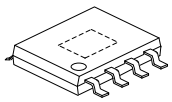
LR1831

CMOS IC

3A, ULTRA-LOW DROPOUT VOLTAGE REGULATOR



HSOP-8

DFN3030-10

■ DESCRIPTION

The UTC **LR1831** 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 **LR1831** 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 **LR1831** provides excellent regulation over variations in line, load and temperature. The UTC **LR1831** provides a power good signal to indicate if the voltage level of V_O reaches 92% of its rating value.

■ FEATURES

* Dropout Voltage 260mV @ 3A Typically
* Output Current up to 3A
* High Accuracy Voltage
* V_{OUT} Power Good Signal
* V_{OUT} Pull Low Resistance when Disable
* Thermal Shutdown Protection
* Current Limiting Protection

■ ORDERING INFORMATION

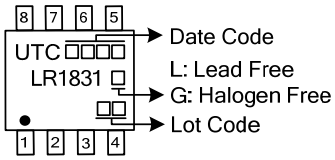
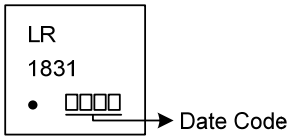
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR1831L-SH2-R	LR1831G-SH2-R	HSOP-8	Tape Reel
LR1831L-K10-3030-R	LR1831G-K10-3030-R	DFN3030-10	Tape Reel

LR1831G-SH2-R

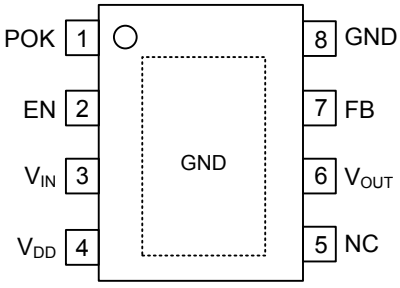
(1)Packing Type
(2)Package Type
(3)Green Package

(1) R: Tape Reel
(2) SH2: HSOP-8, K10-3030: DFN3030-10
(3) G: Halogen Free and Lead Free, L: Lead Free

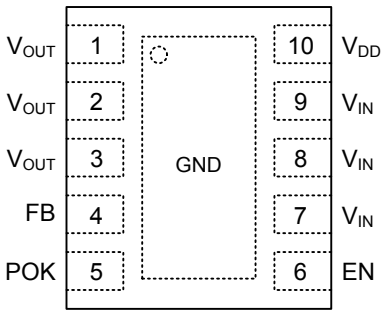
■ MARKING

HSOP-8	DFN3030-10
	

■ PIN CONFIGURATION



HSOP-8

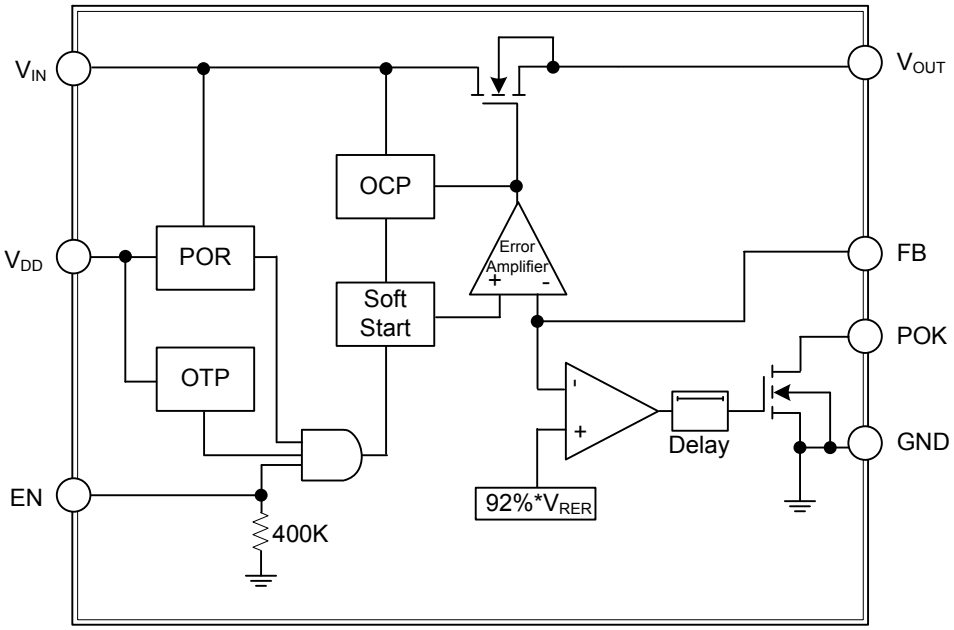


(Top View)
DFN3030-10

■ PIN DESCRIPTION

PIN NO.		PIN NAME	DESCRIPTION
HSOP-8	DFN3030-10		
1	5	POK	Open drain output. Setting high impedance once V_{OUT} reaches 92% of its rating voltage.
2	6	EN	Chip Enable (active high). The device will be shutdown if this pin is left open.
3	7, 8, 9	V_{IN}	Input Voltage. Large bulk capacitance should be placed closely to this pin. A 10μF ceramic capacitor is recommended at this pin.
4	10	V_{DD}	Supply voltage for control circuit. A 3V to 5V supply voltage for control circuit is recommended and supply voltage should be 1.5V higher than the output voltage.
5	-	NC	Not connected
6	1, 2, 3	V_{OUT}	Output Voltage. The power output of the device.
7	4	FB	Feedback Voltage. This pin is connected to the center tap of an external resistor divider network to set the output voltage as V_{OUT}=0.8(R1+R2)/R2.
8	-	GND	Ground.
Exposed Pad	Exposed Pad	GND	Connect exposed pad to GND.

