



## UT7500

CMOS IC

### HIGH DRIVER REGULATOR

#### DESCRIPTION

The UTC **UT7500** series is a low voltage regulator implemented by CMOS technology which is composed of a three-terminal high current. The input voltage for it is allowed as high as 24V and the output voltage are fixed at 1.8V, 2.5V, 3.0V、3.3V、3.6V、4.0V and 5.0V. Besides, it delivers 100mA output current. Other outstanding features of UTC **UT7500** include low voltage drop and low quiescent current.

When being used with external components, UTC **UT7500** can obtain variable voltages and currents.

UTC **UT7500** series is very suitable for applications, such as battery-powered equipment, communication equipment and audio/video equipment.

#### FEATURES

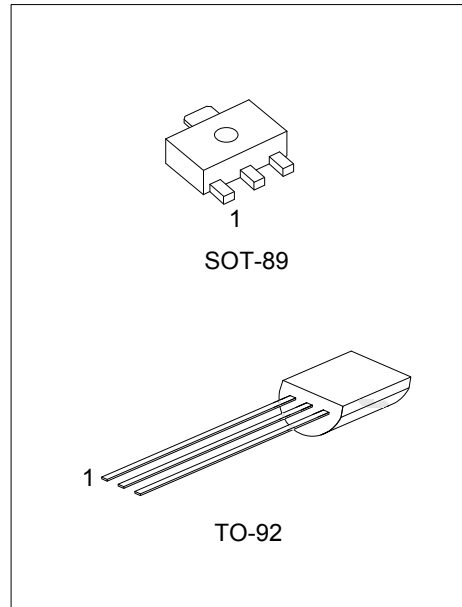
- \* Very Low Power Consumption
- \* Very Low Voltage Drop
- \* Very Low Temperature Coefficient
- \* Up to 24V Input Voltage
- \* 100mA @  $P_D \leq 250mW$  Output Current
- \* Tolerance  $\pm 3\%$

#### ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UT7500L-xx-AB3-B-R	UT7500G-xx-AB3-B-R	SOT-89	O	G	I	Tape Reel
UT7500L-xx-AB3-C-R	UT7500G-xx-AB3-C-R	SOT-89	G	I	O	Tape Reel
UT7500L-xx-T92-B-B	UT7500G-xx-T92-B-B	TO-92	O	G	I	Tape Box
UT7500L-xx-T92-B-K	UT7500G-xx-T92-B-K	TO-92	O	G	I	Bulk
UT7500L-xx-T92-C-B	UT7500G-xx-T92-C-B	TO-92	G	I	O	Tape Box
UT7500L-xx-T92-C-K	UT7500G-xx-T92-C-K	TO-92	G	I	O	Bulk

Note: Pin Assignment: I:V<sub>IN</sub> O:V<sub>OUT</sub> G:GND  
 xx: Output Voltage, refer to Marking Information.

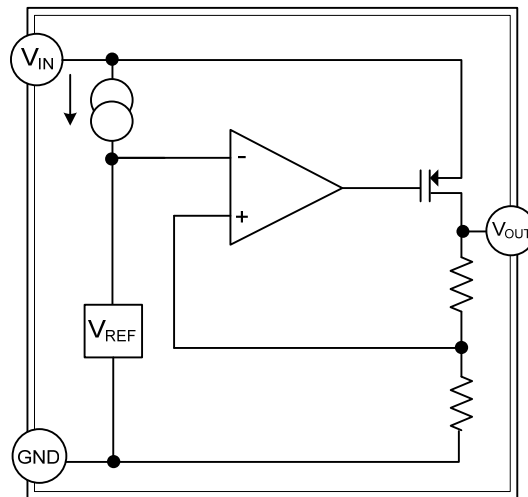
<p>UT7500G-xx-AB3-B-R</p>	<p>(1) Packing Type</p> <p>(2) Pin Code</p> <p>(3) Package Type</p> <p>(4) Output Voltage Code</p> <p>(5) Green Package</p>	<p>(1) R: Tape Reel, B: Tape Box, K: Bulk</p> <p>(2) Refer to Pin Assignment</p> <p>(3) AB3: SOT-89, T92: TO-92</p> <p>(4) xx: Refer to Marking Information</p> <p>(5) G: Halogen Free and Lead Free, L: Lead Free</p>
---------------------------	---	--



MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	18: 1.8V 25: 2.5V 30 :3.0V 33 :3.3V 36 :3.6V 40 :4.0V 50 :5.0V	<p>                         Date Code ← □□□□XX□                          UT7500□ → Voltage Code                          □ → L: Lead Free                          □ → G: Halogen Free                     </p>
TO-92	18: 1.8V 25: 2.5V 30 :3.0V 33 :3.3V 36 :3.6V 40 :4.0V 50 :5.0V	<p>                         UTC → L: Lead Free                          UT7500□ → G: Halogen Free                          XX□□□□ → Date Code                          □□□□ → Pin Code                     </p>

BLOCK DAIGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>IN</sub>	-0.3 ~ +26	V
Power Dissipation	P <sub>D</sub>	Internally limited	
Junction Temperature	T <sub>J</sub>	+125	°C
Operating Temperature	T <sub>OPR</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>STG</sub>	-50 ~ +125	°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.

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

**FOR UT7500-18**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Tolerance	V <sub>OUT</sub>	V <sub>IN</sub> = 3.8V, I <sub>OUT</sub> = 10mA	1.746	1.8	1.854	V
Input Voltage	V <sub>IN</sub>				24	V
Output Current	I <sub>OUT</sub>	V <sub>IN</sub> = 3.8V	60	100		mA
Load Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> = 3.8V, 1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	2.8V ≤ V <sub>IN</sub> ≤ 12V, I <sub>OUT</sub> = 1mA		0.2		%/V
Voltage Drop	V <sub>D</sub>	I <sub>OUT</sub> = 1mA		100		mV
Current Consumption	I <sub>SS</sub>	V <sub>IN</sub> = 3.8V, No load		10	20	μA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A}$	V <sub>IN</sub> = 3.8V, I <sub>OUT</sub> = 10mA 0°C < T <sub>A</sub> < 70°C		±0.45		mV/°C

**FOR UT7500-25**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Tolerance	V <sub>OUT</sub>	V <sub>IN</sub> = 4.5V, I <sub>OUT</sub> = 10mA	2.425	2.5	2.575	V
Input Voltage	V <sub>IN</sub>				24	V
Output Current	I <sub>OUT</sub>	V <sub>IN</sub> = 4.5V	60	100		mA
Load Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> = 4.5V, 1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	3.5V ≤ V <sub>IN</sub> ≤ 12V, I <sub>OUT</sub> = 1mA		0.2		%/V
Voltage Drop	V <sub>D</sub>	I <sub>OUT</sub> = 1mA		100		mV
Current Consumption	I <sub>SS</sub>	V <sub>IN</sub> = 4.5V, No load		10	20	μA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A}$	V <sub>IN</sub> = 4.5V, I <sub>OUT</sub> = 10mA 0°C < T <sub>A</sub> < 70°C		±0.45		mV/°C

**FOR UT7500-30**

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Tolerance	V <sub>OUT</sub>	V <sub>IN</sub> = 5.0V, I <sub>OUT</sub> = 10mA	2.91	3.0	3.09	V
Input Voltage	V <sub>IN</sub>				24	V
Output Current	I <sub>OUT</sub>	V <sub>IN</sub> = 5.0V	60	100		mA
Load Regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> = 5.0V, 1mA ≤ I <sub>OUT</sub> ≤ 50mA		60	150	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	4V ≤ V <sub>IN</sub> ≤ 12V, I <sub>OUT</sub> = 1mA		0.2		%/V
Voltage Drop	V <sub>D</sub>	I <sub>OUT</sub> = 1mA		100		mV
Current Consumption	I <sub>SS</sub>	V <sub>IN</sub> = 5.0V, No load		10	20	μA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A}$	V <sub>IN</sub> = 5.0V, I <sub>OUT</sub> = 10mA 0°C < T <sub>A</sub> < 70°C		±0.45		mV/°C

