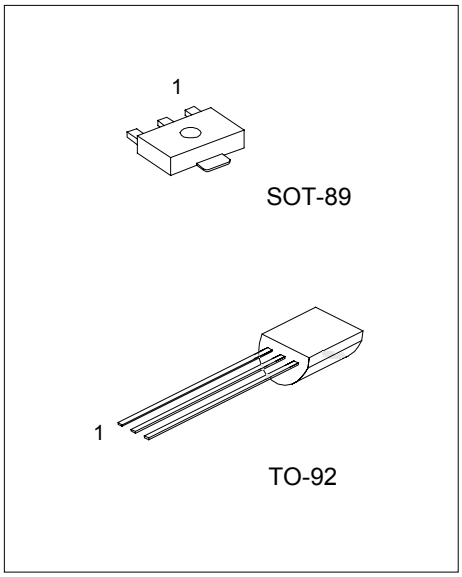
UT71XX

CMOS IC

THREE-TERMINAL LOW POWER VOLTAGE REGULATORS



*Pb-free plating product number: UT71XXL

■ 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 (±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

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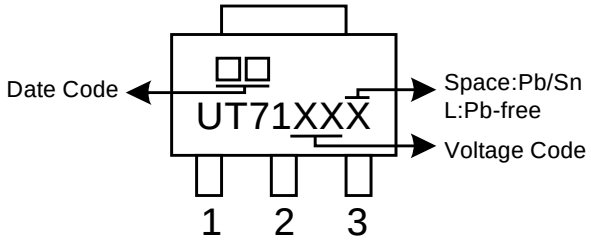
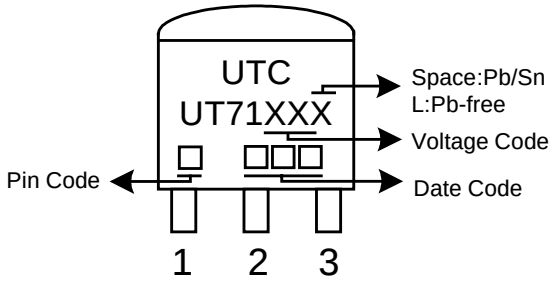
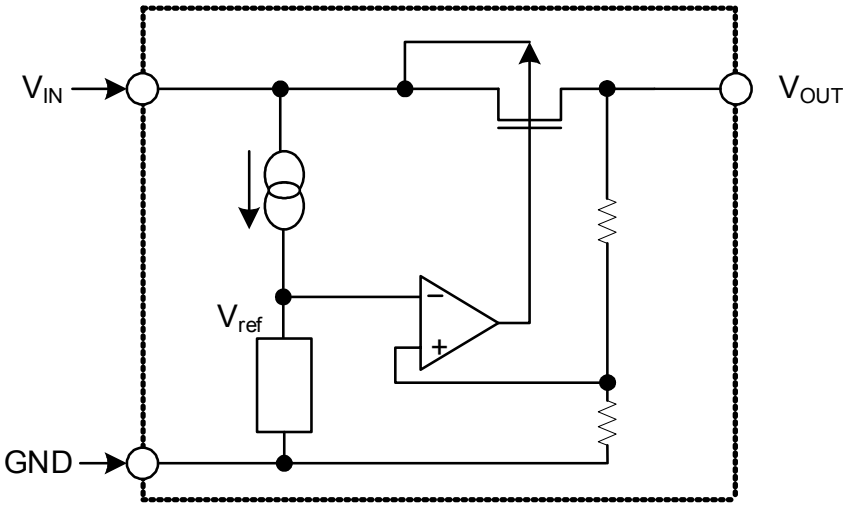
■ MARKING INFORMATION

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

■ 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 CHARACTRISTICS (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	$\triangle V_{OUT}$	V_{IN}=3.5V,1mA≤I_{OUT}≤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, No load		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	2.5V≤V_{IN}≤24V, I_{OUT}=0.5mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=3.5V, I_{OUT}=10mA 0°C<Ta<70°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	$\triangle V_{OUT}$	V_{IN}=3.8V,1mA≤I_{OUT}≤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, No load		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	2.8V≤V_{IN}≤24V, I_{OUT}=0.5mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=3.8V, I_{OUT}=10mA 0°C<Ta<70°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	$\triangle V_{OUT}$	V_{IN}=4V, 1mA≤I_{OUT}≤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, No load		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	3V≤V_{IN}≤24V, I_{OUT}=0.5mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=4V, I_{OUT}=10mA 0°C<Ta<70°C		±0.3		mV/℃

■ ELECTRICAL CHARACTRISTICS(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	$\triangle V_{OUT}$	V_{IN}=4.5V,1mA≤I_{OUT}≤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, No load		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	3.5V≤V_{IN}≤24V, I_{OUT}=0.5mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=4.5V, I_{OUT}=10mA 0°C<Ta<70°C		±0.35		mV/°C

