NJM79M00

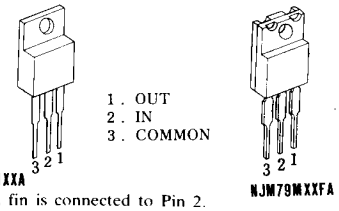
The NJM79M00 series of 3-Thermal Medium Current Negative Voltage Regulators are constructed using the New JRC Planar epitaxial process. These regulators employ internal current limiting, thermal shutdown and safe-area compensation making them essentially indestructible. If adequate heat sinking is provided, they can deliver up to 500mA output current. They are intended as fixed voltage regulators in a wide range of applications including local (on-card) regulation for elimination of noise and distribution problems associated with single point regulation. In addition to use a fixed voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents.

■ Features

- Output Current In Excess of 0.5A
- No External Components
- Internal Thermal Overload protection
- Internal Short Circuit Current Limiting

■ Package Outline

(TO-220) (TO-220F)



NJM79MXXA NJM79MXXFA

The radiation fin is connected to Pin 2.

■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Maximum Rating		Unit
Input Voltage	V_{IN}	79M05 ~ 79M09	−35	V
		79M12 ~ 79M15	−35	
		79M18 ~ 79M24	−40	
Storage Temperature Range	T_{stg}	−40 ~ +125		°C
Operating Temperature Range	Operating Junction Temperature	Tj	−30 ~ +125	°C
	Operating Ambient Temperature	T_{opr}	−30 ~ +75	
Power Dissipation	P_D	7.5 (T_c≦75°C)		W

■ Thermal Characteristics

Thermal Resistance	Junction-to-Ambient Temperature	θja	70(TO-220) 60(TO-220F)	°C/W
	Junction-to-Case	θjc	5	

■ Electrical Characteristics (T_j=25°C, C_{IN}=2.2μF, Co=1.0μF)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
NJM79M05A/FA						
Output Voltage	V_O	V_{IN}=−10V, I_O=0.35A	−4.8	−5.0	−5.2	V
Quiescent Current	I_Q	V_{IN}=−10V, I_O=0mA	—	2.2	5.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−10V, I_O=0.005~0.5A	—	35	50	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−7~−25V, I_O=0.35A	—	5	50	mV
Ripple Rejection	RR	V_{IN}=−10V, I_O=0.35A, e_{in}=2V_{p-p}, f=120Hz	50	58	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−10V, I_O=0.35A, BW=10Hz~100kHz	—	100	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−10V, I_O=5mA	—	−0.4	—	mV/°C

■ Electrical Characteristics (T_j=25°C, C_{IN}=2.2μF, Co=1.0μF)

Measurement is to be conducted in pulse testing.

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
NJM79M06A/FA						
Output Voltage	V_O	V_{IN}=−11V, I_O=0.35A	−5.75	−6.0	−6.25	V
Quiescent Current	I_Q	V_{IN}=−11V, I_O=0mA	—	2.2	5.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−11V, I_O=0.005~0.5A	—	35	60	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−8~−25V, I_O=0.35A	—	5	60	mV
Ripple Rejection	RR	V_{IN}=11V, I_O=0.35A, e_{in}=2V_{p-p}, f=120Hz	50	57	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−11V, I_O=0.35A BW=10Hz~100kHz	—	130	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−11V, I_O=5mA	—	−0.5	—	mV/°C
NJM79M08A/FA						
Output Voltage	V_O	V_{IN}=−14V, I_O=0.35A	−7.7	−8.0	−8.3	V
Quiescent Current	I_Q	V_{IN}=−14V, I_O=0mA	—	2.2	5.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−14V, I_O=0.005~0.5A	—	40	80	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−10.5~−25V, I_O=0.35A	—	8	80	mV
Ripple Rejection	RR	V_{IN}=−14V, I_O=0.35A, e_{in}=2V_{p-p}, f=120Hz	50	55	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−14V, I_O=0.35A, BW=10Hz~100kHz	—	160	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−14V, I_O=5mA	—	−0.7	—	mV/°C
NJM79M09A/FA						
Output Voltage	V_O	V_{IN}=−15V, I_O=0.35A	−8.65	−9.0	−9.35	V
Quiescent Current	I_Q	V_{IN}=−15V, I_O=0mA	—	2.2	5.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−15V, I_O=0.005~0.5A	—	40	90	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−11.5~−25V, I_O=0.35A	—	8	80	mV
Ripple Rejection	RR	V_{IN}=−15V, I_O=0.35A, e_{in}=2V_{p-p}, f=120Hz	50	54	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−15V, I_O=0.35A, BW=10Hz~100kHz	—	175	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−15V, I_O=5mA	—	−0.8	—	mV/°C
NJM79M12A/FA						
Output Voltage	V_O	V_{IN}=−19V, I_O=0.35A	−11.5	−12.0	−12.5	V
Quiescent Current	I_Q	V_{IN}=−19V, I_O=0mA	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−19V, I_O=0.005~0.5A	—	30	120	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−14.5~−30V, I_O=0.35A	—	3	80	mV
Ripple Rejection	RR	V_{IN}=−19V, I_O=0.35A, e_{in}=2V_{p-p}, f=120Hz	54	71	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−19V, I_O=0.35A, BW=10Hz~100kHz	—	210	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−19V, I_O=5mA	—	−0.4	—	mV/°C

