

# LM79XX

# LINEAR INTEGRATED CIRCUIT

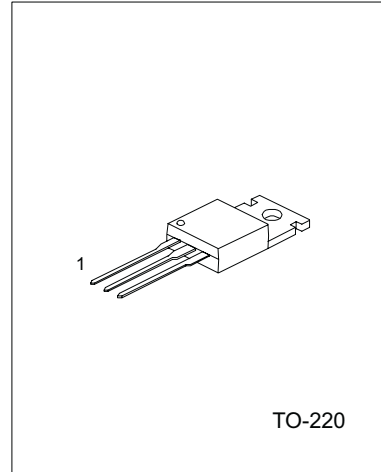
## 3 TERMINAL 1A NEGATIVE VOLTAGE REGULATOR

### DESCRIPTION

The Contek LM79XX series of three-terminal negative regulators are available in TO-220 package and with several fixed output voltage, making them useful in a wide range of application. Each type employs internal current limiting, thermal shut-down and safe area protection, making it essentially indestructible.

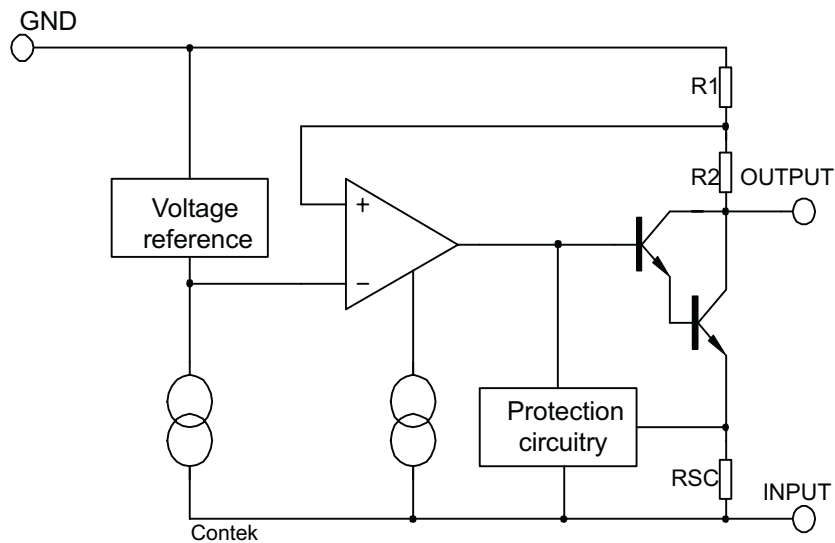
### FEATURES

- \*Output current up to 1A
- \*-5V;-6V;-8V;-12V;-15V;-18V;-24V output voltage available
- \*Thermal overload protection
- \*Short circuit protection



1:GND 2:Input 3:Output

### BLOCK DIAGRAM



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## ABSOLUTE MAXIMUM RATINGS (Ta=25 °C)

| PARAMETER                         | SYMBOL | VALUE      | UNIT  |
|-----------------------------------|--------|------------|-------|
| Input voltage                     | Vi     | -35        | V     |
| Thermal resistance junction-air   | R θ JA | 65         | °C /W |
| Thermal resistance junction-cases | R θ JC | 5          | °C /W |
| Operating Temperature             | Topr   | 0 ~ +125   | °C    |
| Storage Temperature               | Tstg   | -65 ~ +150 | °C    |

## Contek7905 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, 0<Tj<125 °C, Io=500mA, Vi=-10V, Ci=33uF, Co=1uF, unless otherwise specified)

| PARAMETER                | SYMBOL | TEST CONDITIONS                         | MIN   | TYP   | MAX   | UNIT   |
|--------------------------|--------|---|-------|-------|-------|--------|
| Output voltage           | Vo     | Tj=25 °C                                | -4.8  | -5.0  | -5.2  | V      |
|                          |        | 5.0mA<Io<1.0A, Po<15W<br>Vi=-7V to -20V | -4.75 | -5.00 | -5.25 | V      |
| Line regulation          | ΔVo    | Tj=25 °C, Vi=-7V to -25V                |       | 10    | 100   | mV     |
|                          |        | Tj=25 °C, Vi=-8V to -12V                |       |       |       | mV     |
| Load regulation          | ΔVo    | Tj=25 °C, Io=5.0mA to 1.5A              |       | 10    | 100   | mV     |
|                          |        | Tj=25 °C, Io=250mA to 750mA             |       | 3     | 50    | mV     |
| Quiescent current        | Iq     | Tj=25 °C                                |       | 3     | 6     | mA     |
| Quiescent current change | ΔIq    | Io=5mA to 1.0A                          |       | 0.05  | 0.5   | mA     |
|                          |        | Vi=-7V to -25V                          |       | 0.1   | 1.3   | mA     |
| Output voltage drift     | ΔVo/ΔT | Io=5mA                                  |       | -0.4  |       | mV/ °C |
| Output noise voltage     | VN     | f=10Hz to 100kHz, Ta=25 °C              |       | 100   |       | μV     |
| Ripple rejection         | RR     | f=120Hz, Vi=-8V to -18V                 | 54    | 60    |       | dB     |
| Dropout voltage          | Vo     | Io=1.0A, Tj=25 °C                       |       | 2     |       | V      |
| Short circuit current    | Isc    | Vi=-35V, Ta=25 °C                       |       | 300   |       | mA     |
| peak current             | Ipk    | Tj=25 °C                                |       | 2.2   |       | A      |

