



79DXXA

LINEAR INTEGRATED CIRCUIT

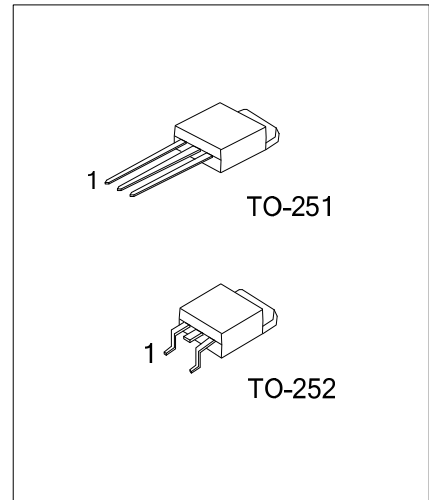
3 TERMINAL 1A NEGATIVE VOLTAGE REGULATOR

DESCRIPTION

The UTC **79DXXA** series of three-terminal negative regulators is available several fixed output voltage, making them useful in a wide range of application. Each type employs internal current limiting, thermal shut-down, making it essentially indestructible.

FEATURES

- * Output current up to 1A
- * -5V, -6V, -8V, -9V, -12V, -15V, -18V, -24V output voltage available
- * Thermal overload protection



NORDERING INFORMATIO

| Ordering Number | | Package | Pin Assignment | | | Packing |
|-----------------|---------------|---------|----------------|---|---|-----------|
| Lead Free | Halogen Free | | 1 | 2 | 3 | |
| 79DXXAL-TM3-T | 79DXXAG-TM3-T | TO-251 | G | I | O | Tube |
| 79DXXAL-TN3-T | 79DXXAG-TN3-T | TO-252 | G | I | O | Tube |
| 79DXXAL-TN3-R | 79DXXAG-TN3-R | TO-252 | G | I | O | Tape Reel |

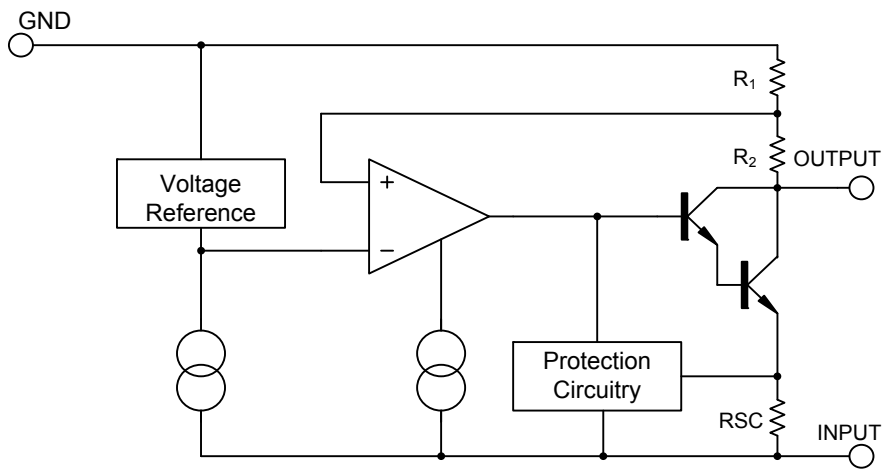
Note: Pin Assignment : G: GND I: Input O: Output

| | |
|--|--|
| <p>79DXXAL-TM3-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating (4)Output Voltage Code</p> | <p>(1) T: Tube, R: Tape Reel (2) TM3: TO-251, TN3: TO-252 (3) L: Lead Free, G: Halogen Free (4) xx: refer to Marking Information</p> |
|--|--|

MARKING INFORMATION

| PACKAGE | VOLTAGE CODE | MARKING |
|------------------|--------------|---------|
| TO-251 TO-252 | 05: -5V | |
| | 06: -6V | |
| | 08: -8V | |
| | 09: -9V | |
| | 12: -12V | |
| | 15: -15V | |
| | 18: -18V | |
| 24: -24V | | |

