



LXXLD30

CMOS IC

0.8V REFERENCE ULTRA LOW DROPOUT LINEAR REGULATOR

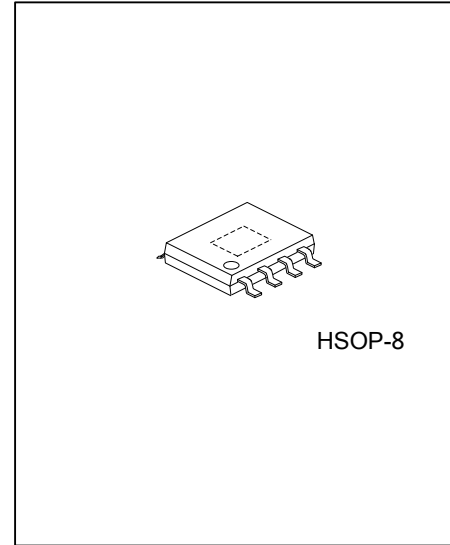
DESCRIPTION

The UTC **LXXLD30** is a typical LDO with the features of very low dropout voltage as low as 0.2V at output current 3A.

For normal operation, two supply voltages are necessary. One called control voltage from other equipment can shutdown the output voltage and it should pull and hold the voltage of EN pin less than 0.3V. Another one is the main supply voltage whose purpose is for main power conversion, to keep the power dissipation low, and to make the dropout voltage lower.

Internally, in the UTC **LXXLD30**, there're many functions which can be seen in the block figure to prevent the IC from being damaged. Internal Power-On-Reset (POR) circuit can control the two supply voltages to prevent fault operations of the circuit; the thermal shutdown circuit is able to protect the device from over thermal operation, and a current limit function will keep the device work safely under current over-loads.

The UTC **LXXLD30** can be used as an ideal to provide well supply voltage in the applications, such as front-side-bus termination on motherboard, NB applications, front side bus V_{TT} (1.2V/3A) and note book PC applications.



HSOP-8

FEATURES

- * Low Dropout $V_D=0.25V(\text{typ.})@ I_{OUT}=3A$
- * Low ESR Output Capacitor
- * $V_{REF}=0.8V$
- * $\pm 1.5\%$ over Line, Load and Temperature Output Accuracy
- * Fast Transient Response
- * Output Voltage Adjustable through External Resistors
- * POR(Power-On-Reset) controlling V_{CTRL} and V_{IN}
- * With internal Soft-Start
- * Internal Current Limit Protection
- * Internal Under Voltage Protection
- * Hysteretic Thermal Shutdown
- * With Power-OK Output (with a Delay Time)
- * For Standby or Suspend Mode: Shutdown

