



UT71XX

CMOS IC

THREE-TERMINAL LOW POWER VOLTAGE REGULATORS

DESCRIPTION

The UTC **UT71XX** 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

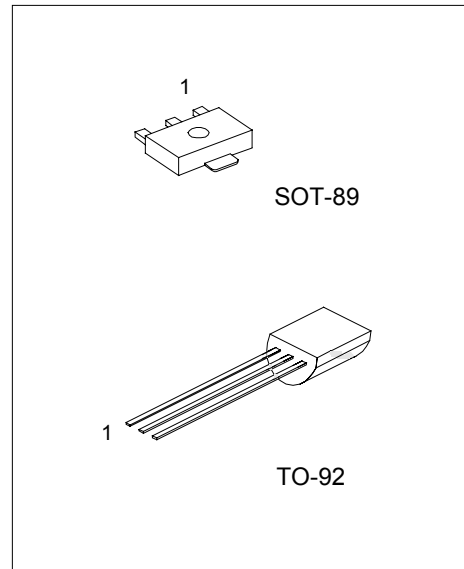
- * Accurate Output Voltage Range ($\pm 2.4\%$)
- * Low Power Consumption
- * Low Voltage Dropout
- * Low Temperature Coefficient
- * Wide Operating Voltage (24V Max.)

ORDERING INFORMATION

Order Number		Package	Pin Assign.			Packing
Normal	Lead free plating		1	2	3	
UT71XX-AB3-C-R	UT71XXL-AB3-C-R	SOT-89	G	I	O	Tape Reel
UT71XX-T92-B-B	UT71XXL-T92-B-B	TO-92	O	G	I	Tape Box
UT71XX-T92-B-K	UT71XXL-T92-B-K	TO-92	O	G	I	Bulk
UT71XX-T92-C-B	UT71XXL-T92-C-B	TO-92	G	I	O	Tape Box
UT71XX-T92-C-K	UT71XXL-T92-C-K	TO-92	G	I	O	Bulk

Note: 1. xx: Output Voltage, refer to Marking Information.

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

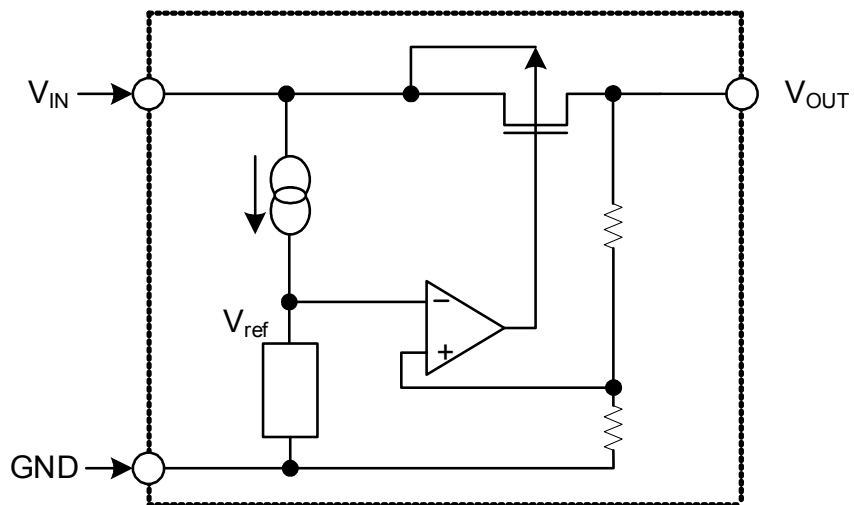


*Pb-free plating product number: UT71XXL

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	15:1.5V 18:1.8V 20:2.0V 25:2.5V 27:2.7V 28:2.8V	
TO-92	30:3.0V 33:3.3V 36:3.6V 44:4.4V 45:4.5V 50:5.0V 70:7.0V	

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.3 ~ +28	V
Power Dissipation	P_D	200	mW
Operating Temperature	T_{OPR}	0 ~ +70	
Storage Temperature	T_{STG}	-40 ~ +150	

Note 1. 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.