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C)

| PARAMETER | SYMBOL | RATING | UNIT |
|-----------------------|------------------|--------------------|------|
| Input Voltage | V _{IN} | -35 | V |
| Output Current | I _{OUT} | 1 | A |
| Power Dissipation | P _D | Internally Limited | W |
| Operating Temperature | T _{OPR} | 0 ~ +125 | °C |
| Storage Temperature | T _{STG} | -65 ~ +150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

| PARAMETER | SYMBOL | RATING | UNIT |
|---------------------|-----------------|--------|------|
| Junction to Ambient | θ _{JA} | 112 | °C/W |
| Junction to Case | θ _{JC} | 12.5 | °C/W |

■ ELECTRICAL CHARACTERISTICS

(I_{OUT}=0.5A, T_J=0°C~125°C, C_I=2.2uF, C_O=1uF, unless otherwise specified)

For UTC 79D05A (V_{IN}=-10V)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|-----------------------|---|-------|------|-------|-------|
| Output Voltage | V _{OUT} | T _J =25°C | -4.80 | -5.0 | -5.20 | V |
| | | V _{IN} =-7V~-20V I _{OUT} =5mA~1A, P _D ≤ 15W | -4.75 | | -5.25 | V |
| Dropout Voltage | V _D | I _{OUT} =1A T _J =25°C | | 2 | | V |
| Line Regulation | ΔV _{OUT} | V _{IN} =-7V~-25V T _J =25°C | | 10 | 100 | mV |
| | | V _{IN} =-8V~-12V T _J =25°C | | 5 | 60 | mV |
| Load Regulation | ΔV _{OUT} | I _{OUT} =5mA~1A T _J =25°C | | 10 | 100 | mV |
| | | I _{OUT} =250mA~750mA T _J =25°C | | 3 | 50 | mV |
| Quiescent Current | I _Q | T _J =25°C | | 3 | 6 | mA |
| Quiescent Current Change | ΔI _Q | I _{OUT} =5mA~1A | | 0.05 | 0.5 | mA |
| | | V _{IN} =-7V~-25V | | 0.1 | 1.3 | mA |
| Output Noise Voltage | eN | f=10Hz~100kHz T _A =25°C | | 100 | | μV |
| Output Voltage Drift | ΔV _{OUT} /ΔT | I _{OUT} =5mA | | -0.4 | | mV/°C |
| Ripple Rejection | RR | V _{IN} =-8V~-18V, f=120Hz | 54 | 60 | | dB |
| Peak Current | I _{PEAK} | T _J =25°C | | 2.2 | | A |

For UTC 79D06A (V_{IN}=-11V)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|-------------------|--|-------|-------|-------|------|
| Output Voltage | V _{OUT} | T _J =25°C | -5.76 | -6.00 | -6.24 | V |
| | | V _{IN} =-8V~-21V, I _{OUT} =5mA~1A, P _D ≤ 15W | -5.70 | | -6.30 | V |
| Dropout Voltage | V _D | I _{OUT} =1.0A T _J =25°C | | 2 | | V |
| Line Regulation | ΔV _{OUT} | V _{IN} =-8V~-25V T _J =25°C | | 10 | 120 | mV |
| | | V _{IN} =-9V~-13V T _J =25°C | | 5 | 60 | mV |
| Load Regulation | ΔV _{OUT} | I _{OUT} =5mA~1A T _J =25°C | | 10 | 120 | mV |
| | | I _{OUT} =250mA~750mA T _J =25°C | | 3 | 60 | mV |
| Quiescent Current | I _Q | T _J =25°C | | 3 | 6 | mA |
| Quiescent Current Change | ΔI _Q | I _{OUT} =5mA~1A | | 0.05 | 0.5 | mA |
| | | V _{IN} =-8V~-25V | | 0.1 | 1.3 | mA |
| Output Noise Voltage | eN | f=10Hz~100kHz T _A =25°C | | 130 | | μV |

■ ELECTRICAL CHARACTERISTICS(Cont.)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|----------------------|---------------------------|-------------------------------|-----|------|-----|-------|
| Output Voltage Drift | $\Delta V_{OUT}/\Delta T$ | $I_{OUT}=5mA$ | | -0.5 | | mV/°C |
| Ripple Rejection | RR | $V_{IN}=-9V\sim-19V, f=120Hz$ | 54 | 60 | | dB |
| Peak Current | I_{PEAK} | $T_J=25^\circ C$ | | 2.2 | | A |