## ELECTRICAL CHARACTERISTICS(Cont.)

### FOR UT7500-33

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Tolerance	$V_{OUT}$	$V_{IN} = 5.5V, I_{OUT} = 10mA$	3.20	3.3	3.40	V
Input Voltage	$V_{IN}$				24	V
Output Current	$I_{OUT}$	$V_{IN} = 5.5V$	60	100		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = 5.5V, 1mA \leq I_{OUT} \leq 50mA$		60	150	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$4.5V \leq V_{IN} \leq 12V, I_{OUT} = 1mA$		0.2		%/V
Voltage Drop	$V_D$	$I_{OUT} = 1mA$		100		mV
Current Consumption	$I_{SS}$	$V_{IN} = 5.5V, \text{No load}$		10	20	$\mu A$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A}$	$V_{IN} = 5.5V, I_{OUT} = 10mA$ $0^\circ C < T_A < 70^\circ C$		$\pm 0.5$		mV/ $^\circ C$

### FOR UT7500-36

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Tolerance	$V_{OUT}$	$V_{IN} = 5.6V, I_{OUT} = 10mA$	3.49	3.6	3.71	V
Input Voltage	$V_{IN}$				24	V
Output Current	$I_{OUT}$	$V_{IN} = 5.6V$	60	100		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = 5.6V, 1mA \leq I_{OUT} \leq 50mA$		60	150	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$4.6V \leq V_{IN} \leq 12V, I_{OUT} = 1mA$		0.2		%/V
Voltage Drop	$V_D$	$I_{OUT} = 1mA$		100		mV
Current Consumption	$I_{SS}$	$V_{IN} = 5.6V, \text{No load}$		10	20	$\mu A$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A}$	$V_{IN} = 5.6V, I_{OUT} = 10mA$ $0^\circ C < T_A < 70^\circ C$		$\pm 0.5$		mV/ $^\circ C$

### FOR UT7500-40

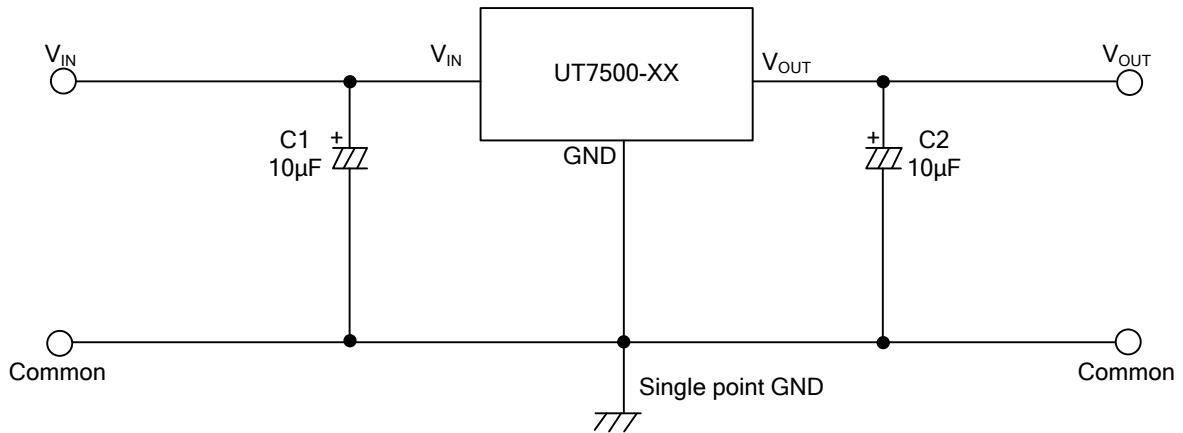
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Tolerance	$V_{OUT}$	$V_{IN} = 6.0V, I_{OUT} = 10mA$	3.88	4	4.12	V
Input Voltage	$V_{IN}$				24	V
Output Current	$I_{OUT}$	$V_{IN} = 6.0V$	100	150		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = 6.0V, 1mA \leq I_{OUT} \leq 70mA$		60	150	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$5V \leq V_{IN} \leq 12V, I_{OUT} = 1mA$		0.2		%/V
Voltage Drop	$V_D$	$I_{OUT} = 1mA$		100		mV
Current Consumption	$I_{SS}$	$V_{IN} = 6.0V, \text{No load}$		10	20	$\mu A$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A}$	$V_{IN} = 6.0V, I_{OUT} = 10mA$ $0^\circ C < T_A < 70^\circ C$		$\pm 0.75$		mV/ $^\circ C$

