

# UTCLM79XX LINEAR INTEGRATED CIRCUIT

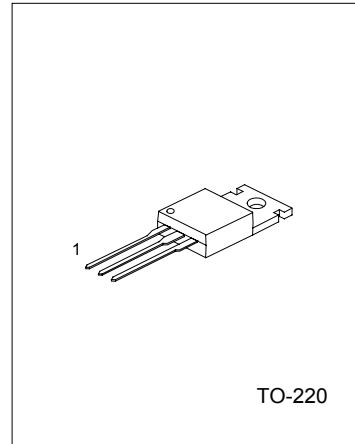
## 3 TERMINAL 1A NEGATIVE VOLTAGE REGULATOR

### DESCRIPTION

The UTC 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.

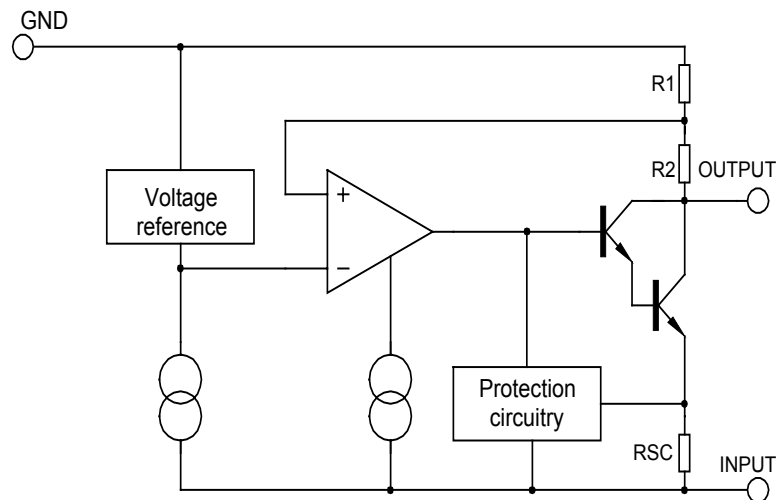
### FEATURES

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



1:GND 2:Input 3:Output

### BLOCK DIAGRAM



# UTCLM79XX LINEAR INTEGRATED CIRCUIT

## ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Input voltage	$V_i$	-35	V
Output Current	$I_o$	1	A
Power Dissipation	$P_D$	Internally Limited	W
Thermal Resistance Junction-Air	$R_{\theta JA}$	65	°C/W
Thermal Resistance Junction-Cases	$R_{\theta JC}$	5	°C/W
Operating Junction Temperature Range	$T_{opr}$	0 ~ +125	°C
Storage Temperature Range	$T_{stg}$	-65 ~ +150	°C

## UTC7905 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -10\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-4.80	-5.0	-5.20	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o \leq 15\text{W}$ $V_i = -7\text{V}$ to $-20\text{V}$	-4.75		-5.25	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -7\text{V}$ to $-25\text{V}$		10	100	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -8\text{V}$ to $-12\text{V}$				mV
Load regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5.0\text{mA}$ to $1.0\text{A}$		10	100	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$		3	50	mV
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$		3	6	mA
Quiescent current change	$\Delta I_q$	$I_o = 5\text{mA}$ to $1.0\text{A}$		0.05	0.5	mA
		$V_i = -7\text{V}$ to $-25\text{V}$		0.1	1.3	mA
Output voltage drift	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-0.4		mV/°C
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		100		$\mu\text{V}$
Ripple rejection	RR	$f = 120\text{Hz}$ , $V_i = -8\text{V}$ to $-18\text{V}$	54	60		dB
Dropout voltage	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2		V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
peak current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

## UTC7906 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -11\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-5.76	-6.00	-6.24	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o \leq 15\text{W}$ $V_i = -8\text{V}$ to $-21\text{V}$	-5.70		-6.30	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -8\text{V}$ to $-25\text{V}$		10	120	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -9\text{V}$ to $-13\text{V}$		5	60	mV
Load regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5.0\text{mA}$ to $1.0\text{A}$		10	120	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$		3	60	mV
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$		3	6	mA
Quiescent current change	$\Delta I_q$	$I_o = 5\text{mA}$ to $1.0\text{A}$		0.05	0.5	mA
		$V_i = -8\text{V}$ to $-25\text{V}$		0.1	1.3	mA
Output voltage drift	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-0.5		mV/°C
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		130		$\mu\text{V}$
Ripple rejection	RR	$f = 120\text{Hz}$ , $V_i = -9\text{V}$ to $-19\text{V}$	54	60		dB
Dropout voltage	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2		V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
peak current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

