Preliminary – **LD6321**

Low-Dropout Regulators

Features

- Teeny™ SC-70 package
- Wide Selection of output voltages
- Guaranteed 80mA output
- Low quiescent current
- Low dropout voltage
- Tight load and line regulation
- Low temperature coefficient
- Current and thermal limiting
- Reversed input polarity protection
- Zero off-mode current
- Logic-controlled shutdown
- Stability with low-ESR ceramic capacitors

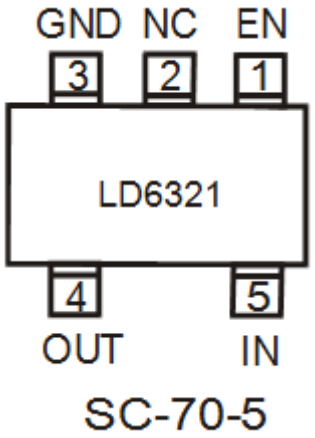
Applications

- Cellular telephones
- Laptop, notebook, and palmtop computers
- Battery-powered equipment
- Bar code scanners
- SMPS post-regulator/dc-to-dc modules
- High-efficiency linear power supplies

General Description

The LD6321 is a µCap 80mA linear voltage regulator in the Teeny™ SC-70 package. Featuring half the footprint of the standard SOT-23 package, this Teeny SC-70 regulator has very low dropout voltage (typically 20mV at light loads and 300mV at 80mA) and very low ground current (225µA at 20mA output). It also offers better than 3% initial accuracy and includes a logic compatible enable input.
The µCap regulator design is optimized to work with low value, low-cost ceramic capacitors. The outputs typically require only 0.47µF of output capacitance for stability.
Designed especially for hand-held, battery-powered devices, the LD6321 can be controlled by a CMOS or TTL compatible logic signal. When disabled, power consumption drops nearly to zero. If on-off control is not required, the enable pin may be tied to the input for 3-terminal operation.
The ground current of the LD6321 increases only slightly in dropout, further prolonging battery life. Key LD6321 features include current limiting, over temperature shutdown, and protection against reversed battery
The LD6321 is available in 2.5V, 2.6V, 2.7V, 2.8V, 3.0V, 3.3V, 3.6, 4.0 and 5.0V fixed voltages. Other voltages are available; contact us for details.

Package Pin Out



SC-70-5

Ordering Information

		Packing Options	
Part No.	Package	Tube (TU)	Tape & Reel (TR)
LD6321	SC-70-5	LD6321S9-TU	LD6321 S9-TR

- Package material default is “Green” package.

Product Marking

LD8888 SSSSS… ●

- ✧ Line 1 – “LD” is a fixed character
  8888: product name
- ✧ Line 2 – SSSSS…: lot number

Absolute Maximum Ratings*1

Parameter	Maximum	Unit
Input Supply Voltage (V_{IN})	-20V to +20	V
Enable input Voltage (V_{EN})	-20V to +20	V
Power Dissipation (P_D)	Internally Limited	
Storage Temperature Range (T_S)	-60 to +150	°C
Lead Temperature (Soldering, 5 sec.)	260	°C
Input Voltage (V_{IN})	2.5 to 16	V
Enable Input Voltage (V_{EN})	0 to Vin	V
Junction Temperature Range	-40 to +125	°C
ESD	*3	
Thermal Resistance (θ_{JA})	*4	

Notes: Operating Ratings*2

The values beyond the boundaries of absolute maximum rating may cause the damage to the device. Functional operation in this context is not implied. Continuous use of the device at the absolute rating level might influence device reliability. All voltages have their reference to device ground.

Electrical Characteristics

$V_{IN} = V_{OUT} + 1V$; I_L = 1mA; C_L = 0.47μF;$V_{EN} \geqq 2.0V$; TJ = 25°C, **bold** values indicate -40°C≦TJ≦+125°C; unless noted.

