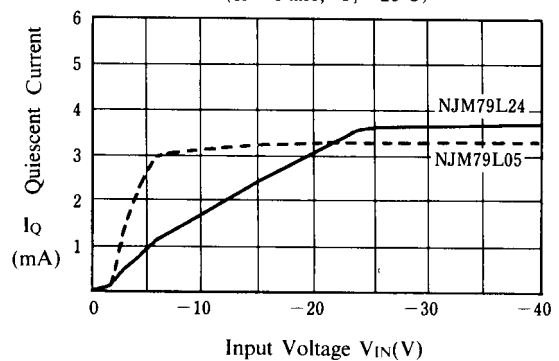
### NJM79L05/15/24 Ripple Rejection vs. Frequency

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



### Quiescent Current vs. Input Voltage

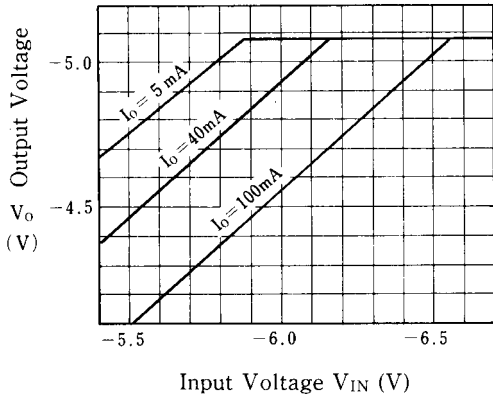
( $I_o = 0\text{mA}$ ,  $T_j = 25^\circ\text{C}$ )



## ■ TYPICAL CHARACTERISTICS

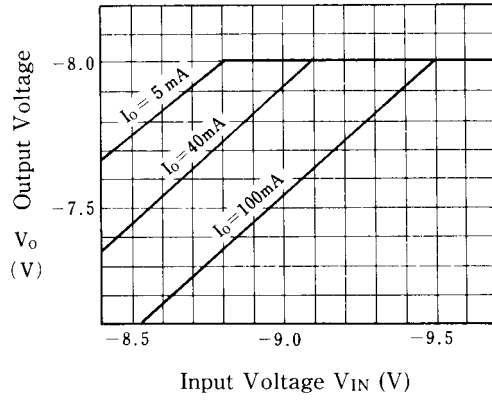
### NJM79L05 Dropout Characteristics

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

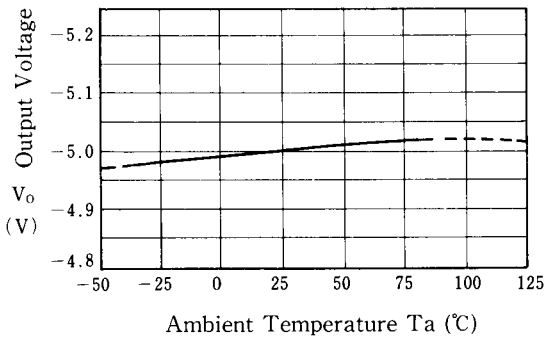


### NJM79L08 Dropout Characteristics

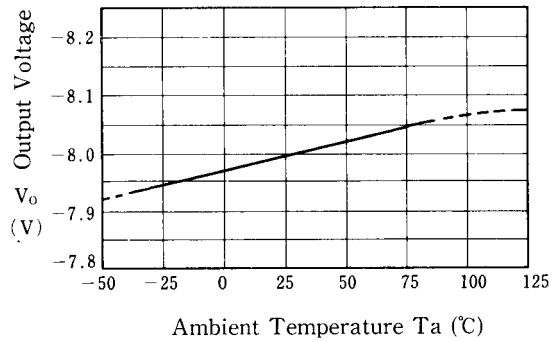
( $T_j = 25^\circ\text{C}$ )



### NJM79L05 Output Voltage vs. Temperature



### NJM79L08 Output Voltage vs. Temperature



**[CAUTION]**

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.