



L6925D

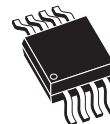
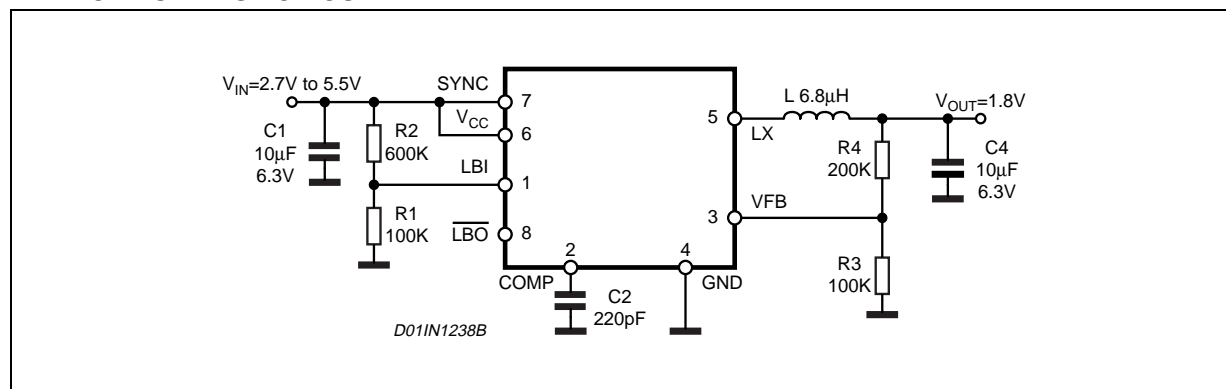
HIGH EFFICIENCY MONOLITHIC SYNCHRONOUS STEP DOWN REGULATOR

- 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 TO 100% DUTY CYCLE
- SELECTABLE LOW NOISE/LOW CONSUMPTION MODE AT LIGHT LOAD
- LOW BATTERY INPUT
- LOW BATTERY OUTPUT
- $\pm 1\%$ OUTPUT VOLTAGE ACCURACY
- CURRENT-MODE CONTROL
- 600kHz SWITCHING FREQUENCY
- EXTERNALLY SYNCHRONIZABLE FROM 500kHz TO 1.4MHz
- OVP
- SHORT CIRCUIT PROTECTION

APPLICATIONS

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

APPLICATION TEST CIRCUIT



MSOP8

ORDERING NUMBERS: L6925D (Tube)
L6925013TR (Tape & Reel)

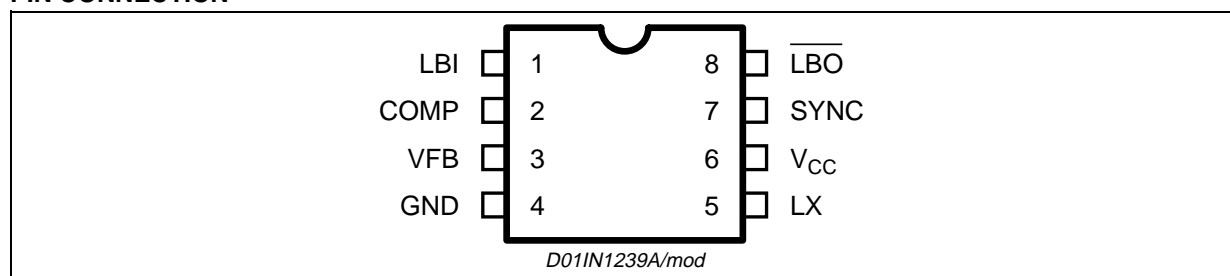
DESCRIPTION

The device is dc-dc monolithic regulator specifically designed to provide extremely high efficiency. The device has an 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 LBO signal when the Battery voltage is lower than a preset value. Other features like, Overvoltage protection, Shortcircuit protection and Thermal Shutdown (150°C) are also present.

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 $T_{amb}=70^{\circ}\text{C}$	0.45	W
T_j	Junction operating temperature range	-40 to 150	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	-65 to 150	$^{\circ}\text{C}$
LX Pin	Maximum Withstanding Voltage Range Test Condition: CDF-AEC-Q100-002- "Human Body Model" Acceptance Criteria: "Normal Performance"	± 1000	V
Other pins		± 2000	V

PIN CONNECTION



THERMAL DATA

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

PIN FUNCTIONS

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

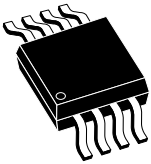
ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$, $V_{CC} = 3.6\text{V}$ unless otherwise specified)

