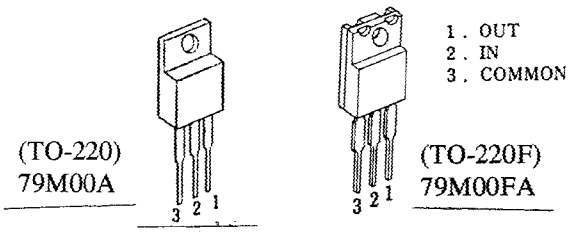
MICRO ELECTRONICS

ML79M00 SERIES

3-TERMINAL NEGATIVE VOLTAGE REGULATOR

The ML79M00 series are 3-Terminal Medium Current Negative Voltage Regulators. 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 in excess of 500mA output current. They are intended as fixed voltage regulation 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 to use as fixed voltage regulators, these devices can be used with external components to obtain adjustable output voltages and currents.

■ Package Outline



(note)* 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	60	°C/W
	Junction-to-Case	θjc	7	

MICRO ELECTRONICS LTD. 美科有限公司
38, Hung To Road, Microtron Building, Kwun Tong, Kowloon, Hong Kong.
Kwun Tong P.O. Box 69477 Hong Kong. Fax No. 2341 0321 Telex: 43510 Micro Hx. Tel: 2343 0181–5

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

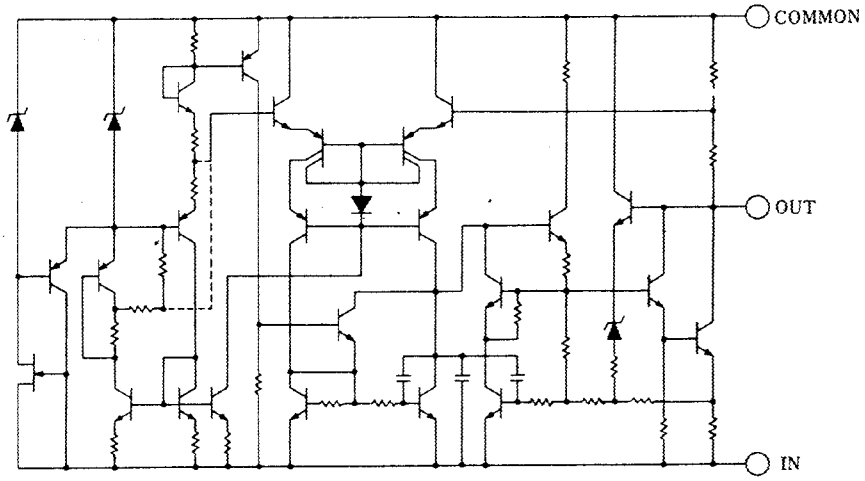
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
79M05A/FA						
Output Voltage	V_O	V_{IN}=−10V, I_O=0.35A	−4.8	−5.0	−5.2	V
Quiescent Current	I_Q	V_{IN}=−10V, I_O=0mA	—	2.2	5.0	mA
Load Regulation	ΔV_O I_O	V_{IN}=−10V, I_O=0.005~0.5A	—	35	50	mV
Line Regulation	ΔV_O V_{IN}	V_{IN}=−7~−25V, I_O=0.35A	—	5	50	mV
Ripple Rejection	RR	V_{IN}=−10V,I_O=0.35A,e_{in}=2$V_{P\text{-}P}$,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/℃
79M06A/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,Io=0.35A	—	5	60	mV
Ripple Rejection	RR	V_{IN}=−11V,I_O=0.35A,e_{in}=2$V_{P\text{-}P}$,f=120Hz	50	57	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−11V,I_O=0.35A,BW=10Hz~100kHz	—	110	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−11V, I_O=5mA	—	−0.5	—	mV/℃
79M08A/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, Io=0.35A	—	8	80	mV
Ripple Rejection	RR	V_{IN}=−14V,I_O=0.35A,e_{in}=2$V_{P\text{-}P}$,f=120Hz	50	55	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−14V,I_O=0.35A,BW=10Hz~100kHz	—	130	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−14V, I_O=5mA	—	−0.7	—	mV/℃
79M09A/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, Io=0.35A	—	8	80	mV
Ripple Rejection	RR	V_{IN}=−15V,I_O=0.35A,e_{in}=2$V_{P\text{-}P}$,f=120Hz	50	54	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−15V,I_O=0.35A,BW=10Hz~100kHz	—	150	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−15V, I_O=5mA	—	−0.8	—	mV/℃
79M12A/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, Io=0.35A	—	3	80	mV
Ripple Rejection	RR	V_{IN}=−19V,I_O=0.35A,e_{in}=2$V_{P\text{-}P}$,f=120Hz	54	71	—	dB
Output Noise Voltage	V_{NO}	V_{IN}=−19V,I_O=0.35A,BW=10Hz~100kHz	—	150	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−19V, I_O=5mA	—	−0.4	—	mV/℃

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

Measurement is to be conducted in pulse testing.

