



UR78XX

CMOS IC

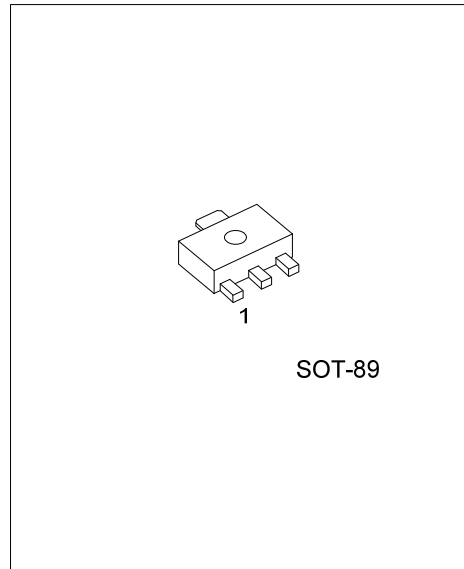
HIGH VOLTAGE , ULTRA LOW IQ VOLTAGE REGULATOR

DESCRIPTION

The UTC **UR78XX** Series are a low dropout regulator with wide input voltage range, high output voltage accuracy, ultra low quiescent current and low dropout. This regulator is based on a CMOS process, and it's input voltage could high enough more than 36V, thus they are very suitable for high voltage application.

FEATURES

- * High output voltage accuracy: $\pm 2\%$
- * Ultra low quiescent current: 1.2uA (Typ.)
- * Low temperature-drift coefficient of V_{OUT} : $\pm 50\text{ppm}/^\circ\text{C}$ (Typ.)
- * Wide Input voltage range: 0 ~ 36V



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UR78XXL-AB3-R	UR78XXG-AB3-R	SOT-89	O	G	I	Tape Reel

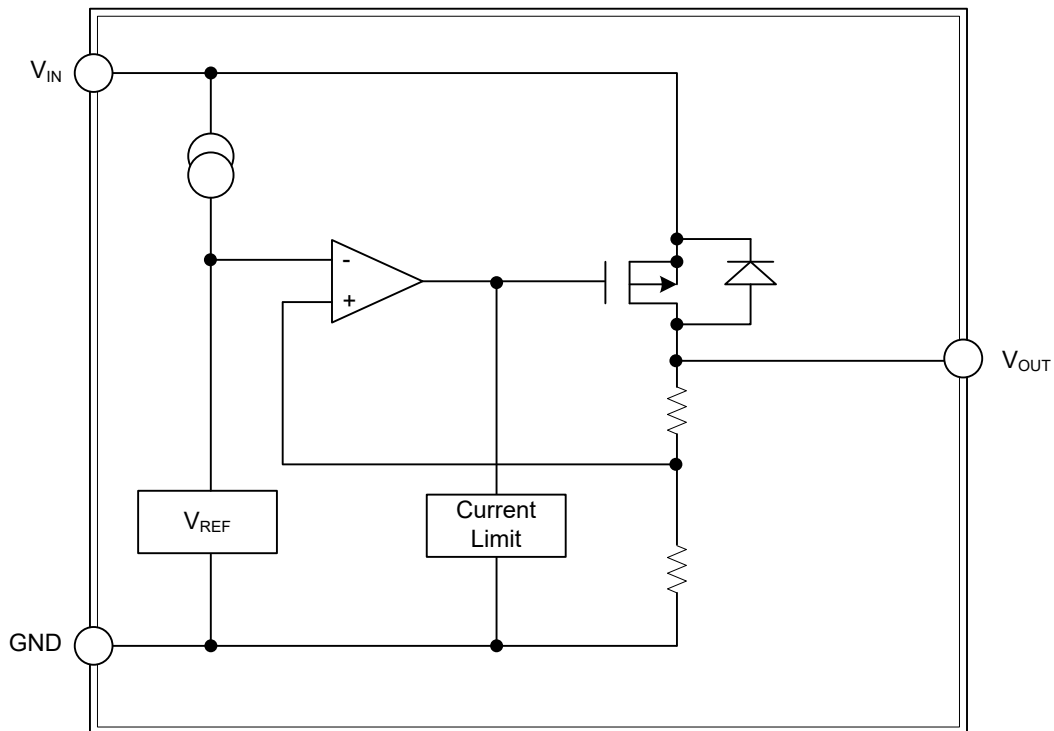
Note: Pin assignment: O: V_{OUT} G: Ground I: V_{IN}

