

## Application Note

### AP7361E Application Information and Demo Board User Guide

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#### Description

The AP7361E is a 1A, adjustable and fixed output voltage, ultra-low dropout linear regulator with enable. The device includes pass element, error amplifier, band-gap reference, current limit and thermal shutdown circuitry. The device is turned on when EN pin is set to logic high level.

The characteristics of the low dropout voltage and low quiescent current make it suitable for low to medium power applications, for example, laptop computers, audio and video applications and battery powered devices. The typical quiescent current is approximately 60 $\mu$ A. Built-in current-limit, thermal-shutdown and power good functions prevent IC from damage in fault conditions.

#### Features

- Wide  $V_{IN}$  Range: 2.0V to 6.0V
- Output Voltage Accuracy:  $\pm 1\%$
- Very Low Dropout Voltage (3.3V): 360mV at 1A Typical
- Low Quiescent Current (IQ): 60 $\mu$ A Typical
- Adjustable Output Voltage Range: 0.8V to 5.0V
- Fixed Output Options: 1.0V, 1.2V, 1.5V, 1.8V, 2.5V, 2.8V and 3.3V
- High PSRR: 75dB @ 1kHz
- Current Limit: 1.5A
- Fold-Back Short Circuit Protection: 400mA
- Power-Good (PG) output for supply monitoring and for sequencing of other supplies
- Thermal Shutdown Protection
- Stable with MLCC, E-Cap, Tan-Cap or Solid Capacitor  $\geq 2.2\mu$ F

- Ambient Temperature Range: -40°C to +85°C
- Available in "Green" Molding Compound (No Br, Sb)
- Moisture Sensitivity: Level 1 Per J-STD-020
- Terminals: Finish - NiPdAu over Copper Leads, Solderable per MIL-STD-202, Method 208<sup>(4)</sup>
- Weight: 0.0164 grams (Approximate)
- Diodes automotive grade parts (Q-suffix) are suitable for automotive applications requiring specific change control; these parts are AEC-Q100/101/200 qualified, PPAP capable, and manufactured in IATF16949:2016 certified facilities.  
<https://www.diodes.com/quality/product-definitions/>
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

#### Applications

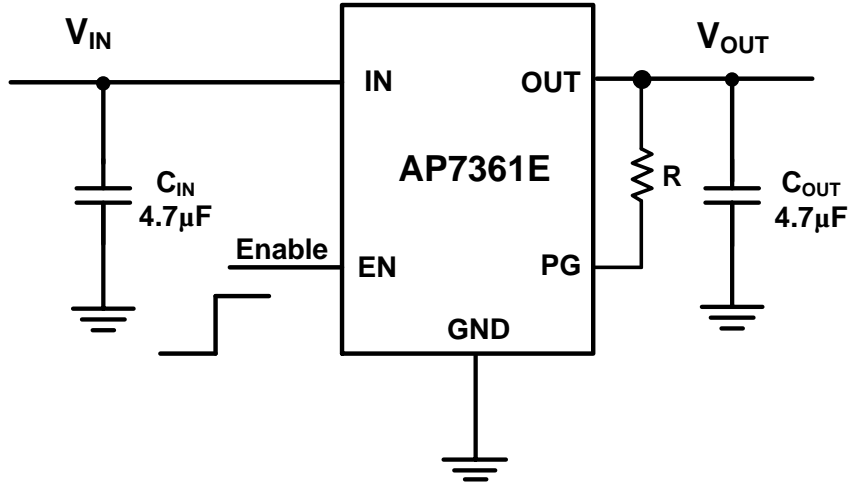
- LCD-TV, Monitor
- Set-Top-Box
- Home Electrical Appliances

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.  
2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.  
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds

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**Typical Applications Circuit**



Fixed Version with EN

X5R- and X7R-type capacitors are suggested due to their minimal variation in value and ESR over temperature.