### FOR UT7500-50

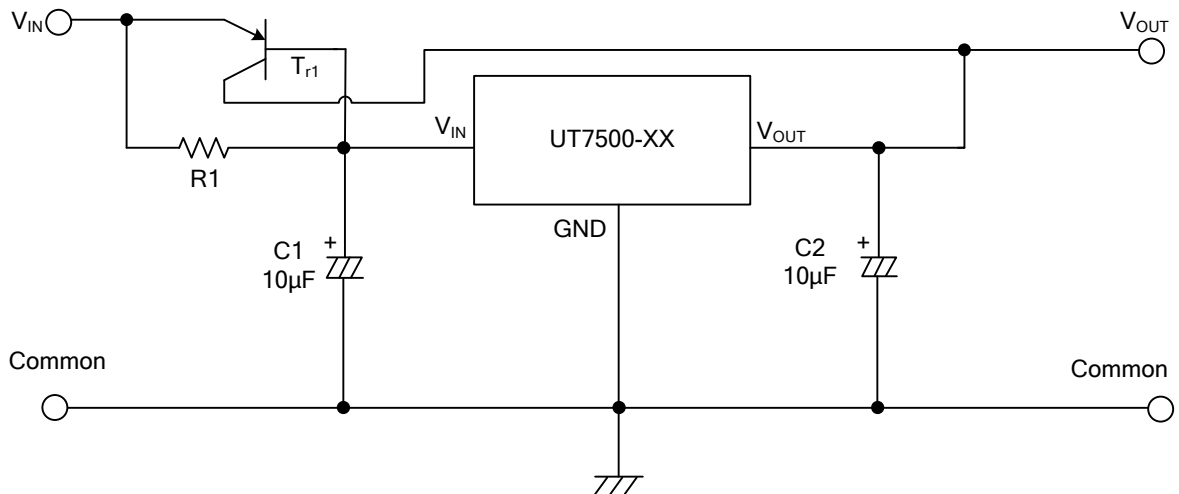
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Tolerance	$V_{OUT}$	$V_{IN} = 7.0V, I_{OUT} = 10mA$	4.85	5.0	5.15	V
Input Voltage	$V_{IN}$				24	V
Output Current	$I_{OUT}$	$V_{IN} = 7.0V$	100	150		mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = 7.0V, 1mA \leq I_{OUT} \leq 70mA$		60	150	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$6V \leq V_{IN} \leq 15V, I_{OUT} = 1mA$		0.2		%/V
Voltage Drop	$V_D$	$I_{OUT} = 1mA$		100		mV
Current Consumption	$I_{SS}$	$V_{IN} = 7.0V, \text{No load}$		10	20	$\mu A$
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A}$	$V_{IN} = 7.0V, I_{OUT} = 10mA$ $0^\circ C < T_A < 70^\circ C$		$\pm 0.75$		mV/ $^\circ C$

