



## LR1830

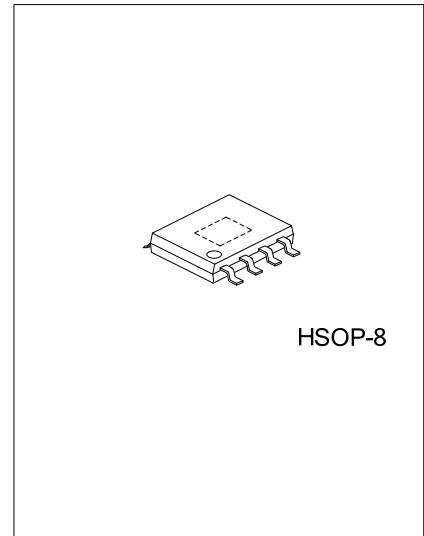
Advance

CMOS IC

### 3A, ULTRA-LOW DROPOUT VOLTAGE REGULATOR

#### DESCRIPTION

The UTC **LR1830** is a high performance positive voltage regulator designed for use in applications requiring very low input voltage and very low dropout voltage at up to 3A. It operates with a  $V_{IN}$  as low as 1V and  $V_{DD}$  voltage 3V with programmable output voltage as low as 0.8V. The UTC **LR1830** features ultra low dropout, ideal for applications where  $V_{OUT}$  is very close to  $V_{IN}$ . Additionally, it has an enable pin to further reduce power dissipation while shutdown. The UTC **LR1830** provides excellent regulation over variations in line, load and temperature. The UTC **LR1830** provides a power good signal to indicate if the voltage level of  $V_O$  reaches 90% of its rating value.



#### FEATURES

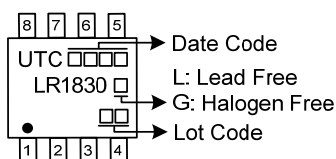
- \* Dropout Voltage 350mV @ 3A Typically
- \* Output Current up to 3A
- \* High Accuracy ADJ Voltage 1.5%
- \*  $V_{OUT}$  Power Good Signal
- \*  $V_{OUT}$  Pull Low Resistance when Disable
- \* Thermal Shutdown Protection
- \* Current Limiting Protection

#### ORDERING INFORMATION

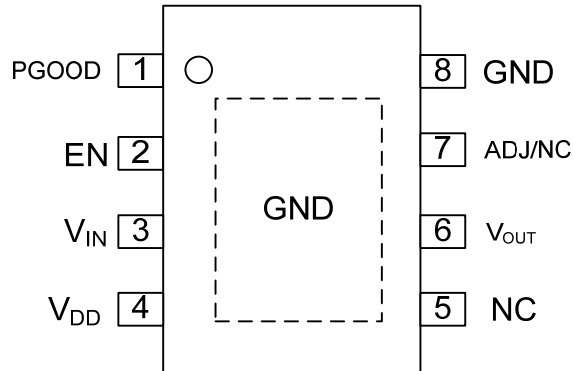
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR1830L-SH2-R	LR1830G-SH2-R	HSOP-8	Tape Reel

<p>LR1830G-SH2-R</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Green Package</li> </ul>	<ul style="list-style-type: none"> <li>(1) R: Tape Reel</li> <li>(2) SH2: HSOP-8</li> <li>(3) G: Halogen Free and Lead Free, L: Lead Free</li> </ul>
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#### MARKING



