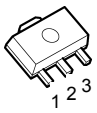
3-TERMINAL NEGATIVE VOLTAGE REGULATOR

■ 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



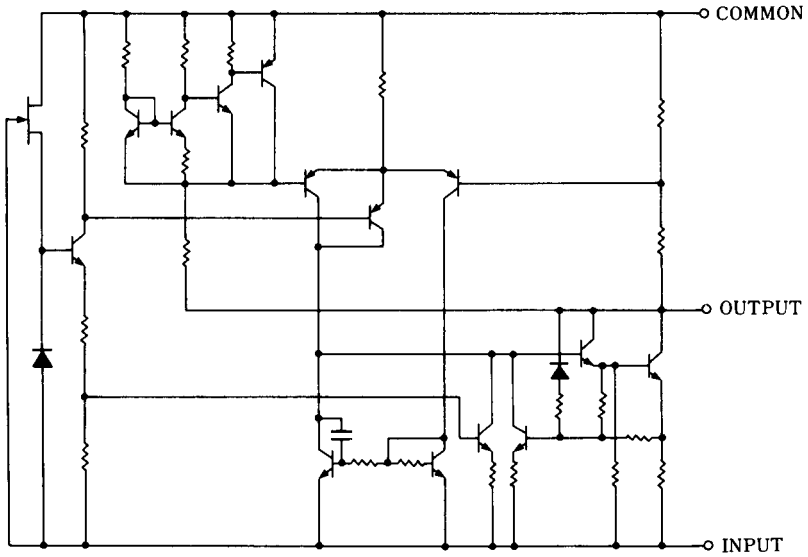
1. COMMON
2. IN
3. OUT

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



■ ABSOLUTE MAXIMUM RATINGS

(T_a=25 ºC)

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	ºC
Storage Temperature Range	T_{stg}	-40 to +125	ºC
Power Dissipation	P_D	(SOT89) 350	mW

■ ELECTRICAL CHARACTERISTICS

(C_{IN}=0.33µF, C_O=1.0µF, Tj=25 ºC)

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L03UA						
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 to -20V, I_O=40mA	-	10	60	mV
Load Regulation	ΔV_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	-	µV
NJM79L05UA						
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 to -20V, I_O=40mA	-	15	150	mV
Load Regulation	ΔV_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	-	µV
NJM79L06UA						
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 to -20V, I_O=40mA	-	18	150	mV
Load Regulation	ΔV_O - I_O	V_{IN}=-12V, I_O=1 to 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 to -19V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	40	68	-	dB
Output Noise Voltage	V_{NO}	V_{IN}=-12V, BW=10Hz to 100kHz, I_O=40mA	-	140	-	µV

■ **ELECTRICAL CHARACTERISTICS** (C_{IN}=0.33μF, C_O=1.0μF, Tj=25 ºC)

Measurement is to be conducted in pulse testing.

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L07UA						
Output Voltage	V_O	V_{IN}=-13V, I_O=40mA	-6.72	-7.0	-7.28	V
Line Regulation	$\Delta V_O - V_{IN}$	V_{IN}=-9.5～-22V, I_O=40mA	-	21	160	mV
Load Regulation	$\Delta V_O - I_O$	V_{IN}=-13V, I_O=1～100mA	-	9	75	mV
Quiescent Current	I_Q	V_{IN}=-13V, I_O=0mA	-	3.5	6.0	mA
Ripple Rejection	RR	V_{IN}=-10～-20V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	40	68	-	dB
Output Noise Voltage	V_{NO}	V_{IN}=-13V, BW=10Hz～100kHz, I_O=40mA	-	170	-	μV
NJM79L08UA						
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 to -23V, I_O=40mA	-	24	175	mV
Load Regulation	ΔV_O - I_O	V_{IN}=-14V, I_O=1 to 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 to -21V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	39	68	-	dB
Output Noise Voltage	V_{NO}	V_{IN}=-14V, BW=10Hz to 100kHz, I_O=40mA	-	190	-	μV
NJM79L09UA						
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 to -24V, I_O=40mA	-	27	200	mV
Load Regulation	ΔV_O - I_O	V_{IN}=-15V, I_O=1 to 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 to -22V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	38	67	-	dB
Output Noise Voltage	V_{NO}	V_{IN}=-15V, BW=10Hz to 100kHz, I_O=40mA	-	210	-	μV
NJM79L12UA						
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 to -27V, I_O=40mA	-	36	250	mV
Load Regulation	ΔV_O - I_O	V_{IN}=-19V, I_O=1 to 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 to -25V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	37	64	-	dB
Output Noise Voltage	V_{NO}	V_{IN}=-19V, BW=10Hz to 100kHz, I_O=40mA	-	210	-	μV