For UTC 79D08A ($V_{IN}=-14V$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|---------------------------|--|-------|------|-------|---------|
| Output Voltage | V_{OUT} | $T_J=25^\circ C$ | -7.68 | -8.0 | -8.32 | V |
| | | $V_{IN}=-10.5V\sim-23V,$ $I_{OUT}=5mA\sim 1A, P_D \leq 15W$ | -7.60 | | -8.40 | V |
| Dropout Voltage | V_D | $I_{OUT}=1A, T_J=25^\circ C$ | | 2 | | V |
| Line Regulation | ΔV_{OUT} | $V_{IN}=-10.5V\sim-25V, T_J=25^\circ C$ | | 10 | 160 | mV |
| | | $V_{IN}=-11.5V\sim-17V, T_J=25^\circ C$ | | 5 | 80 | mV |
| Load Regulation | ΔV_{OUT} | $I_{OUT}=5mA\sim 1A, T_J=25^\circ C$ | | 12 | 160 | mV |
| | | $I_{OUT}=250mA\sim 750mA, T_J=25^\circ C$ | | 4 | 80 | mV |
| Quiescent Current | I_Q | $T_J=25^\circ C$ | | 3 | 6 | mA |
| Quiescent Current Change | ΔI_Q | $I_{OUT}=5mA\sim 1A$ | | 0.05 | 0.5 | mA |
| | | $V_{IN}=-11.5V\sim-25V$ | | 0.1 | 1.0 | mA |
| Output Noise Voltage | eN | $f=10Hz\sim 100kHz, T_A=25^\circ C$ | | 175 | | μV |
| Output Voltage Drift | $\Delta V_{OUT}/\Delta T$ | $I_{OUT}=5mA$ | | -0.6 | | mV/°C |
| Ripple Rejection | RR | $V_{IN}=-11.5V\sim-21.5V, f=120Hz$ | 54 | 60 | | dB |
| Peak Current | I_{PEAK} | $T_J=25^\circ C$ | | 2.2 | | A |

For UTC 79D09A ($V_{IN}=-15V$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|---------------------------|--|-------|------|-------|---------|
| Output Voltage | V_{OUT} | $T_J=25^\circ C$ | -8.64 | -9.0 | -9.36 | V |
| | | $V_{IN}=-11.5V\sim-23V,$ $I_{OUT}=5mA\sim 1A, P_D \leq 15W$ | -8.55 | | -9.45 | V |
| Dropout Voltage | V_D | $I_{OUT}=1A, T_J=25^\circ C$ | | 2.0 | | V |
| Line Regulation | ΔV_{OUT} | $V_{IN}=-11.5V\sim-26V, T_J=25^\circ C$ | | 10 | 180 | mV |
| | | $V_{IN}=-12V\sim-18V, T_J=25^\circ C$ | | 5 | 90 | mV |
| Load Regulation | ΔV_{OUT} | $I_{OUT}=5mA\sim 1A, T_J=25^\circ C$ | | 12 | 180 | mV |
| | | $I_{OUT}=250mA\sim 750mA, T_J=25^\circ C$ | | 4 | 90 | mV |
| Quiescent Current | I_Q | $T_J=25^\circ C$ | | 3 | 6 | mA |
| Quiescent Current Change | ΔI_Q | $I_{OUT}=5mA\sim 1A$ | | 0.05 | 0.5 | mA |
| | | $V_{IN}=-11.5V\sim-26V$ | | 0.1 | 1.0 | mA |
| Output Noise Voltage | eN | $f=10Hz\sim 100kHz, T_a=25^\circ C$ | | 175 | | μV |
| Output Voltage Drift | $\Delta V_{OUT}/\Delta T$ | $I_{OUT}=5mA$ | | -0.6 | | mV/°C |
| Ripple Rejection | RR | $V_{IN}=-12.5V\sim-22.5V, f=120Hz$ | 54 | 60 | | dB |
| Peak Current | I_{PEAK} | $T_J=25^\circ C$ | | 2.2 | | A |

■ ELECTRICAL CHARACTERISTICS(Cont.)

