



UT10XX

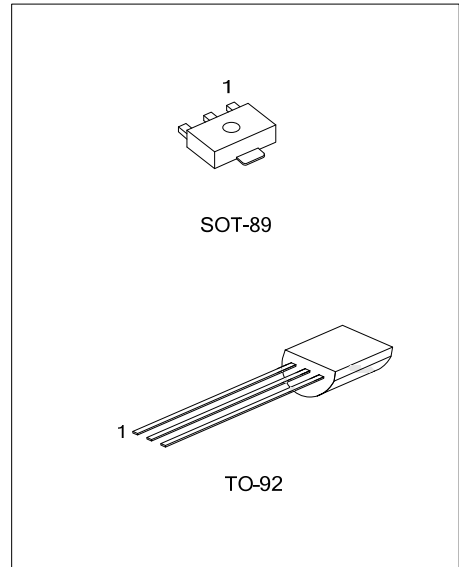
CMOS IC

THREE-TERMINAL LOW POWER VOLTAGE REGULATORS

DESCRIPTION

The UTC **UT10XX** series is a set of three-Terminal low power voltage regulators implemented in CMOS technology. They are available with several fixed output voltages ranging from 1.5V~7.0V. The advantage of CMOS technology is low voltage dropout and low quiescent current.

Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.



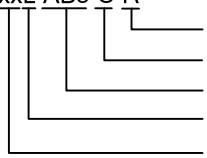
FEATURES

- * Low power consumption
- * Low voltage dropout
- * Low temperature coefficient
- * Wide operating voltage (12V Max.)

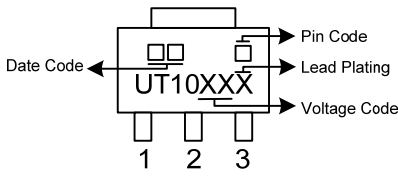
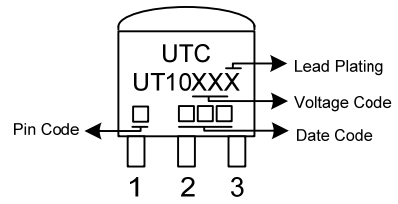
ORDERING INFORMATION

Ordering Number			Package	Pin Assign.			Packing
Normal	Lead Free	Halogen Free		1	2	3	
UT10XX-AB3-C-R	UT10XXL-AB3-C-R	UT10XXG-AB3-C-R	SOT-89	G	I	O	Tape Reel
UT10XX-T92-B-B	UT10XXL-T92-B-B	UT10XXG-T92-B-B	TO-92	O	G	I	Tape Box
UT10XX-T92-B-K	UT10XXL-T92-B-K	UT10XXG-T92-B-K	TO-92	O	G	I	Bulk
UT10XX-T92-C-B	UT10XXL-T92-C-B	UT10XXG-T92-C-B	TO-92	G	I	O	Tape Box
UT10XX-T92-C-K	UT10XXL-T92-C-K	UT10XXG-T92-C-K	TO-92	G	I	O	Bulk

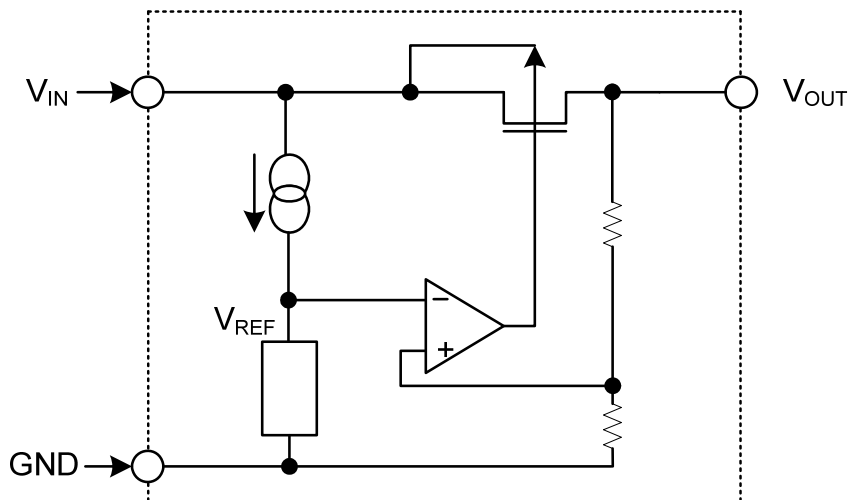
Note: Pin assignment: I: V_{IN} O: V_{OUT} G:Ground