<p>UR78XXG-AB3-R</p> <p>(1) Packing Type (2) Package Type (4) Green Package (5) Output Voltage Code</p>	<p>(1) R: Tape Reel (2) AB3: SOT-89 (4) G: Halogen Free and Lead Free, L: Lead Free (5) XX: Refer to Marking Information</p>
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MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	33: 3.3V 36: 3.6V 40: 4.0V 50: 5.0V 10: 10V 12: 12V	<p>Date Code Voltage Code</p> <p>L: Lead Free G: Halogen Free</p>

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	36	V
Power Dissipation	P_D	500	mW
Junction Temperature	T_J	+125	°C
Operating Temperature Range	T_{OPR}	-40 ~ +125	°C
Storage Temperature Range	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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	200	°C/W
Junction to Case	θ_{JC}	50	°C/W

■ ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

UTC UR7833

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2V, I_{OUT}=10\text{mA}$	3.234	3.3	3.366	V
Output Current (Note 1)	I_{OUT}	$V_{IN}=V_{OUT}+2V$	70	100		mA
Dropout Voltage (Note 2)	V_{DROP}	$I_{OUT}=1\text{mA}$		30	80	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{OUT}+2V \leq V_{IN} \leq 36V, I_{OUT}=1\text{mA}$		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	$V_{IN}=V_{OUT}+2V, 1.0\text{mA} \leq I_{OUT} \leq 50\text{mA}$		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \cdot V_{OUT}}$	$V_{IN}=V_{OUT}+2V, I_{OUT}=10\text{mA}, -40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		±50	±100	Ppm/°C
Supply Current	I_{SS1}	$V_{IN}=V_{OUT}+2V$		1.2	3.0	uA

UTC UR7836

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2V, I_{OUT}=10\text{mA}$	3.528	3.6	3.672	V
Output Current (Note 1)	I_{OUT}	$V_{IN}=V_{OUT}+2V$	70	100		mA
Dropout Voltage (Note 2)	V_{DROP}	$I_{OUT}=1\text{mA}$		30	65	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{OUT}+2V \leq V_{IN} \leq 36V, I_{OUT}=1\text{mA}$		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	$V_{IN}=V_{OUT}+2V, 1.0\text{mA} \leq I_{OUT} \leq 50\text{mA}$		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \cdot V_{OUT}}$	$V_{IN}=V_{OUT}+2V, I_{OUT}=10\text{mA}, -40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		±50	±100	Ppm/°C
Supply Current	I_{SS1}	$V_{IN}=V_{OUT}+2V$		1.2	3.0	uA

UTC UR7840

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2V, I_{OUT}=10\text{mA}$	3.92	4.0	4.08	V
Output Current (Note 1)	I_{OUT}	$V_{IN}=V_{OUT}+2V$	70	100		mA
Dropout Voltage (Note 2)	V_{DROP}	$I_{OUT}=1\text{mA}$		30	65	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{OUT}+2V \leq V_{IN} \leq 36V, I_{OUT}=1\text{mA}$		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	$V_{IN}=V_{OUT}+2V, 1.0\text{mA} \leq I_{OUT} \leq 50\text{mA}$		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \cdot V_{OUT}}$	$V_{IN}=V_{OUT}+2V, I_{OUT}=10\text{mA}, -40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		±50	±100	Ppm/°C
Supply Current	I_{SS1}	$V_{IN}=V_{OUT}+2V$		1.2	3.0	uA

■ ELECTRICAL CHARACTERISTICS (Cont.)