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QW-R101-007,E

# UTC LM79XX LINEAR INTEGRATED CIRCUIT

## UTC7908 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-7.68	-8.0	-8.32	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o \leq 15\text{W}$ $V_i = -10.5\text{V}$ to $-23\text{V}$	-7.60		-8.40	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -10.5\text{V}$ to $-25\text{V}$		10	160	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -11.5\text{V}$ to $-17\text{V}$		5	80	mV
Load regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5.0\text{mA}$ to $1.0\text{A}$		12	160	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$		4	80	mV
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$		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/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		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	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2		V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
peak current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

## UTC LM7909 ELECTRICAL CHARACTERISTICS

(Refer to test circuits,  $0 < T_j < 125^\circ\text{C}$ ,  $I_o = 500\text{mA}$ ,  $V_i = -15\text{V}$ ,  $C_i = 2.2\mu\text{F}$ ,  $C_o = 1\mu\text{F}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_o$	$T_j = 25^\circ\text{C}$	-8.64	-9.0	-9.36	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_d \leq 15\text{W}$ $V_i = -11.5\text{V}$ to $-23\text{V}$	-8.55		-9.45	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -11.5\text{V}$ to $-26\text{V}$		10	180	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -12\text{V}$ to $-18\text{V}$		5	90	mV
Load Regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5\text{mA}$ - $1.0\text{A}$		12	180	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 0.25\text{A}$ - $0.75\text{A}$		4	90	mV
Quiescent Current	$I_q$	$T_j = 25^\circ\text{C}$		3	6	mA
Quiescent Current Change	$\Delta I_q$	$I_o = 5\text{mA}$ - $1.0\text{A}$		0.05	0.5	mA
		$V_i = -11.5\text{V}$ to $-26\text{V}$		0.1	1.0	mA
Temperature coefficient of $V_o$	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-0.6		mV/ $^\circ\text{C}$
Output Noise Voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		175		$\mu\text{V}$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $T_j = 25^\circ\text{C}$ , $V_i = -12.5\text{V}$ to $-22.5\text{V}$	54	60		dB
Dropout Voltage	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2.0		V
Short-Circuit Current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
Peak Output Current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

# UTCLM79XX LINEAR INTEGRATED CIRCUIT

## UTC7912 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-11.52	-12.0	-12.48	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o \leq 15\text{W}$ $V_i = -14.5\text{V}$ to $-27\text{V}$	-11.40		-12.60	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -14.5\text{V}$ to $-30\text{V}$		12	240	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -16\text{V}$ to $-22\text{V}$		6	120	mV
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Load regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5.0\text{mA}$ to $1.0\text{A}$		12	240	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$		4	120	mV
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$		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/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		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	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2		V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
peak current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

## UTC7915 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-14.40	-15.0	-15.60	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o \leq 15\text{W}$ $V_i = -17.5\text{V}$ to $-30\text{V}$	-14.25		-15.75	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -17.5\text{V}$ to $-30\text{V}$		12	300	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -20\text{V}$ to $-26\text{V}$		6	150	mV
Load regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5.0\text{mA}$ to $1.0\text{A}$		12	300	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$		4	150	mV
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$		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/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		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	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2		V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
peak current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

# UTC LM79XX LINEAR INTEGRATED CIRCUIT

## UTC7918 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-17.28	-18.0	-18.72	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o \leq 15\text{W}$ $V_i = -21\text{V}$ to $-33\text{V}$	-17.10		-18.90	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -21\text{V}$ to $-33\text{V}$		15	360	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -24\text{V}$ to $-30\text{V}$		8	180	mV
Load regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5.0\text{mA}$ to $1.0\text{A}$		15	360	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$		5.0	180	mV
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$		3	6	mA
Quiescent current change	$\Delta I_q$	$I_o = 5\text{mA}$ to $1.0\text{A}$		0.05	0.5	mA
		$V_i = -21\text{V}$ to $-32\text{V}$		0.1	1.0	mA
Output voltage drift	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-1		mV/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		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	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2		V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
peak current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

