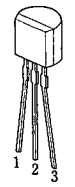
3-TERMINAL NEGATIVE VOLTAGE REGULATOR

■ 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 adequeate 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.

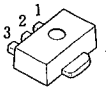
■ PACKAGE OUTLINE

(TO-92)



NJM79L00A

(SOT-89)



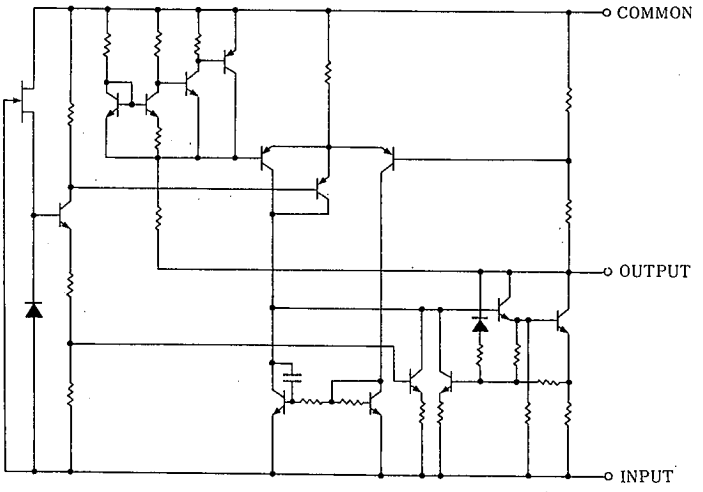
NJM79L00UA

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	℃
Storage Temperature Range	T_{stg}	－40～+125	℃
Power Dissipation	P_D	(TO92) 500	mW
		(SOT89) 350	mW

■ ELECTRICAL CHARACTERISTICS (C_{IN}=0.33 μF, Co=1.0 μF. Tj=25℃) Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L03A						
Output Voltage	V_O	V_{IN}=－10V, I_O=40mA	－2.88	－3.0	－3.12	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=－7～－20V, I_O=40mA	—	10	60	mV
Load Regulation	ΔV_O-I_O	V_{IN}=－10V, I_O=1～100mA	—	4	72	mV
Quiescent Current	I_Q	V_{IN}=－10V, I_O=0mA	—	3.5	6.0	mA
Ripple Rejection	RR	V_{IN}=－8～－18V, I_O=40mA,e_{in}=1$V_{P\text{-}P}$, f=120Hz	45	72	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=－10V,BW=10Hz～100kHz,I_O=40mA	—	70	—	μV
NJM79L05A						
Output Voltage	V_O	V_{IN}=－10V, I_O=40mA	－4.8	－5.0	－5.2	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=－7～－20V, I_O=40mA	—	15	150	mV
Load Regulation	ΔV_O-I_O	V_{IN}=－10V, I_O=1～100mA	—	7	60	mV
Quiescent Current	I_Q	V_{IN}=－10V, I_O=0mA	—	3.5	6.0	mA
Ripple Rejection	RR	V_{IN}=－8～－18V, I_O=40mA, e_{in}=1$V_{P\text{-}P}$, f=120Hz	41	71	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=－10V,BW=10Hz～100kHz,I_O=40mA	—	120	—	μV

6

■ ELECTRICAL CHARACTERISTICS (C_{IN}=0.33 μF, C_O=1.0 μF. Tj=25℃) Measurement is to be conducted in pulse testing.

