LTP3637 Ultra-Low I_a 300 mA CMOS LD0 Regulators

DESCRIPTION

The LTP3637 series of CMOS low dropout regulators are designed specifically for portable batterypowered applications which require ultralow quiescent current. The ultralow consumption of typical 0.8 μ A ensures long battery life and dynamic transient boost feature improves device transient response for wireless communication applications.

The device is available in SOT23-5L packages and DFN1.0 \times 1.0-4 packages.

FEATURES

- Operating Input Voltage Range: 2.0 V to 5.5 V
- Optional Output Voltages: 1.2 V, 1.5 V, 1.8 V, 2.5 V, 2.8 V, 3.0 V, 3.3 V, 3.6 V
- Ultra-Low Quiescent Current: 0.8 μA Typically
- Low Dropout: 170 mV Typically at 150 mA and VOUT = 3.3 V
- High Output Voltage Accuracy ±1.5%
- Stable with Ceramic Capacitors 1 μF
- Over-Current Protection
- Thermal Shutdown Protection
- With auto discharge function at off state

APPLICATIONS

- Battery Powered Equipments
- Portable Communication Equipments
- Cameras, Image Sensors and Camcorders
- Label Information

ORDER INFORMATION

Model	Package	Ordering Number ^{Note1}	Packing Option
LTP3637	S0T23-5L	LTP3637-xxYT5	Tape and Reel, 3000
LTP3637	DFN1.0×1.0-4	LTP3637-xxYF4	Tape and Reel, 10000

Note1: xx stands for output voltages, e.g. if xx = 18, the output voltage is 1.8 V; if xx = 30, the output voltage is 3.0 V.



ΕN

3

PIN CONFIGURATION (Top View)



S0T23-5L

GND 1 0UT GND

DFN1.0×1.0-4

PIN DESCRIPTIONS

Pin S0T23-5 DFN1.0×1.0-4		Symbol	Description
1	4	IN	Power Supply Input Voltage
2	2, E-PAD	GND	Ground.
3	3	EN	Chip Enable Pin, not suspended.
4		NC	No Connection.
5	1	OUT	Output Pin

ABSOLUTE MAXIIMUM RATINGS

Parameter	Symbol	Value		Unit
Input Voltage	V _{IN}	6.5		V
Output Voltage	V _{OUT}	-0.3 to V _{IN} + 0.3		V
Chip Enable Input	V _{EN}	-0.3 to 6.0		V
Operating Junction Temperature	TJ	150		°C
Storage Temperature	T _{STG}	-55 to 150		°C
Thermal Characteristics, Thermal		SOT23-5L	250	- °C /W
Resistance, Junction-to-Air	κ _{θJA}	DFN1.0×1.0	280	
Human Body Model	FCD	6000		V
ESD Capability	ESD	2000		V
Current Maximum Rating	Latch up	200		mA

NOTE: Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

CAUTION: These devices are sensitive to electrostatic discharge; follow proper IC Handling Procedures.

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LTP3637 Ultra-Low I_Q 300 mA CMOS LDO Regulators

CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. LINEARIN recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

LINEARIN reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact LINEARIN sales office to get the latest datasheet.

RECOMMENDED OPERATING CONDITIONS

Symbol	Item	Rating	Unit
V _{IN}	Input Voltage	2.0 to 5.5	V
Ι _{ουτ}	Output Current	0 to 300	mA
T _A	Operating Ambient Temperature	-40 to 85	°C
C _{IN}	Effective Input Ceramic Capacitor Value	0.47 to 4.7	μF
C _{OUT}	Effective Output Ceramic Capacitor Value	0.47 to 4.7	μF

ELECTRICAL CHARACTERISTICS

VIN = 2.5 V, IOUT = 1 mA, CIN = 1 μF , COUT = 1 μF , TA = +25 °C, unless otherwise noted.