2. The device is guaranteed to meet performance specification within 0 ~ +70 operating temperature range and assured by design from -20 ~ +85 .

■ ELECTRICAL CHARACTERISTICS (Ta=25)

FOR UT7115

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=3.5V, I_{OUT}=10mA$	1.464	1.5	1.536	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=3.5V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=3.5V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=3.5V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$2.5V \leq V_{IN} \leq 24V, I_{OUT}=0.5mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=3.5V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.2		mV/

FOR UT7118

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=3.8V, I_{OUT}=10mA$	1.757	1.8	1.843	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=3.8V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=3.8V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=3.8V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$2.8V \leq V_{IN} \leq 24V, I_{OUT}=0.5mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=3.8V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.25		mV/

FOR UT7120

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=4V, I_{OUT}=10mA$	1.952	2.0	2.048	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=4V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=4V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=4V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$3V \leq V_{IN} \leq 24V, I_{OUT}=0.5mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=4V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.3		mV/

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR UT7125

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=4.5V, I_{OUT}=10mA$	2.440	2.5	2.560	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=4.5V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=4.5V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=4.5V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$3.5V \leq V_{IN} \leq 24V, I_{OUT}=0.5mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=4.5V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.35		mV/

FOR UT7127

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=4.7V, I_{OUT}=10mA$	2.635	2.7	2.765	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=4.7V, 1mA \leq I_{OUT} \leq 20mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=4.7V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=4.7V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$3.7V \leq V_{IN} \leq 24V, I_{OUT}=0.5mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=4.7V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.4		mV/

FOR UT7128

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=4.8V, I_{OUT}=10mA$	2.732	2.8	2.867	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=4.8V, 1mA \leq I_{OUT} \leq 20mA$		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}	$V_{IN}=4.8V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$3.8V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=4.8V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.4		mV/

FOR UT7130

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=5V, I_{OUT}=10mA$	2.928	3.0	3.072	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=5V, 1mA \leq I_{OUT} \leq 20mA$		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}	$V_{IN}=5V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$4V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=5V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.45		mV/

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR UT7133

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=5.5V, I_{OUT}=10mA$	3.220	3.3	3.379	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=5.5V, 1mA \leq I_{OUT} \leq 30mA$		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}	$V_{IN}=5.5V, \text{No load}$		4	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$4.5V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=5.5V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.5		mV/

FOR UT7136

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=5.6V, I_{OUT}=10mA$	3.513	3.6	3.686	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=5.6V, 1mA \leq I_{OUT} \leq 30mA$		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}	$V_{IN}=5.6V, \text{No load}$		3	6.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$4.6V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=5.6V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.6		mV/

FOR UT7144

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=6.4V, I_{OUT}=10mA$	4.294	4.4	4.505	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=6.4V, 1mA \leq I_{OUT} \leq 30mA$		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}	$V_{IN}=6.4V, \text{No load}$		4	7.5	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$5.4V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=6.4V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.7		mV/

FOR UT7145

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=6.5V, I_{OUT}=10mA$	4.392	4.5	4.608	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=6.5V, 1mA \leq I_{OUT} \leq 30mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=6.5V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=6.5V, \text{No load}$		4	7.5	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$5.5V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=6.5V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.7		mV/

■ ELECTRICAL CHARACTERISTICS(Cont.)

FOR UT7150

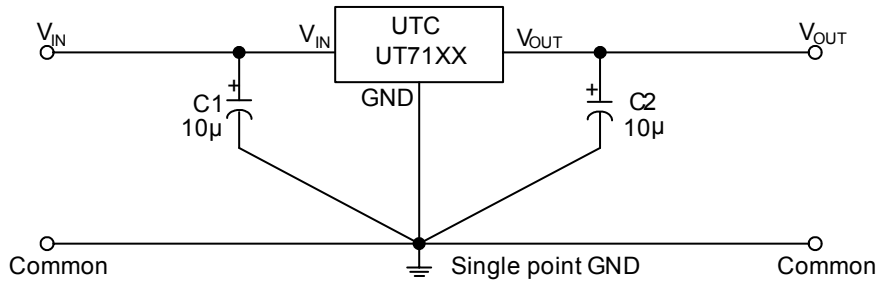
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=7V, I_{OUT}=10mA$	4.88	5.0	5.12	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=7V, 1mA \leq I_{OUT} \leq 30mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=7V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=7V, \text{No load}$		5	9.0	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$6V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=7V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 0.75		mV/