UT10xxL-AB3-C-R 	(1) Packing Type (2) Pin Assignment (3) Package Type (4) Lead Plating (5) Output Voltage Code	(1) B: Tape Box, K: Bulk, R: Tape Reel (2) refer to Pin Assignment (3) AB3: SOT-89, T92: TO-92 (4) G:Halogen Free, L: Lead Free, Blank: Pb/Sn (5) xx: refer to Marking Information
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	18:1.8V 20:2.0V 25:2.5V 27:2.7V 28:2.8V 30:3.0V	 The diagram shows a SOT-89 package with three pins labeled 1, 2, and 3. Markings on the package include 'UT10XXX' in the center, a 'Date Code' on the left, and 'Pin Code', 'Lead Plating', and 'Voltage Code' on the right.
TO-92	33:3.3V 36:3.6V 44:4.4V 45:4.5V 50:5.0V 70:7.0V	 The diagram shows a TO-92 package with three pins labeled 1, 2, and 3. Markings on the package include 'UTC' and 'UT10XXX' in the center, a 'Pin Code' on the left, and 'Lead Plating', 'Voltage Code', and 'Date Code' on the right.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.3 ~ +13	V
Power Dissipation	SOT-89	P_D	200	mW
	TO-92		200	
Operating Temperature		T_{OPR}	0 ~ +70	°C
Storage Temperature		T_{STG}	-40 ~ +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 (Ta=25°C)

FOR UT1018

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=3.8V, I_{OUT}=10mA$	±2.4%	1.757	1.8	1.843 V
			±5%	1.71	1.8	1.89 V
Input Voltage	V_{IN}				12	V
Load Regulation	ΔV_{OUT}	$V_{IN}=3.8V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$2.8V \leq V_{IN} \leq 12V, I_{OUT}=0.5mA$		0.2		%/V
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=3.8V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=3.8V$, No load		2.2	6.0	μA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a}$	$V_{IN}=3.8V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		±0.25		mV/°C

FOR UT1020

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=4V, I_{OUT}=10mA$	±2.4%	1.952	2.0	2.048 V
			±5%	1.9	2.0	2.1 V
Input Voltage	V_{IN}				12	V
Load Regulation	ΔV_{OUT}	$V_{IN}=4V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$3V \leq V_{IN} \leq 12V, I_{OUT}=0.5mA$		0.2		%/V
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=4V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=4V$, No load		2.2	6.0	μA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a}$	$V_{IN}=4V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		±0.3		mV/°C

FOR UT1025

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=4.5V, I_{OUT}=10mA$	±2.4%	2.440	2.5	2.560 V
			±5%	2.375	2.5	2.625 V
Input Voltage	V_{IN}				12	V
Load Regulation	ΔV_{OUT}	$V_{IN}=4.5V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$3.5V \leq V_{IN} \leq 12V, I_{OUT}=0.5mA$		0.2		%/V
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=4.5V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=4.5V$, No load		2.2	6.0	μA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a}$	$V_{IN}=4.5V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		±0.35		mV/°C

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR UT1027

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	V _{IN} =4.7V, I _{OUT} =10mA	±2.4%	2.635	2.7	2.765	V
			±5%	2.565	2.7	2.835	V
Input Voltage	V _{IN}					12	V
Load Regulation	ΔV _{OUT}	V _{IN} =4.7V, 1mA≤I _{OUT} ≤20mA			60	100	mV
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	3.7V≤V _{IN} ≤12V, I _{OUT} =0.5mA			0.2		%/V
Voltage Dropout	V _D	I _{OUT} =1mA			60		mV
Output Current	I _{OUT}	V _{IN} =4.7V		20	30		mA
Current Consumption	I _{SS}	V _{IN} =4.7V, No load			2.5	6.0	μA
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_a}$	V _{IN} =4.7V, I _{OUT} =10mA 0°C<T _a <70°C			±0.4		mV/°C