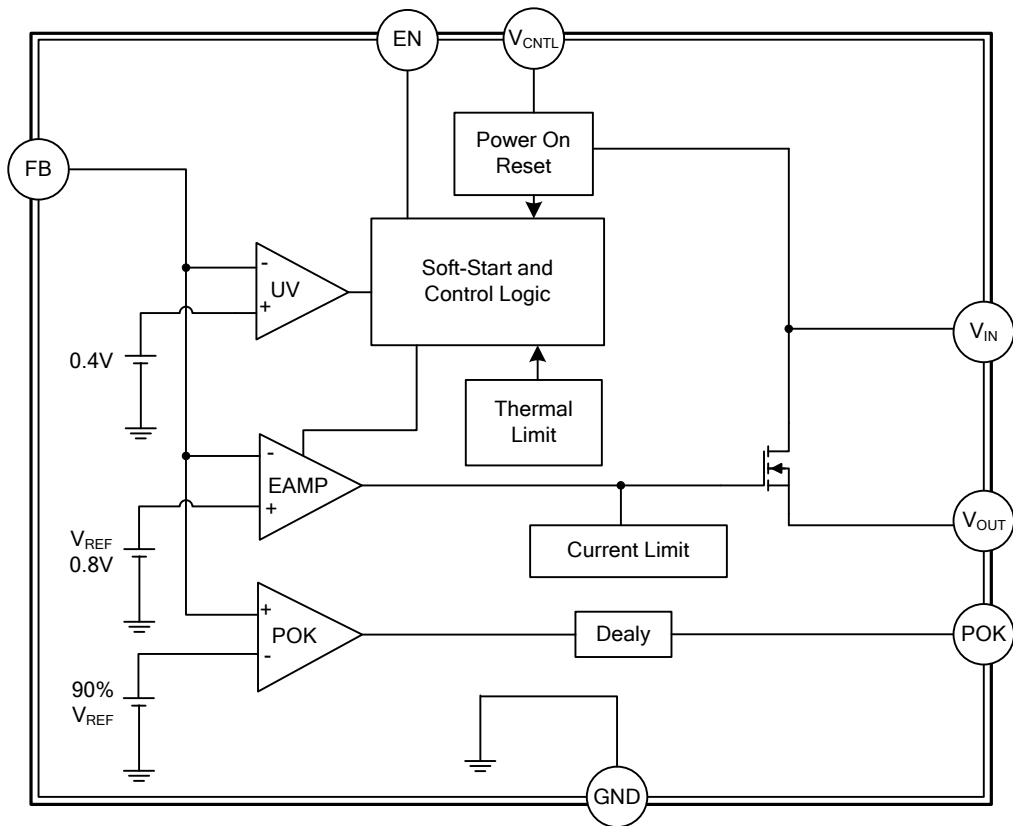
ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LXXLD30L-SH2-R	LXXLD30G-SH2-R	HSOP-8	Tape Reel

Note: XX: Output Voltage, refer to Marking Information.

<p>LXXLD30G-SH2-R</p>	<p>(1) Packing Type (1) R: Tape Reel</p> <p>(2) Package Type (2) SH2: HSOP-8</p> <p>(3) Green Package (3) G: Halogen Free and Lead Free, L: Lead Free</p> <p>(4) Output Voltage Code (4) XX: refer to Marking Information</p>
-----------------------	---

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage (V_{CNTL} to GND)	V_{CNTL}	-0.3 ~ +7	V
Supply Voltage (V_{IN} to GND)	V_{IN}	-0.3 ~ +3.3	V
EN and FB to GND	V_{IO}	-0.3 ~ $V_{\text{CNTL}}+0.3$	V
POK to GND	V_{POK}	-0.3 ~ +7	V
Power Dissipation	P_{D}	3	W
Junction Temperature	T_{J}	+150	°C
Storage Temperature	T_{STG}	-65 ~ +150	°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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT	
Supply Voltage	Control	V_{CNTL}	3.1 ~ 6	V
Supply Voltage	Input	V_{IN}	1.1 ~ 3.3	V
Output Voltage	$V_{\text{CNTL}}=3.3\pm5\%$	V_{OUT}	0.8 ~ 1.2	V
	$V_{\text{CNTL}}=5.0\pm5\%$		+0.8 ~ $V_{\text{IN}}-0.2$	V
Output Current	I_{OUT}	0 ~ 3	A	
Junction Temperature	T_{J}	-25 ~ +125	°C	

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient (Note 1)	θ_{JA}	42	°C/W
Junction to Case (Note 2)	θ_{JC}	18	°C/W

Notes: 1. θ_{JA} is measured with the component mounted on a high effective thermal conductivity test board in free air. The exposed pad of HSOP-8 is soldered directly on the PCB.