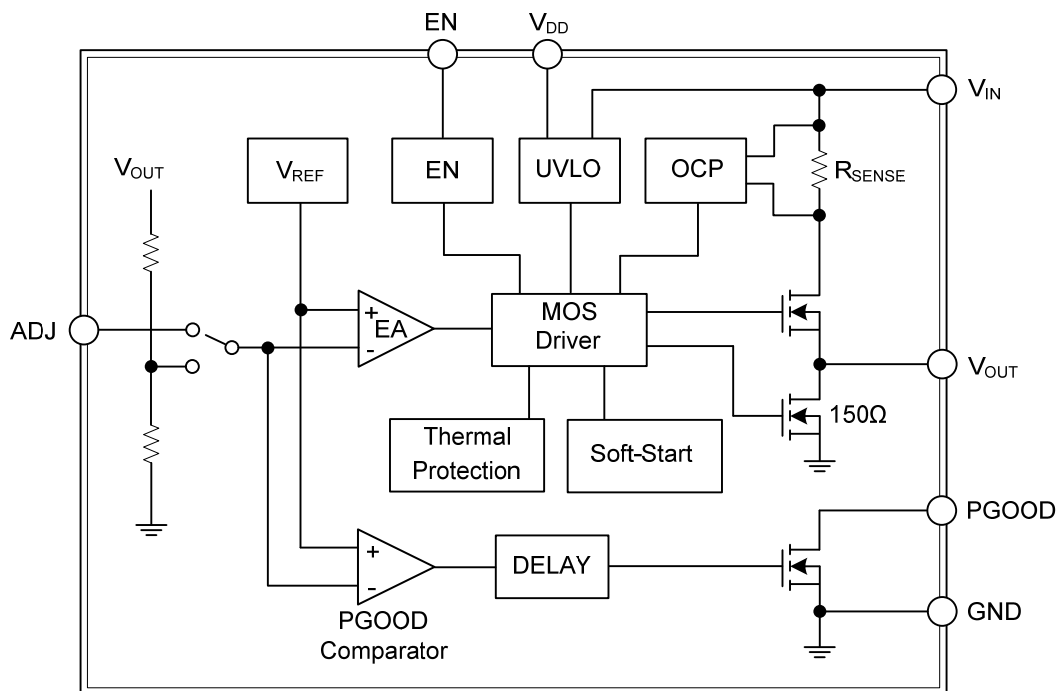
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.		PIN NAME	DESCRIPTION
Adjustable Output Voltage	Fixed Output Voltage		
1	1	PGOOD	Power Good Open Drain Output.
2	2	EN	Enable Control Input.
3	3	V <sub>IN</sub>	Supply Input Voltage.
4	4	V <sub>DD</sub>	Supply Voltage of Control Circuit.
5	5, 7	NC	No Internal Connection.
6	6	V <sub>OUT</sub>	Output Voltage.
7	-	ADJ	Output Voltage Setting. $V_{OUT} = V_{REF} \times (R1+R2)/R2$ .
8	8	GND	Ground. The exposed pad must be soldered to a large PCB and connected to GND for maximum power dissipation.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Input Voltage	DC	$V_{IN}$ to GND	-0.3 ~ 6	V
	< 10ms		-0.3 ~ 7	V
Control Voltage	DC	$V_{DD}$ to GND	-0.3 ~ 6	V
	< 10ms		-0.3 ~ 7	V
Output Voltage		$V_{OUT}$	-0.3 ~ 6	V
Chip Enable Voltage		EN	-0.3 ~ 6	V
Adjust Voltage		ADJ	-0.3 ~ 6	V
Power Good Voltage		$V_{PGOOD}$	-0.3 ~ 6	V
Power Dissipation	$T_A = 25^\circ\text{C}$	$P_D$	1.333	W
Junction Temperature		$T_J$	+150	$^\circ\text{C}$
Storage Temperature		$T_{STG}$	-65 ~ +150	$^\circ\text{C}$

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 (NOTE)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	$V_{IN}$	1 ~ 5	V
Control Voltage	$V_{DD}$	3 ~ 5.5	V
Junction Temperature Range	$T_J$	-40 ~ +125	$^\circ\text{C}$
Ambient Temperature Range	$T_A$	-40 ~ +85	$^\circ\text{C}$

Note: The device is not guaranteed to function outside its operating conditions.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	$\theta_{JA}$	75	$^\circ\text{C}/\text{W}$
Junction to Case	$\theta_{JC}$	15	$^\circ\text{C}/\text{W}$

