# AN79M00/AN79M00F Series

## 3-Terminal Negative Output Voltage Regulators (500mA Type)

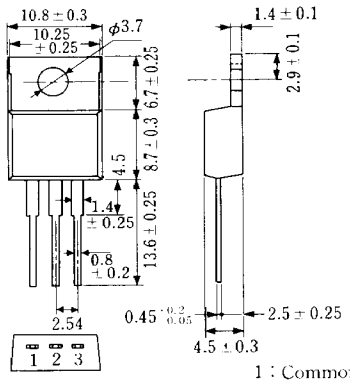
### ■ Outline

The AN79M00 and the AN79M00F series are 3-terminal fixed negative output voltage regulators. Stabilized fixed output voltage is obtained from unstable DC input voltage without using any external components. 12 types of output voltage are available, −5V, −5.2V, −6V, −7V, −8V, −9V, −10V, −12V, −15V, −18V, −20V and −24V. They can be used widely in power circuits with current capacity up to 500mA.

### ■ Features

- No external components
- Output current in excess of 500mA
- Output voltage : −5V, −5.2V, −6V, −7V, −8V, −9V, −10V, −12V, −15V, −18V, −20V, −24V
- Short-circuit current limiting built in
- Thermal overload protection built in
- Output transistor safe area compensation

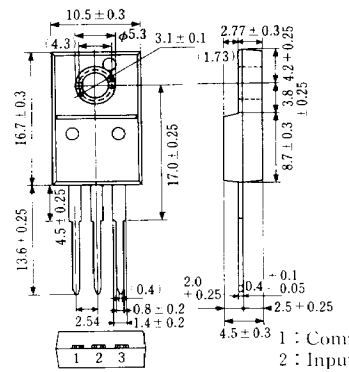
AN79M00 Series Unit : mm




1 : Common
2 : Input
3 : Output

JEDEC : TO-220AB.

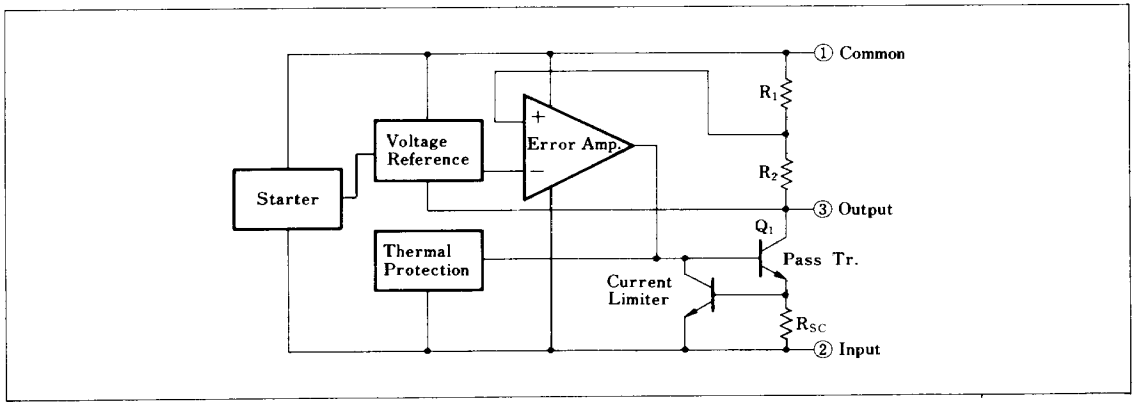
AN79M00F Series Unit : mm




1 : Common
2 : Input
3 : Output

TO-220 Full Pack Package

### ■ Block Diagram



## ■ Absolute Maximum Ratings (Ta=25℃)

| Item | Symbol | Rating | Unit |
|---|---|---|---|
| Input Voltage | $V_I$ | −35*1 | V |
| | | −40*2 | V |
| Power Dissipation | $P_D$ | 15*3 | W |
| Operating Ambient Temperature | $T_{opr}$ | −20～+80 | ℃ |
| Storage Temperature | $T_{stg}$ | −55～+150 | ℃ |

*1 AN79M05/F, AN79M52/F, AN79M06/F, AN79M07/F, AN79M08/F, AN79M09/F, AN79M10/F, AN79M12/F, AN79M15/F, AN79M18/F
*2 AN79M20/F, AN79M24/F *3 Follow the derating curve. When $T_j$ exceeds 150℃, the internal circuit cuts off the output.