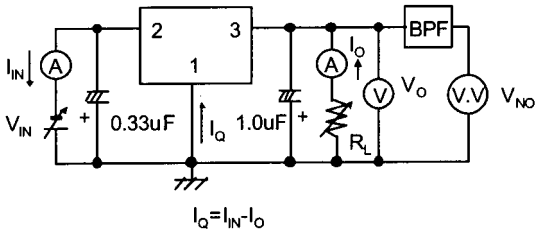
■ **ELECTRICAL CHARACTERISTICS** (C_{IN}=0.33µF, C_O=1.0µF, Tj=25ºC)

Measurement is to be conducted in pulse testing.

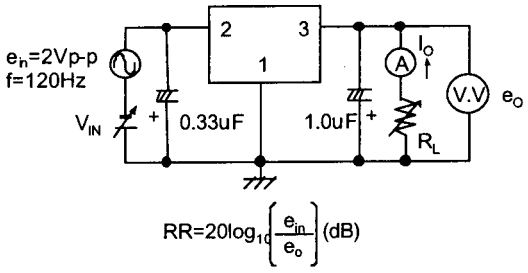
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
NJM79L15UA						
Output Voltage	V_O	V_{IN}=-23V, I_O =40mA	-14.4	-15.0	-15.6	V
Line Regulation	ΔV_O - V_{IN}	V_{IN}=-17.5 to -30V, I_O=40mA	-	45	300	mV
Load Regulation	ΔV_O - I_O	V_{IN}=-23V, I_O=1 to 100mA	-	20	150	mV
Quiescent Current	I_Q	V_{IN}=-23V, I_O=0mA	-	3.5	6.5	mA
Ripple Rejection	RR	V_{IN}=-18.5 to -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 to 100kHz, I_O=40mA	-	340	-	µV
NJM79L18UA						
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 to -33V, I_O=40mA	-	54	325	mV
Load Regulation	ΔV_O - I_O	V_{IN}=-27V, I_O=1 to 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 to -33V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	33	60	-	dB
Output Noise Voltage	V_{NO}	V_{IN}=-27V, BW=10Hz to 100kHz, I_O=40mA	-	410	-	µV
NJM79L24UA						
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 to -38V, I_O=40mA	-	72	350	mV
Load Regulation	ΔV_O - I_O	V_{IN}=-33V, I_O=1 to 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 to -35V, I_O=40mA, e_{in}=1V_{P-P}, f=120Hz	31	55	-	dB
Output Noise Voltage	V_{NO}	V_{IN}=-33V, BW=10Hz to 100kHz, I_O=40mA	-	550	-	µV

■ TEST CIRCUIT

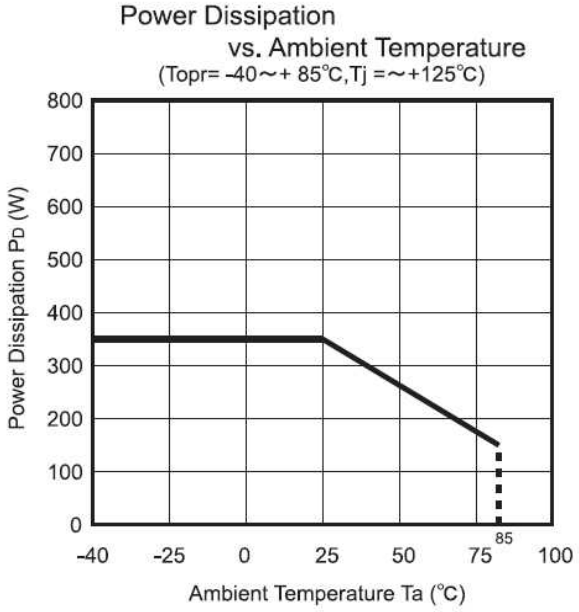
1. Output Voltage, Output Current, Line Regulation, Road Regulation, Quiescent Current, Output Noise Voltage