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	$\triangle V_{OUT}$	V_{IN}=4.7V,1mA≤I_{OUT}≤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, No load		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	3.7V≤V_{IN}≤24V, I_{OUT}=0.5mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=4.7V, I_{OUT}=10mA 0°C<Ta<70°C		±0.4		mV/°C

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	$\triangle V_{OUT}$	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		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	3.8V≤V_{IN}≤24V, I_{OUT}=1mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=4.8V, I_{OUT}=10mA 0°C<Ta<70°C		±0.4		mV/°C

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	$\triangle V_{OUT}$	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		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	4V≤V_{IN}≤24V, I_{OUT}=1mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=5V, I_{OUT}=10mA 0°C<Ta<70°C		±0.45		mV/°C

■ ELECTRICAL CHARACTRISTICS(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	$\triangle V_{OUT}$	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		4	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	4.5V≤V_{IN}≤24V, I_{OUT}=1mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=5.5V, I_{OUT}=10mA 0°C<Ta<70°C		±0.5		mV/°C

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	$\triangle V_{OUT}$	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	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	4.6V≤V_{IN}≤24V, I_{OUT}=1mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=5.6V, I_{OUT}=10mA 0°C<Ta<70°C		±0.6		mV/°C

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	$\triangle V_{OUT}$	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		4	7.5	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	5.4V≤V_{IN}≤24V, I_{OUT}=1mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=6.4V, I_{OUT}=10mA 0°C<Ta<70°C		±0.7		mV/°C

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	$\triangle V_{OUT}$	V_{IN}=6.5V, 1mA≤I_{OUT}≤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, No load		4	7.5	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	5.5V≤V_{IN}≤24V, I_{OUT}=1mA		0.2		%/V
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=6.5V, I_{OUT}=10mA 0°C<Ta<70°C		±0.7		mV/°C

■ ELECTRICAL CHARACTRISTICS(Cont.)

FOR UT7150

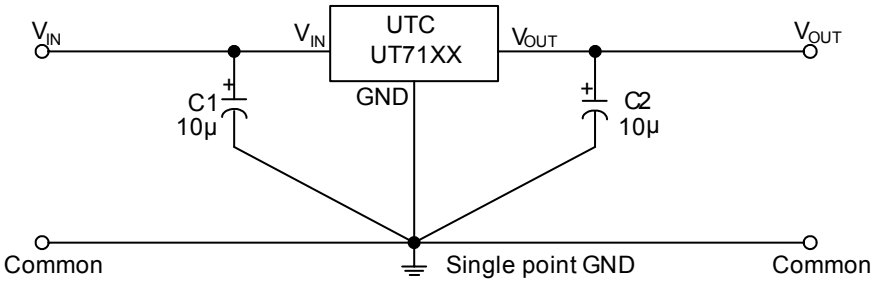
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=7V, I_{OUT}=10mA	4.88	5.0	5.12	V
Input Voltage	V_{IN}				24	V
Load Regulation	$\triangle V_{OUT}$	V_{IN}=7V, 1mA≤I_{OUT}≤30mA		60	100	mV
Voltage Dropout	V_D	I_{OUT}=1mA		60		mV
Output Current	I_{OUT}	V_{IN}=7V	20	30		mA
Current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

FOR UT7170

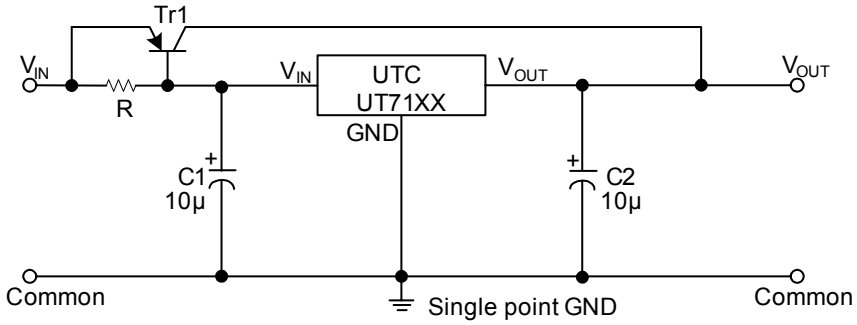
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=9V, I_{OUT}=10mA	6.832	7.0	7.168	V
Input Voltage	V_{IN}				24	V
Load Regulation	$\triangle V_{OUT}$	V_{IN}=9V, 1mA≤I_{OUT}≤30mA		60	100	mV
Voltage Dropout	V_D	I_{OUT}=1mA		60		mV
Output Current	I_{OUT}	V_{IN}=9V	20	30		mA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