FOR UT1028

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	V _{IN} =4.8V, I _{OUT} =10mA	±2.4%	2.732	2.8	2.867	V
			±5%	2.660	2.8	2.940	V
Input Voltage	V _{IN}					12	V
Load Regulation	△V _{OUT}	V _{IN} =4.8V, 1mA≤I _{OUT} ≤20mA			60	100	mV
Voltage Dropout	V _D	I _{OUT} =1mA			60		mV
Output Current	I _{OUT}	V _{IN} =4.8V		20	30		mA
Current Consumption	I _{SS}	V _{IN} =4.8V, No load			2.5	6.0	μA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	3.8V≤V _{IN} ≤12V, I _{OUT} =1mA			0.2		%/V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V _{IN} =4.8V, I _{OUT} =10mA 0°C≤Ta≤70°C			±0.4		mV/°C

FOR UT1030

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	V _{IN} =5V, I _{OUT} =10mA	±2.4%	2.928	3.0	3.072	V
			±5%	2.850	3.0	3.150	V
Input Voltage	V _{IN}					12	V
Load Regulation	△V _{OUT}	V _{IN} =5V, 1mA≤I _{OUT} ≤20mA			60	100	mV
Voltage Dropout	V _D	I _{OUT} =1mA			60		mV
Output Current	I _{OUT}	V _{IN} =5V			20	30	mA
Current Consumption	I _{SS}	V _{IN} =5V, No load			2.5	6.0	μA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	4V≤V _{IN} ≤12V, I _{OUT} =1mA			0.2		%/V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V _{IN} =5V, I _{OUT} =10mA 0°C<Ta<70°C			±0.45		mV/°C

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR UT1033

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	V _{IN} =5.5V, I _{OUT} =10mA	±2.4%	3.220	3.3	3.379	V
			±5%	3.135	3.3	3.465	V
Input Voltage	V _{IN}					12	V
Load Regulation	ΔV _{OUT}	V _{IN} =5.5V, 1mA≤I _{OUT} ≤30mA			60	100	mV
Voltage Dropout	V _D	I _{OUT} =1mA			60		mV
Output Current	I _{OUT}	V _{IN} =5.5V		20	30		mA
Current Consumption	I _{SS}	V _{IN} =5.5V, No load			2.5	6.0	μA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	4.5V≤V _{IN} ≤12V, I _{OUT} =1mA			0.2		%/V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V _{IN} =5.5V, I _{OUT} =10mA 0°C<Ta<70°C			±0.5		mV/°C

FOR UT1036

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V _{OUT}	V _{IN} =5.6V, I _{OUT} =10mA	±2.4%	3.513	3.6	3.686	V
			±5%	3.420	3.6	3.780	V
Input Voltage	V _{IN}					12	V
Load Regulation	△V _{OUT}	V _{IN} =5.6V, 1mA≤I _{OUT} ≤30mA			60	100	mV
Voltage Dropout	V _D	I _{OUT} =1mA			60		mV
Output Current	I _{OUT}	V _{IN} =5.6V		20	30		mA
Current Consumption	I _{SS}	V _{IN} =5.6V, No load			3.0	7.0	μA
Line Regulation	$\frac{\Delta V_{OUT}}{V_{IN} \times V_{OUT}}$	4.6V≤V _{IN} ≤12V, I _{OUT} =1mA			0.2		%/V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V _{IN} =5.6V,I _{OUT} =10mA 0°C<Ta<70°C			±0.6		mV/°C

FOR UT1044

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Output Voltage	V _{OUT}	V _{IN} =6.4V, I _{OUT} =10mA	±2.4%	4.294	4.4	4.505	V
			±5%	4.180	4.4	4.620	V
Input Voltage	V _{IN}				12	V	
Load Regulation	△V _{OUT}	V _{IN} =6.4V, 1mA≤I _{OUT} ≤30mA		60	100	mV	
Voltage Dropout	V _D	I _{OUT} =1mA		60		mV	
Output Current	I _{OUT}	V _{IN} =6.4V	20	30		mA	
Current Consumption	I _{SS}	V _{IN} =6.4V, No load		3.0	7.5	μA	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	5.4V≤V _{IN} ≤12V, I _{OUT} =1mA		0.2		%/V	
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V _{IN} =6.4V, I _{OUT} =10mA 0°C<Ta<70°C		±0.7		mV/°C	