## Contek7906 ELECTRICAL CHARACTERISTICS

(Refer to test circuits, 0<Tj<125 °C, Io=500mA, Vi=-11V, Ci=2.2uF, Co=1uF, unless otherwise specified)

| PARAMETER                | SYMBOL | TEST CONDITIONS                         | MIN   | TYP   | MAX   | UNIT   |
|--------------------------|--------|---|-------|-------|-------|--------|
| Output voltage           | Vo     | Tj=25 °C                                | -5.75 | -6.00 | -6.25 | V      |
|                          |        | 5.0mA<Io<1.0A, Po<15W<br>Vi=-8V to -21V | -5.7  | -6.0  | -6.3  | V      |
| Line regulation          | ΔVo    | Tj=25 °C, Vi=-8V to -25V                |       | 10    | 120   | mV     |
|                          |        | Tj=25 °C, Vi=-9V to -13V                |       | 5     | 60    | mV     |
| Load regulation          | ΔVo    | Tj=25 °C, Io=5.0mA to 1.5A              |       | 10    | 120   | mV     |
|                          |        | Tj=25 °C, Io=250mA to 750mA             |       | 3     | 60    | mV     |
| Quiescent current        | Iq     | Tj=25 °C                                |       | 3     | 6     | mA     |
| Quiescent current change | ΔIq    | Io=5mA to 1.0A                          |       |       | 0.5   | mA     |
|                          |        | Vi=-8V to -25V                          |       |       | 1.3   | mA     |
| Output voltage drift     | ΔVo/ΔT | Io=5mA                                  |       | -0.5  |       | mV/ °C |
| Output noise voltage     | VN     | f=10Hz to 100kHz, Ta=25 °C              |       | 130   |       | μV     |
| Ripple rejection         | RR     | f=120Hz, Vi=-9V to -19V                 | 54    | 60    |       | dB     |
| Dropout voltage          | Vo     | Io=1.0A, Tj=25 °C                       |       | 2     |       | V      |
| Short circuit current    | Isc    | Vi=-35V, Ta=25 °C                       |       | 300   |       | mA     |
| peak current             | Ipk    | Tj=25 °C                                |       | 2.2   |       | A      |



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## Contek7908 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125$  C,  $I_o = 500\text{mA}$ ,  $V_i = -14\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

| PARAMETER                | SYMBOL                  | TEST CONDITIONS   | MIN  | TYP  | MAX  | UNIT          |
|--------------------------|-------------------------|---|------|------|------|---------------|
| Output voltage           | $V_o$                   | $T_j = 25$ C  | -7.7 | -8.0 | -8.3 | V             |
|                          |                         | $5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o < 15\text{W}$<br>$V_i = -10.5\text{V}$ to $-23\text{V}$ | -7.6 | -8.0 | -8.4 | V             |
| Line regulation          | $\Delta V_o$            | $T_j = 25$ C, $V_i = -10.5\text{V}$ to $-25\text{V}$  |      | 10   | 100  | mV            |
|                          |                         | $T_j = 25$ C, $V_i = -11.5\text{V}$ to $-17\text{V}$  |      | 5    | 80   | mV            |
| Load regulation          | $\Delta V_o$            | $T_j = 25$ C, $I_o = 5.0\text{mA}$ to $1.5\text{A}$   |      | 12   | 160  | mV            |
|                          |                         | $T_j = 25$ C, $I_o = 250\text{mA}$ to $750\text{mA}$  |      | 4    | 80   | mV            |
| Quiescent current        | $I_Q$                   | $T_j = 25$ C  |      | 3    | 6    | mA            |
| Quiescent current change | $\Delta I_Q$            | $I_o = 5\text{mA}$ to $1.0\text{A}$   |      | 0.05 | 0.5  | mA            |
|                          |                         | $V_i = -11.5\text{V}$ to $-25\text{V}$  |      | 0.1  | 1.0  | mA            |
| Output voltage drift     | $\Delta V_o / \Delta T$ | $I_o = 5\text{mA}$  |      | -0.6 |      | mV/ C         |
| Output noise voltage     | $V_N$                   | $f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25$ C   |      | 175  |      | $\mu\text{V}$ |
| Ripple rejection         | RR                      | $f = 120\text{Hz}$ , $V_i = -11.5\text{V}$ to $-21.5\text{V}$                                     | 54   | 60   |      | dB            |
| Dropout voltage          | $V_o$                   | $I_o = 1.0\text{A}$ , $T_j = 25$ C  |      | 2    |      | V             |
| Short circuit current    | $I_{sc}$                | $V_i = -35\text{V}$ , $T_a = 25$ C  |      | 300  |      | mA            |
| peak current             | $I_{pk}$                | $T_j = 25$ C  |      | 2.2  |      | A             |