## ■ Electrical Characteristics (Ta=25℃)

### ● AN79M05/F (−5V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −4.8 | −5 | −5.2 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−7～−25V, $I_O$=5～350mA | −4.75 | | −5.25 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−7～−25V, $T_j$=25℃ | | 3 | 50 | mV |
| | | | $V_I$=−8～−18V, $T_j$=25℃ | | 1 | 30 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5～500mA, $T_j$=25℃ | | 20 | 100 | mV |
| | | | $I_O$=5～350mA, $T_j$=25℃ | | 10 | 50 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−8～−25V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $V_O$=5～350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz～100kHz, $T_a$=25℃ | | 125 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−8～−18V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 60 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0～125℃ | | −0.4 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored. Note 2) When not specified, $V_I$=−10V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0～125℃

### ● AN79M52/F (−5.2V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −5.0 | −5.2 | −5.4 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−7～−25V, $I_O$=5～350mA | −4.94 | | −5.46 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−7～−25V, $T_j$=25℃ | | | 50 | mV |
| | | | $V_I$=−8～−18V, $T_j$=25℃ | | | 30 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5～500mA, $T_j$=25℃ | | | 100 | mV |
| | | | $I_O$=5～350mA, $T_j$=25℃ | | | 50 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−8～−25V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $V_O$=5～350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz～100kHz, $T_a$=25℃ | | 130 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−8～−18V, f=120Hz, $I_O$=100mA | 60 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0～125℃ | | −0.4 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored. Note 2) When not specified, $V_I$=−10V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0～125℃

## ■ Electrical Characteristics (Ta=25℃)

● AN79M06/F (−6V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −5.75 | −6 | −6.25 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−8~−25V, $I_O$=5~350mA | −5.7 | | −6.3 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−8~−25V, $T_j$=25℃ | | 5 | 60 | mV |
| | | | $V_I$=−9~−19V, $T_j$=25℃ | | 1.5 | 40 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 20 | 120 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 60 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−9~−25V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $I_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 150 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−9~−19V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 60 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −0.4 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−11V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

● AN79M07/F (−7V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −6.7 | −7 | −7.3 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−9~−25V, $I_O$=5~350mA | −6.65 | | −7.35 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−9~−25V, $T_j$=25℃ | | 6 | 70 | mV |
| | | | $V_I$=−10~−20V, $T_j$=25℃ | | 2 | 35 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 20 | 140 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 70 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−10~−25V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $I_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 175 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−10~−20V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 59 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −0.5 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−12V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

## ■ Electrical Characteristics (Ta=25℃)

● AN79M08/F (−8V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −7.7 | −8 | −8.3 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−10.5~−25V, $I_O$=5~350mA | −7.6 | | −8.4 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−10.5~−25V, $T_j$=25℃ | | 6 | 80 | mV |
| | | | $V_I$=−11~−21V, $T_j$=25℃ | | 2 | 40 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 25 | 160 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 80 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−10.5~−25V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $I_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 200 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−11.5~−21.5V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 59 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −0.6 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−14V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

● AN79M09/F (−9V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −8.65 | −9 | −9.35 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−11.5~−26V, $I_O$=5~350mA | −8.55 | | −9.45 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−11.5~−26V, $T_j$=25℃ | | 7 | 80 | mV |
| | | | $V_I$=−12~−22V, $T_j$=25℃ | | 2 | 50 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 25 | 180 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 90 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−11.5~−26V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $I_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 225 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−12~−22V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 58 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −0.6 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−15V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

## ■ Electrical Characteristics (Ta=25℃)

● AN79M10/F (−10V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −9.6 | −10 | −10.4 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−12.5~−27V, $I_O$=5~350mA | −9.5 | | −10.5 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−12.5~−27V, $T_j$=25℃ | | 7 | 80 | mV |
| | | | $V_I$=−13~−23V, $T_j$=25℃ | | 2 | 50 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 25 | 200 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 100 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−12.5~−27V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $V_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 250 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−13~−23V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 58 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −0.7 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−16V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

● AN79M12/F (−12V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −11.5 | −12 | −12.5 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−14.5~−30V, $I_O$=5~350mA | −11.4 | | −12.6 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−14.5~−30V, $T_j$=25℃ | | 8 | 80 | mV |
| | | | $V_I$=−15~−25V, $T_j$=25℃ | | 2 | 50 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 25 | 240 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 120 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−14.5~−30V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $I_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 300 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−15~−25V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 57 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −0.8 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−19V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

## ■ Electrical Characteristics (Ta=25℃)

● AN79M15/F (−15V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −14.4 | −15 | −15.6 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−17.5~−30V, $I_O$=5~350mA | −14.25 | | −15.75 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−17.5~−30V, $T_j$=25℃ | | 10 | 80 | mV |
| | | | $V_I$=−18~−28V, $T_j$=25℃ | | 3 | 50 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 25 | 240 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 120 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−17.5~−30V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $V_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 375 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−18~−28V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 56 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −0.9 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−23V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