For UTC 79D12A ($V_{IN}=-18V$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|---------------------------|--|--------|-------|--------|----------------|
| Output Voltage | V_{OUT} | $T_J=25^{\circ}C$ | -11.52 | -12.0 | -12.48 | V |
| | | $V_{IN}=-14.5V\sim-27V$, $I_{OUT}=5mA\sim 1A$, $P_D \leq 15W$ | -11.40 | | -12.60 | V |
| Dropout Voltage | V_D | $I_{OUT}=1A$, $T_J=25^{\circ}C$ | | 2 | | V |
| Line Regulation | ΔV_{OUT} | $V_{IN}=-14.5V\sim-30V$, $T_J=25^{\circ}C$ | | 12 | 240 | mV |
| | | $V_{IN}=-16V\sim-22V$, $T_J=25^{\circ}C$ | | 6 | 120 | mV |
| Load Regulation | ΔV_{OUT} | $I_{OUT}=5mA\sim 1A$, $T_J=25^{\circ}C$ | | 12 | 240 | mV |
| | | $I_{OUT}=250mA\sim 750mA$, $T_J=25^{\circ}C$ | | 4 | 120 | mV |
| Quiescent Current | I_Q | $T_J=25^{\circ}C$ | | 3 | 6 | mA |
| Quiescent Current Change | ΔI_Q | $I_{OUT}=5mA\sim 1A$ | | 0.05 | 0.5 | mA |
| | | $V_{IN}=-14.5V\sim-30V$ | | 0.1 | 1.0 | mA |
| Output Noise Voltage | eN | $f=10Hz\sim 100kHz$, $T_a=25^{\circ}C$ | | 200 | | μV |
| Output Voltage Drift | $\Delta V_{OUT}/\Delta T$ | $I_{OUT}=5mA$ | | -0.8 | | $mV/^{\circ}C$ |
| Ripple Rejection | RR | $V_{IN}=-15V\sim-25V$, $f=120Hz$ | 54 | 60 | | dB |
| Peak Current | I_{PEAK} | $T_J=25^{\circ}C$ | | 2.2 | | A |

For UTC 79D15A ($V_{IN}=-23V$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|---------------------------|--|--------|-------|--------|----------------|
| Output Voltage | V_{OUT} | $T_J=25^{\circ}C$ | -14.40 | -15.0 | -15.60 | V |
| | | $V_{IN}=-17.5V\sim-30V$, $I_{OUT}=5mA\sim 1A$, $P_D \leq 15W$ | -14.25 | | -15.75 | V |
| Dropout Voltage | V_D | $I_{OUT}=1A$, $T_J=25^{\circ}C$ | | 2 | | V |
| Line Regulation | ΔV_{OUT} | $V_{IN}=-17.5V\sim-30V$, $T_J=25^{\circ}C$ | | 12 | 300 | mV |
| | | $V_{IN}=-20V\sim-26V$, $T_J=25^{\circ}C$ | | 6 | 150 | mV |
| Load Regulation | ΔV_{OUT} | $I_{OUT}=5mA\sim 1A$, $T_J=25^{\circ}C$ | | 12 | 300 | mV |
| | | $I_{OUT}=250mA\sim 750mA$, $T_J=25^{\circ}C$ | | 4 | 150 | mV |
| Quiescent Current | I_Q | $T_J=25^{\circ}C$ | | 3 | 6 | mA |
| Quiescent Current Change | ΔI_Q | $I_{OUT}=5mA\sim 1A$ | | 0.05 | 0.5 | mA |
| | | $V_{IN}=-17.5V\sim-30.5V$ | | 0.1 | 1.0 | mA |
| Output Noise Voltage | eN | $f=10Hz\sim 100kHz$, $T_a=25^{\circ}C$ | | 250 | | μV |
| Output Voltage Drift | $\Delta V_{OUT}/\Delta T$ | $I_{OUT}=5mA$ | | -0.9 | | $mV/^{\circ}C$ |
| Ripple Rejection | RR | $V_{IN}=-18.5V\sim-28.5V$, $f=120Hz$ | 54 | 60 | | dB |
| Peak Current | I_{PEAK} | $T_J=25^{\circ}C$ | | 2.2 | | A |

■ ELECTRICAL CHARACTERISTICS(Cont.)