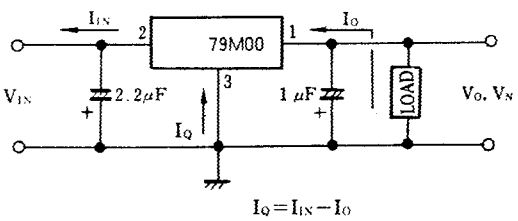
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
79M15A/FA						
Output Voltage	V_O	V_{IN}=−23V, I_O=0.35A	−14.4	−15.0	−15.6	V
Quiescent Current	I_Q	V_{IN}=−23V, I_O=0mA	—	2.7	6.0	mA
Load Regulation	ΔV_O-I_O	V_{IN}=−23V, I_O=0.005~0.5A	—	30	150	mV
Line Regulation	ΔV_O-V_{IN}	V_{IN}=−17.5~−30V, I_O=0.35A	—	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	—	170	—	μV
Average Temperature Coeffficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−23V, I_O=5mA	—	−0.5	—	mV/℃
79M18A/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	—	200	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−27V, I_O=5mA	—	−0.6	—	mV/℃
79M24A/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	—	300	—	μV
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T$	V_{IN}=−33V, I_O=5mA	—	−0.8	—	mV/℃

■ Equivalent Circuit



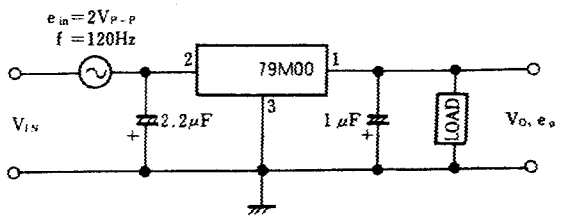
■ Test Circuit

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



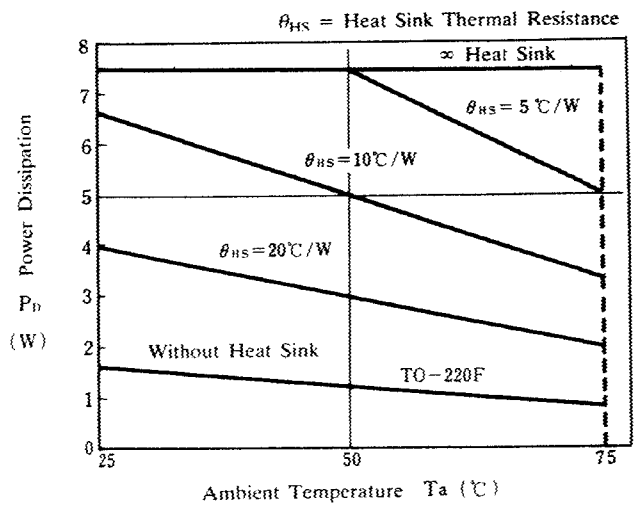
$I_Q = I_{IN} - I_O$

2. Ripple Rejection



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

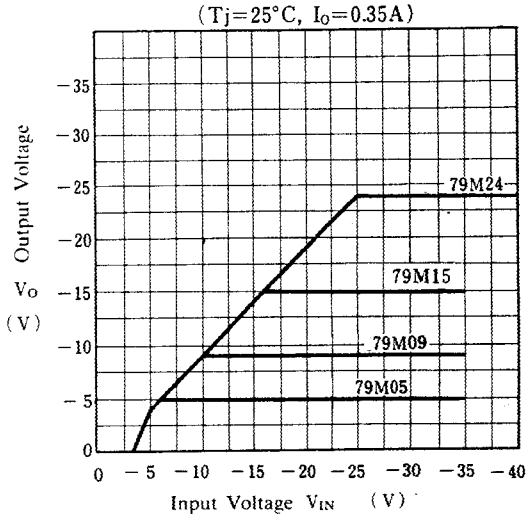
■ Power Dissipation vs. Ambient Temperature



■ Typical Characteristics

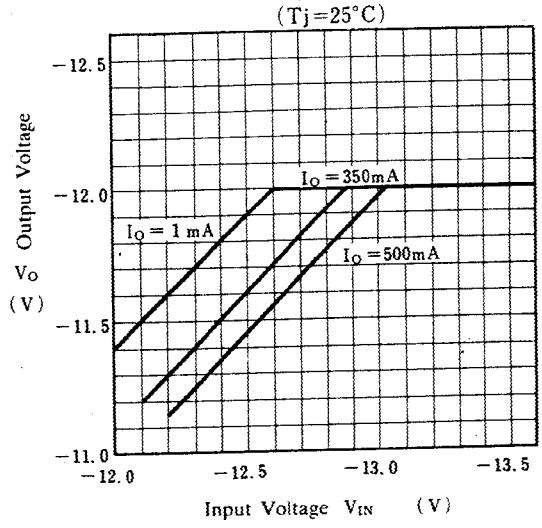
79M00 Output Characteristics

(Tj=25°C, I_O=0.35A)



