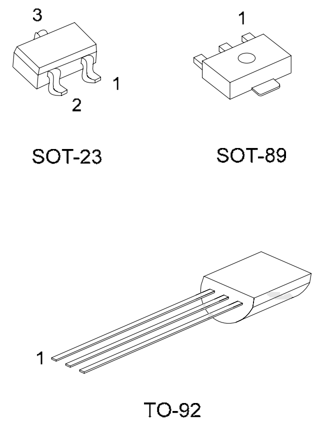
UTC **UNISONIC TECHNOLOGIES CO., LTD**

THREE-TERMINAL LOW POWER VOLTAGE REGULATORS



*Pb-free plating product number: UT10XXL

■ 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.)

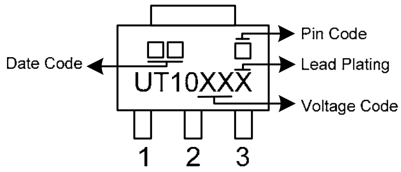
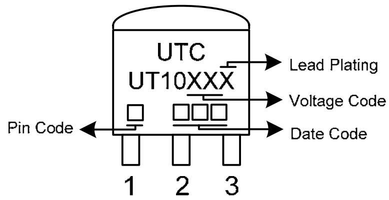
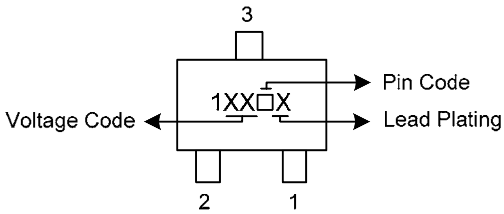
■ ORDERING INFORMATION

Ordering Number		Package	Pin Assign.			Packing
Normal	Lead free plating		1	2	3	
UT10XX-AB3-C-R	UT10XXL-AB3-C-R	SOT-89	G	I	O	Tape Reel
UT10XX-AE3-5-R	UT10XXL-AE3-5-R	SOT-23	G	O	I	Tape Reel
UT10XX-T92-B-B	UT10XXL-T92-B-B	TO-92	O	G	I	Tape Box
UT10XX-T92-B-K	UT10XXL-T92-B-K	TO-92	O	G	I	Bulk
UT10XX-T92-C-B	UT10XXL-T92-C-B	TO-92	G	I	O	Tape Box
UT10XX-T92-C-K	UT10XXL-T92-C-K	TO-92	G	I	O	Bulk

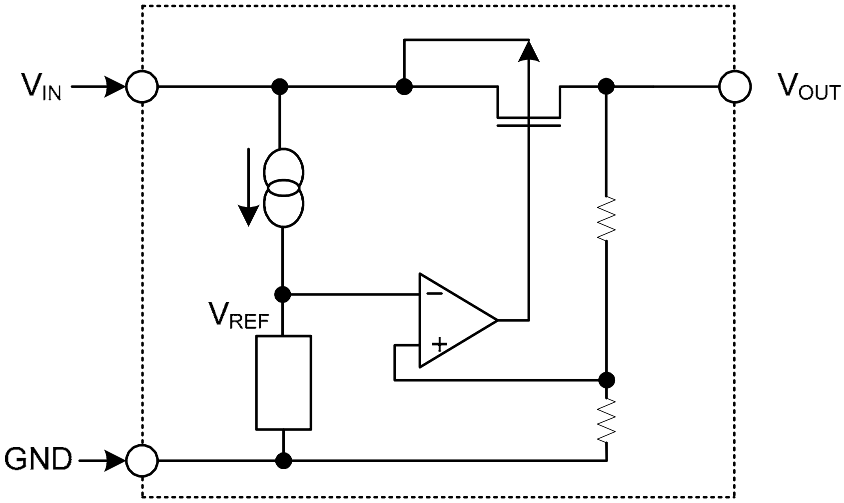
Note: Pin assignment: I: V_{IN} O: V_{OUT} G:Ground

UT10xxL-AB3-C-R	
(1)Packing Type	(1) B: Tape Box, K: Bulk, R: Tape Reel
(2)Pin Assignment	(2) refer to Pin Assignment
(3)Package Type	(3) AB3: SOT-89, AE3: SOT-23, T92: TO-92
(4)Lead Plating	(4) L: Lead Free Plating, Blank: Pb/Sn
(5)Output Voltage Code	(5) xx: refer to Marking Information

■ 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 33:3.3V 36:3.6V 44:4.4V 45:4.5V 50:5.0V 70:7.0V	
TO-92		
SOT-23		

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}	-0.3 ~ +13	V
Power Dissipation	SOT-23	P_D	150	mW
	SOT-89/TO-92		200	
Operating Temperature		T_{OPR}	0 ~ +70	℃
Storage Temperature		T_{STG}	-40 ~ +125	℃

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 CHARACTRISTICS (Ta=25℃)