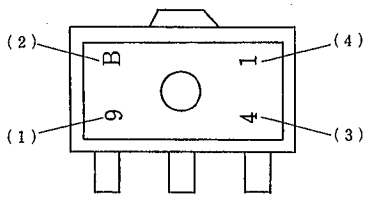
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP.	MAX.	UNIT
NJM79L06A						
Output Voltage	V_O	V_{IN}=−12V, I_O=40mA	−5.76	−6.0	−6.24	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−8.5~−20V, I_O=40mA	—	18	150	mV
Load Regulation	ΔV_O-I_O	V_{IN}=−12V, I_O=1~100mA	—	8	70	mV
Quiescent Current	I_Q	V_{IN}=−12V, I_O=0mA	—	3.5	6.0	mA
Ripple Rejection	RR	V_{IN}=−9~−19V, I_O=40mA, e_{in}=1V_{P-P} f=120Hz	40	68	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−12V,BW=10Hz~100kHz,I_O=40mA	—	140	—	μV
NJM79L08A						
Output Voltage	V_O	V_{IN}=−14V, I_O=40mA	−7.68	−8.0	−8.32	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−10.5~−23V, I_O=40mA	—	24	175	mV
Load Regulation	ΔV_O-I_O	V_{IN}=−14V, I_O=1~100mA	—	10	80	mV
Quiescent Current	I_Q	V_{IN}=−14V, I_O=0mA	—	3.5	6.0	mA
Ripple Rejection	RR	V_{IN}=−11~−21V, I_O=40mA, e_{in}=1V_{P-P} f=120Hz	39	68	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−14V,BW=10Hz~100kHz,I_O=40mA	—	190	—	μV
NJM79L09A						
Output Voltage	V_O	V_{IN}=−15V, I_O=40mA	−8.64	−9.0	−9.36	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−11.5~−24V, I_O=40mA	—	27	200	mV
Load Regulation	ΔV_O-I_O	V_{IN}=−15V, I_O=1~100mA	—	12	90	mV
Quiescent Current	I_Q	V_{IN}=−15V, I_O=0mA	—	3.5	6.0	mA
Ripple Rejection	RR	V_{IN}=−12~−22V, I_O=40mA, e_{in}=1V_{P-P} f=120Hz	38	67	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−15V,BW=10Hz~100kHz,I_O=40mA	—	210	—	μV
NJM79L12A						
Output Voltage	V_O	V_{IN}=−19V, I_O=40mA	−11.5	−12.0	−12.5	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−14.5~−27V,I_O=40mA	—	36	250	mV
Load Regulation	ΔV_O-I_O	V_{IN}=−19V, I_O=1~100mA	—	16	100	mV
Quiescent Current	I_Q	V_{IN}=−19V, I_O=0mA	—	3.5	6.5	mA
Ripple Rejection	RR	V_{IN}=−15~−25V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	37	64	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−19V,BW=10Hz~100kHz,I_O=40mA	—	210	—	μV

6

■ ELECTRICAL CHARACTERISTICS (C_{IN}=0.33 μF, Co=1.0 μF, Tj=25℃) Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L15A						
Output Voltage	V_O	V_{IN}=−23V, I_O=40mA	−14.4	−15.0	−15.6	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−17.5~−30V, I_O=40mA	—	45	300	mV
Load Regulation	ΔV_O-I_O	V_{IN}=−23V, I_O=1~100mA	—	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~−28.5V, I_O=40mA, e_{in}=1V_{P-P} f=120Hz	34	63	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−23V,BW=10Hz~100kHz,I_O=40mA	—	340	—	μV
NJM79L18A						
Output Voltage	V_O	V_{IN}=−27V, I_O=40mA	−17.3	−18.0	−18.7	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−20.7~−33V, I_O=40mA	—	54	325	mV
Load Regulation	ΔV_O-I_O	V_{IN}=−27V, I_O=1~100mA	—	23	170	mV
Quiescent Current	I_Q	V_{IN}=−27V, I_O=0mA	—	3.5	6.5	mA
Ripple Rejection	RR	V_{IN}=−23~−33V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	33	60	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−27V,BW=10Hz~100Kz, I_O=40mA	—	410	—	μV
NJM79L24A						
Output Voltage	V_O	V_{IN}=−33V, I_O=40mA	−23.0	−24.0	−25.0	V
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−27~−38V, I_O=40mA	—	72	350	mV
Load Regulation	ΔV_O-I_O	V_{IN}=−33V, I_O=1~100mA	—	30	200	mV
Quiescent Current	I_Q	V_{IN}=−33V, I_O=0mA	—	3.5	6.5	mA
Ripple Rejection	RR	V_{IN}=−29~−35V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	31	55	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−33V,BW=10Hz~100kHz,I_O=40mA	—	550	—	μV

■ SOT-89 MARK



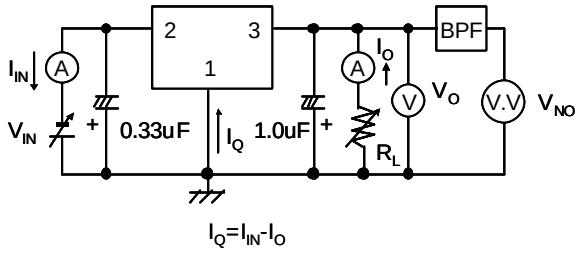
(1)9: Negative Output
(2)Vo Rank
(3)The end of A.D.
(4)Production Month
Oct. ···X
Nov.···Y
Dec. ···Z