● AN79M18/F (−18V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −17.3 | −18 | −18.7 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−21~−33V, $I_O$=5~350mA | −17.1 | | −18.9 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−21~−33V, $T_j$=25℃ | | 10 | 80 | mV |
| | | | $V_I$=−22~−32V, $T_j$=25℃ | | 5 | 50 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 30 | 300 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 150 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−21~−33V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $V_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 450 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−22~−32V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 55 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −1 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−27V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

## ■ Electrical Characteristics (Ta=25℃)

● AN79M20/F (−20V Type)

| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −19.2 | −20 | −20.8 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−23~−35V, $I_O$=5~350mA | −19 | | −21 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−23~−35V, $T_j$=25℃ | | 10 | 80 | mV |
| | | | $V_I$=−24~−34V, $T_j$=25℃ | | 5 | 50 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 30 | 300 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 150 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−23~−35V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $I_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 500 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−24~−34V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 54 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −1 | | mV/℃ |

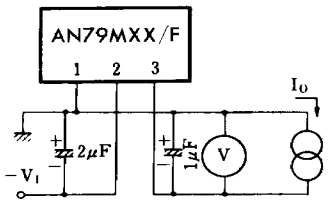
Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−29V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

● AN79M24/F (−24V Type)

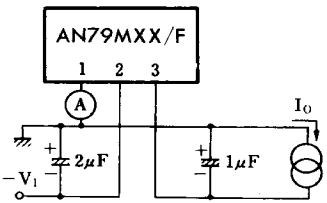
| Item | Symbol | Test Circuit | Condition | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| Output Voltage | $V_O$ | 1 | $T_j$=25℃ | −23 | −24 | −25 | V |
| Output Voltage Tolerance | $V_O$ | 1 | $V_I$=−27~−38V, $I_O$=5~350mA | −22.8 | | −25.2 | V |
| Line Regulation | $REG_{IN}$ | 1 | $V_I$=−27~−38V, $T_j$=25℃ | | 10 | 80 | mV |
| | | | $V_I$=−27~−37V, $T_j$=25℃ | | 5 | 70 | mV |
| Load Regulation | $REG_L$ | 1 | $I_O$=5~500mA, $T_j$=25℃ | | 30 | 300 | mV |
| | | | $I_O$=5~350mA, $T_j$=25℃ | | 10 | 150 | mV |
| Bias Current | $I_{Bias}$ | 2 | $T_j$=25℃ | | 2 | 4 | mA |
| Input Bias Current Fluctuation | $\Delta I_{Bias(IN)}$ | 2 | $V_I$=−27~−38V, $T_j$=25℃ | | | 0.8 | mA |
| Load Bias Current Fluctuation | $\Delta I_{Bias(L)}$ | 2 | $I_O$=5~350mA, $T_j$=25℃ | | | 0.4 | mA |
| Output Noise Voltage | $V_{no}$ | 1 | f=10Hz~100kHz, $T_a$=25℃ | | 600 | | μV |
| Ripple Rejection Ratio | RR | 3 | $V_I$=−28~−38V, $I_O$=100mA, f=120Hz, $T_a$=25℃ | 54 | | | dB |
| Minimum Input/Output Voltage Difference | $V_{DIF(min.)}$ | | $I_O$=500mA, $T_j$=25℃ | | 1.1 | | V |
| Output Short Circuit Current | $I_{O(Short)}$ | 1 | $V_I$=−35V, $T_j$=25℃ | | 50 | | mA |
| Peak Output Current | $I_{O(Peak)}$ | 1 | $T_j$=25℃ | | 1000 | | mA |
| Output Voltage Temperature Coefficient | $\Delta V_O/T_a$ | | $I_O$=5mA, $T_j$=0~125℃ | | −1 | | mV/℃ |

Note 1) The specified condition $T_j$=25℃ means that the test should be carried out with the test time so short (within 10ms) that the drift in characteristic value due to the rise in chip junction temperature can be ignored.
Note 2) When not specified, $V_I$=−33V, $I_O$=350mA, $C_I$=2μF, $C_O$=1μF and $T_j$=0~125℃

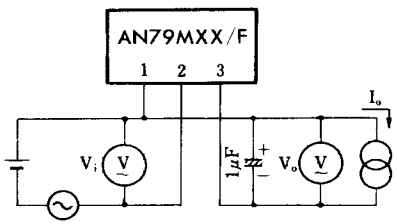
**Test Circuit 1** ($V_O$, $REG_{IN}$, $REG_L$, $V_{no}$, $I_{O(Short)}$, $I_{O(Peak)}$)