2. The Thermal Pad Temperature is measured on the PCB copper area connected to the thermal pad of package.

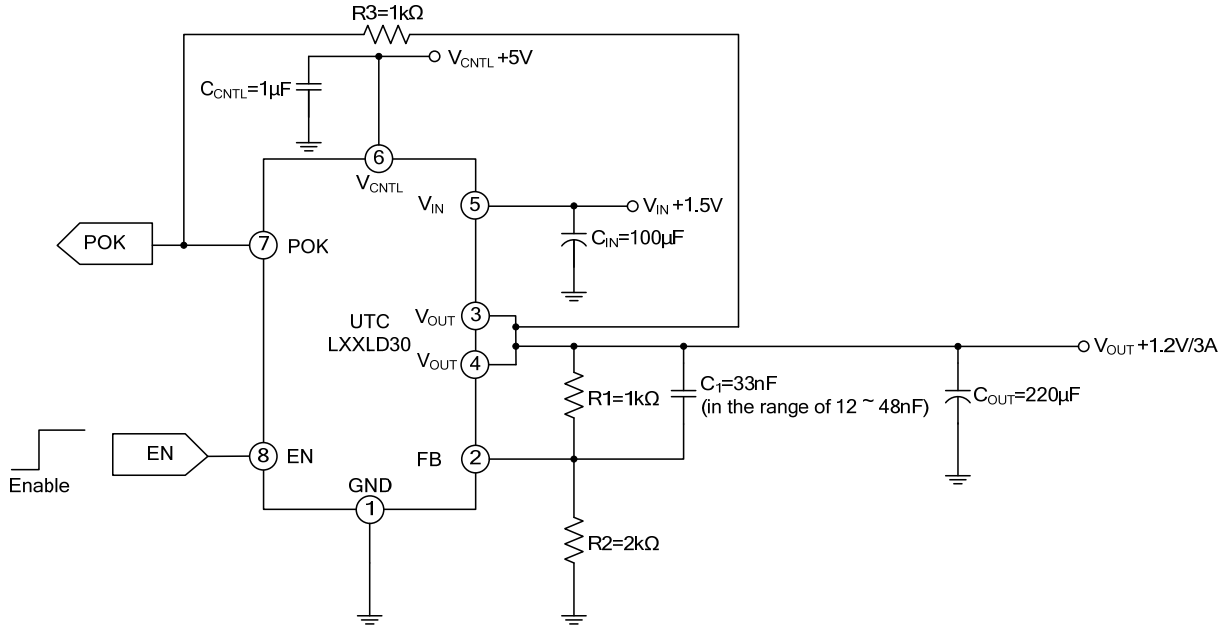
■ ELECTRICAL CHARACTERISTICS

(Refer to the typical application circuit. These specifications apply over, $V_{\text{CNTL}} = 5\text{V}$, $V_{\text{IN}} = 1.5\text{V}$, $V_{\text{OUT}} = 1.2\text{V}$ and $T_{\text{A}} = 0 \sim 70^{\circ}\text{C}$, unless otherwise specified. Typical values refer to $T_{\text{A}} = 25^{\circ}\text{C}$).