For UTC 79D18A ($V_{IN}=-27V$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|---------------------------|---|--------|-------|--------|-----------------|
| Output Voltage | V_{OUT} | $T_J=25^{\circ}C$ | -17.28 | -18.0 | -18.72 | V |
| | | $V_{IN}=-21V\sim-33V$ $I_{OUT}=5mA\sim 1A, P_D \leq 15W$ | -17.10 | | -18.90 | V |
| Dropout Voltage | V_D | $I_{OUT}=1A$ $T_J=25^{\circ}C$ | | 2 | | V |
| Line Regulation | ΔV_{OUT} | $V_{IN}=-21V\sim-33V$ $T_J=25^{\circ}C$ | | 15 | 360 | mV |
| | | $V_{IN}=-24V\sim-30V$ $T_J=25^{\circ}C$ | | 8 | 180 | mV |
| Load Regulation | ΔV_{OUT} | $I_{OUT}=5mA\sim 1A$ $T_J=25^{\circ}C$ | | 15 | 360 | mV |
| | | $I_{OUT}=250mA\sim 750mA$ $T_J=25^{\circ}C$ | | 5.0 | 180 | mV |
| Quiescent Current | I_Q | $T_J=25^{\circ}C$ | | 3 | 6 | mA |
| Quiescent Current Change | ΔI_Q | $I_{OUT}=5mA\sim 1A$ | | 0.05 | 0.5 | mA |
| | | $V_{IN}=-21V\sim-32V$ | | 0.1 | 1.0 | mA |
| Output Noise Voltage | eN | $f=10Hz\sim 100kHz$ $T_a=25^{\circ}C$ | | 300 | | μV |
| Output Voltage Drift | $\Delta V_{OUT}/\Delta T$ | $I_{OUT}=5mA$ | | -1 | | mV/ $^{\circ}C$ |
| Ripple Rejection | RR | $V_{IN}=-22V\sim-32V, f=120Hz$ | 54 | 60 | | dB |
| Peak Current | I_{PEAK} | $T_J=25^{\circ}C$ | | 2.2 | | A |

For UTC 79D24A ($V_{IN}=-33V$)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|---------------------------|---|--------|------|--------|-----------------|
| Output Voltage | V_{OUT} | $T_J=25^{\circ}C$ | -23.04 | -24 | -24.96 | V |
| | | $V_{IN}=-27V\sim-38V$ $I_{OUT}=5mA\sim 1A, P_D \leq 15W$ | -22.80 | | -25.20 | V |
| Dropout Voltage | V_D | $I_{OUT}=1.0A$ $T_J=25^{\circ}C$ | | 2 | | V |
| Line Regulation | ΔV_{OUT} | $V_{IN}=-27V\sim-38V$ $T_J=25^{\circ}C$ | | 15 | 480 | mV |
| | | $V_{IN}=-30V\sim-36V$ $T_J=25^{\circ}C$ | | 8 | 240 | mV |
| Load Regulation | ΔV_{OUT} | $I_{OUT}=5mA\sim 1A$ $T_J=25^{\circ}C$ | | 15 | 480 | mV |
| | | $I_{OUT}=250mA\sim 750mA$ $T_J=25^{\circ}C$ | | 5.0 | 240 | mV |
| Quiescent Current | I_Q | $T_J=25^{\circ}C$ | | 3 | 6 | mA |
| Quiescent Current Change | ΔI_Q | $I_{OUT}=5mA\sim 1A$ | | 0.05 | 0.5 | mA |
| | | $V_{IN}=-27V\sim-38V$ | | 0.1 | 1.0 | mA |
| Output Noise Voltage | eN | $f=10Hz\sim 100kHz$ $T_a=25^{\circ}C$ | | 400 | | μV |
| Output Voltage Drift | $\Delta V_{OUT}/\Delta T$ | $I_{OUT}=5mA$ | | -1 | | mV/ $^{\circ}C$ |
| Ripple Rejection | RR | $V_{IN}=-28V\sim-38V, f=120Hz$ | 54 | 60 | | dB |
| Peak Current | I_{PEAK} | $T_J=25^{\circ}C$ | | 2.2 | | A |