**Test Circuit 2** ($I_{Bias}$, $\Delta I_{Bias(IN)}$, $\Delta I_{Bias(L)}$)

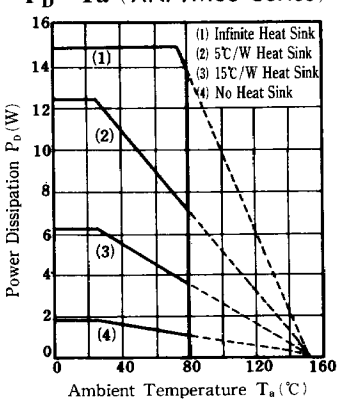



**Test Circuit 3** (RR)

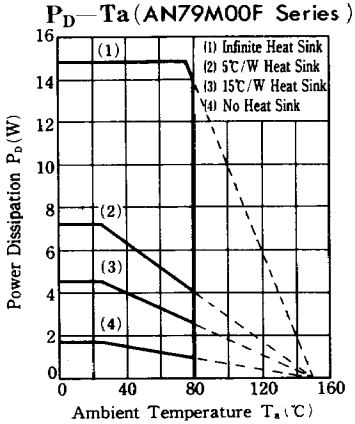



$$RR = 20\log\left(\frac{|V_i|}{|V_o|}\right)$$

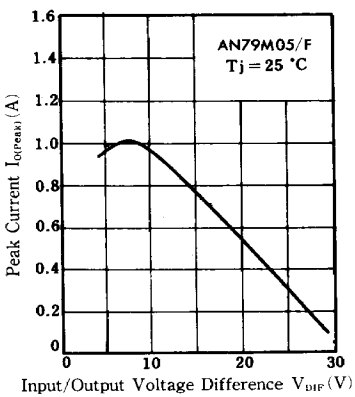
**$P_D$—Ta (AN79M00 Series)**



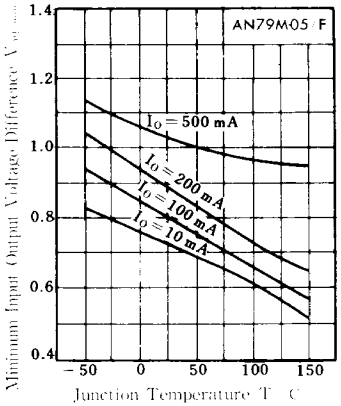

**$P_D$—Ta (AN79M00F Series)**



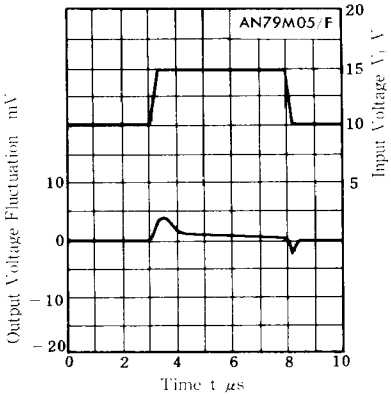

**$I_{O(Peak)}$—$V_{DIF}$**



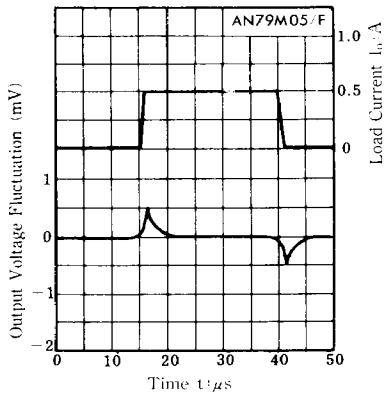
**$V_{DIF(min.)} - T_j$**



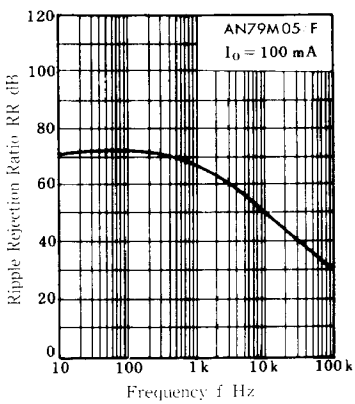

**Input Response Characteristic**



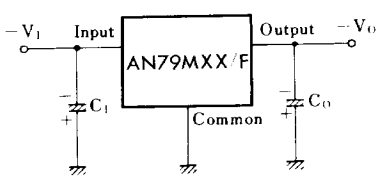

**Load Response Characteristic**




**RR – f**




## ■ Basic Regulator Circuit




$C_I$ is connected when the input line is long. 2μF
$C_O$ improves the transient Response. 1μF

## ■ Application Circuit