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			2.8		V
V _{CC OFF}	Turn Off threshold			2.65		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		1.2		A
	Valley current limit	V _{CC} = 3.6V		1.4		A
V _{out}	Output voltage range		0.6		V _{CC}	V
f _{osc}	Oscillator frequency			600		KHz
f _{sync}	Sync mode clock (*)		500		1400	KHz
DC CHARACTERISTICS						
I _q	Quiescent current (low noise mode)	V _{sync} = 0V, no load, V _{FB} > 0.6V		230		μA
	Quiescent current (low consumption mode)	V _{sync} = V _{CC} , no load, V _{FB} > 0.6V		25		μA
I _{sh}	Shutdown current	V _{CC} < 2.7V, V _{FB} > 0.6V		0.2		μA
I _{LX}	LX leakage current (*)	V _{CC} < 2.7V, V _{LX} = V _{CC}		1		μA
		V _{CC} < 2.7V, V _{LX} = 0V		1		μA
ERROR AMPLIFIER CHARACTERISTICS						
V _{fb}	Voltage feedback		0.593	0.6	0.607	V
I _{fb}	Feedback input current (*)	V _{FB} = 0.6V		25		nA
SYNC/MODE FUNCTION						
V _{sync_H}	Sync mode threshold high				1.3	V
V _{sync_L}	Sync mode threshold low		0.5			V
LB SECTION						
V _{LBI}	LBI Threshold			0.6		V
V _{LBO}	LBO Logic Low	I _{sink} = 1mA, V _{CC} = 3.6V, V _{LBI} < 0.6V		0.2	0.4	V
I _{LK-LBO}	LBO Leakage Current (*)	V _{LBO} = 3.6V, V _{CC} = 3.6V, V _{LBI} > 0.6V			50	nA
PROTECTIONS						
HOVP	Hard overvoltage threshold			10		%Vout

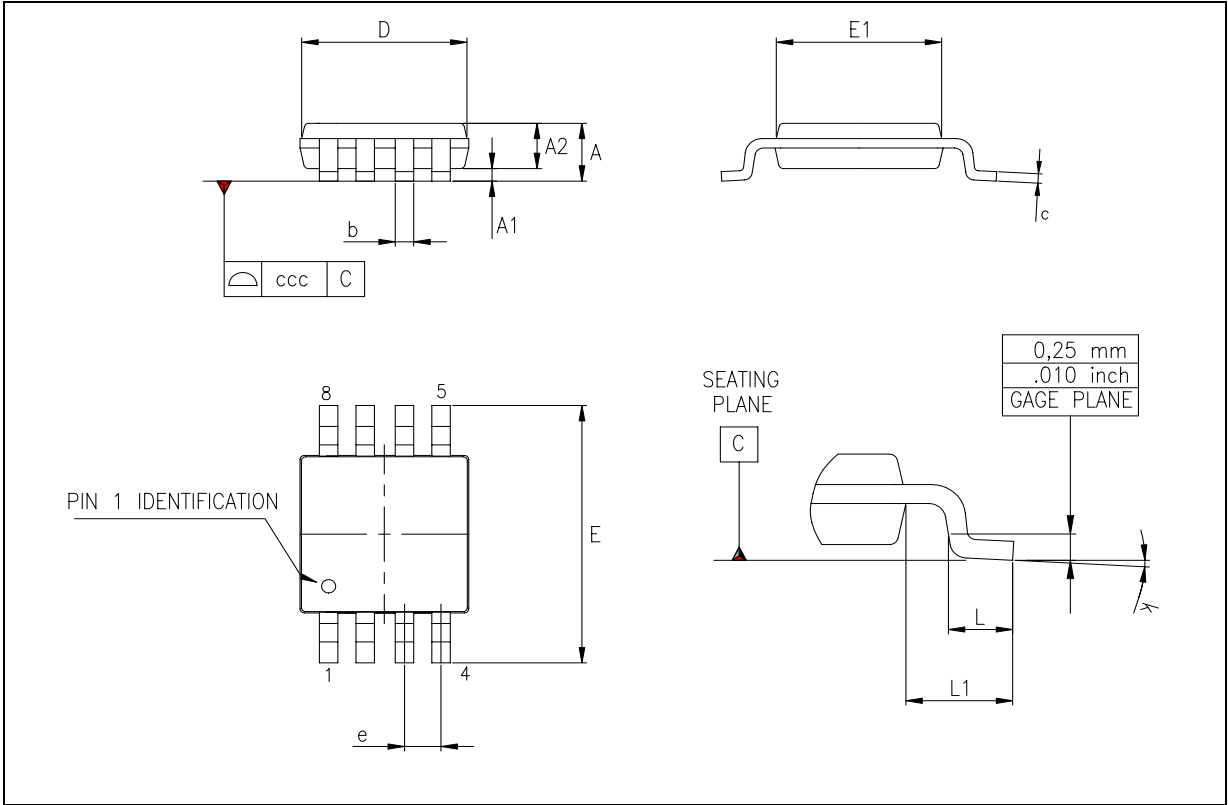
(*) Guaranteed by design

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 protrusions shall not exceed 0.15mm (.006inch) per side.						

**OUTLINE AND
MECHANICAL DATA**



**MSOP8
(Body 3mm)**



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