UTC UR7850

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2V, I_{OUT}=10mA$	4.9	5.0	5.1	V
Output Current (Note 1)	I_{OUT}	$V_{IN}=V_{OUT}+2V$	70	100		mA
Dropout Voltage (Note 2)	V_{DROP}	$I_{OUT}=1mA$		30	65	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{OUT}+2V \leq V_{IN} \leq 36V, I_{OUT}=1mA$		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	$V_{IN}=V_{OUT}+2V, 1.0mA \leq I_{OUT} \leq 50mA$		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \cdot V_{OUT}}$	$V_{IN}=V_{OUT}+2V, I_{OUT}=10mA, -40^\circ C \leq T_A \leq 85^\circ C$		± 50	± 100	Ppm/ $^\circ C$
Supply Current	I_{SS1}	$V_{IN}=V_{OUT}+2V$		1.2	3.0	μA

UTC UR7810

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2V, I_{OUT}=10mA$	9.8	10	10.2	V
Output Current (Note 1)	I_{OUT}	$V_{IN}=V_{OUT}+2V$	70	100		mA
Dropout Voltage (Note 2)	V_{DROP}	$I_{OUT}=1mA$		30	80	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{OUT}+2V \leq V_{IN} \leq 36V, I_{OUT}=1mA$		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	$V_{IN}=V_{OUT}+2V, 1.0mA \leq I_{OUT} \leq 50mA$		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \cdot V_{OUT}}$	$V_{IN}=V_{OUT}+2V, I_{OUT}=10mA, -40^\circ C \leq T_A \leq 85^\circ C$		± 50	± 100	Ppm/ $^\circ C$
Supply Current	I_{SS1}	$V_{IN}=V_{OUT}+2V$		1.2	3.0	μA

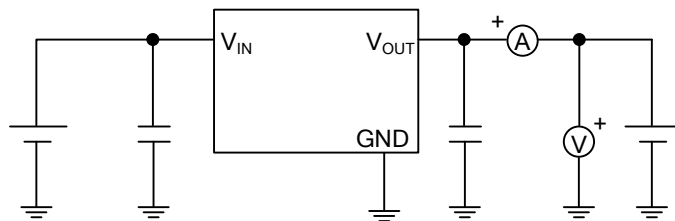
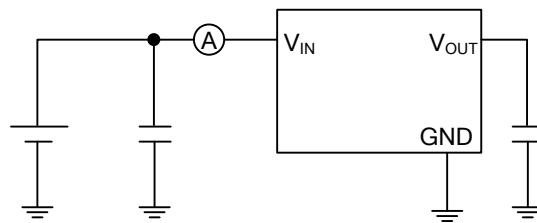
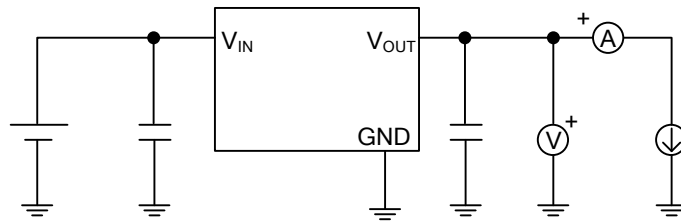
UTC UR7812

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2V, I_{OUT}=10mA$	11.76	12	12.24	V
Output Current (Note 1)	I_{OUT}	$V_{IN}=V_{OUT}+2V$	70	100		mA
Dropout Voltage (Note 2)	V_{DROP}	$I_{OUT}=1mA$		30	80	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \cdot V_{OUT}}$	$V_{OUT}+2V \leq V_{IN} \leq 36V, I_{OUT}=1mA$		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	$V_{IN}=V_{OUT}+2V, 1.0mA \leq I_{OUT} \leq 50mA$		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \cdot V_{OUT}}$	$V_{IN}=V_{OUT}+2V, I_{OUT}=10mA, -40^\circ C \leq T_A \leq 85^\circ C$		± 50	± 100	Ppm/ $^\circ C$
Supply Current	I_{SS1}	$V_{IN}=V_{OUT}+2V$		1.2	3.0	μA

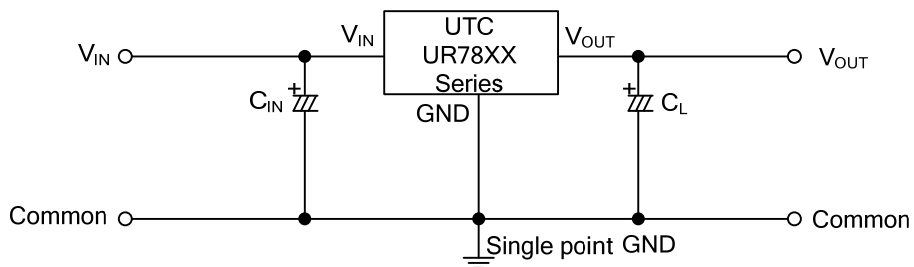
Notes: 1. Increase the output current slowly, record the current when V_{OUT} decrease 98% of V_{OUT} .