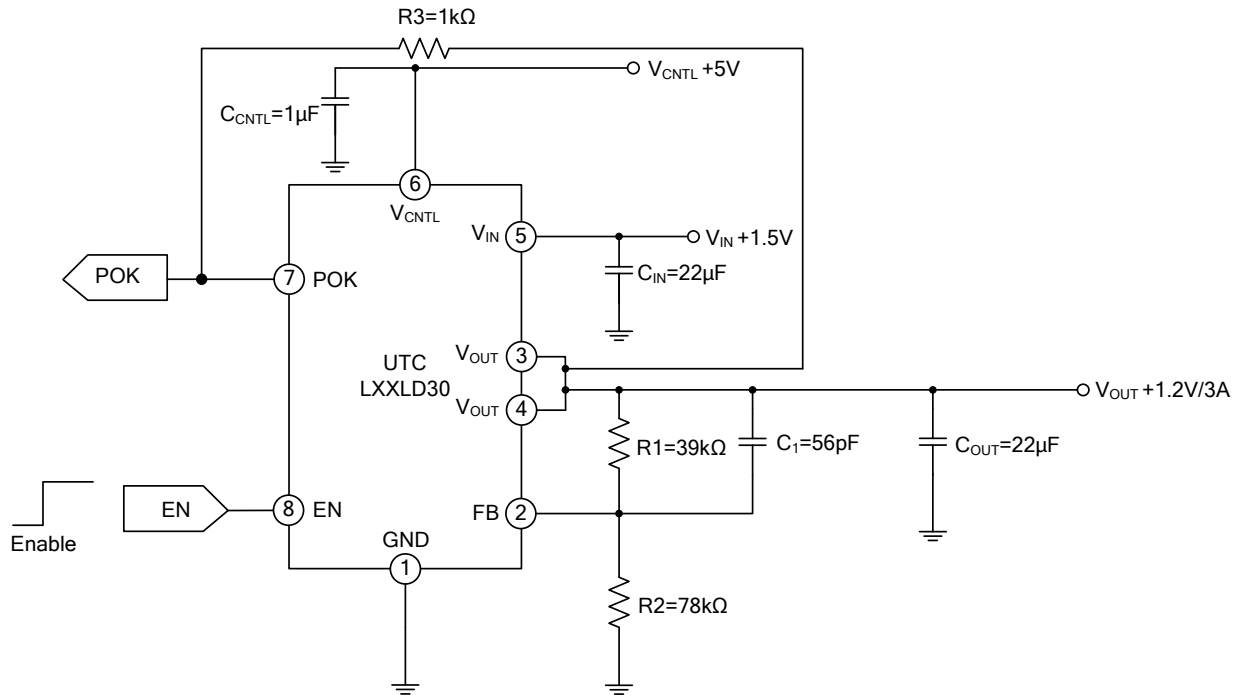
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
V_{CNTL} Nominal Supply Current	I_{CNTL}	$\text{EN} = V_{\text{CNTL}}$	0.4	1	2	mA		
V_{CNTL} Shutdown Current	I_{SD}	$\text{EN} = \text{GND}$		180	380	μA		
POR Threshold	V_{CNTL} V_{IN}	V_{THR}	V_{CNTL} Rising		2.7	2.9	3.1	V
			V_{IN} Rising		0.8	0.9	1.0	V
POR Hysteresis	V_{CNTL} V_{IN}	V_{HYS}				0.4		V
						0.5		V
Reference Voltage	V_{REF}	$\text{FB} = V_{\text{OUT}}$		0.8		V		
Output Voltage Accuracy		$I_{\text{OUT}} = 0\text{A} \sim 3\text{A}$, $T_{\text{J}} = -25 \sim 125^{\circ}\text{C}$	-1.5		+1.5	%		
Line Regulation	$\frac{\Delta V_{\text{OUT}}}{\Delta V_{\text{IN}} \times V_{\text{OUT}}}$	$V_{\text{CNTL}} = 3.3 \sim 5\text{V}$		0	0.13	%/V		
Load Regulation	$\frac{\Delta V_{\text{OUT}}}{V_{\text{OUT}}}$	$I_{\text{OUT}} = 0\text{A} \sim 3\text{A}$		0.06	0.15	%		
Current Limit	I_{LIMIT}	$V_{\text{CNTL}} = 5\text{V}$, $T_{\text{J}} = 25^{\circ}\text{C}$	4.8	5.7	6.6	A		
		$V_{\text{CNTL}} = 5\text{V}$, $T_{\text{J}} = -25 \sim +125^{\circ}\text{C}$	4					
		$V_{\text{CNTL}} = 3.3\text{V}$, $T_{\text{J}} = 25^{\circ}\text{C}$	4.6	5.5	6.4			
		$V_{\text{CNTL}} = 3.3\text{V}$, $T_{\text{J}} = -25 \sim +125^{\circ}\text{C}$	3.8					
Dropout Voltage	V_{D}	$V_{\text{CNTL}} = 5\text{V}$, $I_{\text{OUT}} = 3\text{A}$, $T_{\text{J}} = 25^{\circ}\text{C}$		0.17	0.25	V		
		$V_{\text{CNTL}} = 5\text{V}$, $I_{\text{OUT}} = 3\text{A}$, $T_{\text{J}} = -50 \sim +125^{\circ}\text{C}$			0.3			
Over Temperature Shutdown	OTS	T_{J} Rising		150		$^{\circ}\text{C}$		
Over Temperature Hysteresis	OTH			50		$^{\circ}\text{C}$		
Under-Voltage Threshold		V_{FB} Falling		0.4		V		
EN Logic High Threshold Voltage		V_{EN} Rising	0.3	0.4	0.5	V		
EN Hysteresis				30		mV		
EN Pin Pull-Up Current		$\text{EN} = \text{GND}$		10		μA		
Soft-Start Interval	T_{SS}			2		ms		
POK Threshold Voltage for Power OK	V_{POK}	V_{FB} Rising	90%	92%	94%	V_{REF}		
POK Threshold Voltage for Power Not OK	V_{PNOK}	V_{FB} Falling	79%	81%	83%	V_{REF}		
POK Low Voltage		POK sinks 5mA		0.25	0.4	V		
POK Delay Time	T_{DELAY}		1	3	10	ms		