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR UT1050

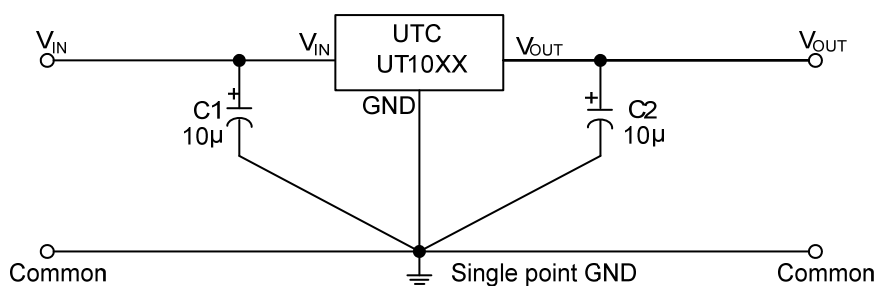
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT	
Output Voltage	V _{OUT}	V _{IN} =7V, I _{OUT} =10mA	±2.4%	4.88	5.0	5.12	V	
			±5%	4.75	5.0	5.25	V	
Input Voltage	V _{IN}					12	V	
Load Regulation	△V _{OUT}	V _{IN} =7V, 1mA≤I _{OUT} ≤30mA			60	100	mV	
Voltage Dropout	V _D	I _{OUT} =1mA			60		mV	
Output Current	I _{OUT}	V _{IN} =7V			20	30	mA	
Current Consumption	I _{SS}	V _{IN} =7V, No load				3.5	9.0	μA
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	6V≤V _{IN} ≤12V, I _{OUT} =1mA				0.2		%/V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V _{IN} =7V, I _{OUT} =10mA 0°C≤Ta≤70°C				±0.75		mV/°C

FOR UT1070

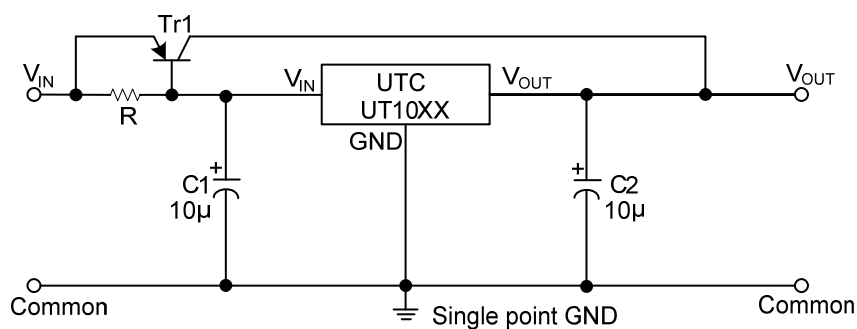
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Output Voltage	V _{OUT}	V _{IN} =9V, I _{OUT} =10mA	±2.4%	6.832	7.0	7.168	V
			±5%	6.65	7.0	7.35	V
Input Voltage	V _{IN}				12	V	
Load Regulation	△V _{OUT}	V _{IN} =9V, 1mA≤I _{OUT} ≤30mA		60	100	mV	
Voltage Dropout	V _D	I _{OUT} =1mA		60		mV	
Output Current	I _{OUT}	V _{IN} =9V	20	30		mA	
Current Consumption	I _{SS}	V _{IN} =9V, No load		5.0	12.5	μA	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	8V≤V _{IN} ≤12V, I _{OUT} =1mA		0.2		%/V	
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V _{IN} =9V, I _{OUT} =10mA 0°C<Ta<70°C		±1.05		mV/°C	

■ APPLICATION CIRCUIT

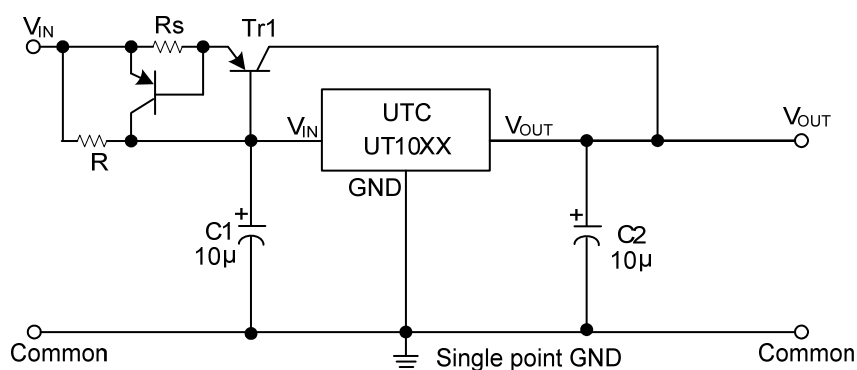
The basic circuits using the UTC **UT10XX** series