FOR UT7170

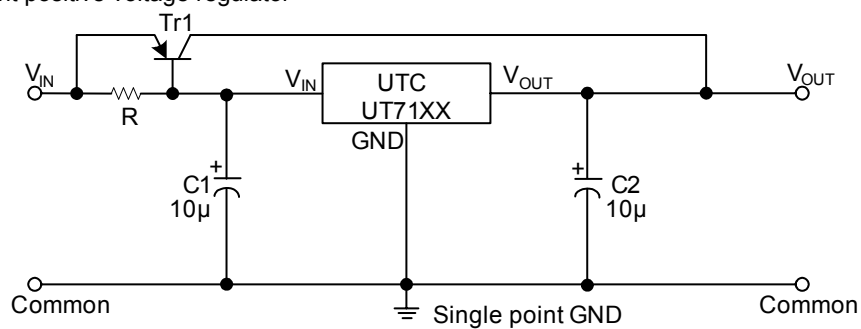
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=9V, I_{OUT}=10mA$	6.832	7.0	7.168	V
Input Voltage	V_{IN}				24	V
Load Regulation	V_{OUT}	$V_{IN}=9V, 1mA \leq I_{OUT} \leq 30mA$		60	100	mV
Voltage Dropout	V_D	$I_{OUT}=1mA$		60		mV
Output Current	I_{OUT}	$V_{IN}=9V$	20	30		mA
Current Consumption	I_{SS}	$V_{IN}=9V, \text{No load}$		5	12.5	μA
Line Regulation	$\frac{V_{OUT}}{V_{IN} \times V_{OUT}}$	$8V \leq V_{IN} \leq 24V, I_{OUT}=1mA$		0.2		%/V
Temperature Coefficient	$\frac{V_{OUT}}{T_a}$	$V_{IN}=9V, I_{OUT}=10mA$ $0^\circ C < T_a < 70^\circ C$		± 1.05		mV/

■ TYPICAL APPLICATION CIRCUIT

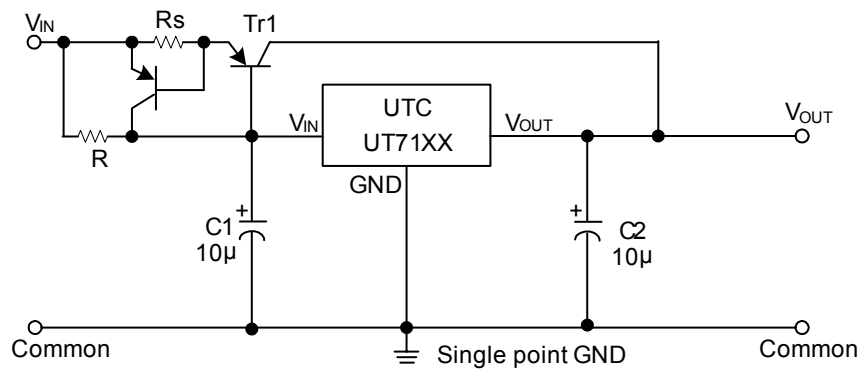
The basic circuits using the UTC **UT71XX** series