## ■ TYPICAL APPLICATION CIRCUITS

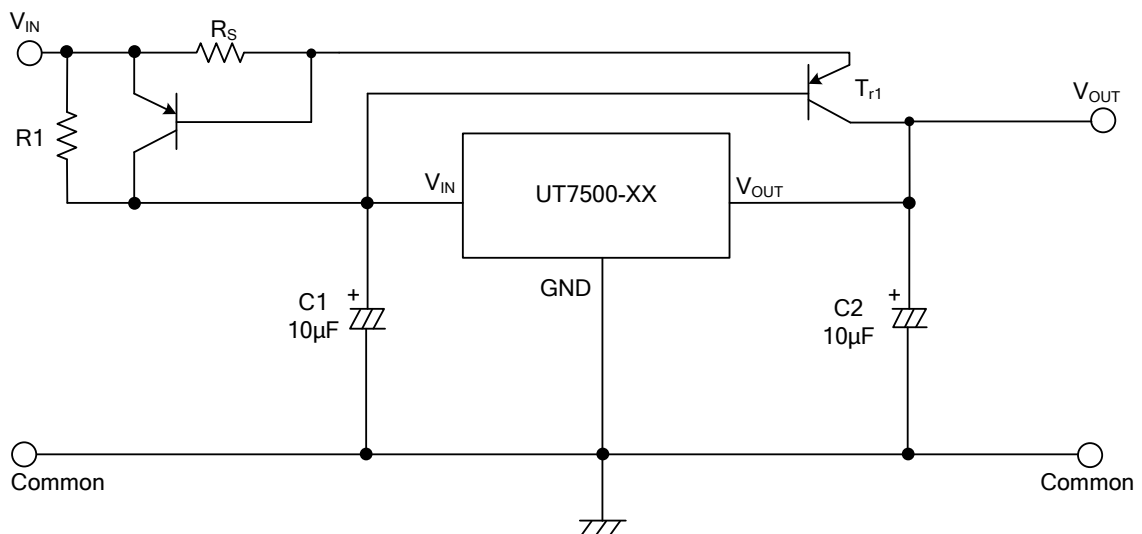
### Basic Circuit



### High Output Current Positive Voltage Regulator

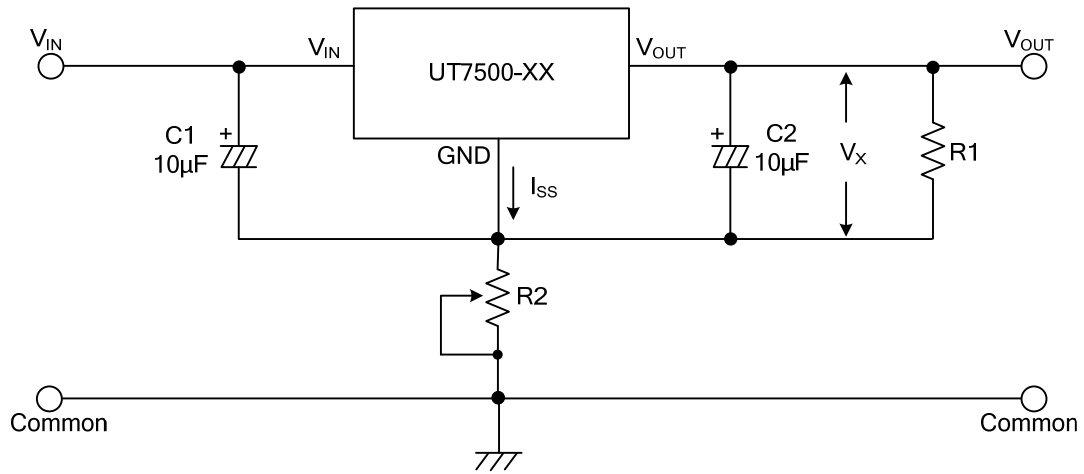


### Short-Circuit Protection for T<sub>r1</sub>



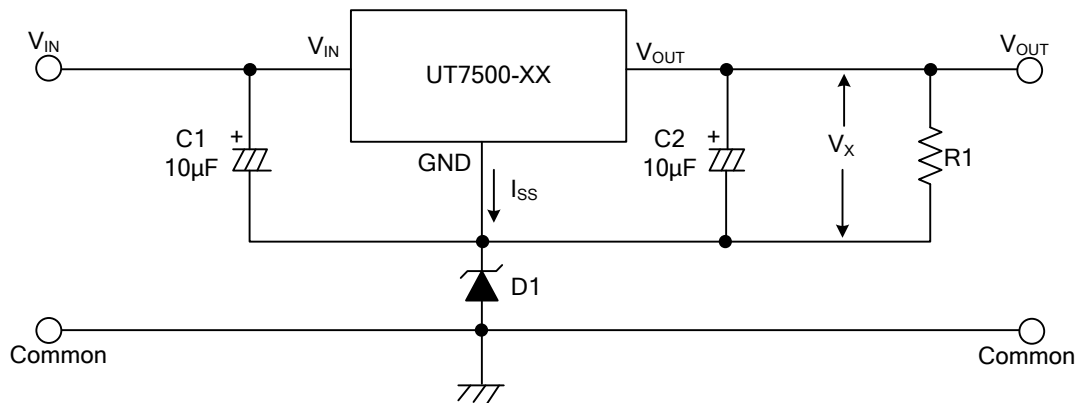
## ■ TYPICAL APPLICATION CIRCUITS(Cont.)