2. Ripple Rejection

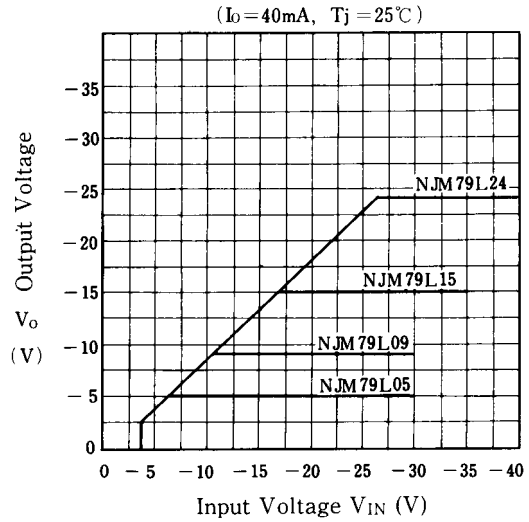


■ POWER DISSIPATION VS. AMBIENT TEMPERATURE

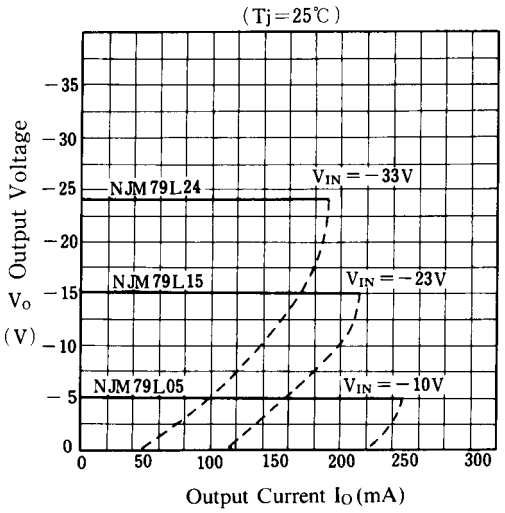


■ TYPICAL CHARACTERISTICS

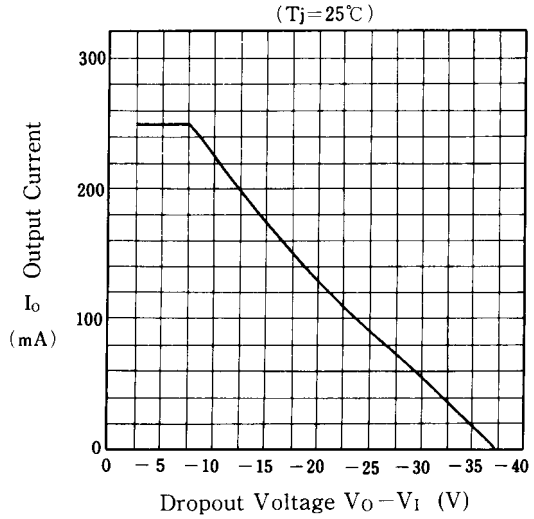
NJM79L00 Input Voltage vs. Output Voltage



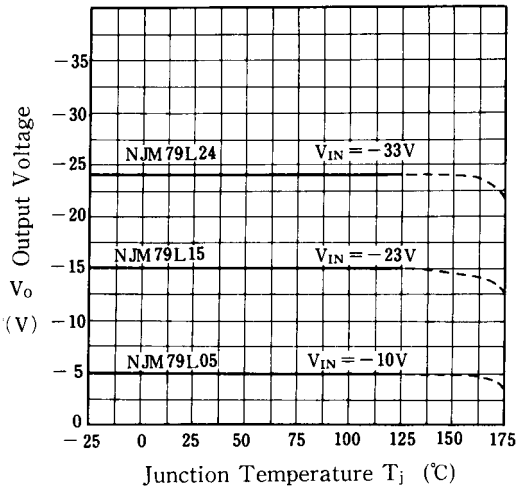
NJM79L05/15/24 Load Characteristics



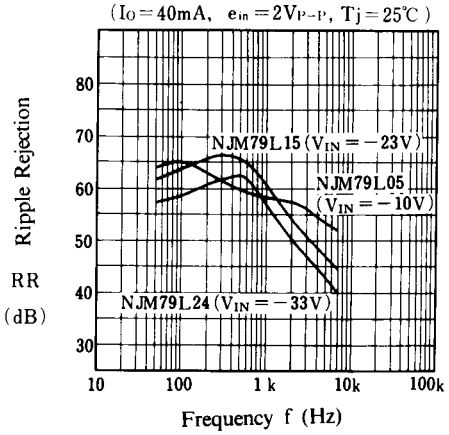
NJM79L00 Series Short Circuit Current



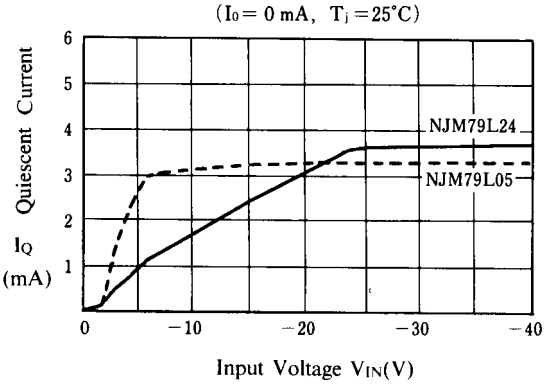
NJM79L05/12/24 Output Voltage vs. Junction Temperature