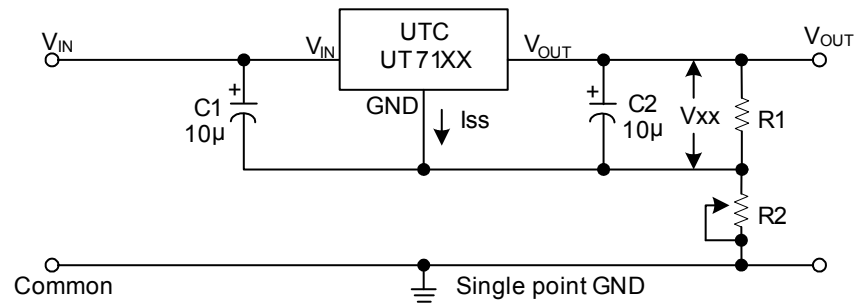
High output current positive voltage regulator



Short-circuit protection for Tr1



Circuit for increasing output voltage

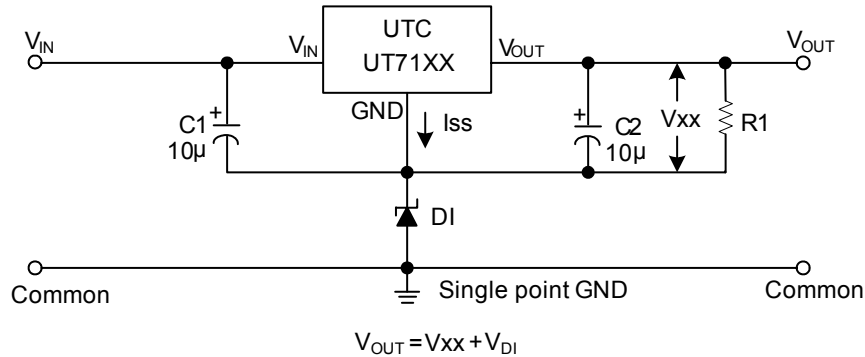


$$V_{OUT} = V_{xx} \left(1 + \frac{R_2}{R_1}\right) + I_{ss} R_2$$

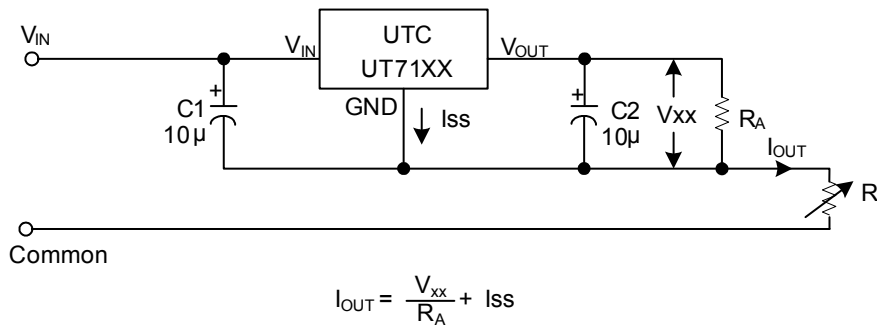
$$V_{xx} \left(1 + \frac{R_2}{R_1}\right)$$

■ TYPICAL APPLICATION CIRCUIT(cont.)

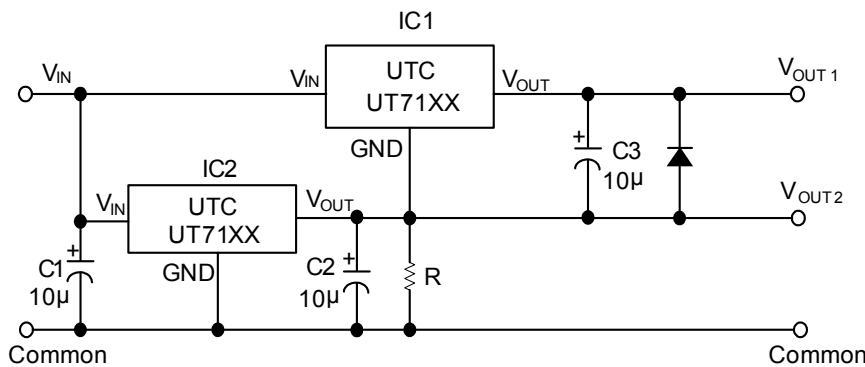
Circuit for increasing output voltage



Constant current regulator



Dual supply



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