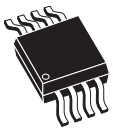
L6925D

HIGH EFFICIENCY MONOLITHIC SYNCHRONOUS STEP DOWN REGULATOR

PRODUCT PREVIEW

- 2.7V TO 5.5V BATTERY INPUT RANGE
- HIGH EFFICIENCY: UP TO 95%
- INTERNAL SYNCHRONOUS SWITCH
- NO EXTERNAL SCHOTTKY REQUIRED
- EXTREMELY LOW QUIESCENT CURRENT
- 800mA MAX OUTPUT CURRENT
- ADJUSTABLE OUTPUT VOLTAGE FROM 0.6V
- LOW DROP-OUT OPERATION: UP TO100% DUTY CYCLE
- SELECTABLE LOW NOISE/LOW CONSUMPTION MODE AT LIGHT LOAD
- LOW BATTERY INPUT
- LOW BATTERY OUTPUT
- ±1% OUTPUT VOLTAGE ACCURACY
- CURRENT-MODE CONTROL
- 600kHz SWITCHING FREQUENCY
- EXTERNALLY SYNCHRONIZABLE FROM 500kHz TO 1.4MHz
- OVP
- SHORT CIRCUIT PROTECTION



MSOP8

ORDERING NUMBER: L6925D

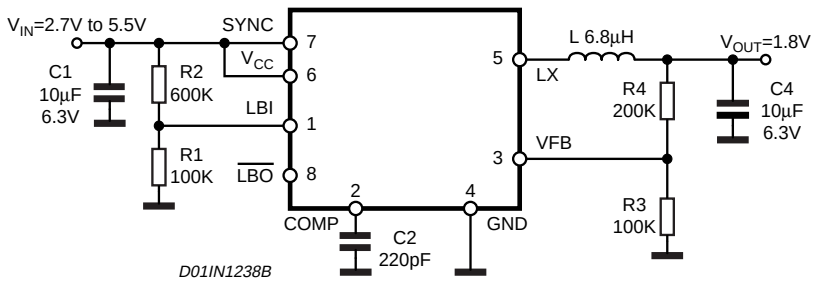
APPLICATIONS

- BATTERY-POWERED EQUIPMENTS
- PORTABLE INSTRUMENTS
- CELLULAR PHONES
- PDAs AND HAND HELD TERMINALS
- DSC
- GPS

DESCRIPTION

The device is dc-dc monolithic regulator specifically designed to provide extremely high efficiency.
The device has on UVLO set at 2.7V cause it is particularly thought for single Li-ion cell applications. Output voltage can be selected by an external divider down to 0.6V. Duty Cycle can saturate to 100% allowing low drop-out operation. The device is based on a 600kHz fixed-frequency, current mode-architecture. Low Consumption Mode operation can be selected at light load conditions, allowing switching losses to be reduced. L6925D is externally synchronizable with a clock which makes it useful in noise-sensitive applications. LBI pin can be used to have a $\overline{\text{LBO}}$ signal when the Battery voltage is lower than a preset value. Other features like Powergood, Overvoltage protection, Shortcircuit protection and Thermal Shutdown (150°C) are also present.

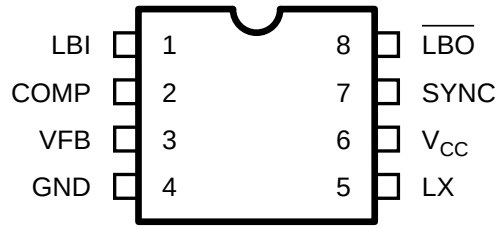
APPLICATION TEST CIRCUIT



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_6	Input voltage	-0.3 to 6	V
V_5	Output switching voltage	-1 to V_{CC}	V
V_1	Shutdown	-0.3 to V_{CC}	V
V_3	Feedback voltage	-0.3 to V_{CC}	V
V_2	Analog input voltage	-0.3 to V_{CC}	V
P_{tot}	Power dissipation at Tamb=70°C	0.45	W
T_j	Junction operating temperature range	-40 to 150	°C
T_{stg}	Storage temperature range	-65 to 150	°C