■ TYPICAL APPLICATION CIRCUIT

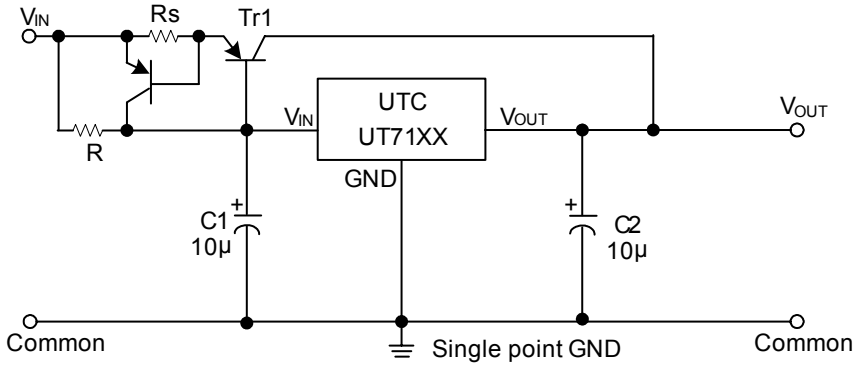
The basic circuits using the UTC **UT71XX** series



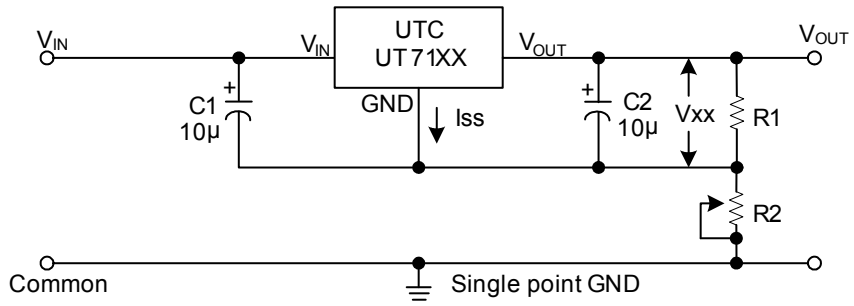
High output current positive voltage regulator



Short-circuit protection for Tr1



Circuit for increasing output voltage

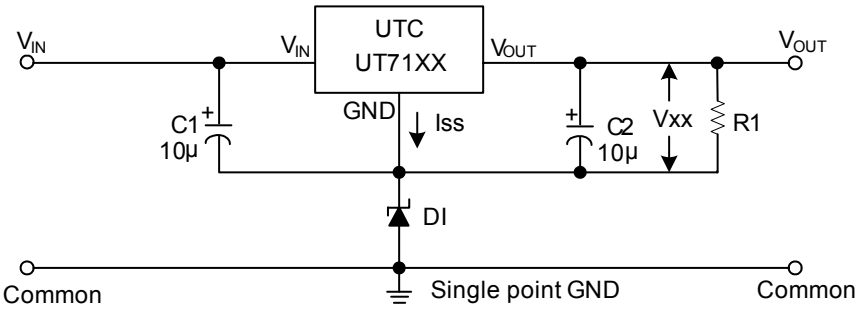


$$V_{OUT} = Vxx\left(1+\frac{R2}{R1}\right) + IssR2$$

$$Vxx\left(1+\frac{R2}{R1}\right)$$

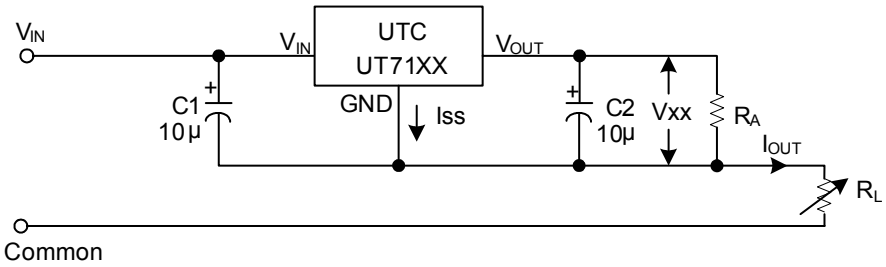
■ TYPICAL APPLICATION CIRCUIT(cont.)

Circuit for increasing output voltage



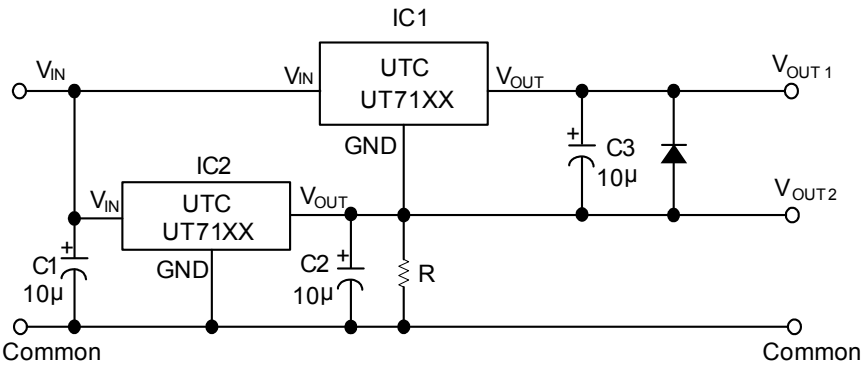
$$V_{OUT} = Vxx + V_{DI}$$

Constant current regulator



$$I_{OUT} = \frac{V_{xx}}{R_A} + Iss$$

Dual supply



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