**Absolute Maximum Ratings**

Symbol	Parameter	Ratings	Unit
ESD HBM	Human Body Model ESD Protection	>2	kV
ESD MM	Machine Model ESD Protection	±500	V
V <sub>IN</sub>	Input Voltage	6.5	V
-	OUT, ADJ, EN Voltage	V <sub>IN</sub> +0.3	V
T <sub>J</sub>	Operating Junction Temperature Range	-40 to +150	°C
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C
P <sub>D</sub>	Power Dissipation	1700	mW

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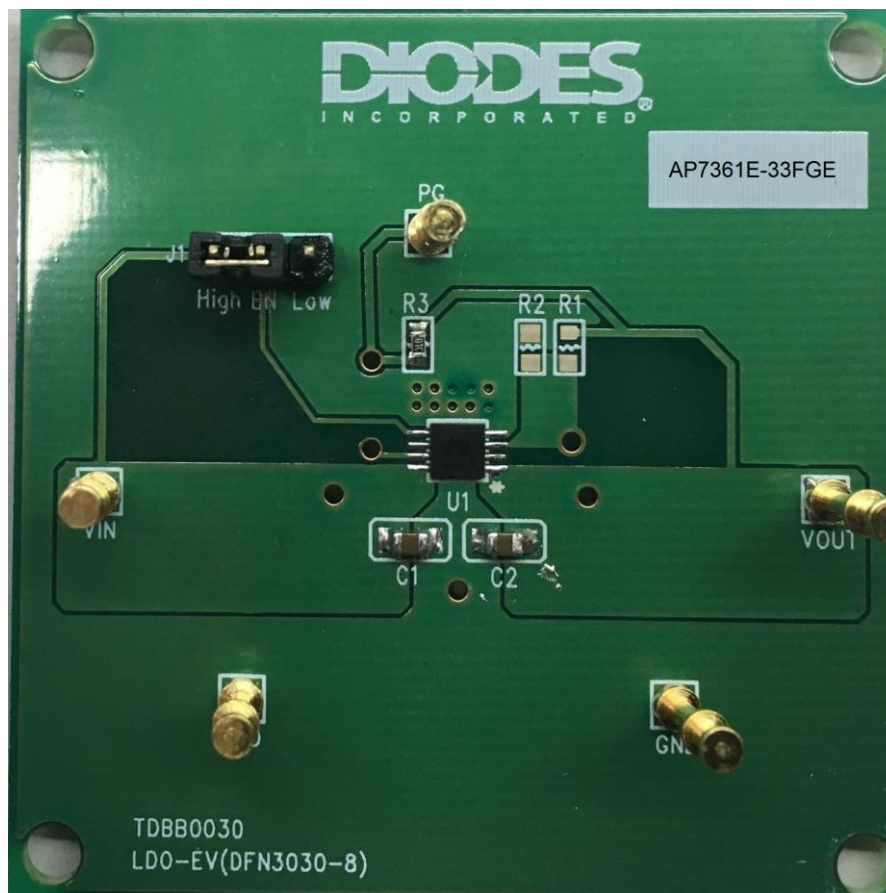
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#### Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
$V_{IN}$	Input Voltage	2.0	6	V
$V_{OUT}$	Output Voltage	0.8	5.0	V
$I_{OUT}$	Output Current	0	1	A
$T_A$	Operating Ambient Temperature	-40	+85	°C

#### Evaluation Board



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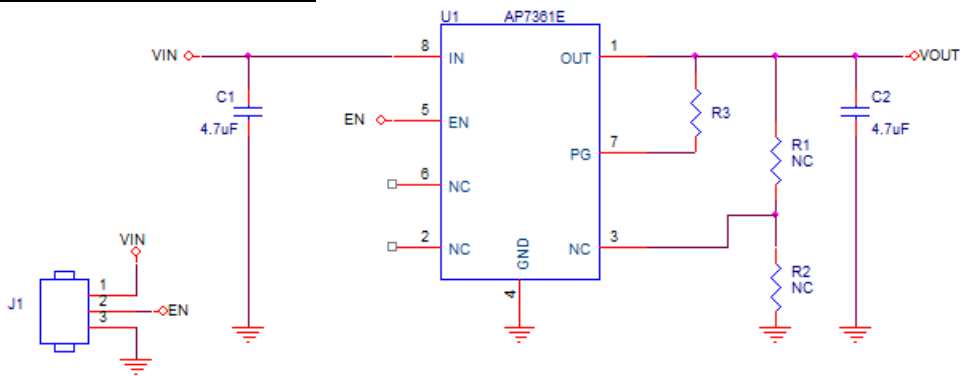
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#### Quick Start Guide

