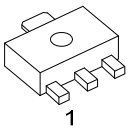
UR78XX

CMOS IC

HIGH VOLTAGE , ULTRA LOW IQ VOLTAGE REGULATOR



SOT-89

■ 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: ±2%
* Ultra low quiescent current: 1.2uA (Typ.)
* Low temperature-drift coefficient of V_{OUT}: ±50ppm/°C (Typ.)
* Wide Input voltage range: 0 ~ 36V

■ ORDERING INFORMATION

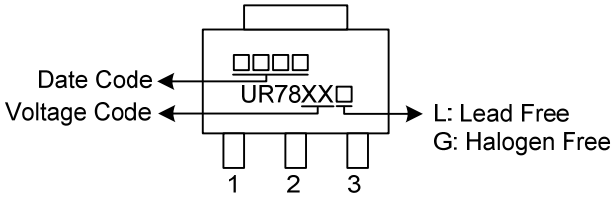
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UR78XXL-AB3-R	UR78XXG-AB3-R	SOT-89	O	G	I	Tape Reel

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

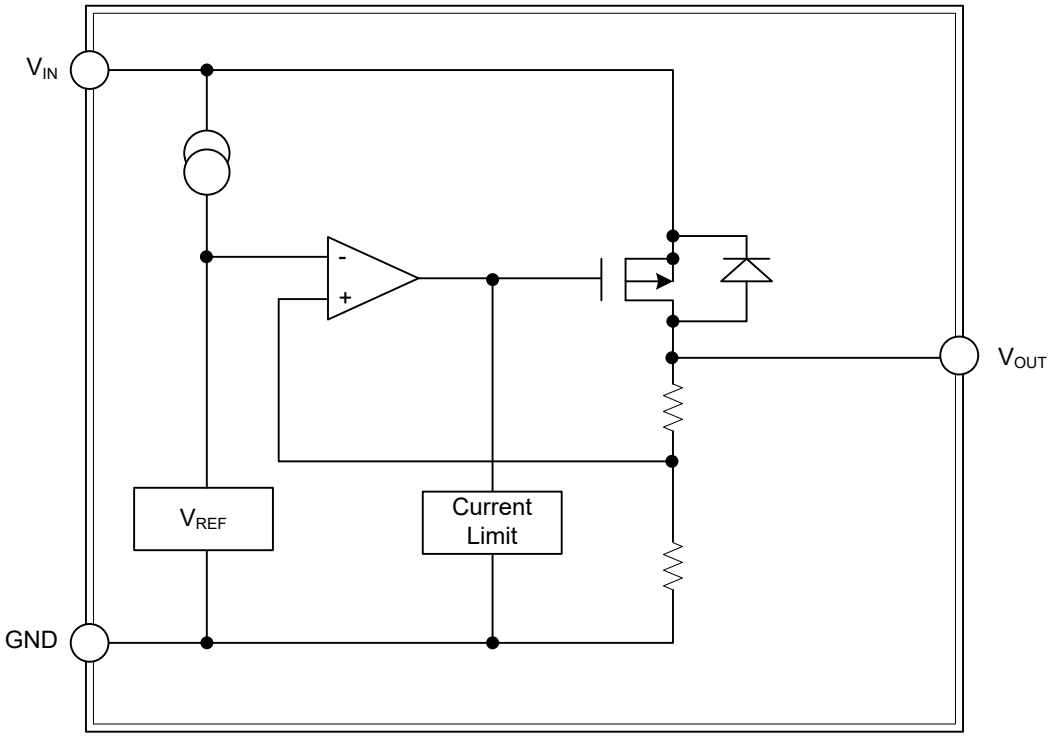
UR78XXG-AB3-R
- (1)Packing Type
- (2)Package Type
- (4)Green Package
- (5)Output Voltage Code

(1) R: Tape Reel
(2) AB3: SOT-89
(4) G: Halogen Free and Lead Free, L: Lead Free
(5) XX: Refer to Marking Information