## Contek7912 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125$  C,  $I_o = 500\text{mA}$ ,  $V_i = -18\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

| PARAMETER                | SYMBOL                  | TEST CONDITIONS   | MIN   | TYP   | MAX   | UNIT          |
|--------------------------|-------------------------|---|-------|-------|-------|---------------|
| Output voltage           | $V_o$                   | $T_j = 25$ C  | -11.5 | -12.0 | -12.5 | V             |
|                          |                         | $5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o < 15\text{W}$<br>$V_i = -14.5\text{V}$ to $-27\text{V}$ | -11.4 | -12   | -12.6 | V             |
| Line regulation          | $\Delta V_o$            | $T_j = 25$ C, $V_i = -14.5\text{V}$ to $-30\text{V}$  |       | 12    | 240   | mV            |
|                          |                         | $T_j = 25$ C, $V_i = -16\text{V}$ to $-22\text{V}$  |       | 6     | 120   | mV            |
| Load regulation          | $\Delta V_o$            | $T_j = 25$ C, $I_o = 5.0\text{mA}$ to $1.5\text{A}$   |       | 12    | 240   | mV            |
|                          |                         | $T_j = 25$ C, $I_o = 250\text{mA}$ to $750\text{mA}$  |       | 4     | 120   | mV            |
| Quiescent current        | $I_Q$                   | $T_j = 25$ C  |       | 3     | 6     | mA            |
| Quiescent current change | $\Delta I_Q$            | $I_o = 5\text{mA}$ to $1.0\text{A}$   |       | 0.05  | 0.5   | mA            |
|                          |                         | $V_i = -14.5\text{V}$ to $-30\text{V}$  |       | 0.1   | 1.0   | mA            |
| Output voltage drift     | $\Delta V_o / \Delta T$ | $I_o = 5\text{mA}$  |       | -0.8  |       | mV/ C         |
| Output noise voltage     | $V_N$                   | $f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25$ C   |       | 200   |       | $\mu\text{V}$ |
| Ripple rejection         | RR                      | $f = 120\text{Hz}$ , $V_i = -15\text{V}$ to $-25\text{V}$   | 54    | 60    |       | dB            |
| Dropout voltage          | $V_o$                   | $I_o = 1.0\text{A}$ , $T_j = 25$ C  |       | 2     |       | V             |
| Short circuit current    | $I_{sc}$                | $V_i = -35\text{V}$ , $T_a = 25$ C  |       | 300   |       | mA            |
| peak current             | $I_{pk}$                | $T_j = 25$ C  |       | 2.2   |       | A             |



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## Contek7915 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125$  C,  $I_o = 500\text{mA}$ ,  $V_i = -23\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