2. $V_{drop}=V_{IN1}-(V_{OUT} \times 0.98)$, $V_{OUT}: V_{IN}=V_{OUT}+2V, I_{OUT}=1mA$

■ TEST CIRCUIT

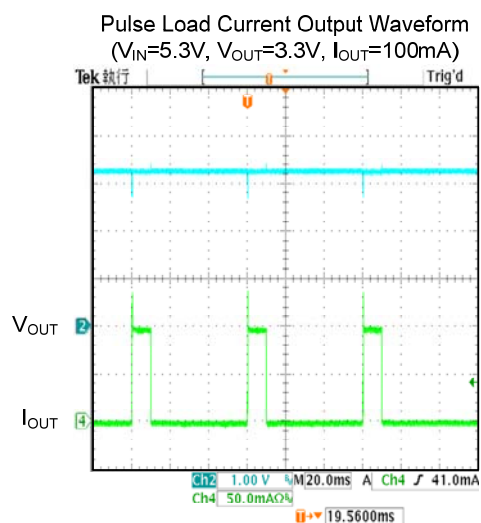
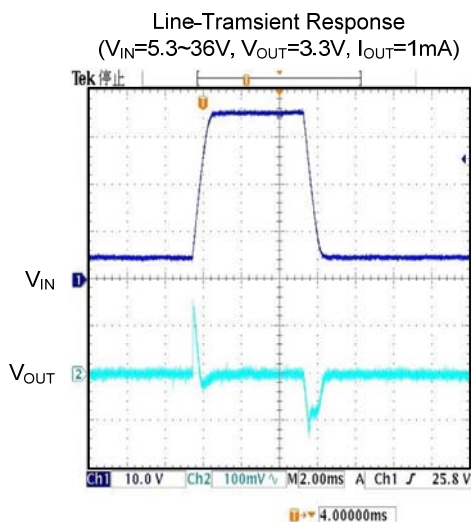
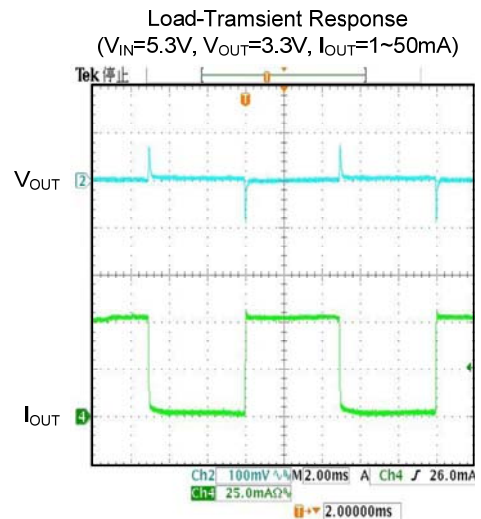
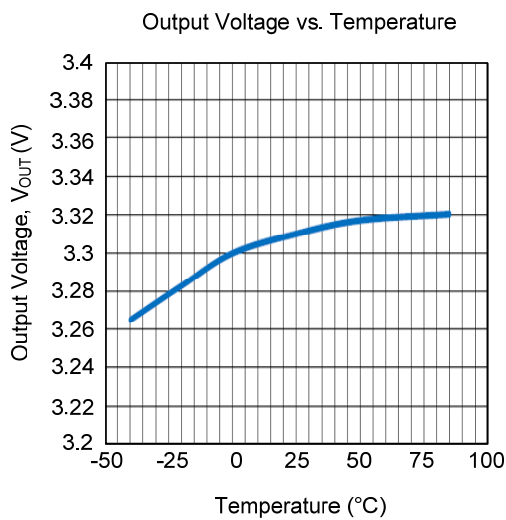
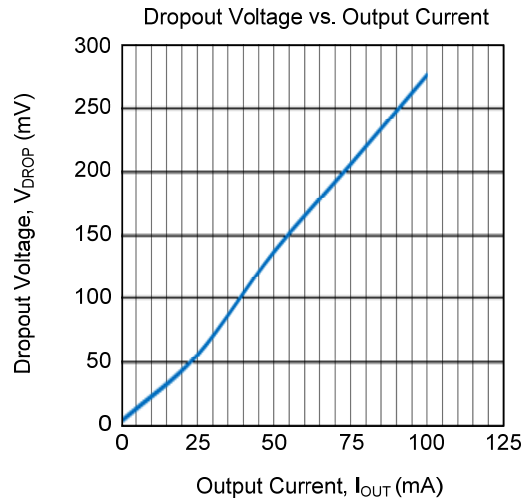
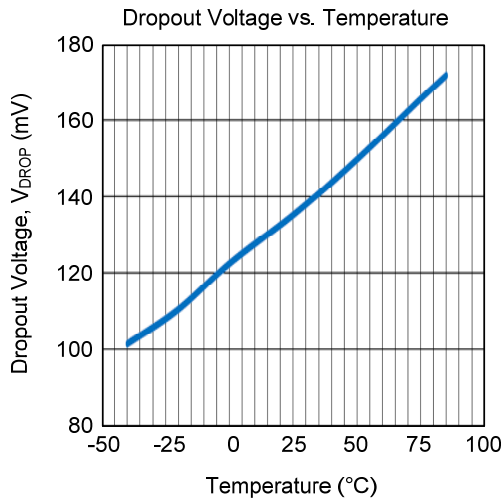