High output current positive voltage regulator

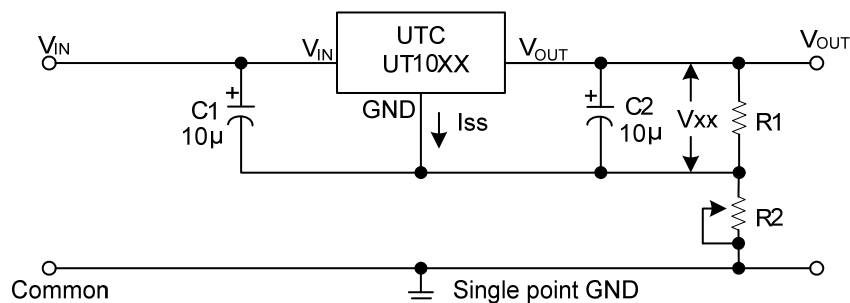


Short-circuit protection for $Tr1$



■ APPLICATION CIRCUITS(Cont.)

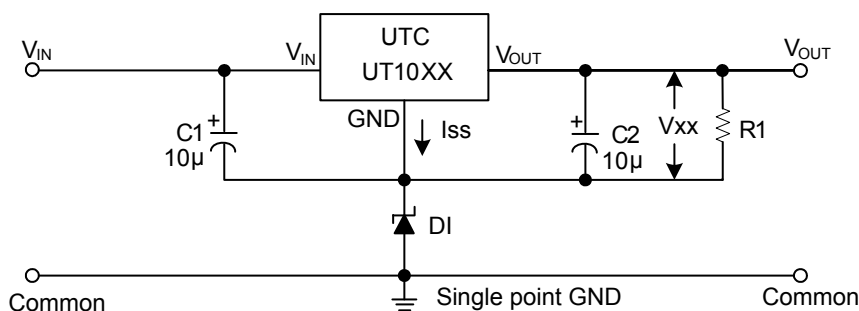
Circuit for increasing output voltage



$$V_{OUT} = V_{XX} \left(1 + \frac{R_2}{R_1}\right) + I_{SS} R_2$$

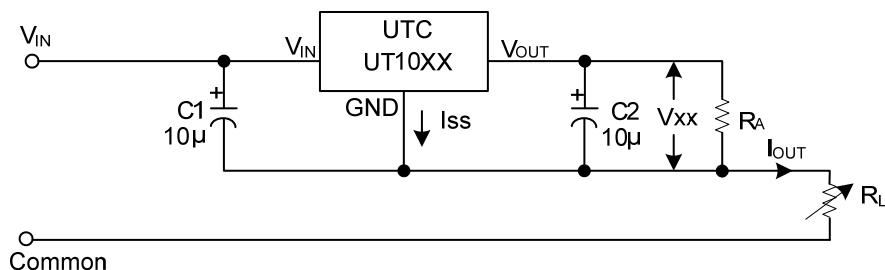
$$\approx V_{XX} \left(1 + \frac{R_2}{R_1}\right)$$

Circuit for increasing output voltage



$$V_{OUT} = V_{XX} + V_{DI}$$

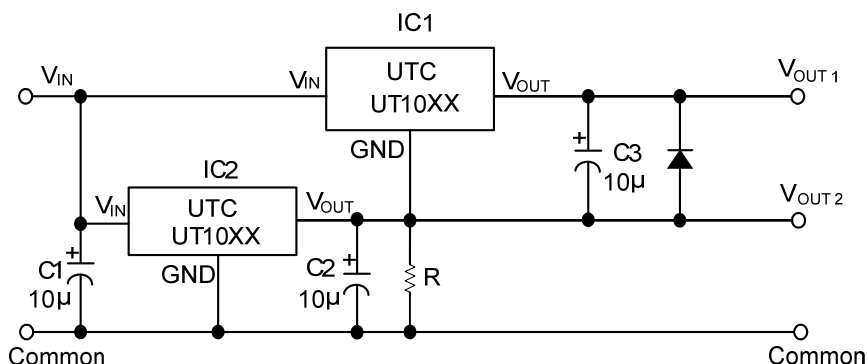
Constant current regulator



$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

■ APPLICATION CIRCUIT(Cont.)

Dual supply



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