### Circuit for Increasing Output Voltage



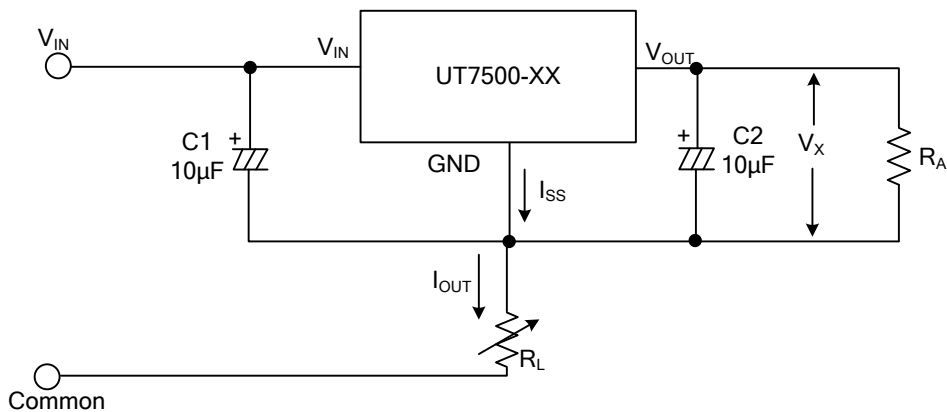
$$V_{OUT} = V_X (1 + R2/R1) + I_{SS}R2$$

### Circuit for Increasing Output Voltage



$$V_{OUT} = V_X + V_{D1}$$

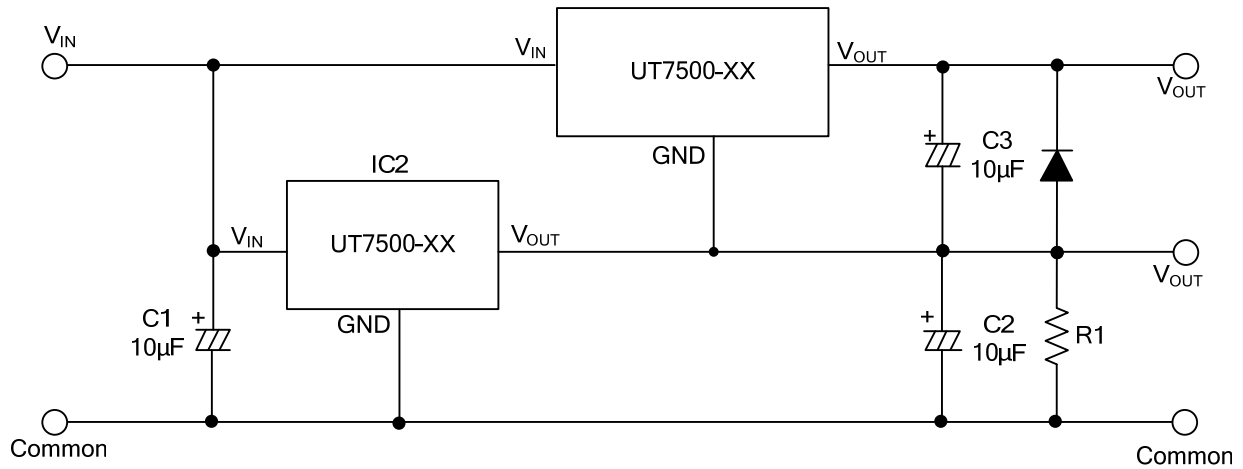
### Constant Current Regulator



$$I_{OUT} = \frac{V_X}{R_A} + I_{SS}$$

■ TYPICAL APPLICATION CIRCUITS(Cont.)

**Dual Supply**



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.