■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	33: 3.3V 36: 3.6V 40: 4.0V 50: 5.0V 10: 10V 12: 12V	

■ 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°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}=10mA	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}=1mA		30	80	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	V_{OUT}+2V≤V_{IN}≤36V, I_{OUT}=1mA		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	V_{IN}=V_{OUT}+2V, 1.0mA≤I_{OUT}≤50mA		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \bullet V_{OUT}}$	V_{IN}=V_{OUT}+2V, I_{OUT}=10mA , -40°C≤T_A≤85°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}=10mA	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}=1mA		30	65	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	V_{OUT}+2V≤V_{IN}≤36V, I_{OUT}=1mA		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	V_{IN}=V_{OUT}+2V, 1.0mA≤I_{OUT}≤50mA		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \bullet V_{OUT}}$	V_{IN}=V_{OUT}+2V, I_{OUT}=10mA , -40°C≤T_A≤85°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}=10mA	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}=1mA		30	65	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	V_{OUT}+2V≤V_{IN}≤36V, I_{OUT}=1mA		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	V_{IN}=V_{OUT}+2V, 1.0mA≤I_{OUT}≤50mA		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \bullet V_{OUT}}$	V_{IN}=V_{OUT}+2V, I_{OUT}=10mA , -40°C≤T_A≤85°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	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	V_{OUT}+2V≤V_{IN}≤36V, I_{OUT}=1mA		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	V_{IN}=V_{OUT}+2V, 1.0mA≤I_{OUT}≤50mA		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \bullet V_{OUT}}$	V_{IN}=V_{OUT}+2V, I_{OUT}=10mA , -40°C≤T_A≤85°C		±50	±100	Ppm/°C
Supply Current	I_{SS1}	V_{IN}=V_{OUT}+2V		1.2	3.0	uA

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	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet V_{OUT}}$	V_{OUT}+2V≤V_{IN}≤36V, I_{OUT}=1mA		0.05	0.2	%/V
Load Regulation	ΔV_{OUT2}	V_{IN}=V_{OUT}+2V, 1.0mA≤I_{OUT}≤50mA		30	80	mV
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT1}}{T_A \bullet V_{OUT}}$	V_{IN}=V_{OUT}+2V, I_{OUT}=10mA , -40°C≤T_A≤85°C		±50	±100	Ppm/°C
Supply Current	I_{SS1}	V_{IN}=V_{OUT}+2V		1.2	3.0	uA

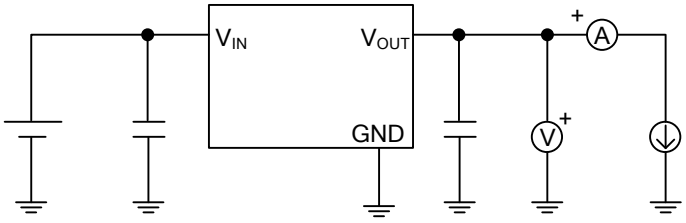
UTC **UR7812**

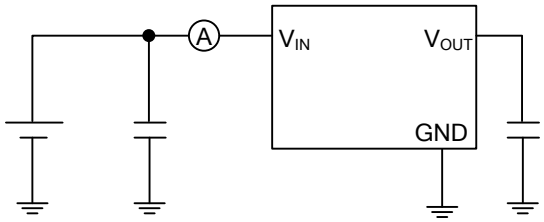
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}	V_{IN}=V_{OUT}+2V, I_{OUT}=10mA	11.76	12	12.24	V
Output Current (Note 1)	I_{OUT}	V_{IN}=V_{OUT}+2V	70	100		mA
Dropout Voltage (Note 2)	V_{DROP}	I_{OUT}=1mA		30	80	mV
Line Regulation	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \bullet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

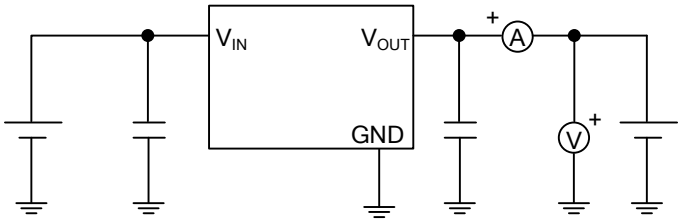
Notes: 1. Increase the output current slowly, record the current when V_{OUT} decrease 98% of V_{OUT}.