■ TYPICAL APPLICATION CIRCUIT



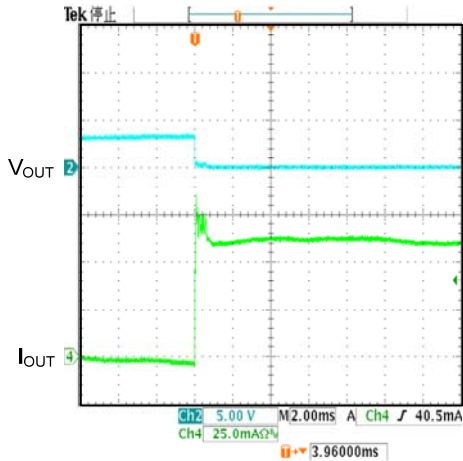
$C_{IN} > 1.0\mu F$
 $C_L > 2.2\mu F$ (tantalum capacitor)

TYPICAL CHARACTERISTICS

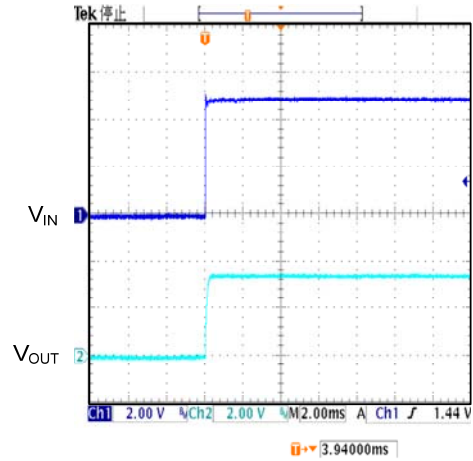


■ TYPICAL CHARACTERISTICS (Cont.)

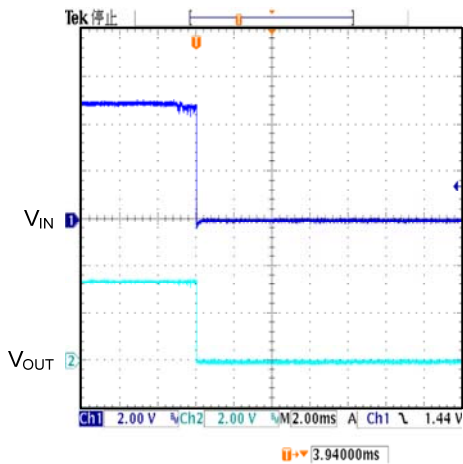
Output Short Waveform
($V_{IN}=5.3V$, $V_{OUT}=3.3V$)



Power-Up Output Waveform
($V_{IN}=5.3V$, $V_{OUT}=3.3V$, $I_{OUT}=50mA$)



Power-Down Output Waveform
($V_{IN}=5.3V$, $V_{OUT}=3.3V$, $I_{OUT}=50mA$)



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