	(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

6

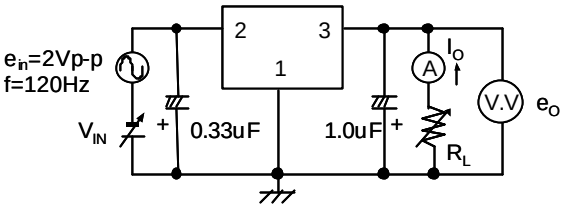
ν TEST CIRCUIT

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



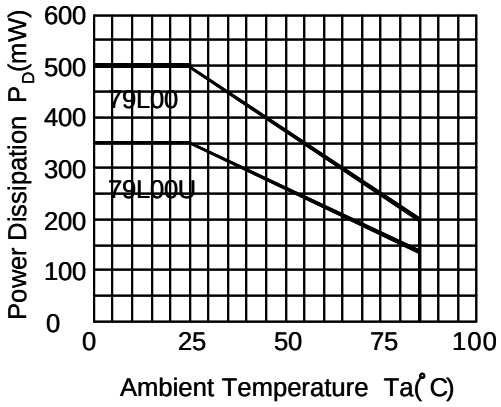
$I_Q = I_{IN} - I_O$

2. Ripple Rejection



$$RR = 20\log_{10}\left\{\frac{e_{in}}{e_o}\right\}(dB)$$

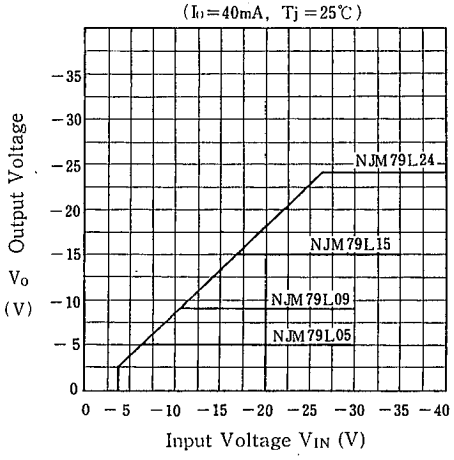
ν POWER DISSIPATION VS.AMBIENT TEMPERATURE



■ TYPICAL CHARACTERISTICS

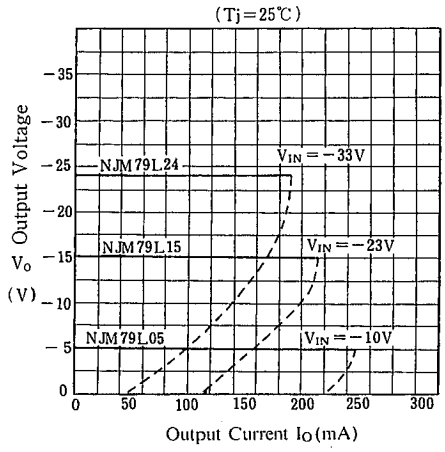
NJM79L00 Input Voltage vs.Output Voltage

(I_O=40mA, Tj=25℃)



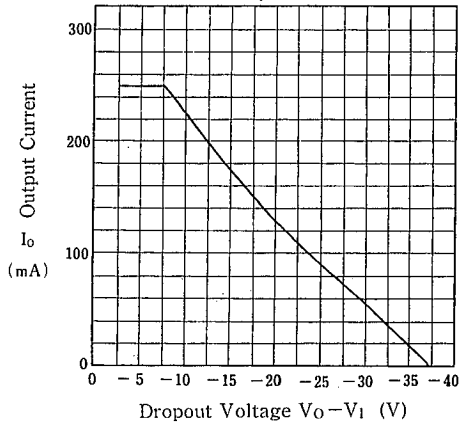
NJM79L05/15/24 Load Characteristics

(Tj=25℃)