| PARAMETER                | SYMBOL                  | TEST CONDITIONS   | MIN    | TYP   | MAX    | UNIT          |
|--------------------------|-------------------------|---|--------|-------|--------|---------------|
| Output voltage           | $V_o$                   | $T_j = 25$ C  | -14.4  | -15.0 | -15.6  | V             |
|                          |                         | $5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o < 15\text{W}$<br>$V_i = -17.5\text{V}$ to $-30\text{V}$ | -14.25 | -15   | -15.75 | V             |
| Line regulation          | $\Delta V_o$            | $T_j = 25$ C, $V_i = -17.5\text{V}$ to $-30\text{V}$  |        | 12    | 300    | mV            |
|                          |                         | $T_j = 25$ C, $V_i = -20\text{V}$ to $-26\text{V}$  |        | 6     | 150    | mV            |
| Load regulation          | $\Delta V_o$            | $T_j = 25$ C, $I_o = 5.0\text{mA}$ to $1.5\text{A}$   |        | 12    | 300    | mV            |
|                          |                         | $T_j = 25$ C, $I_o = 250\text{mA}$ to $750\text{mA}$  |        | 4     | 150    | mV            |
| Quiescent current        | $I_Q$                   | $T_j = 25$ C  |        | 3     | 6      | mA            |
| Quiescent current change | $\Delta I_Q$            | $I_o = 5\text{mA}$ to $1.0\text{A}$   |        | 0.05  | 0.5    | mA            |
|                          |                         | $V_i = -17.5\text{V}$ to $-30.5\text{V}$  |        | 0.1   | 1.0    | mA            |
| Output voltage drift     | $\Delta V_o / \Delta T$ | $I_o = 5\text{mA}$  |        | -0.9  |        | mV/ C         |
| Output noise voltage     | $V_N$                   | $f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25$ C   |        | 250   |        | $\mu\text{V}$ |
| Ripple rejection         | RR                      | $f = 120\text{Hz}$ , $V_i = -18.5\text{V}$ to $-28.5\text{V}$                                     | 54     | 60    |        | dB            |
| Dropout voltage          | $V_o$                   | $I_o = 1.0\text{A}$ , $T_j = 25$ C  |        | 2     |        | V             |
| Short circuit current    | $I_{sc}$                | $V_i = -35\text{V}$ , $T_a = 25$ C  |        | 300   |        | mA            |
| peak current             | $I_{pk}$                | $T_j = 25$ C  |        | 2.2   |        | A             |

## Contek7918 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125$  C,  $I_o = 500\text{mA}$ ,  $V_i = -27\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

| PARAMETER                | SYMBOL                  | TEST CONDITIONS   | MIN   | TYP   | MAX   | UNIT          |
|--------------------------|-------------------------|---|-------|-------|-------|---------------|
| Output voltage           | $V_o$                   | $T_j = 25$ C  | -17.3 | -18.0 | -18.7 | V             |
|                          |                         | $5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o < 15\text{W}$<br>$V_i = -21\text{V}$ to $-33\text{V}$ | -17.1 | -18   | -18.9 | V             |
| Line regulation          | $\Delta V_o$            | $T_j = 25$ C, $V_i = -21\text{V}$ to $-33\text{V}$  |       | 15    | 360   | mV            |
|                          |                         | $T_j = 25$ C, $V_i = -24\text{V}$ to $-30\text{V}$  |       | 8     | 180   | mV            |
| Load regulation          | $\Delta V_o$            | $T_j = 25$ C, $I_o = 5.0\text{mA}$ to $1.5\text{A}$   |       | 15    | 360   | mV            |
|                          |                         | $T_j = 25$ C, $I_o = 250\text{mA}$ to $750\text{mA}$  |       | 5.0   | 180   | mV            |
| Quiescent current        | $I_Q$                   | $T_j = 25$ C  |       | 3     | 6     | mA            |
| Quiescent current change | $\Delta I_Q$            | $I_o = 5\text{mA}$ to $1.0\text{A}$   |       |       | 0.5   | mA            |
|                          |                         | $V_i = -21\text{V}$ to $-32\text{V}$  |       |       | 1.0   | mA            |
| Output voltage drift     | $\Delta V_o / \Delta T$ | $I_o = 5\text{mA}$  |       | -1    |       | mV/ C         |
| Output noise voltage     | $V_N$                   | $f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25$ C   |       | 300   |       | $\mu\text{V}$ |
| Ripple rejection         | RR                      | $f = 120\text{Hz}$ , $V_i = -22\text{V}$ to $-32\text{V}$                                       | 54    | 60    |       | dB            |
| Dropout voltage          | $V_o$                   | $I_o = 1.0\text{A}$ , $T_j = 25$ C  |       | 2     |       | V             |
| Short circuit current    | $I_{sc}$                | $V_i = -35\text{V}$ , $T_a = 25$ C  |       | 300   |       | mA            |
| peak current             | $I_{pk}$                | $T_j = 25$ C  |       | 2.2   |       | A             |