NJM79L05/15/24 Ripple Rejection vs. Frequency

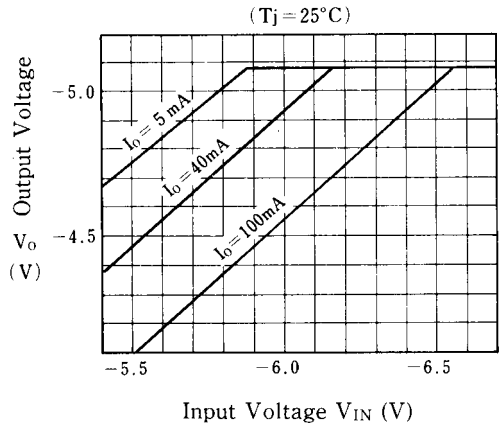


Quiescent Current vs. Input Voltage

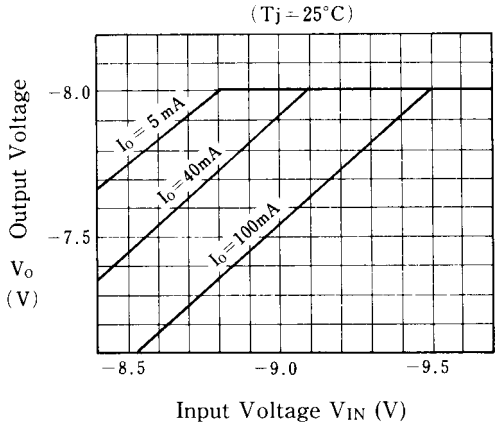


■ TYPICAL CHARACTERISTICS

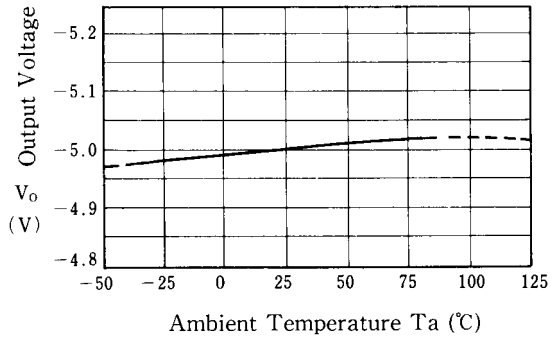
NJM79L05 Dropout Characteristics



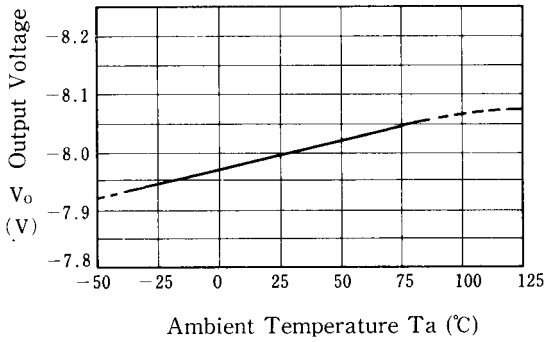
NJM79L08 Dropout Characteristics



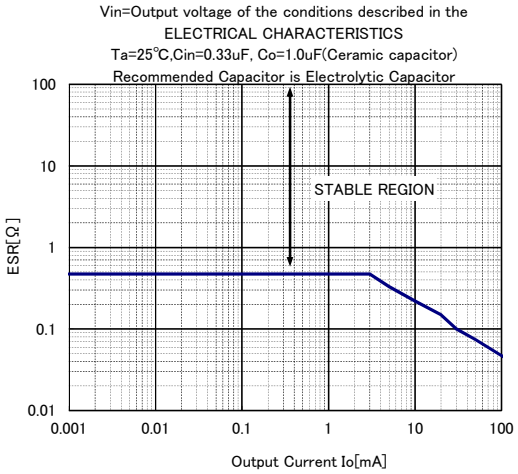
NJM79L05 Output Voltage vs. Temperature



NJM79L08 Output Voltage vs. Temperature



NJM79L00 Equivalent Series Resistance vs. Output Current



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