■ **Electrical Characteristics** (T_j=25°C, C_{IN}=2.2μF, Co=1.0μF) Measurement is to be conducted in pulse testing.

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
NJM79M15A/FA						
Output Voltage	V_O	V_{IN}=−23V, I_O=0.35A	−14.4	−15.0	−15.6	V
Quiescent Current	I_Q	V_{IN}=−23V, I_O=0mA	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=23V, I_O=0.005~0.5A	—	30	150	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−17.5~−30V, I_O=0.35A	—	3	80	mV
Ripple Rejection	RR	V_{IN}=−23V, I_O=0.35A, e_{in}=2$V_{p\text{-}p}$, f=120Hz	54	70	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−23V, I_O=0.35A, BW=10Hz~100kHz	—	230	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−23V, I_O=5mA	—	−0.5	—	mV/°C
NJM79M18A/FA						
Output Voltage	V_O	V_{IN}=−27V, I_O=0.35A	−17.3	−18.0	−18.7	V
Quiescent Current	I_Q	V_{IN}=−27V, I_O=0mA	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−27V, I_O=0.005~0.5A	—	35	180	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−21~−30V, I_O=0.35A	—	4	80	mV
Ripple Rejection	RR	V_{IN}=−27V, I_O=0.35A, e_{in}=2$V_{p\text{-}p}$, f=120Hz	54	69	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−27V, I_O=0.35A, BW=10Hz~100kHz	—	270	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−27V, I_O=5mA	—	−0.6	—	mV/°C
NJM79M24A/FA						
Output Voltage	V_O	V_{IN}=−33V, I_O=0.35A	−23.0	−24.0	−25.0	V
Quiescent Current	I_Q	V_{IN}=33V, I_O=0mA	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−33V, I_O=0.005~0.5A	—	40	240	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−27~−38V, I_O=0.35A	—	5	80	mV
Ripple Rejection	RR	V_{IN}=−33V, I_O=0.35A, e_{in}=2$V_{p\text{-}p}$, f=120Hz	54	66	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−33V, I_O=0.35A, BW=10Hz~100kHz	—	330	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−33V, I_O=5mA	—	−0.8	—	mV/°C

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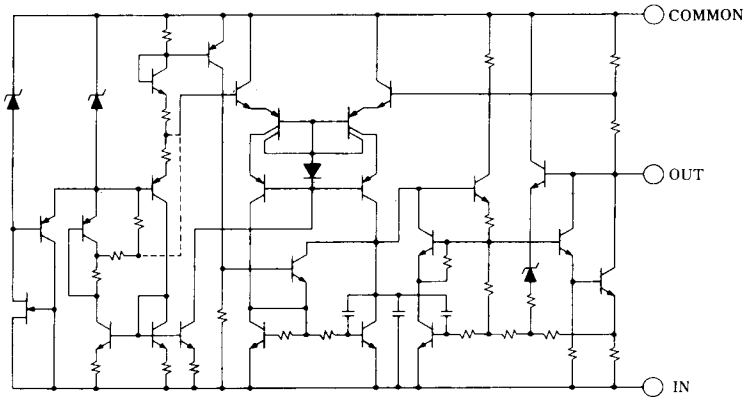
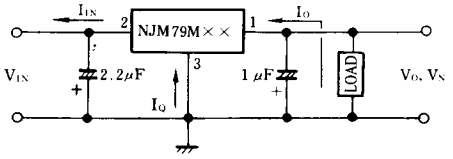
■ Equivalent Circuit



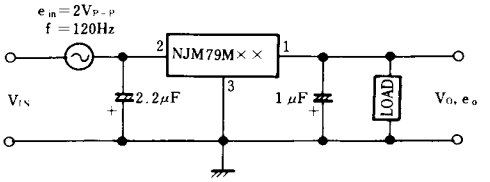
■ Test Circuit

1. Output Voltage, Line Regulation, Load Regulation, Quiescent Current, Average Temperature Coefficient of Output Voltage, Output Noise Voltage