### ■ ELECTRICAL CHARACTERISTICS

( $V_{DD}=5V$ ,  $C_{IN}=C_{OUT}=10\mu F$ ,  $C_{VDD}=1\mu F$ ,  $T_A=25^\circ C$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{DD}$ Operation Range	$V_{DD}$		3		5.5	V
$V_{DD}$ POR Threshold	$V_{POR\_VDD}$	$V_{DD}$ Rising		2.7		V
$V_{DD}$ POR Falling Hysteresis	$\Delta V_{POR\_VDD}$	$V_{DD}$ Falling	0.15	0.2		V
Input Voltage Range	$V_{IN}$		1		5.5	V
$V_{IN}$ POR Threshold	$V_{POR\_VIN}$	$V_{IN}$ Rising	0.7	0.8	0.9	V
$V_{IN}$ POR Falling Hysteresis	$\Delta V_{POR\_VIN}$	$V_{IN}$ Falling		0.2		V
Quiescent Current	$I_Q$	EN On, No Load		0.6	1.2	mA
Reference Voltage	$V_{REF}$		0.788	0.8	0.812	V
Fixed Output Voltage Accuracy			-1.5		1.5	%
$V_{OUT}$ Load Regulation	$\Delta V_{LOAD}$	$I_{OUT}=1mA\sim 3A$ , $V_{IN}=V_{OUT}+1V$		0.5	1	%
OUT Line Regulation	$\Delta V_{LINE}$	$V_{DD}=3.6V\sim 5.5V$ , $V_{IN}=V_{OUT}+1V\sim 5V$ , $I_{OUT}=1mA$		0.2	0.6	%
Dropout Voltage	$V_{DROP}$	$I_{OUT}=2A$		250	350	mV
		$I_{OUT}=3A$		350	450	mV
Current Limit	$I_{LIM}$	$V_{IN}=3.6V$		3.6		A
Short Circuit Current	$I_{SC}$	$V_{OUT} < 0.2V$		1.4		A
$V_{OUT}$ Pull Low Resistance	$R_{PULL}$	$V_{EN}=0V$		150		$\Omega$
Thermal Shutdown Temperature	$T_{SD}$			160		$^\circ C$
Thermal Shutdown Recovery Temperature	$T_{SDR}$			90		$^\circ C$
PGOOD Rising Threshold	$V_{TH\_PGOOD}$	$V_{OUT}$ Rising		90		%
PGOOD Hysteresis	$\Delta V_{TH\_PGOOD}$	$V_{OUT}$ Falling		10		%
PGOOD Delay Time				1		ms
PGOOD Sink Capability	$V_{PGOOD}$	$I_{SINK}=10mA$		0.2	0.4	V
EN Input Voltage	Logic-High	$V_{IH}$	1.2			V
	Logic-Low	$V_{IL}$			0.4	V
EN Delay Time				0.85		ms
EN Pin Bias Current	$I_{EN}$	$V_{EN}=5V$		12		$\mu A$
$V_{DD}$ Pin Shutdown Current	$I_{SHDN\_VDD}$	$V_{EN}=0V$			1	$\mu A$
$V_{IN}$ Pin Shutdown Current	$I_{SHDN\_VIN}$	$V_{EN}=0V$ , $V_{IN}=5V$			1	$\mu A$
Inrush Current	$I_{INRUSH}$	$V_{OUT}=1.8V$ , $C_{OUT}=10\mu F$ , $I_{Load}=1A$		0.5		A
Soft-Start Time	$t_{SS}$			2.8		ms

■ TYPICAL APPLICATION CIRCUIT

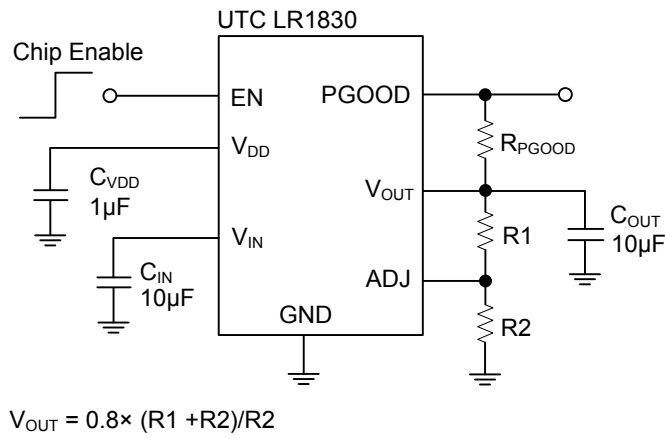


Figure 1. Adjustable Voltage Regulator

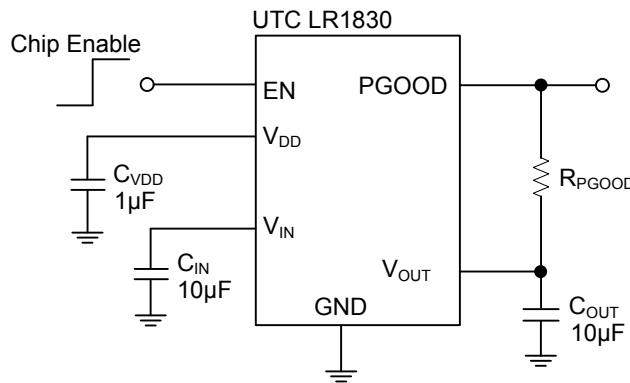


Figure 2. Fixed Voltage Regulator

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