PIN CONNECTION



D01IN1239A/mod

THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction to Ambient	180	°C/W

PIN FUNCTIONS

N	Name	Description
2	COMP	Error amplifier output. Compensate it with a 220pF capacitor
6	VCC	Input voltage.
4	GND	Ground.
3	VFB	Error amplifier input. The output voltage can be adjusted by using an external resistor divider connected to this pin (V_{FB} = 0.6V).
7	SYNC	This pin allows to select Low Noise/ Low Consumption Mode or to sychronize the device.
1	LBI	Battery low voltage detector input. The internal threshold is set to 0.6V. The external threshold can be adjusted by using an external resistor divider.
5	LX	Switch node connection to the inductor.
8	$\overline{LBO}$	Battery low voltage detector output. If the voltage at the LBI pin drops below the internal thrshold, $\overline{LBO}$ goes low. The $\overline{LBO}$ is an open drain output. A pull_up resistor should be connected between the pin and the output voltage

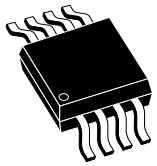
ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_{cc}	Operating input voltage	After Turn On	2.7		5.5	V
$V_{cc\ ON}$	Turn On threshold			2.85		V
$V_{cc\ OFF}$	Turn Off threshold				2.7	V
$V_{cc\ hys}$	Hysteresis			150		mV
R_p	High side Ron	V_{cc} = 3.6V, I_{lx} =100mA		240		mΩ
R_n	Low side Ron	V_{cc} = 3.6V, I_{lx} =100mA		215		mΩ
I_{lim}	Peak current limit	V_{cc} = 3.6V		1		A
	Valley current limit	V_{cc} = 3.6V		1.2		A
V_{out}	Output voltage range		0.6		Vcc	V
f_{osc}	Oscillator frequency			600		KHz
f_{sync}	Sync mode clock		500		1400	KHz
t_{on}	Minimum ON time				200	ns
DC CHARACTERISTICS						
I_q	Quiescent current (low noise mode)	2.7V<V_{cc}<5.5V, V_{sync} = 0V, no load, V_{FB} > 0.6V		230	400	µA
	Quiescent current (low cunsumption mode)	2.7V<V_{cc}<5.5V, V_{sync} = V_{cc}, no load		25	33	µA
I_{sh}	Shutdown current	V_{cc} < 2.7V, V_{FB} > 0.6V			5	µA
I_{lx}	LX leakage current	V_{cc} < 2.7V, V_{LX} = V_{cc}			3	µA
		V_{cc} < 2.7V, V_{LX} = 0V			1	µA
ERROR AMPLIFIER CHARACTERISTICS						
V_{fb}	Voltage feedback	V_{cc} = 3.6V	0.594	0.6	0.606	V
I_{fb}	Feedback input current		-50		50	nA
SYNC/MODE FUNCTION						
V_{sync_H}	Sync mode threshold high				1.3	V
V_{sync_L}	Sync mode threshold low		0.5			V
LBI SECTION						
V_{LBI}	LBI Threshold		0.588	0.6	0.612	V
$V_{\overline{LBO}}$	$\overline{LBO}$ Logic Low	I_{sink} = 1mA, V_{cc} = 3.6V, V_{LBI} < 0.6V		0.2	0.4	V
$I_{LK\text{-}\overline{LBO}}$	$\overline{LBO}$ Leakage Current	$V_{\overline{LBO}}$ = 3.6V, V_{cc} = 3.6V, V_{LBI} > 0.6V			25	nA
PROTECTIONS						
HOVP	Hard overvoltage threshold			10		%Vout

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.10			0.043
A1	0.050		0.150	0.002		0.006
A2	0.750	0.850	0.950	0.03	0.033	0.037
b	0.250		0.400	0.010		0.016
c	0.130		0.230	0.005		0.009
D (1)	2.900	3.000	3.100	0.114	0.118	0.122
E	4.650	4.900	5.150	0.183	0.193	0.20
E1 (1)	2.900	3.000	3.100	0.114	0.118	0.122
e		0.650			0.026	
L	0.400	0.550	0.700	0.016	0.022	0.028
L1		0.950			0.037	
k	0˚ (min.) 6˚ (max.)					
aaa			0.100			0.004

Note: 1. D and F does not include mold flash or protrusions. Mold flash or potrusions shall not exceed 0.15mm (.006inch) per side.

OUTLINE AND MECHANICAL DATA



MSOP8 (Body 3mm)