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

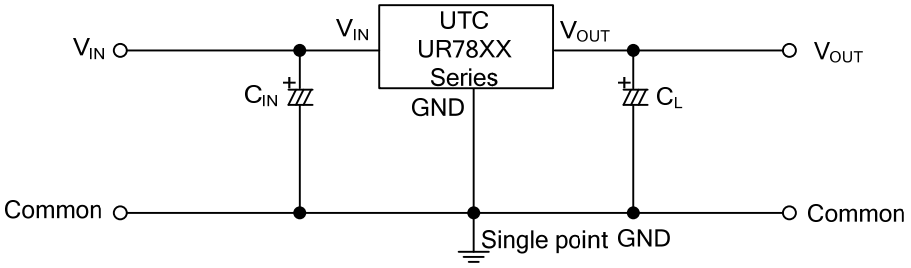
■ TEST CIRCUIT







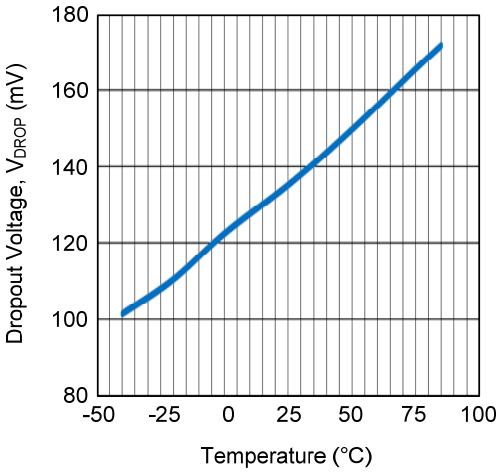
■ TYPICAL APPLICATION CIRCUIT



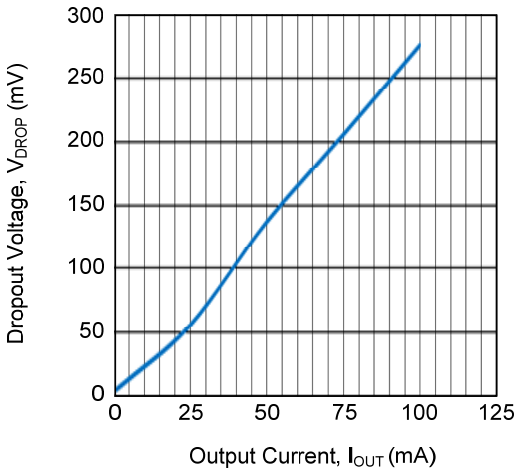
C_{IN}>1.0μF
C_L>2.2μF (tantalum capacitor)