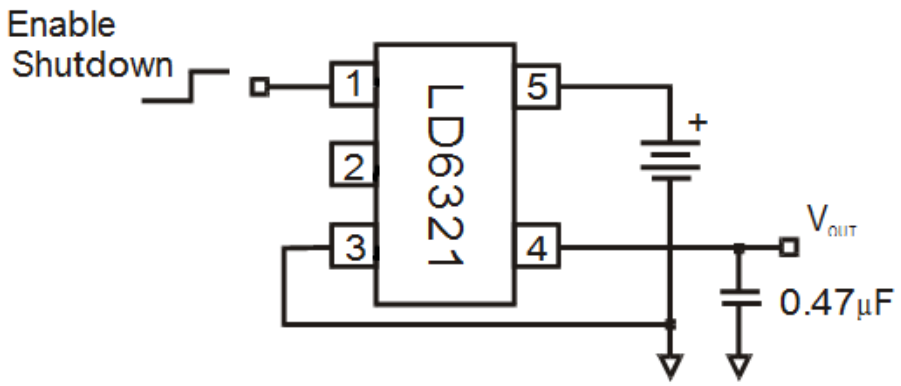
Parameter	Symbol	Condition	Min	Typ.	Max	Unit
Output Voltage Accuracy	V_O	TJ = 25°C	-3	–	3	%
		-40°C≦TJ≦+125°C	**-4**	–	**4**	
Output Voltage Temp. Coefficient	$\Delta V_O/\Delta T$	*5	–	50	200	ppm/°C
Line Regulation	$\Delta V_O/V_O$	$V_{IN}=V_{OUT}$+1V to 16V, TJ = 25°C	–	0.008	0.3	%
		$V_{IN}=V_{OUT}$+1V to 16V, -40°C≦TJ≦+125°C			**0.5**	
Load Regulation*6	$\Delta V_O/V_O$	I_L=0.1mA to 80 mA, TJ = 25°C	–	0.008	0.3	%
		I_L=0.1mA to 80 mA, -40°C≦TJ≦+125°C			**0.5**	
Dropout Voltage*7	V_{IN}-V_O	I_L=100μA	–	20	–	mV
		I_L=20mA	–	200	**350**	
		I_L=50mA	–	250	–	
		I_L=80mA	–	300	**600**	
Quiescent Current	I_Q	$V_{EN} \leq 0.4V$ (shutdown)	–	0.01	10	μA
Ground Pin Current*8	I_{GND}	I_L=100μA, $V_{EN} \geq 2.0V$, (active)	–	180	–	μA
		I_L=20mA, $V_{EN} \geq 2.0V$, (active)	–	225	**750**	
		I_L=50mA, $V_{EN} \geq 2.0V$, (active)	–	850	–	
		I_L=80mA, $V_{EN} \geq 2.0V$, (active)	–	1800	**3000**	
Ground Pin Current at Dropout*8	$I_{GNDDROP}$	$V_{IN}=V_{OUT}$(nominal)-0.5V	–	200	300	μA
Current Limit	I_{LIMIT}	V_{OUT}=0 V	–	180	250	mA
Thermal Regulation	$\Delta V_O/\Delta P_D$	*9	–	0.05	–	%W
Enable Input						
Enable Input Voltage Level	V_{IL}	logic Low (off)	–	–	0.6	V
	V_{IH}	logic High (on)	2.0	–	–	V
Enable Input Current	I_{IL}	$V_{IL} \leq 0.6$ V	–	0.01	1	μA
	I_{IH}	$V_{IH} \geq 2.0$ V	–	15	50	μA

Notes: 1. Exceeding the absolute maximum rating may damage the device. **2.** The device is not guaranteed to function outside its operating rating. **3.** Devices are ESD sensitive. Handling precautions recommended. **4.** The maximum allowable power dissipation is a function of the maximum junction temperature, TJ(max), the junction-to-ambient thermal resistance, θ JA, and the ambient temperature, TA. The maximum allowable power dissipation at any ambient temperature is calculated using: PD(max) = (TJ(max) - TA)÷ θ JA. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown. θ JA of the SC-70-5 is 4500C/W, mounted on a PC board. **5.** Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range. **6.** Regulation is measured at constant junction temperature using low duty cycle pulse testing. Changes in output voltage due to heating effects are covered by the thermal regulation specification. **7.** Dropout voltage is defined as the input to output differential at which the output voltage drops 2% below its nominal value measured at 1V differential. **8.** Ground pin current is the regulator quiescent current plus pass transistor base current. The total current drawn from the supply is the sum of the load current plus the ground pin current. **9.** Thermal regulation is defined as the change in output voltage at a time "t" after a change in power dissipation is applied, excluding load or line regulation effects. Specifications are for an 80mA load pulse at VIN = 16V for t = 10ms.

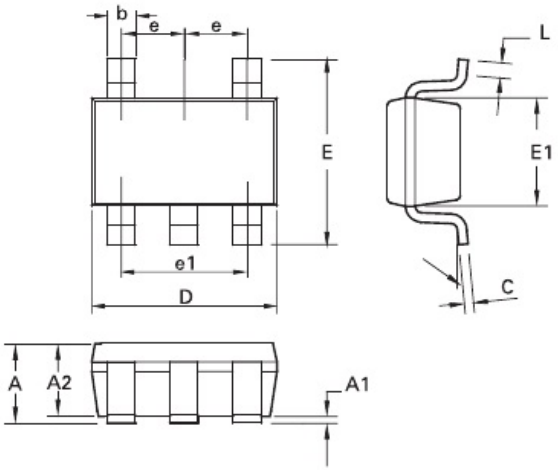
Pin Description

Name	Description
EN	Enable (Input): TTL/CMOS compatible control input. Logic high=enabled; logic low or open= shutdown.
NC	Not internally connected
GND	Ground
OUT	Regulator Output
IN	Supply Input

Typical Application Circuit



Package Outline



SC70-5	Millimeters		Inches	
legend	Min.	Max.	Min.	Max.
A	0.80	1.10	0.0315	0.0433
A1	-	0.10	-	0.0039
A2	0.80	1.00	0.0315	0.0349
b	0.15	0.30	0.0060	0.0118
c	0.08	0.25	0.0031	0.0098
D	1.96	2.04	0.0771	0.0803
E	2.06	2.14	0.0809	0.0843
E1	1.23	1.28	0.0482	0.0502
e	0.64	0.66	0.0250	0.0260
e1	1.27	1.33	0.0501	0.0521
L	0.26	0.46	0.0102	0.0181
α	0	7	0	7

LD Tech Corporation

Tel: +886-3-567-8806
Fax: +886-3-567-8706
E-mail: sales@ldtech.com.tw
Website: www.ldtech.com.tw