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Input Voltage		V_{IN} to GND	6	V
Control Voltage		V_{DD} to GND	6	V
Output Voltage		V_{OUT}	5	V
Chip Enable Voltage		EN	6	V
Power Good Voltage		V_{PGOOD}	6	V
Power Dissipation (T_A=25°C)	HSOP-8	P_D	0.874	W
	DFN3030-10		2.2 (Note 2)	W
Junction Temperature		T_J	-40 ~ +150	°C
Storage Temperature		T_{STG}	-65 ~ +150	°C

Notes: 1. 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.
2. The PCB area is 4 times larger than that of IC's.

■ RECOMMENDED OPERATING CONDITIONS (NOTE)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	1 ~ Min. {5.2, V_{DD}}	V
Control Voltage	V_{DD}	3 ~ 5.5	V
Ambient Temperature	T_A	-40 ~ +85	°C
Junction Temperature	T_J	-40 ~ +125	°C

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

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	HSOP-8	θ_{JA}	143	°C/W
	DFN3030-10		45 (Note)	°C/W

Note: The PCB area is 4 times larger than that of IC's.

■ ELECTRICAL CHARACTERISTICS (V_{IN}=V_O+0.5V, V_{EN}=V_{DD}=5V, C_{IN}=C_{OUT}=10μF)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
SUPPLY VOLTAGE SECTION						
V_{DD} Operation Voltage Range	V_{DD}	V_{DD} Input Range, V_{OUT}=V_{REF}	3.0		5.5	V
V_{IN} Operation Voltage Range	V_{IN}	V_{IN} Input Range, V_{OUT}=V_{REF}	1.0		Min{5.2,V_{DD}}	V
Quiescent current	I_Q	V_{DD}=V_{IN}=V_{EN}=5V, I_{OUT}=0A, V_{OUT}=V_{REF}		1.0	1.5	mA
V_{DD} Input current	I_{VDD}	V_{DD}=V_{IN}=V_{EN}=5V, I_{OUT}=0A, V_{OUT}=V_{REF}		1.0	1.5	mA
Control Input Current in Shutdown	I_{VDD_SD}	V_{DD}=V_{IN}=5V, I_{OUT}=0A, V_{EN}=0V		1.0	10	μA
V_{DD} POR Threshold	V_{DDRTH}		2.4	2.7	3	V
V_{DD} POR Hysteresis				0.20		V
V_{IN} POR Threshold	V_{INRTH}		0.55	0.75	0.95	V
V_{IN} POR Hysteresis				0.20		V
OUTPUT VOLTAGE						
Reference Voltage	V_{REF}	I_{OUT}=1mA, V_{OUT}=V_{REF}	0.784	0.8	0.816	V
Output Voltage Accuracy			-2.0		+2.0	%
Line Regulation（V_{DD}）	$\triangle V_{LINE\_VDD}$	V_{DD}=4V to 5V, I_{OUT}=1mA, V_{OUT}=V_{REF}, V_{IN}=2V		0.03	0.2	%
Line Regulation（V_{IN}）	$\triangle V_{LINE\_VIN}$	V_{IN}=1.2V to 5V, I_{OUT}=1mA, V_{OUT}=V_{REF}		0.01	0.1	%
Load Regulation	$\triangle V_{LOAD}$	I_{OUT}=1mA to 3A, V_{OUT}=V_{REF}		0.1	1.5	%
V_{OUT} Pull Low Resistance		V_{DD}=V_{IN}=5V, V_{EN}=0V		130		ohm
DROPOUT VOLTAGE						
Dropout Voltage	V_{DROP}	V_{OUT}=V_{REF}, I_{OUT}=2A		170	210	mV
		V_{OUT}=V_{REF}, I_{OUT}=3A		260	320	mV
Protection						
Current Limit	ILIM	V_{DD}=V_{IN}=V_{EN}=5V, V_{OUT}=V_{REF}		3.8		A
Short Circuit Current	$I_{FOLDBACK}$	VOUT＜0.2A		100		mA
Thermal Shutdown Temperature	T_{SD}	TJ Rising		160		°C
Thermal Shutdown Returned Temperature				110		°C
ENABLE						
Logic-Low Voltage		V_{DD}=5V			0.6	V
Logic-High Voltage		V_{DD}=5V	1.4			V
EN Input Bias Current	I_{EN}	V_{EN}=5V		12	20	μA
SOFT START TIME						
V_{OUT} Soft start time				1.5		mS
POWER GOOD						
PGOOD Rising Threshold		V_{REF} Rising		92		%
PGOOD Hysteresis		V_{REF} Falling		8		%
PGOOD Sink Capability		I_{PGOOD}=1mA		0.2	0.4	V
PGOOD Delay				1.7		mS

■ TYPICAL APPLICATION CIRCUIT