## UTC7924 ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output voltage	$V_o$	$T_j = 25^\circ\text{C}$	-23.04	-24	-24.96	V
		$5.0\text{mA} < I_o < 1.0\text{A}$ , $P_o \leq 15\text{W}$ $V_i = -27\text{V}$ to $-38\text{V}$	-22.80		-25.20	V
Line regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $V_i = -27\text{V}$ to $-38\text{V}$		15	480	mV
		$T_j = 25^\circ\text{C}$ , $V_i = -30\text{V}$ to $-36\text{V}$		8	240	mV
Load regulation	$\Delta V_o$	$T_j = 25^\circ\text{C}$ , $I_o = 5.0\text{mA}$ to $1.0\text{A}$		15	480	mV
		$T_j = 25^\circ\text{C}$ , $I_o = 250\text{mA}$ to $750\text{mA}$		5.0	240	mV
Quiescent current	$I_q$	$T_j = 25^\circ\text{C}$		3	6	mA
Quiescent current change	$\Delta I_q$	$I_o = 5\text{mA}$ to $1.0\text{A}$		0.05	0.5	mA
		$V_i = -27\text{V}$ to $-38\text{V}$		0.1	1.0	mA
Output voltage drift	$\Delta V_o / \Delta T$	$I_o = 5\text{mA}$		-1		mV/ $^\circ\text{C}$
Output noise voltage	$V_N$	$f = 10\text{Hz}$ to $100\text{kHz}$ , $T_a = 25^\circ\text{C}$		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	$V_d$	$I_o = 1.0\text{A}$ , $T_j = 25^\circ\text{C}$		2		V
Short circuit current	$I_{sc}$	$V_i = -35\text{V}$ , $T_a = 25^\circ\text{C}$		300		mA
peak current	$I_{pk}$	$T_j = 25^\circ\text{C}$		2.2		A

# UTC LM79XX LINEAR INTEGRATED CIRCUIT

## APPLICATION CIRCUITS

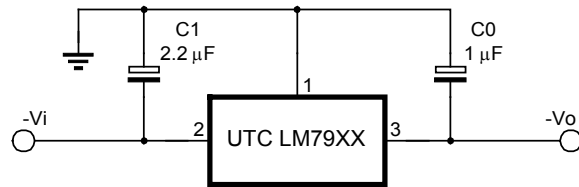


Fig.1 Fixed output regulator

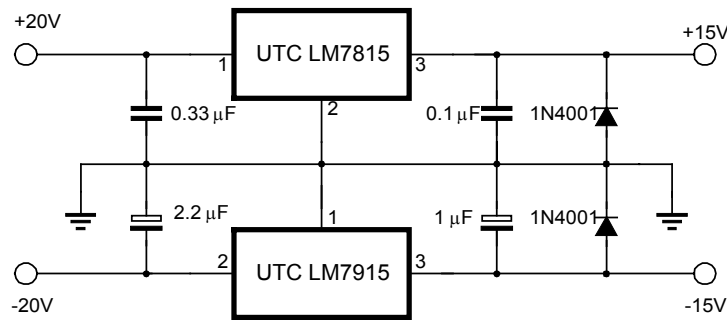


Fig.2 Split power supply(+15V,1A)

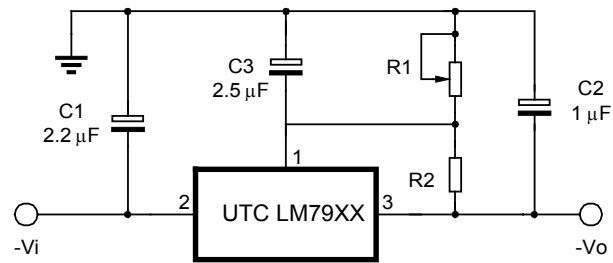


Fig.3 Circuit for increasing output voltage

# UTCLM79XX LINEAR INTEGRATED CIRCUIT

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