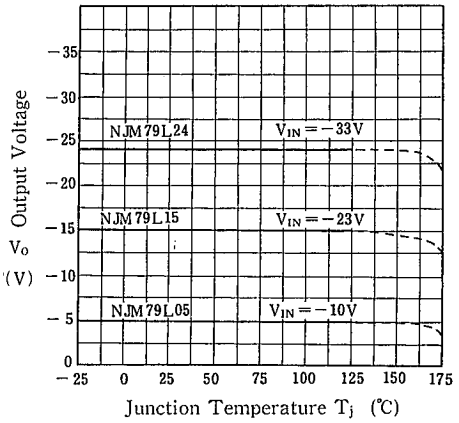


NJM79L00 Series Short Circuit Current

(Tj=25℃)

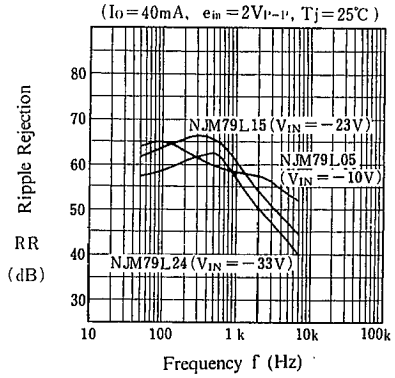


NJM79L05/12/24 Output Voltage vs. Junction Temperature



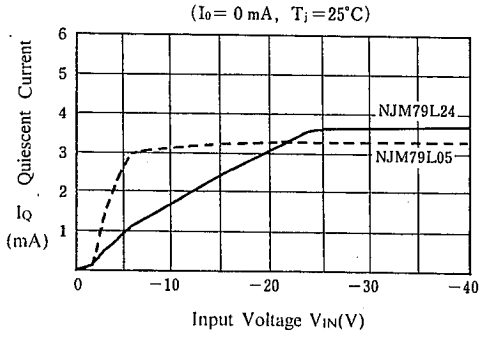
NJM79L05/15/24 Ripple Rejection vs. Frequency

(I_O=40mA, e_{in}=2V_{P-P}, Tj=25℃)



Quiescent Current vs.Input Voltage

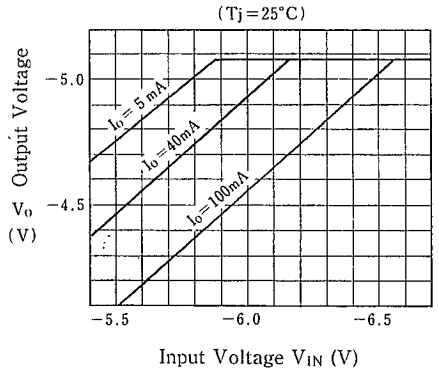
(I_O= 0 mA, Tj=25°C)



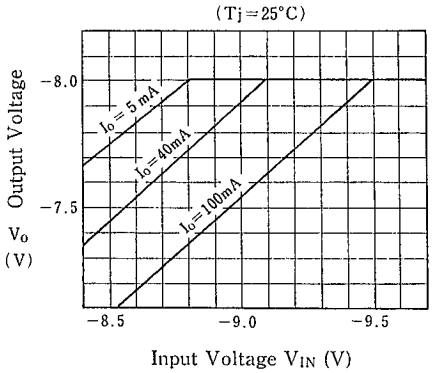
6

■ TYPICAL CHARACTERISTICS

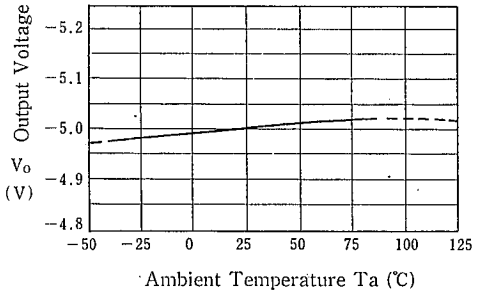
NJM79L05 Dropout Characteristics



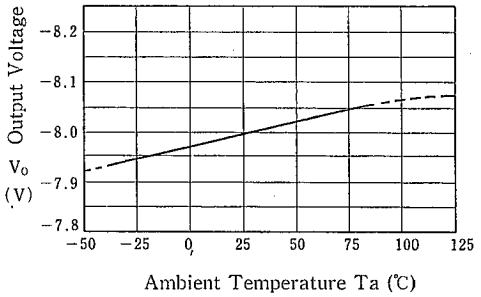
NJM79L08 Dropout Characteristics



NJM79L05 Output Voltage vs. Temperature



NJM79L08 Output Voltage vs. Temperature



6

MEMO

[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.