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	$\triangle V_{OUT}$	V_{IN}=3.8V, 1mA≤I_{OUT}≤20mA			60	100	mV
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	2.8V≤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}=3.8V		20	30		mA
Current Consumption	I_{SS}	V_{IN}=3.8V, No load			2.2	6.0	μA
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=3.8V, I_{OUT}=10mA 0°C<Ta<70°C			±0.25		mV/℃

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	$\triangle V_{OUT}$	V_{IN}=4V, 1mA≤I_{OUT}≤20mA			60	100	mV
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	3V≤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}=4V		20	30		mA
Current Consumption	I_{SS}	V_{IN}=4V, No load			2.2	6.0	μA
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=4V, I_{OUT}=10mA 0°C<Ta<70°C			±0.3		mV/℃

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	$\triangle V_{OUT}$	V_{IN}=4.5V, 1mA≤I_{OUT}≤20mA			60	100	mV
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	3.5V≤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}=4.5V		20	30		mA
Current Consumption	I_{SS}	V_{IN}=4.5V, No load			2.2	6.0	μA
Temperature Coefficient	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=4.5V, I_{OUT}=10mA 0°C<Ta<70°C			±0.35		mV/℃

■ ELECTRICAL CHARACTRISTICS(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	$\triangle V_{OUT}$	V_{IN}=4.7V, 1mA≤I_{OUT}≤20mA			60	100	mV
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	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	$\frac{\triangle V_{OUT}}{\triangle Ta}$	V_{IN}=4.7V, I_{OUT}=10mA 0°C<Ta<70°C			±0.4		mV/℃

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	$\triangle V_{OUT}$	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			2.5	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	3.8V≤V_{IN}≤12V, 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/℃

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	$\triangle V_{OUT}$	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			2.5	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	4V≤V_{IN}≤12V, 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/℃

■ ELECTRICAL CHARACTRISTICS(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	$\triangle V_{OUT}$	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			2.5	6.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	4.5V≤V_{IN}≤12V, 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 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	$\triangle V_{OUT}$	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			3.0	7.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{V_{IN} \times V_{OUT}}$	4.6V≤V_{IN}≤12V, 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 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	$\triangle V_{OUT}$	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			3.0	7.5	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	5.4V≤V_{IN}≤12V, 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

■ ELECTRICAL CHARACTRISTICS(Cont.)

FOR UT1050

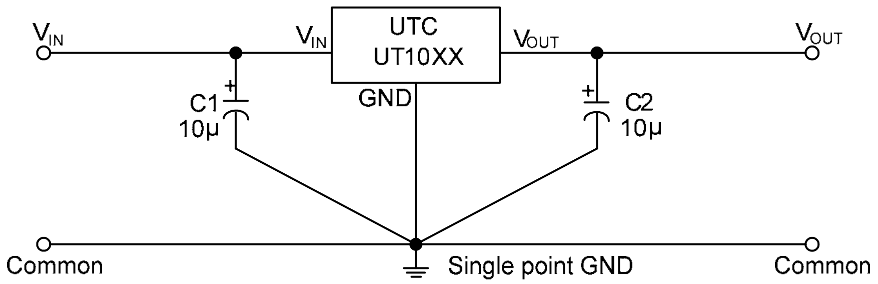
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=7V, I_{OUT}=10mA	±2.4%	4.88	5.0	5.12	V
			±5%	4.75	5.0	5.25	V
Input Voltage	V_{IN}					12	V
Load Regulation	$\triangle V_{OUT}$	V_{IN}=7V, 1mA≤I_{OUT}≤30mA			60	100	mV
Voltage Dropout	V_D	I_{OUT}=1mA			60		mV
Output Current	I_{OUT}	V_{IN}=7V		20	30		mA
Current Consumption	I_{SS}	V_{IN}=7V, No load			3.5	9.0	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	6V≤V_{IN}≤12V, 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 UT1070

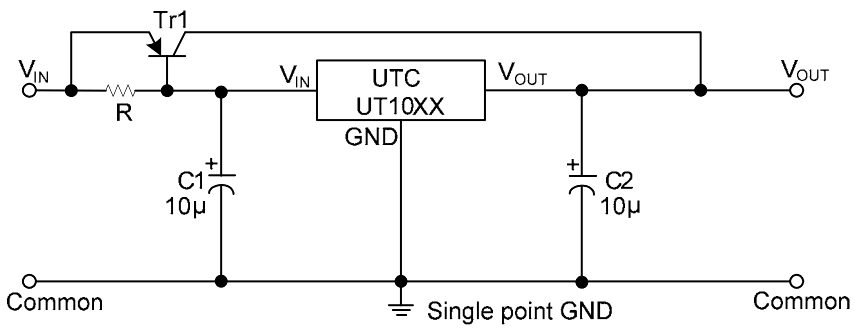
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=9V, I_{OUT}=10mA	±2.4%	6.832	7.0	7.168	V
			±5%	6.65	7.0	7.35	V
Input Voltage	V_{IN}					12	V
Load Regulation	$\triangle V_{OUT}$	V_{IN}=9V, 1mA≤I_{OUT}≤30mA			60	100	mV
Voltage Dropout	V_D	I_{OUT}=1mA			60		mV
Output Current	I_{OUT}	V_{IN}=9V		20	30		mA
Current Consumption	I_{SS}	V_{IN}=9V, No load			5.0	12.5	μA
Line Regulation	$\frac{\triangle V_{OUT}}{\triangle V_{IN} \times V_{OUT}}$	8V≤V_{IN}≤12V, 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/℃