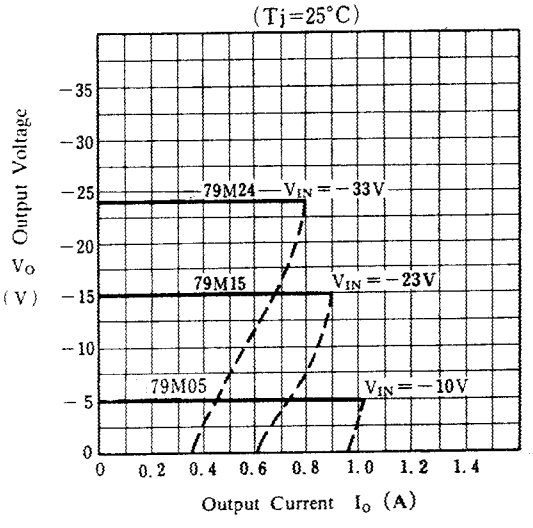
79M12 Output Voltage vs. Low Input Voltage

(Tj=25°C)



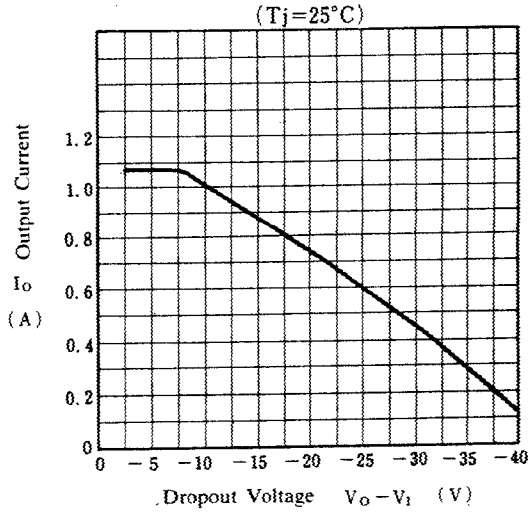
79M05/15/24 Load Characteristics

(Tj=25°C)

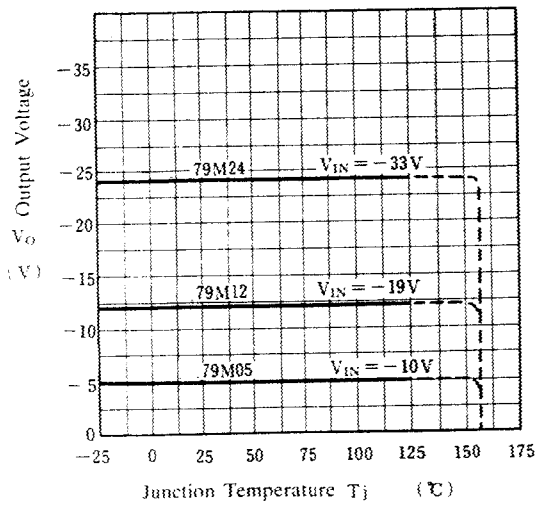


79M00 Series Short Circuit Output Current

(Tj=25°C)

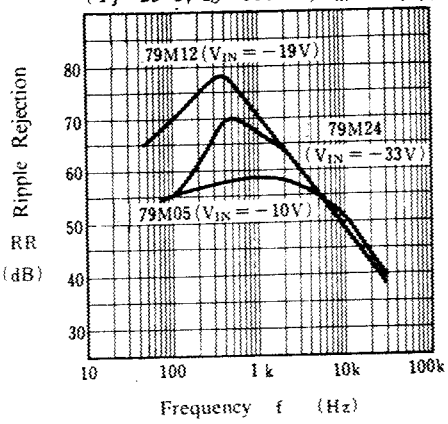


79M05/12/24 Output Voltage vs. Junction Temperature



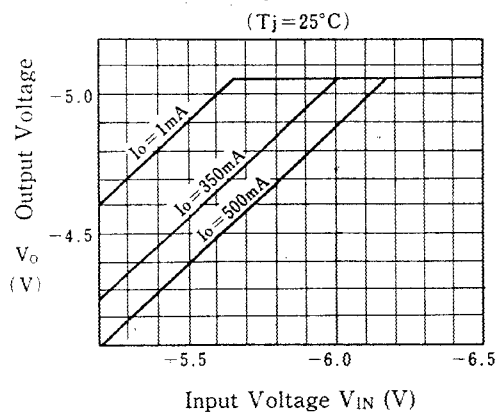
79M05/15/24 Ripple Rejection vs. Frequency

(Tj=25°C, I_O=350mA, e_{in}=2V_{p-p})

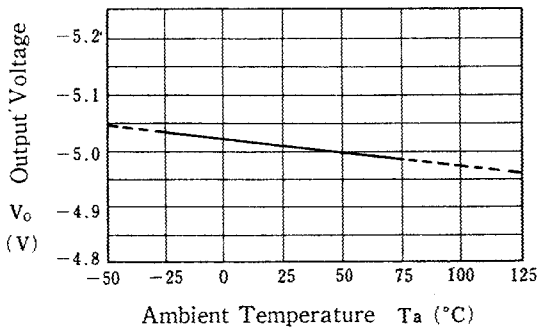


■ Typical Characteristics

79M05 Dropout Characteristics



79M05 Output Voltage vs. Temperature



Supply Current vs. Input Voltage