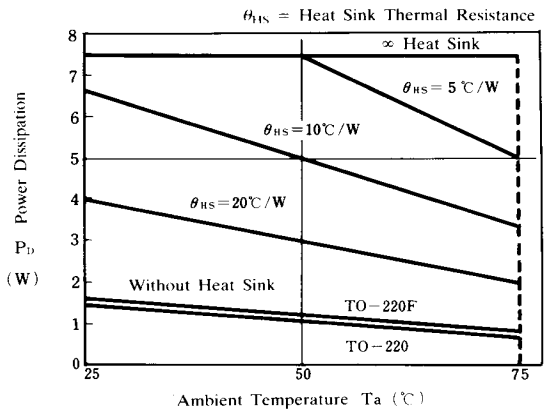
$I_Q = I_{IN} - I_O$

2. Ripple Rejection



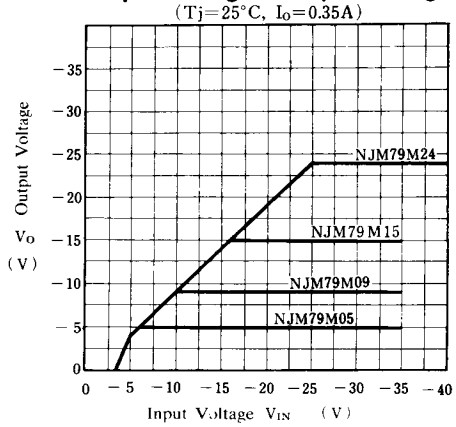
$$RR = 20\log_{10}\left(\frac{e_{in}}{e_o}\right)\ [dB]$$

■ Power Dissipation vs. Ambient Temperature

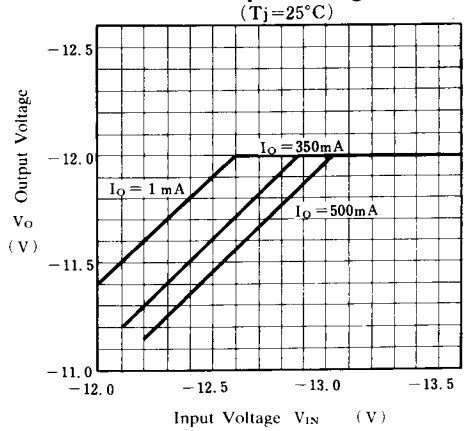


■ Typical Characteristics

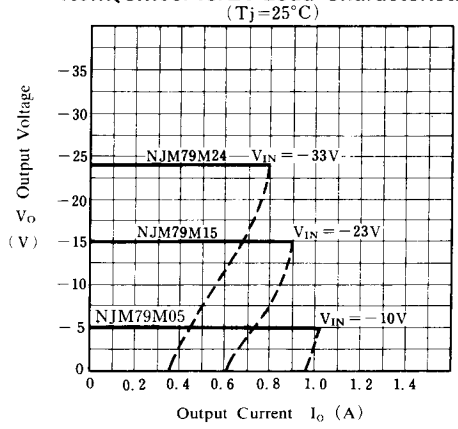
Output Voltage vs. Input Voltage
(Tj=25°C, I_O=0.35A)



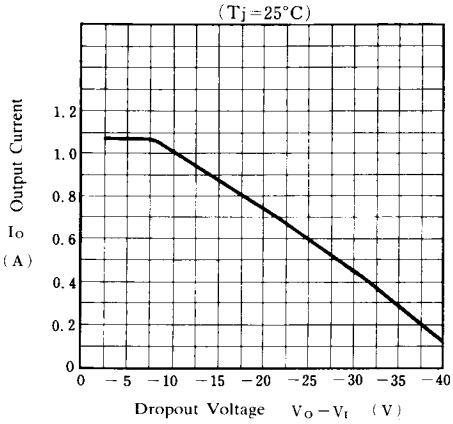
NJM79M12 Output Voltage vs. Low Input Voltage
(Tj=25°C)



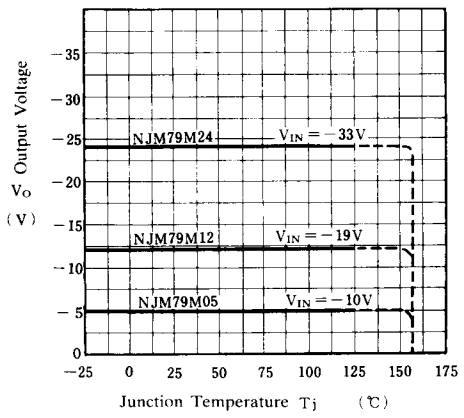
NJM79M05/15/24 Load Characteristics
(Tj=25°C)



NJM79M00 Series Short Circuit Output Current
(Tj=25°C)



Output Voltage vs. Low Input Voltage



NJM79M05/15/24 Ripple Rejection vs. Frequency
(Tj=25°C, I_O=350mA, e_{in}=2V_{p-p})