■ APPLICATION CIRCUIT

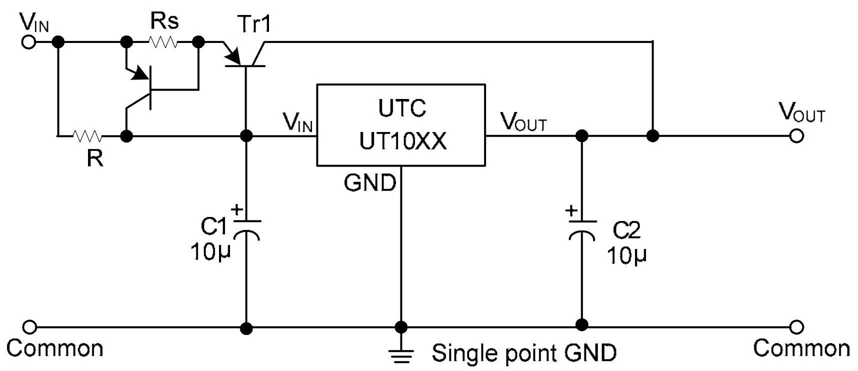
The basic circuits using the UTC **UT10XX** series



High output current positive voltage regulator

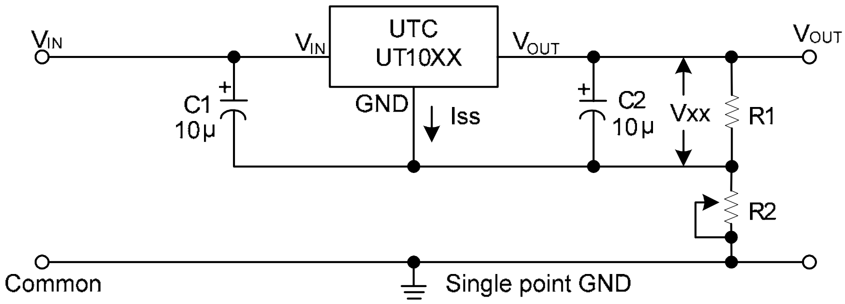


Short-circuit protection for Tr1



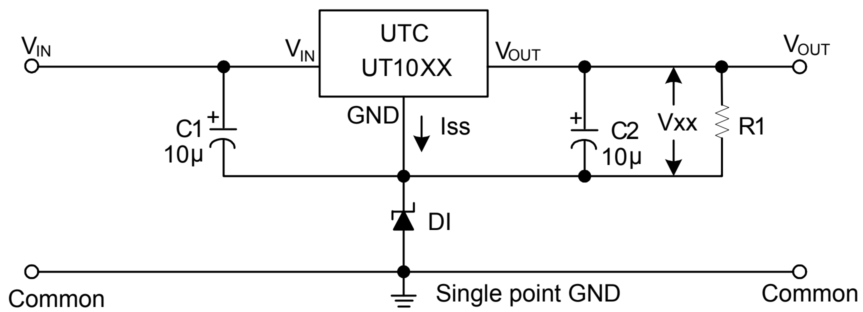
■ APPLICATION CIRCUITS(Cont.)

Circuit for increasing output voltage



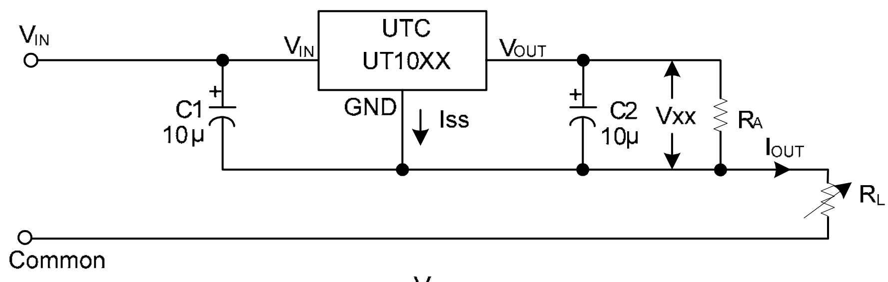
$$V_{OUT} = Vxx\left(1+\frac{R2}{R1}\right) + IssR2$$
$$\fallingdotseq Vxx\left(1+\frac{R2}{R1}\right)$$

Circuit for increasing output voltage



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

Constant current regulator



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

■ APPLICATION CIRCUIT(Cont.)

Dual supply