Symbol	Parameter	Test Conditions		Min	Тур	Max	Unit
V _{IN}	Operating Input			2.0		5.5	V
V _{OUT}	Output Voltage	T _A = +25 °C		-1.5		+1.5	_
		-40 °C \leq T _A \leq	85 °C	-2.5		+2.5	%
Ι _α	Quiescent Current	I _{OUT} = 0 mA			0.8	1.1	μA
I _{SD}	Shutdown Current	V_{EN} = 0 V	V _{EN} = 0 V			0.1	
LineReg	Line Regulation	$2.5 \text{ V} \leq \text{V}_{\text{IN}} \leq 5.5 \text{ V}, \text{ I}_{\text{OUT}} = 1 \text{ mA}$			0.1	0.2	%/V
LoadReg	Load Regulation	1 mA \leq I _{OUT} \leq 150 mA, V _{IN} = 2.5 V			20		mV
V _{DROP}	Dropout Voltage	I _{out} = 150 mA			170		mV
I_LMT	Current Limit				300	550	mA
I _{SHORT}	Short Circuit Current	V _{out} = 0 V			90		mA
PSRR	Power supply Rejection Ratio	L 100 A	f = 1 kHz		-55		_
		f = 10 kHz			-52		dB
e _N	Output Noise Voltage	VIN = 2.5 V, IOUT = 1 mA, f = 10 Hz to 100 kHz, COUT = 1 μF			100		μVrms



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APPLICATION CIRCUITS



Note: The EN pin is not be suspended

Applications Information

General

The LTP3637 is a high performance 300mA Linear Regulator with Ultra Low I_{α} . This device delivers low Noise and high Power Supply Rejection Ratio with excellent dynamic performance due to employing the Dynamic Quiescent Current adjustment which assure ultra low I_{α} consumption at noload state. These parameters make the device very suitable for various battery powered applications.

Input Decoupling (C_{IN})

It is recommended to connect at least a 1µF Ceramic X5R or X7R capacitor between IN and GND pins of the device. This capacitor will provide a low impedance path for any unwanted AC signals or Noise superimposed onto constant Input Voltage. The good input capacitor will limit the influence of input trace inductances and source resistance during sudden load current changes.

Higher capacitance and lower ESR Capacitors will improve the overall line transient response.

Output Decoupling (C_{OUT})

The LTP3637 does not require a minimum Equivalent Series Resistance (ESR) for the output capacitor. The X5R and X7R types have the lowest capacitance variations over temperature thus they are recommended. There is recommended connect the output capacitor as close as possible to the output pin of the regulator.

Current Limit Protection

When output current at the OUT pin is higher than current limit threshold, the current limit protection will be triggered and clamp the output current to approximately 550mA to prevent over-current and to protect the regulator from damage due to overheating.

Thermal Shutdown

When the die temperature exceeds the Thermal Shutdown point (T_{SD} =160°C typically) the device goes to disabled state and the output voltage is not delivered until the die temperature decreases to 150°C. The Thermal Shutdown feature provides a protection from a catastrophic device failure at accidental overheating. This protection is not intended to be used as a substitute for proper heat sinking.







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Power Dissipation and Heat sinking

The maximum power dissipation supported by the device is dependent upon board design and layout. Mounting pad configuration on the PCB, the board material and the ambient temperature affect the rate of junction temperature rise for the part. The maximum power dissipation the LTP3637 device can handle is given by:

$$P_{D(MAX)} = \frac{\left[T_{J(MAX)} - T_{A} \right]}{P_{\theta JA}}$$

(equation-1)





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PACKAGE OUTLINE

S0T23-5L



	Dimensions In Millimeters		
Symbol	MIN	MAX	
А	1.050	1.250	
A1	0.000	0.100	
b	0.350	0.500	
С	0.080	0.200	
D	2.820	3.020	
E	2.600	3.000	
E1	1.600	1.700	
е	0.950BSC		
e1	1.800	2.000	
L	0.300	0.600	
θ	0°	8 °	

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PACKAGE OUTLINE

DFN1.0×1.0-4



Cumple of	Dimensions In Millimeters				
Symbol	Min	Mod	Max		
A	0.350		0.400		
A1	0.000	0.020	0.050		
b	0.150	0.200	0.250		
С		0.127REF			
D	0.950	1.000	1.050		
D2	0.380	0.480	0.580		
D3	0.230	0.330	0.430		
e	0.650BSC				
E	0.950	1.000	1.050		
E2	0.380	0.480	0.580		
E3	0.230	0.330	0.430		
L	0.200	0.250	0.300		
L2	0.103REF				
L3	0.075REF				
L4	0.208REF				
L5	0.200REF				

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