■ APPLICATION CIRCUITS

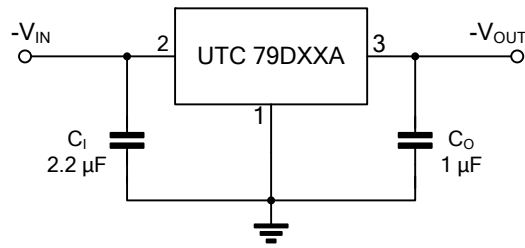


Fig.1 Fixed output regulator

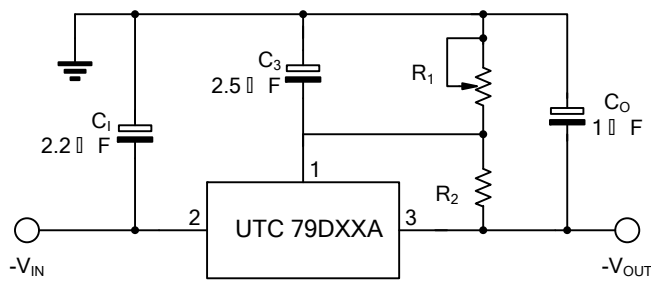
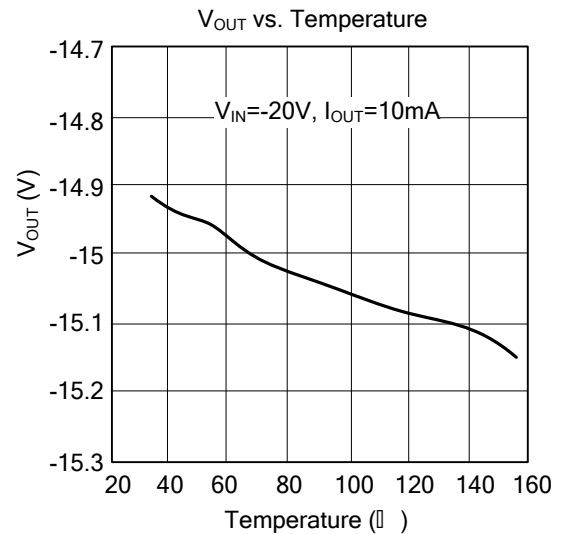
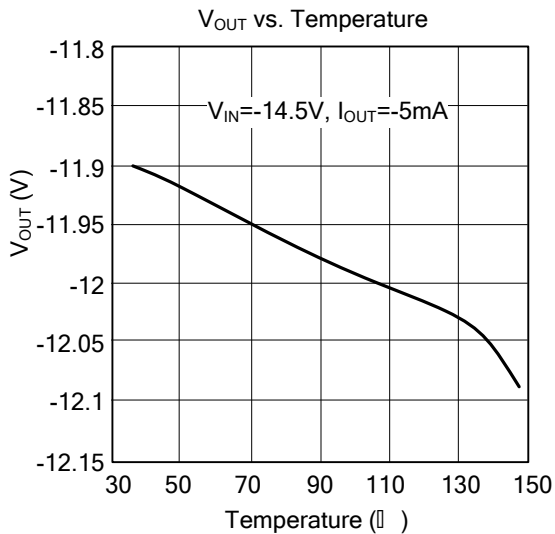
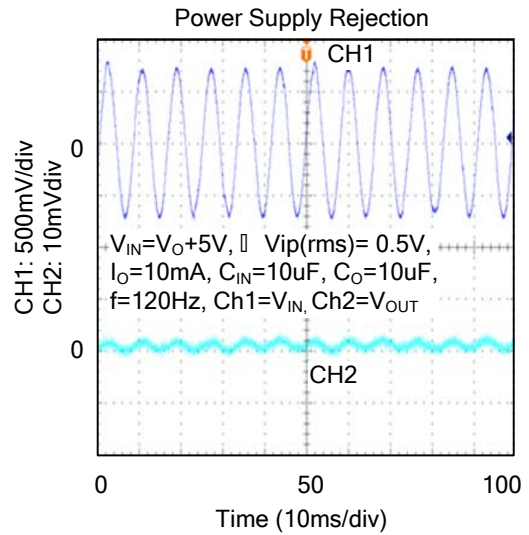
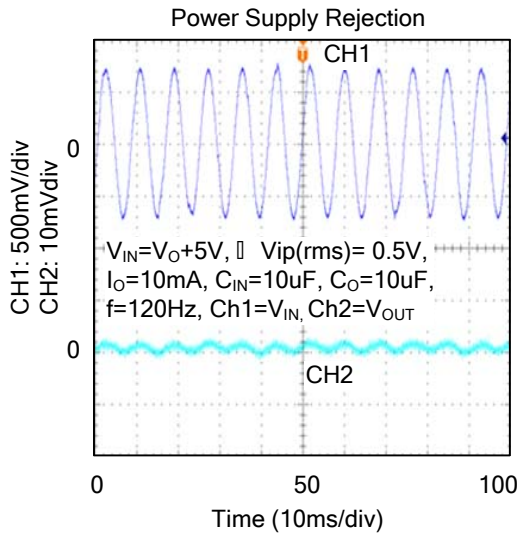