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# LM79XX

# LINEAR INTEGRATED CIRCUIT

## Contek7924 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125$  C,  $I_o = 500\text{mA}$ ,  $V_i = -33\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

| PARAMETER                | SYMBOL                  | TEST CONDITIONS   | MIN   | TYP | MAX   | UNIT          |
|--------------------------|-------------------------|---|-------|-----|-------|---------------|
| Output voltage           | $V_o$                   | $T_j = 25$ C  | -23   | -24 | -25   | V             |
|                          |                         | $5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o < 15\text{W}$<br>$V_i = -27\text{V}$ to $-38\text{V}$ | -22.8 | -24 | -25.2 | V             |
| Line regulation          | $\Delta V_o$            | $T_j = 25$ C, $V_i = -27\text{V}$ to $-38\text{V}$  |       | 15  | 480   | mV            |
|                          |                         | $T_j = 25$ C, $V_i = -30\text{V}$ to $-36\text{V}$  |       | 8   | 240   | mV            |
| Load regulation          | $\Delta V_o$            | $T_j = 25$ C, $I_o = 5.0\text{mA}$ to $1.5\text{A}$   |       | 15  | 480   | mV            |
|                          |                         | $T_j = 25$ C, $I_o = 250\text{mA}$ to $750\text{mA}$  |       | 5.0 | 240   | mV            |
| Quiescent current        | $I_Q$                   | $T_j = 25$ C  |       | 3   | 6     | mA            |
| Quiescent current change | $\Delta I_Q$            | $I_o = 5\text{mA}$ to $1.0\text{A}$   |       |     | 0.5   | mA            |
|                          |                         | $V_i = -27\text{V}$ to $-38\text{V}$  |       |     | 1.0   | mA            |
| Output voltage drift     | $\Delta V_o / \Delta T$ | $I_o = 5\text{mA}$  |       | -1  |       | mV/ C         |
| Output noise voltage     | $V_N$                   | $f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25$ C   |       | 400 |       | $\mu\text{V}$ |
| Ripple rejection         | RR                      | $f = 120\text{Hz}$ , $V_i = -28\text{V}$ to $-38\text{V}$                                       | 54    | 60  |       | dB            |
| Dropout voltage          | $V_o$                   | $I_o = 1.0\text{A}$ , $T_j = 25$ C  |       | 2   |       | V             |
| Short circuit current    | $I_{sc}$                | $V_i = -35\text{V}$ , $T_a = 25$ C  |       | 300 |       | mA            |
| peak current             | $I_{pk}$                | $T_j = 25$ C  |       | 2.2 |       | A             |

## APPLICATION CIRCUITS

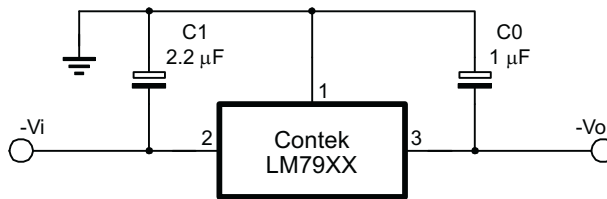


Fig.1 Fixed output regulator

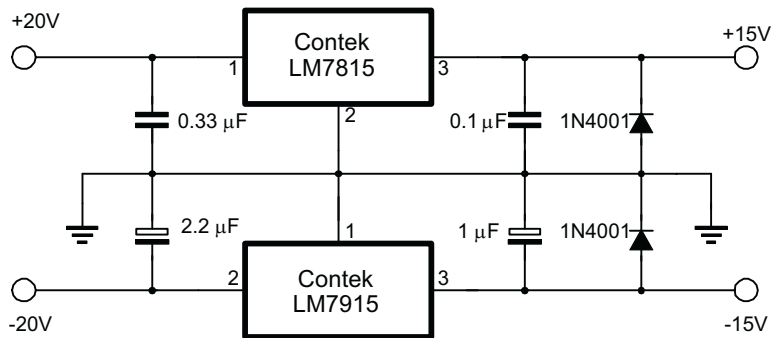


Fig.2 Split power supply(+15V,1A)



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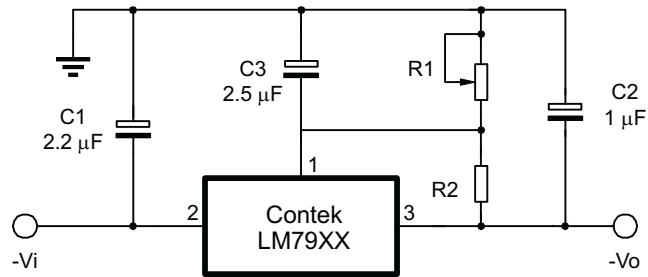


Fig.3 Circuit for increasing output voltage

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