■ TYPICAL APPLICATION CIRCUIT

1. Using an Output Capacitor with $ESR \geq 18m\Omega$



2. Using an MLCC as the Output Capacitor



V_{OUT} (V)	R1 (kΩ)	R2 (kΩ)	C1 (pF)
1.05	43	137.6	47
1.5	27	30.86	82
1.8	15	12	150

■ APPLICATION INFORMATION

1. Power Sequencing

When there's no main voltage applied at V_{IN} , it is suggested not to apply a voltage to V_{OUT} for a long time. Because the internal parasitic diode (between V_{OUT} to V_{IN}) will conduct and dissipate power, there's no protection.

2. Output Capacitor

A proper output capacitor to maintain stability and improve transient response over temperature and current is necessary. Proper ESR (equivalent series resistance) and capacitance of the output capacitor should be selected properly for stability of the normal operation and good load transient response.

Many kinds of capacitors can be used as an output capacitor, such as ultra-low-ESR capacitors (like ceramic chip capacitors), low-ESR bulk capacitors (like solid Tantalum, POSCap, and Aluminum electrolytic capacitors). And also the value of the output capacitors' can be increased without limit.

In the applications with large stepping load current, the low-ESR bulk capacitors are normally recommended.

Decoupling ceramic capacitors are recommended to be placed at the load and ground pins very closely and also the impedance of the layout must be minimized.

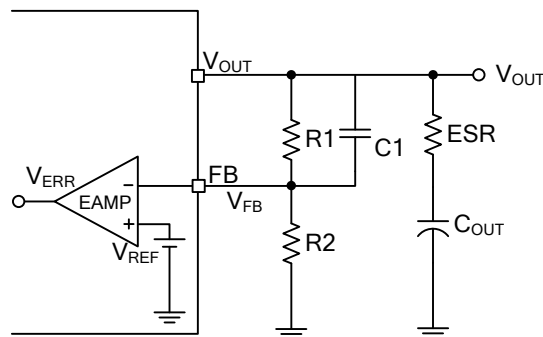
3. Input Capacitor

In order to prevent the input rail from dropping, the proper input capacitor to supply current surge during stepping load transients is required. Because the limited slew rate of the surge currents, more parasitic inductance needs more input capacitance.

Ultra-low-ESR capacitors ($>100\text{mF}$, $\text{ESR}<300\text{m}\Omega$) is recommended for the input capacitor.

4. Feedback Network

The following figure shows the feedback network between V_{OUT} GND and FB pins. Working with the internal error amplifier, the feedback network can provide proper frequency response for the UTC LXXLD30.



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. UTC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.