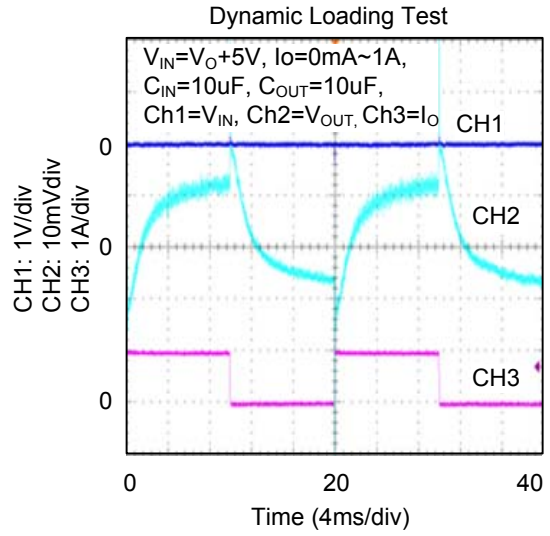
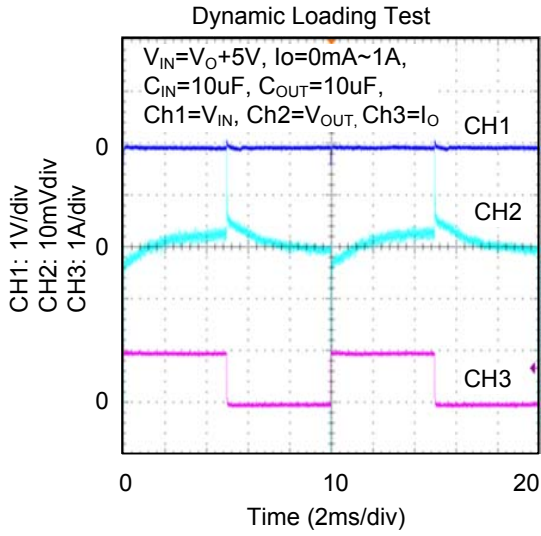
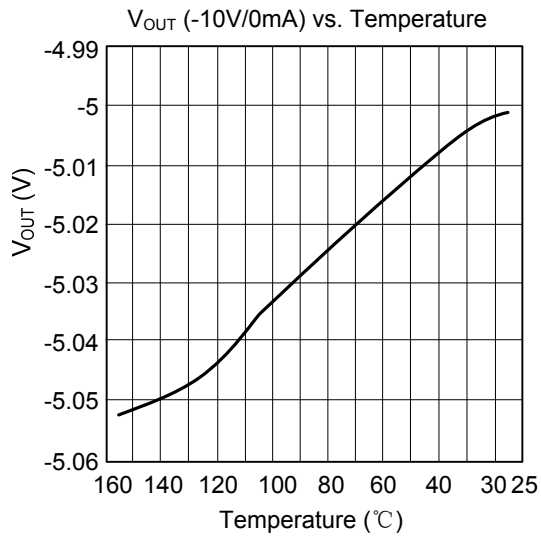


Fig.2 Circuit for increasing output voltage

■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



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