■ TYPICAL CHARACTERISTICS

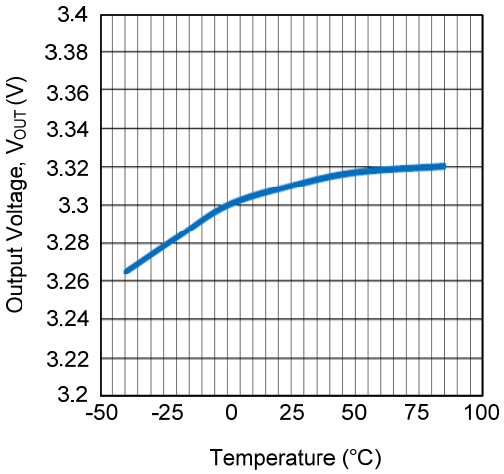
Dropout Voltage vs. Temperature



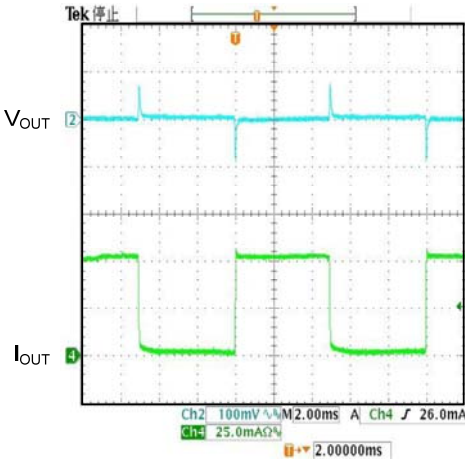
Dropout Voltage vs. Output Current



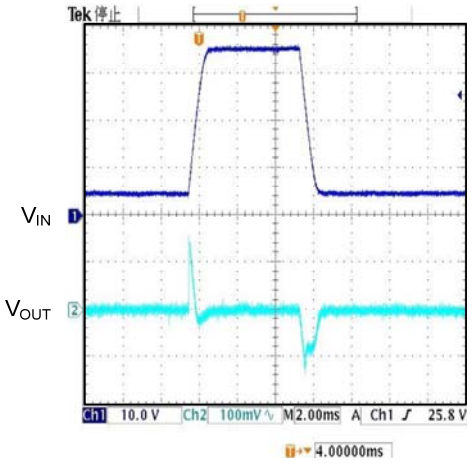
Output Voltage vs. Temperature



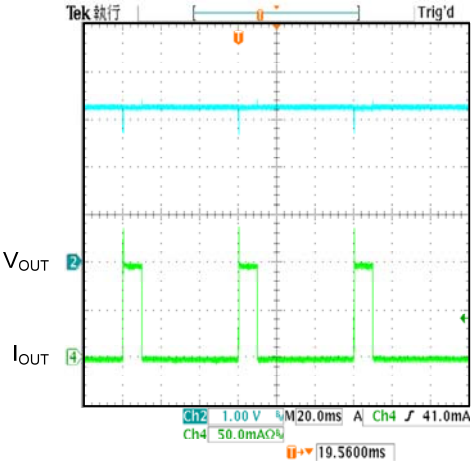
Load-Tramsient Response
(V_{IN}=5.3V, V_{OUT}=3.3V, I_{OUT}=1~50mA)



Line-Tramsient Response
(V_{IN}=5.3~36V, V_{OUT}=3.3V, I_{OUT}=1mA)

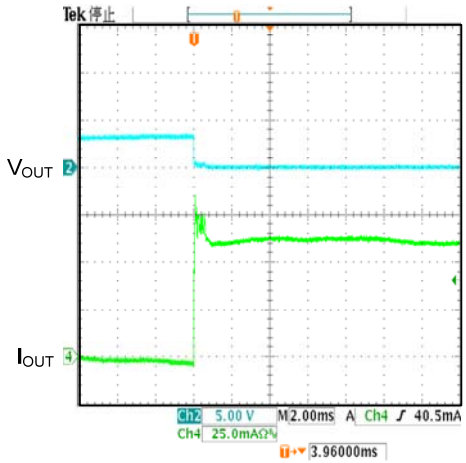


Pulse Load Current Output Waveform
(V_{IN}=5.3V, V_{OUT}=3.3V, I_{OUT}=100mA)

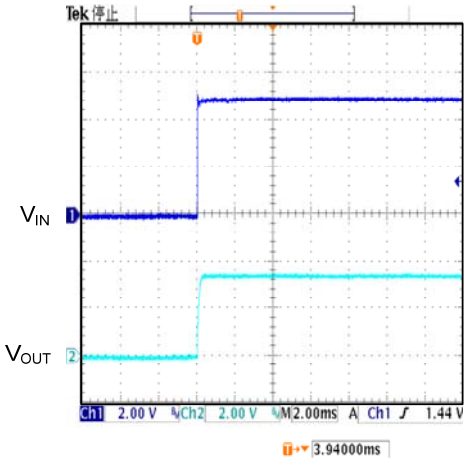


■ TYPICAL CHARACTERISTICS (Cont.)

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)