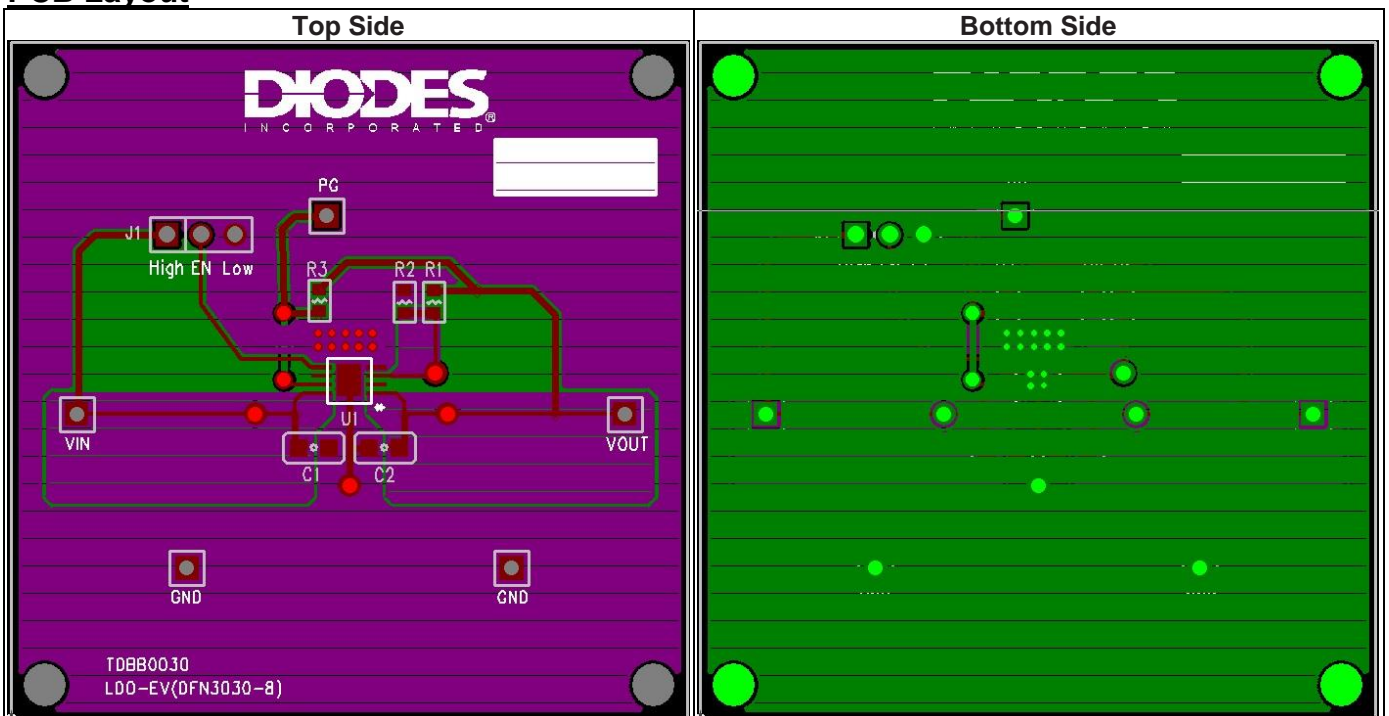
The AP7361E-EVM has a simple layout and allows access to the appropriate signals through test points. To evaluate the performance of the AP7361E, follow the procedure below:

1. Connect a power supply to the input terminals VIN and GND. Set VIN to VOUT+1V.
2. Connect the positive terminal of the electronic load to VOUT and negative terminal to GND.
3. For Enable, place a jumper at J1 to "High" position to connect EN pin to enable IC. Jump to "Low" position to disable IC.
4. The evaluation board should now power up with a 3.3V output voltage.
5. Check for the proper output voltage at the output terminals VOUT and GND. Measurement can also be done with a multimeter with the positive and negative leads between VOUT and GND.

#### Evaluation Board Schematic



#### PCB Layout



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#### **Bill of Materials**

Component Location	Qty	Specification	Mark	Maker Part No.	Size
C1	1	Cap MLCC 4.7uF/10V/X7R	WALSIN	0805B475K100CT	0805
C2	1	Cap MLCC 4.7uF/10V/X7R	WALSIN	0805B475K100CT	0805
R1 R2	2	NC			R1 R2
R3	1	R0603 10k $\Omega$	YAGEO	AC0603FR-0710KL	R3
J1	1	0.1"*3 Header 1 and Jumper			5mm X 2.5mm
VIN VOUT GND	4	Test pin			2.2mm X 1.35mm
U1	1	LDO	Diodes Inc	AP7361E-33FGE-7	DFN3030-8
PCB	1	LDO-EV (DFN3030-8)	Diodes Inc.	TDBB0030	47mmX47mm

#### **Vendors of peripheral components**

##### **Suggested Capacitors :**

Vendor	Capacitance	Type	Series
WALSIN	Cap MLCC 4.7uF/10V/X7R	SMD	0805B475K100CT

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